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# The longevity equation: climate resilience for health in the Middle East



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# About this report

*The longevity equation: climate resilience for health in the Middle East* is an Economic Impact report supported by PureHealth. The report explores how climate change is impacting the health and longevity of populations in the Middle East, the role of healthcare systems and health professionals in communication and advocacy of climate change mitigation and adaptation, and how key stakeholders from health and non-health sectors work together to protect the health of future generations.

The research was supported by a pragmatic literature review and interview programme that drew on the insights of regional and international policymakers, academics and industry experts to understand the importance of climate change mitigation and adaptation in protecting the health and increasing the longevity of Middle East populations. Our thanks are due to the following individuals for their time and insights:

- **HH Princess Mashael bint Saud Al-Shalan**, founding partner, Aeon Strategy
- **Rima Habib**, professor, Department of Environmental Health, Faculty of Health Sciences, American University of Beirut, Lebanon
- **Dr Andrew Haines**, professor of environmental change and public health, London School of Hygiene & Tropical Medicine

- **Dr Nawal Al Hosani**, acting undersecretary for the Green Development and Climate Change Department, Ministry of Climate Change and Environment, UAE
- **Dr Noura Khamis Al Ghaithi**, undersecretary, Department of Health, Abu Dhabi, UAE
- **Osama Ali Maher**, technical advisor for emergencies and environment, World Health Organization Centre for Environmental Health Action
- **Marina Belén Romanello**, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change
- **Sonia Roschnik**, executive director, Geneva Sustainability Centre
- **Fatin Samara**, professor and co-chairperson, UAE Climate Change Research Network
- **Mohd Alam**, expert, climate change, integrated environmental policy and planning at Environment Agency Abu Dhabi

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# Foreword by PureHealth



In this age of innovation, the convergence of technology and healthcare is not merely a vision but a profound transformation that is reshaping the boundaries of care delivery. This new reality holds the promise of a healthier and more sustainable future, not just for humanity but for our fragile planet as well. At the crossroads of this evolution stands PureHealth, guided by a singular vision—to unlock time for humankind—and driven by a mission to advance the science of longevity, both for people and planet.

PureHealth, a healthcare investment company, has the largest integrated healthcare platform in the UAE, with a network of over 25 hospitals, 100-plus clinics, 160-plus diagnostic centres and 20,000-plus workers in the country. Our primary focus is on enhancing individuals' health-spans rather than lifespans, while offering a wide range of services including insurance solutions, pharmacies, health tech innovations, procurement services and strategic investments. With our ongoing global expansion programme, we have successfully acquired healthcare assets in the US and the UK, solidifying our position as an emerging global healthcare player. Through our global footprint, we are committed to making a significant positive impact both domestically and on the international stage.

We are actively engaging with global healthcare peers, with a special focus on addressing climate change impacts. We are proud members of initiatives such as Global Green and Healthy Hospitals, Health Care Without Harm, and the UN-backed Race to Zero. Our key commitment includes aligning with the Science-Based Targets Initiative and we have set a target of achieving net zero by 2040. This dedication to taking such an ambitious step toward sustainability places us among pioneering integrated healthcare platforms in the Middle East, Africa and Asia.

Over the next decade, we envision a digital ecosystem of care that leverages the power of data and artificial intelligence to enable a democratised model of care. This digital ecosystem will not only enhance access to healthcare but also streamline resource allocation, and reduce waste, inefficiencies and delays. Moreover, it will enable

predictive healthcare, early identification of health risks and personalised interventions that are not only effective but environmentally conscious.

Finally, we recognise that the pursuit of decarbonisation in healthcare cannot be insular—rather, it requires global collaboration. By sharing our innovations in digital transformation, advocating for green healthcare practices and collaborating with like-minded institutions, we can inspire a worldwide shift towards a sustainable healthcare ecosystem.

This whitepaper is an endeavour to establish linkages between climate change and health in the context of the Middle East. We seek to understand not only the challenges but also the resilience and innovation that define this region. Our collective aim is to inform policy, promote collaborations and foster a culture of proactive health preservation in a world where the climate-health nexus is an ever more critical domain of inquiry and action.

**Farhan Malik**  
Founder & Group CEO, PureHealth

# Executive summary



The Middle East is the geographic area most vulnerable to disruptions arising from climate change. Without considerable mitigation efforts, human habitability and healthy longevity in the region will be severely impacted.

## A global climate change hotspot

The biggest climate-related risk factors impacting the region include heat and rising temperatures, air pollution, food and water security, vector-borne and water-borne diseases, adverse weather events such as storms and floods, and rising sea levels.

The region is warming twice as fast as the rest of the world, with an expected temperature rise of 4°C by 2050, double the projected global increase of 2°C. Future temperatures in the region are projected to exceed the threshold for human adaptability, leading to higher mortality rates for children and the elderly, with some parts of the region becoming virtually unliveable.<sup>1</sup>

In addition, air pollution levels in the region's largest cities are among the highest in the world, with the average resident breathing air that exceeds ten times the level of pollutants considered safe by the World Health Organisation (WHO).<sup>2</sup> A study by the Saudi Green Initiative shows that air pollution from greenhouse gases is estimated to have shortened life expectancy in Saudi Arabia by 1.5 years.<sup>3</sup>

The Middle East is also among the most water-scarce and food-insecure regions in the world, making the region exceptionally vulnerable to global changes in agriculture productivity, supply chains and water supply as a result of climate change. About 60% of the region's population is estimated to live under either "high" or "very high" water stress conditions. Projections suggest that under a business-as-usual scenario, all countries in the region could deplete their groundwater reserves by the year 2050.<sup>4</sup>

Climate change is also creating environments for infectious diseases to thrive in the region, with exposure to water-borne and vector-borne diseases including malaria and dengue expected to increase in the near future.<sup>5</sup>

The health and social consequences of climate change are far reaching and include heat-related deaths, cardiovascular and respiratory diseases, and the spread of infectious diseases, malnutrition, injuries and mental ill health.

### **Political commitment and policy environment**

Preventing and reducing the adverse impact of climate change on health and longevity in the Middle East requires policy, interventions and action to both mitigate and adapt to climate change.

As signatories of the Paris Climate Agreement, almost all governments in the region have committed to reducing greenhouse gas emissions and reaching net zero.<sup>6</sup> A number of governments in the region have also announced national pledges to mitigate global warming through a transition to renewable energy and green technologies.<sup>7</sup> However, in a region where fossil fuels have traditionally been the backbone of the economy, leaders may be slow to fully embrace decarbonisation, resulting in conflicting policies and priorities.

Although countries in the region have adopted policies and initiatives to support mitigation efforts, many still do not have a clear vision of how to adapt to the long-term effects of climate change on public health.

### **The role of healthcare systems**

Healthcare systems are especially vulnerable to the effects of climate change while also being major contributors to climate change. As many countries in the Middle East undergo transformation of healthcare systems and how care is delivered to support a growing and ageing population, there is a unique opportunity to build climate-resilient healthcare systems.

The health sector also has a responsibility to reduce its contribution to greenhouse gas emissions. The sector is responsible for approximately 4.6% of global CO<sub>2</sub> emissions, a larger share than either aviation or shipping. If the global health sector were a country, it would be the world's fifth-largest emitter.<sup>8</sup>

Much of this carbon footprint lies outside of hospitals and health systems, with scope 3 emissions, mainly from supply chains, responsible for over 70% of the total.<sup>8</sup> The range of industries that contribute to the health sector, from energy, chemicals, transport and food, give the sector considerable agency to influence climate change mitigation and adaptation efforts.

Expanding the use of telehealth and virtual care in the region can also have a measurable impact on reducing the carbon footprint associated with transportation and travel for in-person visits, with estimated savings of 0.70-372 kg CO<sub>2</sub>e per telemedicine consultation.<sup>9</sup>

Healthcare professionals have an important role as both content experts and trusted messengers in raising awareness of the health impacts of climate change and advocating for climate change action. Expanding public health and medical education to address climate change is critical.

### **The need for multi-sector collaboration**

A siloed approach to protecting human health from climate change will not work. Climate change mitigation and adaptation efforts require intersectional and regional cooperation. All levels of government must adapt to reduce the health burden associated with climate change.

Collaboration and action between health and non-health stakeholders in the pursuit of regional development and climate protection can also enable co-benefits, with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions.<sup>10</sup> Local and regional networks and coalitions, such as the UAE Climate Research Network (CCRN), have an important role in supporting data sharing and collaboration.<sup>11</sup>

Key areas where health and non-health sectors can realise these co-benefits include the development of green spaces, expansion of public and active transport solutions, and innovation in passive cooling technology.

Although the health risks of climate change will be experienced by all countries in the Middle East, these effects are not felt equitably across the region. More vulnerable lower-income and conflict-affected countries, who will be forced to adapt at a much quicker pace, may be a source of inspiration for neighbouring countries on how to do more with less.

### **Advancing climate action to protect the future health and longevity of populations in the Middle East**

The impact of climate change is hitting the Middle East region at a much quicker rate than other parts of the world, increasing the imperative for regional governments and policymakers to take meaningful action. As home to some of the world's youngest and fastest-growing populations, changes made today to mitigate the negative impacts of climate change will have far-reaching benefits on the health and longevity of future populations in the Middle East.



We have identified a number of common priorities under three key pillars: knowledge empowerment, climate-smart health systems and multisector action. These can help to guide regional stakeholders in mitigating and adapting to the impacts of climate change while also supporting the health and longevity of the region's populations.

### **1. Knowledge empowerment**

- Build awareness, education and accountability of the climate risk factors and their potential impact on human health across all stakeholder groups and levels of society. Educate and empower healthcare workers to inform and manage at-risk patients and advocate for climate action. As part of this, climate change education must be embedded in school curricula.
- Improve surveillance, data collection and monitoring of the region's climate change risk factors and their direct and indirect impact on human health. Leverage recent developments in digital health infrastructure, health information systems and infectious disease surveillance infrastructure to collect and monitor data and information on at-risk patients, morbidities and mortality linked to climate change.
- Support ongoing research to quantify the health impacts of climate change in the region, in terms of preventable human suffering and unnecessary financial cost, to raise the alarm and build an investment case for climate mitigation and adaptation efforts.

### **2. Climate-smart health systems**

- Develop national health adaptation plans that consider the unique country dynamics and health systems across the region. All plans should consider future population needs and health system requirements, the need for training and capacity building within the health sector, cross-sector coordination, and budget allocation.
- Strengthen the capacity of health systems to prevent, prepare and respond to climate change through the development of robust surveillance and early-warning systems. A trained workforce will be essential as climate-related risks intensify and pressure on health systems grows.
- Adopt initiatives to reduce emissions and unnecessary waste from regional health systems and hold suppliers accountable for their climate commitments. Consider the climate impact of digital innovations such as remote monitoring devices and AI-powered telehealth consultations.

### **3. Multisector action**

- Integrate health into national climate mitigation and adaptation strategies and support cross-sectoral collaboration and accountability.
- Consider the co-benefits of public health action and environmental sustainability in current and future urban development through initiatives that incorporate the natural environment, green space and improvements in public transport.
- Expand the scope of climate mitigation and adaptation beyond national borders through regional data sharing, resource sharing and collaboration.

# Introduction



By 2050, the world is expected to see unprecedented sea-level rise, major agricultural losses and an increase in extreme weather events at the hand of accelerating climate change. As one of the most pervasive threats to humanity, climate change is already endangering the health and welfare of populations across the globe. Global heat records are raising the alarm—this year, scientists at the UN declared July 2023 the warmest month ever recorded and the UN secretary-general, António Guterres, warned that “the era of global warming has ended” and “the era of global boiling has arrived.”<sup>12</sup>

Climate change is one of the greatest and most complex threats to the health and longevity of future generations. The WHO estimates that, between 2030 and 2050, climate change will be responsible for approximately 250,000

additional deaths per year from malnutrition, infectious disease and heat stress.<sup>13</sup> According to a report released by the Intergovernmental Panel on Climate Change (IPCC) in March 2023, the impact of climate change on human health is already more widespread and severe than anticipated. Between 3.3bn and 3.6bn people live in places highly vulnerable to climate change’s impacts. Extreme heat events have resulted in human mortality and morbidity in all regions of the world; the incidence of climate-related food-borne, water-borne diseases and vector-borne diseases are increasing, and risks related to mental health challenges, food and water security, flooding, and biodiversity loss, are expected to increase in the short term.<sup>14</sup>

“You’re not having to adapt to one hazard,” warns Marina Belén Romanello, executive director of the Lancet Countdown: Tracking Progress on Health and Climate Change. “You’re having to adapt to a cocktail of health impacts with extreme weather events, with extreme heat, with infectious disease outbreaks, with food insecurity, with collapse of our agricultural systems.”

It is unequivocal that climate change impacts all aspects of our health, society and economy. However, untangling the relationship between climate change and health remains challenging owing to limited data availability, meaning that the true scale of the risks and health threats may be undervalued.

### ACTION ON CLIMATE CHANGE IS ESSENTIAL TO ACHIEVE THE UN SUSTAINABLE DEVELOPMENT GOALS

The UN Sustainable Development Goals (SDGs), adopted by world leaders in 2015, serve as a blueprint to eradicate poverty, improve the lives of people and secure the future of the planet. The SDGs acknowledge the intersection and interdependencies between human health and planetary health. Health is both a result and an enabler of sustainable development across all sectors of government.<sup>15</sup>

Climate change threatens the achievement of many of the health and non-health related SDG targets (Figure 1). For example, SDG 3 focuses on good health and wellbeing, targeting a reduction in deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination, while SDG 13 targets climate action to improve resilience and manage climate-related hazards and natural disasters.

The SDGs provide an important framework for addressing climate change and achieving wider public health benefits.

Figure 1: UN Sustainable Development Goals

# SUSTAINABLE DEVELOPMENT GOALS



Source: International Science Council. A Guide To SDG Interactions: From Science To Implementation. 2017

With the Middle East region playing host to the largest international climate summit for two consecutive years, COP27, which took place in Sharm El Sheikh, Egypt, in 2022, and COP28 in Dubai, UAE, in 2023, the vulnerability of the region to climate change, as well as the opportunity and necessity to accelerate action on the climate agenda, is gaining more traction among regional governments and policymakers.

Heat stress, severe drought, rising sea levels and sandstorms are among the major symptoms of a changing climate in the Middle East. The impact of climate change will have potentially devastating health, social and economic outcomes for the region's over 500m inhabitants.<sup>16</sup> The Middle East is also expected to experience higher economic losses than other regions, with a reduction of up to 6% of GDP by 2050, predominantly driven by water and heat stress and their adverse effects on agriculture, health and income.<sup>17</sup> The impact of the climate crisis is affecting us all, but in different ways. Its consequences are unfair and unjust, and disproportionately impacting some communities more than others. This only emphasises the need for inclusivity in our collective response to the climate crisis," states Dr Nawal Al Hosani, acting undersecretary for the Green Development and Climate Change Department at the UAE Ministry of Climate Change and Environment (MOCCA).

The upcoming climate summit will be the first to feature a "Health Day", evidence of the growing realisation that the climate crisis is also a health crisis.<sup>18</sup> While the impact of climate change on health is widely known, it is only in recent years that the health community has become a central focus of annual global climate change negotiations. At COP26 in 2021, a number of the world's health ministries committed to developing climate-resilient and low-carbon health systems, forming the Alliance on Transformative Action on Climate and Health (ATACH), a WHO-led platform for co-ordination, knowledge and best-practice exchange. As of August 2023, 73 countries have formally committed to the initiative.<sup>19</sup>

As the UAE prepares to host COP28, there is an opportunity for the region to play a leading role in driving international co-operation on climate mitigation and public health. Our report explores the consequences of the climate crisis for the health and wellbeing of populations in the Middle East. It aims to stimulate discussion on the urgency for accelerated climate action in the region and the priorities for governments, health systems and all sectors.

# 1: The climate change threat to human health and longevity



## 1.1 Climate-related risk factors in the Middle East

The Middle East is the geographic area most vulnerable to disruptions arising from climate change.<sup>20</sup> Adverse temperatures, air pollution, rising sea levels, and lower and more erratic precipitation are among the leading drivers of climate change in the region. “High population density, rapid urbanisation and limited water resources increase vulnerability to climate change in the Middle East”, says Dr Noura Khamis Al Ghaithi, undersecretary at the Department of Health in Abu Dhabi, UAE.

**“High population density, rapid urbanisation and limited water resources increase vulnerability to climate change in the Middle East.”**

Dr Noura Khamis Al Ghaithi, undersecretary at the Department of Health in Abu Dhabi, UAE.

Much of the region lies in harsh climate zones, where global warming is exacerbating desertification, water stress and rising seas. Rainfall has become more variable and climate disasters such as droughts and floods more frequent.<sup>20</sup> The region is also experiencing substantial population growth, resulting in rapid urbanisation.<sup>1</sup> In addition to a “relatively inhospitable climate,” as described by Dr Andrew Haines, professor of environmental change and public health at the London School of Hygiene & Tropical Medicine, political instability, mass migration, resource scarcity and wide economic disparities further exacerbate climate vulnerabilities in the Middle East.

### Heat and rising temperatures

With an ageing population, high prevalence of chronic disease and intense urbanisation, the Middle East and North Africa (MENA) region is highly susceptible to heat exposure.<sup>17</sup> The region is warming twice as fast as the rest of the world, with an expected temperature rise of 4°C by 2050, double the projected global increase of 2°C. This prediction is based on greenhouse gas emissions continuing to increase at the current rate.<sup>21</sup>

This pace of warming is expected owing to a number of reasons. One is the wet-bulb temperature rise, a measure of heat-stress that combines dry air temperature with humidity. According to some sources, the region is one of the few to repeatedly measure wet-bulb temperatures above the threshold of human survivability.<sup>22</sup> Another is the desert warming amplification phenomenon, in which dryer soil prevents natural cooling effects and creates a feedback loop that further intensifies heat.<sup>7</sup>

Future temperatures in the region are projected to exceed a threshold for human adaptability, leading to higher mortality rates for children and the elderly, and making some parts of the region becoming virtually unliveable.<sup>7</sup>

**2x**



**The Middle East region is warming twice as fast as the rest of the world, with an expected temperature rise of 4°C by 2050, double the projected global increase of 2°C**



Although all of the region experiences high temperatures, coastal cities surrounding the Arabian Gulf are expected to experience heat waves that may surpass limits suitable for human survival by 2100.<sup>23</sup>

**“Increased incidences of heatwaves in the region are already fostering an arid climate that is unbearable for many individuals.”**

Rima Habib, professor, Department of Environmental Health, Faculty of Health Sciences, American University of Beirut, Lebanon.

According to Rima Habib, a professor at the Department of Environmental Health at the American University of Beirut in Lebanon, “increased incidences of heatwaves in the region

are already fostering an arid climate that is unbearable for many individuals.”

According to projections by the IPCC, rates of heat-related mortality in MENA populations older than 65 are expected to increase 8–20-fold in 2070–99, compared with rates seen in 1951–2005.<sup>22</sup> The average annual heat-related death rate in the MENA region is 2.1 per 100,000 people, which is projected to increase to 123.4 per 100,000 people by 2100. Egypt has the highest absolute number of heat-related deaths in the region, with over 2,500 annually.<sup>23</sup> However, over 80% of these deaths could be avoided if global warming was limited to 2°C, highlighting the urgent need for better adaptation policies and a switch to renewable energy technologies.<sup>23</sup>



### Air pollution

According to the WHO, more than 90% of the world's population is exposed to air pollution.<sup>13</sup> Air pollution levels in the region's largest cities are among the highest in the world. The average resident in the Middle East breathes air that contains more than ten times the level of pollutants considered safe by the WHO.<sup>2</sup>

The high levels of air pollution are visible in mortality and morbidity data in the region. In Saudi Arabia, 9% of annual deaths and 315,200 disability-adjusted life years (DALYs) in 2017 were attributable to air pollution.<sup>24</sup> The nation's death rate attributable to air pollution, at 1.12 per 1,000 people, is one of the highest among the G20 countries.<sup>25</sup> A study by the Saudi Green Initiative shows that air pollution from greenhouse gases is estimated to have shortened life expectancy in Saudi Arabia by 1.5 years.<sup>3</sup> Meanwhile in 2019 the UAE recorded over 1,800 deaths linked to ambient air exposure.<sup>26</sup> The direct correlation between air quality and health outcomes is often difficult to determine due to the complexity of attributing air quality as the primary cause of morbidity or mortality.

Rapid urbanisation in the region and the increase in human-induced emissions are major contributors to air pollution, causing air quality degradation in several of the region's largest cities.<sup>4</sup> Air pollution has an adverse impact on the health of populations, as it has the potential to damage the heart, lungs and every other vital organ of the body.<sup>27</sup>

**“We need to improve the way we record data for people that visit hospitals so that we can show the effect of changes in air pollution on health outcomes.”**

Mohd Alam, expert in climate change, integrated environment policy and Planning at Environment Agency Abu Dhabi.

Regional drying and warming trends are strong drivers of the increase in the frequency and intensity of dust storms in the Middle East.<sup>4</sup> The Middle East is considered one of the largest dust-producing regions in the world. During summer months, the region experiences an increasing number of cyclones, leading to more severe dust storms.<sup>28</sup> These dust storms have an impact on outdoor air quality and are a significant risk factor for those living with respiratory diseases. In Qatar, asthma cases are reported to increase by 30% during and shortly after very windy conditions.<sup>29</sup>

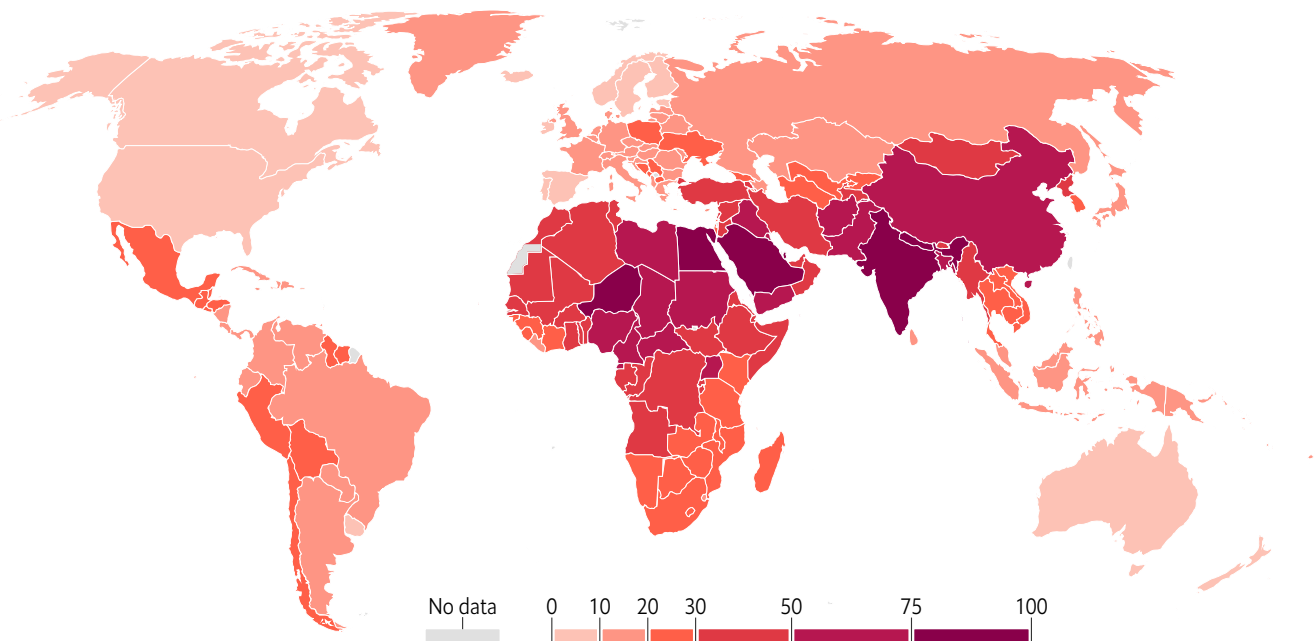
“The UAE is prone to dust and sandstorms,” states Fatin Samara, a professor and co-chair of the UAE Climate Change Research Network (CCRN), adding that “The particle content of desert dust storms has a rising anthropogenic load from human activity, which have the potential to expose the human population to bioreactive metals, organic pollutants and microplastics”. Mohd Alam, an environment policy and planning expert at Environment Agency Abu Dhabi (EAD), agrees that climate change is likely to aggravate dust events in the coming years, increasing the effects on respiratory health. One of the biggest difficulties that Mr Alam sees is linking emissions and changes in particulate matter to health outcomes. “It's a very complex topic because there are a number of interconnected factors,” he says. “We need to improve the way we record data for people that visit hospitals so that we can show the effect of changes in air pollution on health outcomes.”

Whereas the impact of dust storms on human health has been well documented in Asia and Europe, there is limited data available for the Middle East region. Adverse health outcomes attributable to dust and dust storm events reported from other regions include respiratory and cardiovascular diseases. Long-term dust exposure can also impact pulmonary and cognitive function and lead to difficulties in pregnancy.<sup>29</sup>



**Figure 2: Exposure to air pollution with fine particulate matter, 2017**

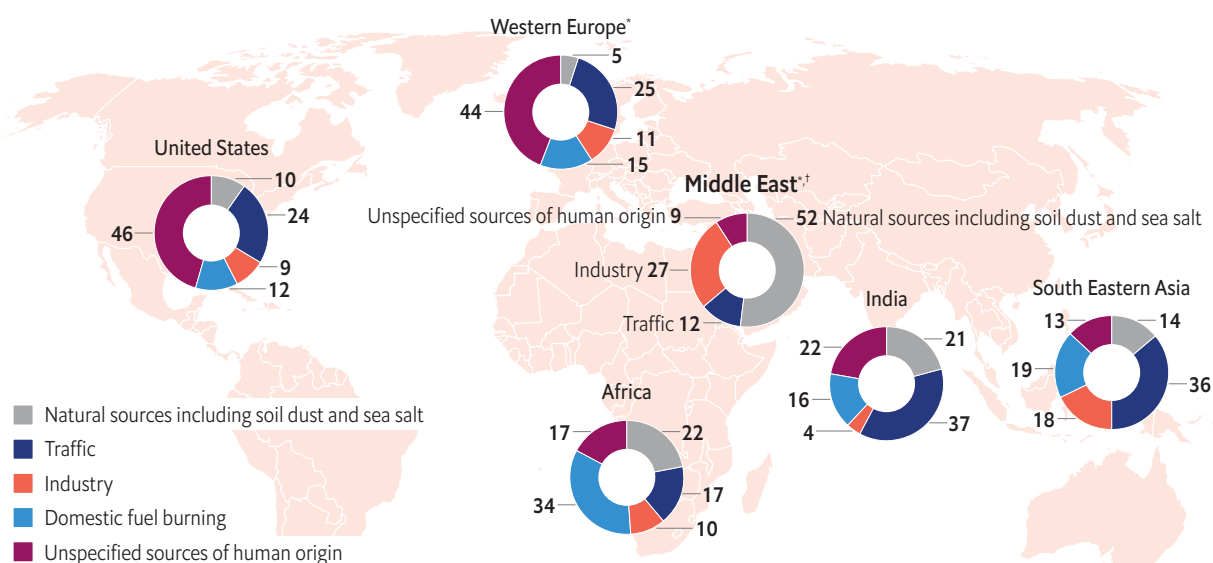
Population-weighted average level of exposure to concentrations of suspended particles measuring less than 2.5 microns in diameter (PM2.5). Exposure measured in micrograms of PM2.5 per cubic metre (µg/m³)



Source: Brauer et al. (2017) via World Bank. <https://ourworldindata.org/grapher/pm25-air-pollution>

**Figure 3: Pollution source contributions to total PM2.5, %**

Population-weighted averages for relative source contributions to total PM2.5 in urban sites, 2015



\* Domestic fuel burning sources have not been assessed in this region

† Based only on two studies, and therefore only provides indicative results

Source: Karagulian F, Belis CA, Dora CFC, Prüss-Ustün AM, Bonjour S, Adair-Rohani H, Amann M. Contributions to cities' ambient particulate matter (PM): a systematic review of local source contributions at global level. Atmos Environ 2015;120:475–483.

### PM2.5 AND ITS IMPACT ON HUMAN HEALTH

PM2.5 - particulate matter with a diameter of 2.5 micrometres or smaller - is most dangerous to human health. These particles are small enough to penetrate deep into the respiratory system and permeate the bloodstream. Exposure to PM2.5 can cause respiratory problems such as asthma and lung diseases, trigger inflammation and oxidative stress leading to heart attack and stroke, aggravate existing health conditions and increase the risk of cancer and reproductive health issues. Sources of PM2.5 include vehicle emissions, industrial processes, construction activities, burning fossil fuels and natural sources such as dust (figure 3).

### Food and water security

The Middle East is among the most water scarce and food insecure regions in the world, making the region exceptionally vulnerable to global changes in agriculture productivity, supply chains and water supply as a result of climate change.

The MENA region has approximately 1,100 cubic metres of natural renewable water resources (NRWR) per capita per year, compared to 5,000 cubic metres NRWR in Western Europe and

34,000 cubic metres of NRWR in Australia.<sup>4</sup>

“We don’t have any river that originates from our countries in the Middle East—no lake, no river, nothing,” says Osama Ali Maher, a technical advisor for emergencies and environment at the WHO Regional Centre for Environmental Health Action.

According to the “Falkenmark indicator”, or water stress index, 1,700 cubic metres of NRWR per capita per year is the minimum threshold to sustain a population’s basic needs. Countries that fall below this figure are considered to experience water stress. Countries with less than 1,000 cubic metres of NRWR suffer from water scarcity and countries with less than 500 cubic metres suffer from absolute water scarcity. In the Middle East, 60% of the region’s population is estimated to live under either “high” or “very high” water stress conditions and nine out of 15 countries experience absolute water scarcity.<sup>4</sup>

**“The increased incidence of drought is very acute in the region, which will start making it harder and harder for [countries] to manage water scarcity.”**

Marina Belén Romanello, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change.

Projections suggest that under a business-as-usual scenario, all countries in the region could deplete their groundwater reserves by the year 2050.<sup>4</sup>

Water scarcity, which encompasses both water availability and water quality, is an important indicator of health. Beyond drinking, water supply is intimately linked to food security, sanitation and hygiene, which are primary determinants of the global burden of disease. “It’s a region that generally is used to receiving very little rainfall,” says Ms Romanello. “The increased incidence of drought is very acute in the region, which will start making it harder and harder for them to manage water scarcity.”

The lack of access to potable water affects human health in a variety of ways. In poor and disadvantaged areas, exposure to contaminated water is the leading cause of diarrhoeal diseases, one of the top five contributors to the global disease burden.<sup>30</sup>

Climate change also impacts food availability, access, stability and use. In the Middle East, sustained food pressures at household and national levels are exacerbated by shortfalls in water security, urban expansion, population growth and varying economic conditions. Malnutrition is expected to worsen in developing

countries as extreme weather events and precipitation patterns damage crops and food supplies.<sup>31</sup> Food production requires large quantities of water, and a deficient water supply can interfere or disrupt access to a nutritious diet. The expected water scarcity in the Middle East may cause certain countries in the area to lose up to 60% of their agricultural productivity by the year 2050.<sup>32</sup>

For the Gulf Cooperation Council (GCC) countries—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE—which import upwards of 85% of their food, adverse climate events in other parts of the world that have the potential to disrupt global supply chains are also an acute concern.<sup>33</sup> “Food security is also an important component within the UAE because we know that more than 85% of the food that we consume is imported,” says Ms Samara. “How will climate change affect this?” “We saw more recently some of the shocks of both covid-19 and the war in Ukraine,” adds Princess Mashael bint Saud Al-Shalan, founding partner of Aeon Strategy. “This had implications on some of the food basket staples that we are reliant on.”

With the population of the Middle East projected to double in the coming decades, the effects of climate change and a double burden of malnutrition (characterised by the co-existence of undernutrition, micronutrient deficiencies, as well as overweight and obesity), will place compounding pressure on food security and health systems.<sup>31</sup>

**“Food security is also an important component within the UAE because we know that more than 85% of the food that we consume is imported. How will climate change affect this?”**

Fatin Samara, professor and co-chairperson, UAE Climate Change Research Network.

## 1.2 The impact of climate change on health

The direct impacts of climate change result from rising temperatures, heat waves, and increases in the frequency of complex extreme weather events such as windstorms, floods and droughts. The health and social consequences of these events are far-reaching and include heat-related deaths, cardiovascular and respiratory diseases, and the spread of infectious diseases, malnutrition, injuries and mental ill health.<sup>34</sup> “Climate change affects longevity by altering ecosystems, disease patterns, and public health,” says Dr Al Ghaithi.

**“Climate change affects longevity by altering ecosystems, disease patterns, and public health.”**

Dr Noura Khamis Al Ghaithi, Undersecretary, Department of Health, Abu Dhabi, UAE

The impacts of climate change on human health accumulate and play out over the full life course, from pre-birth to old age.<sup>27</sup> The region already has a high prevalence of chronic disease, and this population is more vulnerable to the adverse health consequences of climate change.<sup>35</sup> “You have an ageing population, people with underlying health conditions, chronic heart disease, respiratory disease, diabetes—those chronic conditions that are growing in their incidence in countries that are fast developing,” says Ms Romanello. “As a result, you are seeing that more and more people are highly vulnerable [to the impacts of climate change] and they might not even know it.”

The list of health issues attributable to climate change is a long one; however, cardiovascular, respiratory, mental health and infectious

diseases stand out as particular concerns for the Middle East region.

### Cardiovascular disease

According to the World Heart Foundation, cardiovascular disorders are the leading cause of mortality in the MENA region, responsible for one-third of all deaths annually, and 45% of total mortality in the Arabian Peninsula.<sup>36</sup> Heat exposure has been implicated as an important risk factor contributing to cardiovascular disease (CVD) and associated mortality. A 2022 Lancet review reported that a 1°C rise in temperature was associated with a 2.1% increase in CVD-related mortality.<sup>37</sup>

Individuals who work outside in the summer months are also at increased risk of cardiovascular incidents. According to data on Nepali migrant labours working in Qatar’s construction sector, 35% of CVD related deaths in 2009-17 could have been prevented if effective heat protection programmes had been implemented.<sup>38</sup>

Air pollution is also associated with an increase in CVD mortality, with increased complications and duration of hospitalisation in patients suffering from heart problems. Global studies have reported associations between high concentrations of pollutants and increased incidence of atrial fibrillation.<sup>39</sup>

### Respiratory diseases

Low air quality causes reduced lung function, increased risk of asthma complications, heart attack, heart failure and death. More than 90% of children are exposed to PM of particles less than 2.5 micrometres in diameter (PM2.5) in concentrations above WHO guidelines, which

can affect their health throughout their life, with an increased risk of lung damage, impaired lung growth and pneumonia, and a subsequent risk of developing asthma and chronic obstructive pulmonary disease (COPD).<sup>27</sup>

Although there are limited data on the impact of climate change on respiratory conditions in the Middle East region, an increased prevalence of pollen allergies has been linked to the increasing temperatures due to climate change. The prevalence of asthma in children is also increasing in the region, with exposure to indoor and outdoor air pollution identified as a contributing factor.<sup>40</sup>



### Mental health

The rapid rate of climate change poses a growing threat to mental health and psychological wellbeing.<sup>41</sup> Mental health concerns pertaining to climate change range from stress symptoms to clinical disorders. Refugees, migrants, ethnic minorities and other vulnerable populations are disproportionately affected.<sup>42</sup>

The mental health impacts of climate change are influenced by the type of weather event. Acute extreme weather events can result in highly anxious reactions, while sub-acute weather changes can induce persistent psychological distress and compounding impacts on anxiety and depression. A survey conducted by Economist Impact in 2022 assessed the attitudes of Arab youth to climate change, reporting that climate-related threats and a lack of action to tackle them are causing “eco-anxiety”, with 70% of Arab youth surveyed reporting to have felt anxious about the future of the environment and the impact of climate change in the preceding six months.<sup>43</sup>

Although the mental health effects of climate change are difficult to quantify, mental health conditions are rising as a share of the total disease burden in the MENA region.<sup>44</sup> The burden of mental illness may be further exacerbated in the coming years by the risk factors associated with a young population and a high burden of non-communicable diseases.<sup>45</sup>

### Communicable diseases

Climate change can create suitable environments for infectious diseases to thrive. “With climate change, we’re seeing an increased risk of infectious disease,” explains Ms Romanello. “We’re monitoring the obvious diseases, but there are a lot more diseases that we’re not monitoring that are emerging diseases that we’ll be exposed to.”

Vector-borne diseases, which result from infections transmitted to humans and other animals by blood-feeding agents such as



mosquitoes, ticks and fleas, are highly sensitive to climate variability. Warmer climates and certain rainfall patterns can create hospitable environments for vectors and pathogens.<sup>46</sup>

**“The risk of food and waterborne disease is changing quite acutely in the region, with the droughts, the changing rainfall patterns and the heat creating emerging risks for infectious diseases.”**

Marina Belén Romanello, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change.

“Climate change is likely to cause an increase in vector-borne and waterborne diseases in the Middle East, such as dengue fever, malaria, cholera, leishmaniasis and West Nile virus,” says Dr Al Ghaithi. “These are just a few examples, and there may be other diseases and health risks that could emerge in the future as a result of climate change.”

In Saudi Arabia, the annual Hajj pilgrimage, which welcomes upwards of 2m visitors, and the Umrah season, which was performed by over 24m pilgrims throughout the year in 2022, pose a distinct risk for infectious disease transmission for Saudi Arabia and the wider region.<sup>47</sup> “With the Hajj season, the possibilities of introducing new diseases, whether through the point of entry or due to climatic changes, is still there” says Mr Maher.

Malaria, which already affects 3m people annually in the MENA region, is expected to become more prevalent and affect new territories as higher temperatures reduce the incubation period.<sup>48</sup> “The risk of food and waterborne disease is changing quite acutely in the region, with the droughts, the changing rainfall patterns and the heat creating emerging risks for infectious diseases,” says Ms Romanello.

### Vulnerable groups

Climate change presents a threat to the health and longevity of all people in the Middle East region; however, certain population demographics, including the elderly, young children, women and people who live with chronic medical conditions, are at greater risk, as are as those who work outside or live in poverty.

Although all workers in the Middle East face the risks of exposure to extreme heat, labourers in the construction sector are overwhelmingly exposed to the most dangerous working conditions in the region. All GCC countries depend on migrant labour to support economic growth and development, particularly in the construction sector. According to Human Rights Watch, these workers lack sufficient health and safety protection from the region’s extreme summertime heat and humidity.<sup>49</sup>

All GCC states apply a midday work ban prohibiting employers from continuing outdoor work during predefined times and months. However, extreme heat conditions can occur outside of these predefined times.<sup>49</sup> A study in Saudi Arabia reported that the highest heat intensity for workers in the country is from 9 am to midday, yet the ban is in effect between noon and 3 pm.<sup>50</sup> A study in Kuwait reported a substantial increase in the risk of occupational injuries associated with extreme heat, despite the ban.<sup>51</sup>

Wet Bulb Globe Temperature (WBGT) is a more accurate measure of heat stress risks based on air temperature and relative humidity. According to the index, the “threshold” temperature for what a healthy person can endure is around 30°C-31°C in warm, humid environments. In 2021 Qatar introduced legislation that prohibits outdoor work when the WBGT rises above 32.1°C. Though a welcome development, uncertainty on the level of enforcement remains, and there is concern that the measure is still too high for sustained periods of outdoor labour.<sup>49</sup>

Human Rights Watch urges all GCC countries to adopt and enforce the WBGT index as the standard for imposing work limitations and implement evidence-based policies and health and safety measures to protect workers. Furthermore, as deaths and adverse health outcomes attributable to heat exposure are not counted as work-related causes, workers are often not eligible for compensation under local labour laws. The impact of climate change on migrant workers cannot be ignored. According to the UN International Labour Organization, the equivalent of 80m full-time jobs may be lost by 2030 owing to rising temperatures, rendering outdoor work impossible without urgent and significant action.<sup>52</sup> The UAE's latest National Determined Contribution Update, released in July 2023, states that the country is working on additional policies to protect outdoor workers from heat that include enhancing surveillance of heat-related illnesses.<sup>53</sup>

#### From evidence to action

According to Dr Haines, "We certainly have evidence that climate change is impacting on health. And the methods are getting more and more robust for estimating that."

Although it is evident that climate change will amplify pre-existing health and socioeconomic vulnerabilities in the Middle East, it is also apparent that much of the severe mortality and morbidity resulting from heat stress, air pollution and other environmental threats can be avoided

with urgent and co-ordinated action. In the short term, healthcare systems need to adapt to monitor and manage the immediate impacts of climate change, while in the long term, co-ordinated mitigation and adaptation policy and action are required among local and regional health and non-health stakeholders to improve regional resilience to environmental change. "The science tells us the negative impacts of climate change on our health and the health of our planet. Through innovation, collaboration and technology we can find solutions to mitigate these impacts and improve outcomes," states Dr Hosani. The remaining sections in this report explore the roles and responsibilities of health and non-health stakeholders in tackling the climate crisis and protecting the region's health.

**"The science tells us the negative impacts of climate change on our health and the health of our planet. Through innovation, collaboration and technology we can find solutions to mitigate these impacts and improve outcomes."**

Dr Nawal Al Hosani, acting undersecretary for the Green Development and Climate Change Department, Ministry of Climate Change and Environment, UAE.



## 2: Climate change and the healthcare system





## 2.1 Protecting populations from the impact of climate change



### Political commitment and policy environment

Preventing and reducing the adverse impact of climate change on health and longevity in the Middle East requires policy, interventions and action to both mitigate and adapt to climate change.

**Climate change mitigation** refers to overarching efforts to reduce greenhouse gas emissions to slow the speed, scale and magnitude of climate change. Efforts include reducing energy demand by decreasing consumption and improving efficiency, transitioning from fossil fuels to renewable energy, and reducing emissions from agriculture.<sup>54</sup>

All Middle Eastern states, with the exception of Iran and Yemen, are signatories of the Paris Climate Agreement, an international treaty that aims to strengthen the global response to the threat of climate change by limiting global temperature rise to below 2°C, while pursuing efforts to limit temperature increase further to 1.5°C.<sup>6</sup> A number of governments in the region have also announced national pledges to mitigate global warming through a transition to renewable energy and green technologies (table

1).<sup>7</sup> The UAE is targeting net-zero emissions by 2050, making it the first Middle East nation to do so.<sup>55</sup> Speaking on recent strategy developments in the UAE, Dr Hosani comments, “We have updated our National Energy Strategy to include several new goals, including creating 50,000 new green jobs by 2030, triple renewable energy capacity to 14 GW by 2030 and raise the percentage of clean energy in the total energy mix to 30% by 2031.” On an Emirate level, Abu Dhabi announced its Climate Change Strategy in July 2023, which aims to reduce emissions by 30m tonnes by 2027, a 22% reduction from 135m tonnes in 2016.<sup>56</sup> Under the Saudi Green Initiative, Saudi Arabia has set the goal of net-zero emissions by 2060 and introduced reforms on energy subsidies, while also committing to generating 50% of its power from renewable sources by 2030.<sup>57</sup> According to Princess Mashael, national-level policy initiatives such as the Saudi Green Initiative have triggered “a seismic shift in how we’ve been operating, at least in terms of getting some of our projects across the finish line,” adding that policymakers at all levels in all sectors now appreciate the importance of the topic.

Although these overarching climate mitigation efforts do not directly target the health impacts of climate change, they should have an indirect impact by reducing the severity of the climate risk factors in the region. However, there is a need for greater harmonisation and integration between health, environment, and other sectors and institutions to ensure effective implementation, monitoring and surveillance. Princess Mashael stresses the importance of linking climate strategies and plans to “specific standards, specific projects, specific agreements and, even more importantly, to specific budgets.”

**Table 1: Climate mitigation policy in selected countries in the Middle East**

Country	Alignment with national development agenda	Climate change mitigation strategy, policy or plan	Other climate change mitigation commitments
<b>Egypt</b>	Egypt Vision 2030. Egypt’s national development strategy includes a number of aims related to climate change focused on renewable energy and developing climate adaptation measures. The vision includes environmental programmes and KPIs to support waste management, water conservation and reduce air pollution. <sup>58</sup>	Egypt National Climate Change Strategy 2050. Egypt’s National Climate Change Strategy includes adaptation and mitigation programmes across all sectors including health. The national strategy is also designed to enhance climate finance and infrastructure, support research in green technology, and raise awareness to confront climate change. <sup>59</sup>	Renewable Energy Law. The Renewable Energy Law, introduced in 2014, aims to stimulate the use of renewable energy sources in the private sector. <sup>60</sup>  Greater Cairo Air Pollution Management and Climate Change Project (2020-26). Funded by the World Bank, the project aims to reduce urban air pollution through waste management and infrastructure improvements. <sup>61</sup>  Other national strategies and plans to address specific climate change risk factors include: the National Strategy for Disaster Risk Reduction 2030, Integrated Sustainable Energy Strategy 2030, National Water Resources Plan (2017-37) and Sustainable Agricultural Development Strategy towards 2030 (SADS 2030). <sup>62</sup>
<b>Saudi Arabia</b>	Saudi Vision 2030. Sustainability is a pillar of Saudi Arabia’s Vision 2030 agenda and incorporated into wider ambitions of energy transition, infrastructure and economic development. The national development agenda also includes a number of initiatives on renewable energy, environment preservation and protection, and the development of “liveable green cities”. <sup>63</sup>	The Saudi Green Initiative. Under the long-term sustainable action plan, launched in 2021, Saudi Arabia has pledged to achieve net-zero emissions by 2060, plant 650m trees (with a total target of 10bn) and protect 30% of the country’s land and sea by 2030. <sup>57</sup>  The Middle East Green Initiative, led by Saudi Arabia, aims to establish a roadmap for climate change mitigation in the wider region. <sup>57</sup>	National Renewable Energy Programme (NREP). The NREP aims to maximise the potential of renewable energy in Saudi Arabia and support the country’s transition to supplying 50% of its domestic energy supply from renewable sources by 2030. <sup>63</sup>  Circular Carbon Economy National Programme. This programme and accompanying framework aims to address CO2 emissions, while facilitating the transition to a sustainable, circular economy. <sup>64</sup>
<b>UAE</b>	We the UAE 2031. The national plan aims to advance climate action and consolidate the country’s position as a global hub for innovation in sustainability, science and technology. Improving food security is stated as a key indicator. <sup>65</sup>	UAE Net Zero 2050. The UAE Net Zero by 2050 is a national strategic initiative to achieve net-zero emissions by 2050, in alignment with the Paris Agreement. <sup>55</sup>  National Climate Change Plan 2050. The national plan serves as a roadmap to accelerate climate change mitigation efforts including by reducing greenhouse gas emissions, minimising the risks and improving the capacity to adapt to climate change, and supporting the transition into a climate-resilient green economy. <sup>66</sup>  UAE Green Agenda 2015-30. The Green Agenda is a long-term plan to reduce greenhouse gas emissions while supporting the development of a climate-friendly green economy. <sup>67</sup>	National Water and Energy Demand Management Programme. The programme targets efficiency of energy consumption in the transport, industry and construction sectors including a target to reduce energy demand by 40%, expand water re-use by 95% and increase the renewable energy’s contribution to the energy mix to 50% by 2050. <sup>68</sup>  National strategies and plans to address specific climate change risk factors include The National Air Quality Agenda 2031, The National Food Security Strategy 2051, The UAE Water Security Strategy 2030, National Biodiversity Strategy, National Strategy to Combat Desertification, National Strategy for Sustainability of the Marine and Coastal Environment, and The National Invasive Species Strategy and Action Plan (2022-2026). <sup>69</sup>

**Climate change adaptation** refers to interventions that respond to the effects of climate change by adjusting, moderating and coping with the risks and impacts of a changing climate. The capacity to adapt is determined by a number of factors, including governance, economics, infrastructure and technology. Examples of adaptation interventions that address the impact of climate change on health include surveillance and monitoring of diseases impacted by climate change, education and public health promotion, and capacity building to manage the impacts of extreme weather events.<sup>70</sup>

While countries in the region have adopted policies and initiatives to support mitigation efforts, many still do not have a clear vision regarding how to adapt to the long-term effects of climate change on public health. Egypt, Saudi Arabia and the UAE have recognised the health impacts of climate change and the urgent need for adaptation in their national contribution reports to the UN Framework Convention on Climate Change (UNFCCC), part of their progress towards meeting the goals of the Paris Agreement.<sup>53,62</sup>

A number of countries are making progress towards the development of a Health National Adaptation Plan (HNAP). Such plans are critical for ensuring the prioritisation of action to address the health impacts of climate change at all levels of planning, linking the health sector to national and international climate change agendas, and emphasising the health co-benefits of mitigation and adaptation

actions.<sup>71</sup> The UAE launched the UAE National Framework for Action on Climate Change and Health 2019-2021, which outlines the response to high-priority risks and public health challenges presented by climate change. Priority areas identified in the framework include surveillance, capacity building, and the need to enhance collaboration between health and other sectors. The UAE National Committee on Climate Change and Health has since been established to develop a national policy and action plan on health and climate change.<sup>72</sup> According to Mr Alam, health is a focal point of the recently launched Abu Dhabi Climate Change Strategy.<sup>56</sup> The strategy, which focuses on climate adaptation across four key pillars—infrastructure, energy, health and environment—“broadens the reach to all government organisations to come together to not only organise how we address these climate-related risks but also how we approach research on the impact of climate change and health because there are so many questions that are not yet answered in a robust way.”

Egypt’s National Climate Change Strategy also outlines a number of adaptation efforts to protect citizens from the negative health impacts of climate change. These include strengthening preventive services, establishing effective early warning systems and control programmes, upskilling and training healthcare workers, and directing special attention to vulnerable and high-risk groups such as women, children, people with special needs, the elderly and the sick.<sup>59</sup>

## 2.2 Strengthening health system responses to climate change



While healthcare systems are on the front lines caring for people facing immediate impacts and those with new or exacerbated chronic conditions, like cardiovascular or respiratory illness, climate change also impacts delivery and access to healthcare. Extreme weather events can disrupt infrastructure, transportation, and communication systems. Supply chains are often disrupted, leading to shortages of essential pharmaceuticals and medical devices.<sup>73</sup>

Health systems are also affected financially by the rising frequency of extreme weather events. A study of ten climate events from 2012 to 2018 in the United States estimated health-related

costs, including hospital admissions, emergency department visits, other medical expenses and lost wages at approximately US\$10 billion.<sup>74</sup>

Defined by the WHO as the capacity to “anticipate, respond to, cope with, recover from, and adapt to climate-related shocks while bringing sustained improvements in population health,” climate-resilient health systems form the first line of defence in sustaining health and protecting vulnerable populations from an unstable and rapidly changing climate.<sup>75</sup>

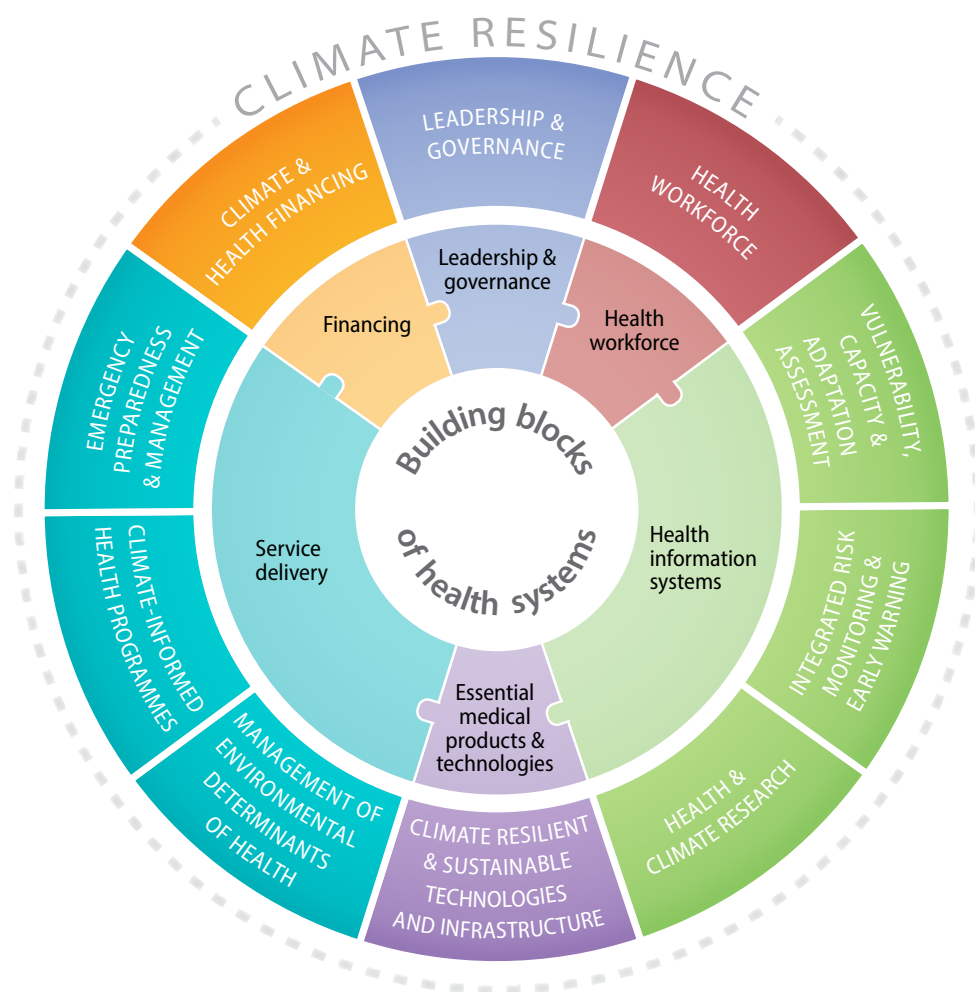
The WHO Operational framework for building climate-resilient health systems provides a blueprint for how health systems can adapt to the challenges presented by short-term climate variability and long-term climate change (figure 4). The ten components under the framework, aligned with the WHO Building Blocks for Health, are designed to help policymakers and public health professionals anticipate, prevent, prepare for and manage climate-related health risks.<sup>75</sup>

While reinforcing each of these ten components is essential for a comprehensive response to the risks presented by climate change, priorities will vary according to country dynamics, health system capacity and exposure to climate risks. The covid-19 pandemic also served as a ‘dress rehearsal’ for the impending challenges of the climate crisis, revealing vulnerabilities in health system capacity and delivery as well as regional inequalities and supply chain dependencies.<sup>76</sup> “Covid-19 was a huge wake-up call. It was a wake-up call of how things can change, of how vulnerable we all are and particularly of how vulnerable our health systems are,” says Ms Romanello.

**“Covid-19 was a huge wake-up call. It was a wake-up call of how things can change, of how vulnerable we all are and particularly of how vulnerable our health systems are.”**

Marina Belén Romanello, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change.

Figure 4: The WHO Operational framework for building climate resilient health systems



Source: World Health Organization. Operational framework for building climate resilient health systems. 2015.<sup>75</sup>

**Embedding climate data in health information systems**

An essential first step in building climate resilience is to determine the extent and magnitude of the potential health risks attributable to climate change through a vulnerability and adaptation assessment. This information is then used to establish early warning and monitoring systems to prepare for potential climate hazards and drive climate

research priorities.<sup>75</sup> A lack of available data threatens to undermine regional climate risks and their impact on health. “There’s often a data gap in the Middle East because you need robust data collection systems, including daily death registration,” says Dr Haines. “And in some countries these systems are not well established so there are major gaps in the available data.”

As the scale and frequency of extreme weather events increase, the UN has called



for an expansion of early warning systems as one of the most efficient and cost-effective adaptation measures.<sup>77</sup> According to the World Meteorological Organisation, substantially increasing the coverage of national early warning systems can lower disaster-related mortality by up to eight times.<sup>78</sup> Since 2017 the UAE's National Early Warning System has been administering alerts of extreme weather conditions and necessary instructions to the public via mobile phone networks.<sup>79</sup> More recently, the country has also started using space-based technology to predict weather events. The UAE Space Agency uses imagery analysis to support comprehensive flood monitoring and early warning systems as intense rainfall becomes more frequent in the country, with flash floods in the north in August 2022 claiming seven lives and forcing over 3,800 people, most of whom were low-income migrant workers, to evacuate their homes.<sup>53,80</sup> Early adaptation measures included in Egypt's most recent Nationally Determined Contribution (NDC; NDCs are Paris Agreement-linked climate action plans to cut emissions and adapt to climate impacts) include developing early warning systems to provide citizens with information for time-sensitive actions to reduce injury, sickness and deaths.<sup>62</sup>

Ms Romanello warns that while early warning systems have proved effective in the UK over the past year in mitigating the impact of heat-related mortalities, "the groups that bear most of the impacts of heat exposure [such as the elderly] will be those that have the least capacity to protect themselves, if they even know of the risk. No matter how much early warning assistance you give, those people still need assistance." "You have to have a functioning health system in order to make use of these early monitoring systems," adds Dr Haines.

Developments in electronic health records (EHRs) and national surveillance systems can be leveraged to support real-time data capture on the impact of climate change on health, identify

regions at high risk of climate events and support effective resource allocation.<sup>81,82</sup>

H5N1, MERS-CoV, and, more recently, covid-19 have been catalysts for rapid improvement in disease surveillance in the region over the past decade.<sup>83</sup> Infectious disease surveillance has long been a public health priority in Saudi Arabia owing to the annual Hajj pilgrimage and Umrah season.<sup>47</sup> The Health Electronic Surveillance Network (HESN), a web-based surveillance system integrating all health facilities in the Kingdom to monitor the growing threat of infectious disease and support national health security, was introduced in 2012 and upgraded following the pandemic to support more comprehensive surveillance methods.<sup>84</sup>



Adoption and integration of EHRs varies across the Middle East, with notable developments in the UAE and Saudi Arabia. In the UAE, the National Unified Medical Record platform, Riayati, now connects and integrates patient medical records from all public and private healthcare facilities. The platform is expected to contribute to the sustainability of the UAE healthcare system by improving preventive care through better disease surveillance, improving efficiency and supporting further digital health developments, such as advanced analytics and artificial intelligence (AI).<sup>85</sup> Saudi Arabia has also made progress in the development of national EHRs. One of the Kingdom's Vision 2030 goals is to have 100% of the population covered by the unified digital medical records system by 2025.<sup>86</sup>

### Integrating climate change knowledge in service delivery

The health sector is also often directly responsible for programmes that address climate-sensitive health risks. Such programmes should take into account both current climate variability and projected future climate change. Climate-related health programmes in the region have largely focused on heat safety. In 2023 the UAE Ministry of Health and Prevention (MOHAP), in collaboration with the Sharjah Supreme Council for Family Affairs and various public and private bodies, launched a campaign to increase awareness about the risks associated with extreme heat and promote preventive measures within community groups. The campaign included the distribution of awareness booklets in multiple languages to low-income migrant workers, as well as expanding access to medical examinations to assess individual health risks for heat-related illnesses.<sup>87</sup> The Ministry of Public Health (MOPH) in Qatar has also conducted similar workshops.<sup>88</sup> The risk of climate-sensitive infectious diseases is also gaining more attention in the region and mosquito control programmes have been expanded in some countries, including the UAE.<sup>89</sup>

**“In order to adapt to climate change you need strong primary care systems.”**

Dr Andrew Haines, former director, London School of Hygiene & Tropical Medicine.

Resilient health systems mean that public health infrastructure is prepared to adapt to changing population catchments and service demands and operate under diverse environmental conditions. The covid-19 pandemic highlighted regional disparities in the capacity of health systems to prepare for and manage a health emergency, with more adverse outcomes reported in low-income and conflicted affected settings.<sup>90</sup>

Despite the heterogeneity, common challenges in the region include increasing pressure on health services owing to growing healthcare demands and demographic changes, a rising burden of chronic diseases, and a shortage of healthcare workers. Attracting, training and retaining healthcare workers is a challenge across the Middle East, and there is considerable variation in health workforce capacity among and within countries. Physician density in many countries is lower when compared to the averages of countries within comparable income groups. For example, all GCC countries have less than the global high-income average of 3.2 physicians per 1,000 population, ranging from 0.9 in Bahrain to 2.6 in the UAE and 2.7 in Saudi Arabia.<sup>91</sup> GCC countries are also heavily reliant on expatriate healthcare workers. 82% of physicians and 96% of nurses in the UAE are expatriates; many of these workers are also from lower-income countries, exacerbating the workforce shortages in these countries.<sup>92</sup>

Primary and community care remains largely underdeveloped across the region, and all countries could benefit from a reorientation of health systems towards primary healthcare. “In order to adapt to climate change. You need strong primary care systems,” explains Dr Haines. “Primary care professionals and community health workers know the local circumstances in which populations are living and are well equipped to reach out to these vulnerable populations.”

Enhancing primary and preventive care offers opportunities to mitigate the growing burden of chronic disease and the vulnerability of this population to the impacts of climate change, including heat stress and air pollution, while reinforcing the sustainability of the healthcare system to manage a growing and ageing population.<sup>93</sup>

The Middle East region is facing a crisis of chronic disease. The region has the highest prevalence of diabetes in the world, with 73m adults, or 16% of the population, living with

diabetes in 2021, a figure projected to reach 135m, 19% of the population, by 2045.<sup>94</sup> The prevalence of obesity is also projected to increase exponentially in the region, with almost 50% of adults in the UAE and Egypt expected to be obese by 2035, up from 18% and 36% of the adult population in 2018. Figures from Saudi Arabia are even more staggering, with the prevalence of obesity projected to increase from 20% in 2019 to 57% by 2035.<sup>95</sup>

## “Building awareness and empowering people to protect themselves from heat is crucially important .”

Marina Belén Romanello, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change.

Primary care providers can contribute to both climate change adaptation and mitigation efforts by promoting healthy behaviours, such as diet and exercise, thereby helping to reduce the burden of chronic disease while also reducing climate emissions from the health system by mitigating the need to treat those diseases.

### Healthcare professionals as educators, advocates and influencers

Education is a key element in driving global responses to climate change. Educating the public and increasing the level of awareness can reinforce positive changes in health behaviours and public attitude. “Building awareness and empowering people to protect themselves from heat is crucially important,” says Ms Romanello. “Healthcare professionals need to start warning the elderly as they walk into their practices, as they see their patients, that they need to be extra careful with heat exposure.”

According to the Working Group to Advance Action on Climate Change and Health, all spheres of healthcare workers should be able to “identify, prevent, and respond to the health impacts of climate change and environmental degradation”.<sup>96</sup> There are clear roles for health

professionals as both content experts and trusted messengers in raising awareness about the health impacts of climate change and advocating for climate change action. “I firmly believe that healthcare professionals need to be the most outspoken about climate change,” says Ms Romanello. “If health professionals want to take care of health and are concerned with health, [climate change] is the biggest risk to our health, and it harms our physical and mental health and [aggravates] chronic conditions.”

Expanding public health and medical education to address climate change is critical.<sup>97</sup> “Training communities, health workers, or making use of those with basic training can be extremely helpful in preventing ill health due to climate change by strengthening the capacity to adapt,” explains Dr Haines. While climate change is being integrated into the medical curriculum of some higher education institutions to prepare the next generation of healthcare professionals to understand and manage the health implications of climate change, the coverage is patchy. There is also a need to build awareness among healthcare professionals practising today.<sup>98</sup>

Egypt’s National Climate Strategy recognises the importance of capacity building and the role of healthcare professionals in raising climate change awareness among the wider public. The strategy includes KPIs for the percentage of health sector teams trained on health risks posed by climate change impacts, and the number of educational seminars on climate change and its impact on national health curricula developed to train health personnel on the health impacts of climate change.<sup>59</sup>





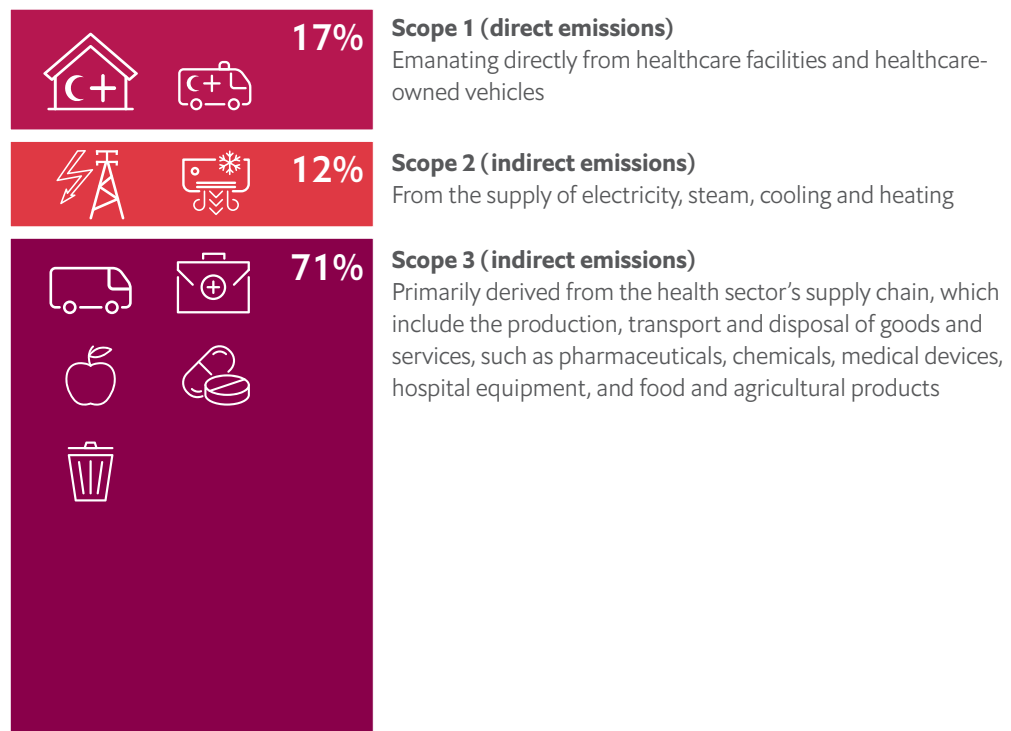
## 2.3 Decarbonising healthcare systems

Although healthcare systems protect populations from and treat patients for the adverse impact of climate change, they are also major producers of carbon emissions and have an important role to play in climate change mitigation efforts. The healthcare sector is responsible for approximately 4.6% of global CO<sub>2</sub> emissions, a larger share than either aviation or shipping. If the global health sector were a country, it would be the world's fifth-largest emitter.<sup>99</sup>

The distribution of the healthcare carbon footprint varies significantly by country size and

income level. The contribution of healthcare emissions as a percentage of total emissions ranges from 7.6% in the US to 1.9% in Indonesia and 1.5% in India. Ten countries account for 75% of the global healthcare climate footprint. Healthcare's climate footprint generally reflects overall national emissions patterns—those countries with high overall emissions find this reflected in their health sectors. The US, China and the EU are the three largest countries or regions for both health and overall emissions, accounting for 27%, 17% and 12% of total health emissions respectively. Data are unavailable for countries in the Middle East region.<sup>99</sup>

**Figure 4: Source of the health sector's carbon footprint<sup>99</sup>**



## PATHWAYS TO HEALTHSECTOR DECARBONISATION

The *Global Road Map for Health Care Decarbonization*, developed by Healthcare without Harm, a climate- and health-focused advocacy organisation, identifies three interrelated, overlapping decarbonisation pathways that the sector needs to navigate in order to address carbon emissions.<sup>103</sup> The implementation of these actions should result in a major reduction of healthcare greenhouse gas emissions:

- **Decarbonise healthcare delivery, facilities and operations.** Healthcare delivery and operations are at the core of the sector's climate footprint. Hospitals can be among the most energy-intensive buildings, accounting for 10% of total energy consumption in commercial buildings in the US.<sup>104</sup> Interventions such as the installation of solar panels in roofs in hospitals, adapting the hospital menu to more sustainable food options, replacing telemedicine for face-to-face appointments when possible, and introducing effective lighting and energy appliances, have shown to have a significant impact in the reduction of carbon footprints.<sup>105</sup>
- **Decarbonise healthcare's supply chain.** More than 70% of healthcare's climate footprint comes from Scope 3 emissions, much of which originate in the global supply chain.<sup>99</sup> In addition to adopting sustainable supply-chain practices and holding suppliers accountable to carbon reduction targets, as the NHS is doing in England, the carbon footprint of a hospital supply chain can be minimised by reducing the demand of goods and services and minimising waste across the system including unnecessary patient visits, diagnostic testing and duplication of processes.<sup>106</sup>
- **Accelerate decarbonisation in the wider economy and society.** Every aspect of the healthcare supply chain and delivery is reliant on other industries that provide energy, chemicals, building materials, packaging, infrastructure, transport, food and more. The range of industries that contribute to the health sector give the sector considerable agency to advocate for and influence climate change mitigation and adaptation efforts.

Making healthcare systems more sustainable is an important contributor to reaching national net-zero goals and supporting the wellbeing of populations. Hospitals and healthcare systems should consider how they can decrease their contribution to heat-island effects and reduce energy demand.<sup>100</sup> In the US, The National Academy of Medicine has launched a call to action to decarbonise the healthcare sector,

while NHS England is working with the WHO on a plan to promote decarbonisation of the healthcare sector around the world.<sup>101,102</sup> The NHS/WHO plan aims to create a learning sharing forum for healthcare professionals, support policy alignment, strengthen procurement practices, co-ordinate innovation funding and provide technical support.

Although still in the early stages, regional decarbonisation plans are beginning to take shape across healthcare systems in the region. In January 2023 the Abu Dhabi Department of Health (DOH) announced its sustainability goals for the Emirates healthcare sector. Focused on three key areas—infrastructure, operations and healthcare waste—the goals include reducing carbon emissions by 20% by 2030 and achieving net zero by 2050. With the support of international networks, including the International Hospital Federation and Global Green and Healthy Hospitals, the agenda aims to establish a governance model for hospitals to reduce energy consumption, water usage and waste production.<sup>107</sup> Other initiatives include a sustainable procurement policy, healthcare waste management strategy and the launch of the Emerald Sustainability Index, which according to Dr Al Ghaithi, will “measure and rate hospitals' environmental stewardship based on infrastructure, operations and disposals.”

Saudi Arabia is also exploring a national accreditation for new healthcare developments, in accordance with an international and recognised assessment tool, the Leadership in Energy and Environmental Design (LEED) rating system.<sup>108</sup> The Joint Commission International (JCI), which accredits over 400 healthcare organisations in the MENA region and includes standards for clinical care, patient safety, leadership and facility management, has announced plans to introduce environmental sustainability standards from mid-2024 in partnership with the Geneva Sustainability Centre to support the decarbonisation of the health sector.<sup>109</sup> “Healthcare systems have got an awful lot to offer and most of them around the

world are still at the beginning of the journey,” says Sonia Roschnik, executive director of the Geneva Sustainability Centre. “Even those where we’ve started [on the path to decarbonisation], like the NHS, there’s still a long road ahead.”

In terms of where to start, healthcare decarbonisation should be based on common principles with differentiated responsibilities and priorities based on the income level and capacity of a country. High-income countries, whose health systems contribute disproportionately to global healthcare emissions, have an imperative to act quickly and take action. Middle-income countries have an opportunity to direct investment towards low- or zero-emission healthcare systems. Low-income countries need to deploy low-carbon and zero-emissions technology that enhances their ability to develop their health systems and provide health access and services to all.<sup>103</sup>

With a growing and ageing population, the demand for healthcare is set to increase exponentially in the Middle East in the coming decades, meaning that healthcare systems will have to scale up and expand services while also reducing emissions, in all likelihood increasing the cost of healthcare. Climate change will further add to these rising costs, as seen in other parts of the world—for example, air pollution and climate change are estimated to generate more than US\$800bn in healthcare costs annually in the US.<sup>110</sup> Reducing the climate impacts on the health of the population will also contribute to reducing the burden of disease and pressure on health systems. It also presents an opportunity to redefine how healthcare is delivered. Key areas to explore include establishing “Green UHC [universal healthcare]” by integrating sustainability with UHC and maximising telehealth.<sup>103</sup>

### The role of digital health

Digital health has emerged as a critical tool for enhancing accessibility and availability to quality healthcare while also reducing the sector’s share of greenhouse gas emissions. Shifting to telehealth and virtual services and expanding e-prescriptions and remote monitoring can significantly reduce patient visits, travel time and health system waste. Expanding the capacity and integration of EHRs can assist in monitoring how environmental shifts and climate change affect communities.<sup>111</sup>

The covid-19 pandemic accelerated development in the acceptance and use of—policies to support—telehealth, especially in the UAE. For example, in 2022 Emirates Health Services (EHS), a government healthcare provider, launched a “metaverse platform” to provide medical care to UAE citizens through a virtual space, regardless of the doctor and the patient’s physical location. The “Doctor for Every Citizen” initiative launched by the Dubai Health Authority (DHA) in 2021 provides free consultation and follow-up services through voice and video calls. Meanwhile, the RemoteCare app, launched by the Abu Dhabi Department of Health (DOH), enables patients to receive non-emergency diagnosis and care from their own home.<sup>112</sup>



As part of its Vision 2030 goals and System Transformation Plan, Saudi Arabia is committed to investing heavily in digital health to meet the demands of a large and densely populated nation. As part of reducing its dependency on hospital care and moving towards preventive health services, the Kingdom aims to digitise 70% of patient activities by 2030. A number of apps launched by the Ministry of Health, such as Mawid and Seha, provide virtual consultations and patient support.<sup>113</sup>

Telehealth can have a measurable impact on reducing carbon footprint, and reducing carbon emissions associated with transportation and travel for in-person visits, with estimated savings of up to 372 kg CO<sub>2</sub>e per telemedicine consultation.<sup>6</sup> Although the emissions savings from telehealth will be highly context-specific, depending on the distance to healthcare services and transport used, data from the UK indicate that the widespread adoption of telemedicine services could lead to significant emission reductions, with travel accounting for 10% of the NHS England's carbon footprint; in 2008 an

estimated 5% of all road travel was attributable to the NHS.<sup>114</sup>

Telehealth also offers huge potential for expanding access and reducing unmet care needs, especially in remote areas. In Saudi Arabia, the Saudi Telehealth Network initiative is working to enhance the quality and cost-effectiveness of telehealth, particularly in rural and remote areas.<sup>115</sup> In Egypt, the Hayah Karima (Decent Life) initiative, includes developing telemedicine services in remote and underserved areas of Egypt as part of a plan to develop sustainable rural communities.<sup>116</sup> However, the disparities that impact remote and low-income regions, making them more vulnerable to the impacts of climate change, are also present in access to digital infrastructure. The percentage of the population using the internet ranges from 100% of the population in Qatar and the UAE to 72% in Egypt, 66% in Jordan and 27% in Yemen.<sup>117</sup> For the region to realise the full potential of digital health solutions, addressing digital infrastructure beyond the health sector will be critical.

### 3. Enabling the health co-benefits of collaboration on climate action

Local public health authorities are on the frontlines, yet they seldom have the capacity and resources to prevent, adapt and respond to climate-related health risks. All levels of government must adapt to reduce the health burden associated with climate change. Ms Romanello points to the need for co-ordination between federal and state departments to enable an intersectional approach to health and climate change policy. "You need to have very close links between the ministries of health, of finance, of the environment, along with urban planners," she says. Federal and regional governments can support adaptive capacity, build financial capital, share knowledge and access to technology, and champion an all-of-society approach to climate action.<sup>118</sup>

#### Lessons from the covid-19 pandemic

Lessons from the covid-19 pandemic can inform regional adaptation to climate change and reinforce the importance of collective action toward the protection of global health security. There is an urgent need for better health surveillance, data sharing across borders, and more resilient health systems that are prepared and equipped for emergencies.<sup>119</sup> Both the covid-19 pandemic and the climate crisis disproportionately impact vulnerable communities, including refugees and migrant workers, and deepen existing inequalities.<sup>120</sup> By strengthening capacity, investing in long-term

planning, fostering regional collaboration and protecting vulnerable populations, the parallels of the pandemic and climate change can offer solutions for resilience and sustainability.<sup>121</sup>



## 3.1 A collective response

Although local public health authorities play a collaborator and initiator role in reducing the health burden of climate change, given their proximity to the impacts of climate change on health and knowledge of the local population, all sectors have a role and responsibility. "To be successful, we know that every sector of our economy must be geared towards a greener future," says Dr Al Hosani.

Collaboration and action between health and non-health stakeholders in the pursuit of regional development and climate protection can also enable co-benefits, with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions.<sup>123</sup>

**Table 2: Responsibilities of health and non-health actors in the mitigation and adaptation of climate health risks**

Healthcare sector	Other government sectors	Private sector
<p><b>Policymakers</b></p> <ul style="list-style-type: none"> <li>Disseminate evidence-based guidance on health and climate change risks</li> <li>Identify vulnerable populations and communicate disease burden</li> <li>Develop public health programmes and early warning systems</li> </ul> <p><b>Providers</b></p> <ul style="list-style-type: none"> <li>Collaborate with other players to develop a coordinated community response to concerns linked to health and climate change</li> <li>Educate and train healthcare workers for climate emergencies</li> <li>Monitor exposure to climate risks in the community</li> <li>Adopt sustainable policies and practices to limit carbon emissions</li> </ul>	<p><b>Energy</b></p> <ul style="list-style-type: none"> <li>Support efficient energy access for vulnerable populations</li> <li>Assess health impacts of new energy projects</li> </ul> <p><b>Education</b></p> <ul style="list-style-type: none"> <li>Develop community safety alert systems and preparedness education</li> <li>Embed climate education in schools</li> </ul> <p><b>Environment</b></p> <ul style="list-style-type: none"> <li>Assess health impacts of new energy and infrastructure projects</li> <li>Safeguard freshwater and natural resources</li> </ul> <p><b>Infrastructure and urban planning</b></p> <ul style="list-style-type: none"> <li>Consider population health in urban planning and design choices</li> <li>Support green spaces, active transportation and passive cooling solutions</li> </ul> <p><b>Emergency response and disaster preparedness</b></p> <ul style="list-style-type: none"> <li>Develop disaster response scenarios and plans</li> <li>Train emergency workers and other sectors</li> </ul>	<p><b>Employers</b></p> <ul style="list-style-type: none"> <li>Develop health and safety plans for extreme weather events</li> <li>Restructure business models to align with the green economy</li> <li>Incorporate environment, social and governance (ESG) metrics into incentives</li> </ul> <p><b>Industry</b></p> <ul style="list-style-type: none"> <li>Mandate sector-wide climate-related disclosures</li> <li>Develop associations to support employee activism on sustainability</li> </ul>

Source: US Centers for Disease Control and Prevention. Climate and Health: A Guide for Cross-Sector Collaboration.<sup>122</sup>



## 3.2 Areas for collaboration

### Education

Education is a critical tool in advancing climate mitigation and adaptation. All parties of the UNFCCC have a responsibility for building climate literacy among their populations. Education helps to change attitudes and behaviours and empowers all members of society, particularly young people, to take action.<sup>124</sup>

Education policymakers in the UAE and Egypt have taken steps to incorporate climate education in the school curriculum. In partnership with UNICEF, the UAE Ministry of Education has launched the Greening Capacities Initiative ahead of COP28 to advance climate education and action among school children.<sup>125</sup> In Abu Dhabi, the Environmental Agency (EAD) has also been working with schools in the emirate since 2001 on several initiatives to promote “eco-literacy” and behavioural change.<sup>126</sup> In Egypt, environmental topics and concepts, including climate change, biodiversity and environmental sustainability, have been introduced into the kindergarten and primary education curriculum.<sup>127</sup>

### Reimagining cityscapes

Rapid population growth and urbanisation are forcing regional governments to re-think the design of urban infrastructure to make cities healthier, more sustainable and resilient to the impacts of climate change. In Saudi Arabia, 90% of the population is expected to live in urban areas by 2050, up from 80% in 2022 and a 170% rise since 1960.<sup>128</sup> Meanwhile, Egypt’s urban population is expected to reach 75% by 2050, up from 43% in 2022.<sup>62</sup>

Almost 25% of our health is determined by the environment in which we live. Although certain aspects of our environment are beyond our control, there are many actions that we can take to minimise our exposure to harmful toxins and pollutants, mitigate greenhouse gas emissions, and maximise access to healthcare, social support, greenspaces, and other resources that promote health and longevity.<sup>129</sup> Urban greenspaces can help to reduce exposure to extreme heat, promote natural cooling and help to prevent damage from extreme weather events, protecting health and improving the quality of life of local populations.<sup>130,131</sup>



Regional examples of planned developments include:

- **Sustainable parks in Egypt:** Increasing the per capita share of greenspaces is part of Egypt's urban development plan. The plan includes parks and green spaces that are irrigated with treated wastewater to reduce carbon output and improve the health and quality of life for citizens.<sup>62</sup>
- **Riyadh Green Lung in Saudi Arabia:** King Salman Park, a planned 16 sq km green space in the capital, Riyadh, is being developed as a multi-purpose outdoor space to encourage public participation in sport and exercise and stimulate social connection.<sup>132</sup>
- **Dubai 2040 Urban Masterplan in the UAE:** This comprehensive plan for sustainable urban development aims to double green and recreational spaces and establish "green corridors" to link commercial hubs, residential areas and workplaces, and facilitate the movement of pedestrians and cyclists.<sup>133</sup>

Urban development that integrates green space and the natural environment can provide a magnitude of health and social benefits. Proximity to natural environments is associated with lower stress and increased levels of physical activity.<sup>134</sup> Greater access to greenspaces may also support a reduction in the prevalence of cardiovascular, musculoskeletal, respiratory and other diseases.<sup>135</sup>

#### Keeping populations cool

Despite the region's infrastructural achievements, urban design has been slow to embrace more sustainable cooling solutions. As temperatures reach record-breaking levels,

many of the region's inhabitants are forced to spend an average of nearly 90% of their time in air-conditioned indoor environments, exposing themselves to harmful pollutants at 2-5 times higher levels than those in outdoor spaces.<sup>136</sup> Ms Roschnik says that the region's tendency to combat hotter temperatures with more air-conditioning is misguided, saying, "The danger of being in a higher resource place is that you think technology and money saves the day."

As an active cooling measure, air-conditioning is highly power-intensive—it accounts for nearly 70% of energy consumption in some nations in the region.<sup>136</sup> "Air conditioning units release waste heat to the outdoors," says Ms Romanello. "So while people indoors are protected, walking in a city that has a lot of air conditioning is a nightmare because you're exposed to an enormous amount of heat when you're outdoors."

There is a need for more sustainable passive cooling solutions.<sup>137</sup> Re-engineering air-conditioning units, investing in targeted cooling devices and bringing back natural elements into urban design are some technology-driven steps to implement energy-efficient cooling.<sup>138</sup>

Considering extreme temperatures and the need for passive cooling is becoming a prominent feature of more recent urban development. Saudi Arabia is currently piloting the use of new materials that absorb less solar radiation and better reflect sun rays to cool roads and pavements.<sup>139</sup> Meanwhile, Madinat Al Irfan, a suburban extension of Muscat, the capital of Oman, is being designed to include shaded walkways for a dual purpose—to build a comfortable walking environment and lower cooling loads of buildings in the area.<sup>140</sup> Commenting on developments in the UAE, Dr Al Hosani adds, "The UAE's arid environment and high temperatures has catalysed climate action initiatives that address urban planning, cooling technologies, and the urban heat island effect - which can reduce the risks of heat-related illnesses and heat strokes."

**"The danger of being in a higher resource place is that you think technology and money saves the day."**

Sonia Roschnik, executive director, Geneva Sustainability Centre.



### Aggressive action on decarbonisation

The Paris Agreement calls for all states to drastically reduce their fossil fuel consumption in the near term. Analysis from the Economist Intelligence Unit (EIU) shows that the Middle East lags behind meeting global climate targets.<sup>141</sup> The MENA region possesses 60% of the world's proven oil reserves and 45% of natural gas resources, meaning that countries in this region will not only need to reduce emissions from fossil fuels but also restructure their economies to reduce mitigation costs and the losses from declining fossil fuel exports.<sup>142,143</sup> Although oil-producing countries in the region are rapidly expanding climate change initiatives, which include transitioning to green energy and net-zero goals, fossil fuel production also continues to increase.<sup>144</sup>

Despite delayed momentum, the region is taking steps to pivot away from carbon-intensive sectors and operations. Examples include Abu Dhabi Airports exploring smart mobility options such as electric take-offs, and Saudi Aramco, the Saudi national oil firm, implementing new low-carbon petrochemical developments, funded by financial returns from conventional oil and gas activities.<sup>145,146</sup>

"Discussions that we've been having with the region in the context of COP28 indicate that they're not married to fossil fuels," says Ms Romanello. "[Countries] want to develop renewable energy technologies and I think this is

where the opportunity for health comes for this region." While many countries in the region are heavily dependent on fossil fuel revenue, they are also acutely aware of the negative effects of climate change on health. It's important that regional climate change initiatives do not mask an urgent need for aggressive action on decarbonisation.

### Stronger together

Local and regional networks and coalitions have an important role in formalising the relationship between health and non-health sectors towards a common goal of reducing climate risks. "These issues can only be dealt with through a broader public health strategy and that means working with the interface between the organised healthcare system, public health and other sectors that determine public health," says Dr Haines. "Climate change affects absolutely every one of the pillars of health, and that touches upon the different sectors of our economies and governments," adds Ms Romanello. "Everyone needs to be in the room with the health professionals."

The UAE Climate Change Research Network (CCRN) is an example of national multisector coordination. Ms Samara, the co-chairperson of the CCRN, explains that the network is designed to bridge gaps between climate scientists, researchers and policymakers, and remove barriers towards the creation of shared local knowledge databases. "A lack of climate literacy on all levels and a lack of adequate data hamper the development of evidence-based adaptation strategies," says Ms Habib. "This can also lead to limited awareness of the health risks imposed by climate change." She adds that collaboration between governments, international organisations, civil society and the private sector is essential to overcoming such challenges.

Although the health risks of climate change will be experienced by all countries in the Middle East, these effects are not felt equitably across the region.<sup>147</sup> Fostering capacity-building and knowledge exchange is vital for the region

**"Climate change affects absolutely every one of the pillars of health, and that touches upon the different sectors of our economies and governments. Everyone needs to be in the room with the health professionals."**

Marina Belén Romanello, executive director, Lancet Countdown: Tracking Progress on Health and Climate Change.

to improve infrastructure, service delivery and overall health resilience. The Abu Dhabi Department of Health (DOH) is the first regional health authority to join the Partnership for Health System Sustainability and Resilience, an international collaboration that brings together academic, governmental and private institutions to explore novel solutions in research, digital health and innovation, with the aim of protecting healthcare systems against future crises, including climate change, natural disasters and pandemics.<sup>148</sup> Ahead of COP28, the UAE health ministry will co-chair the Alliance on Transformative Action on Climate and Health (ATACH), a WHO-led platform of over 73 countries committed to building climate-resilient, low-carbon and sustainable health systems, providing an opportunity to strengthen global collaboration.<sup>149</sup> “Mitigation and adaptation through greater collaboration are vital tools in our fight against climate change,” says Dr Al Hosani, adding that “the

UAE believes collaboration is the key to finding solutions to the challenges arising from climate change and we will put the need for a united, solutions-based approach at the core of COP28 presidency.”

More vulnerable lower-income and conflict-affected countries, which will be forced to adapt at a much quicker pace than higher-income and more stable countries, may also be a source of inspiration for neighbouring countries on how to do more with less. Ms Roschnik highlights the two-way benefits of knowledge-sharing: “I hope that lower-resource countries will pave the way for higher-resource countries, because they have to be more creative, more innovative and have had to manage with lesser resources. They tend to see the interconnection between adaptation and mitigation as being something you need to do together.” As for the collaboration between Middle East countries, there are many “opportunities for joint initiatives, knowledge-sharing networks and collaborative research projects,” says Dr Al Ghaithi. “These approaches can foster collaboration, knowledge exchange, and improve healthcare outcomes in the Middle East region.”

**“I hope that lower-resource countries will pave the way for higher-resource countries, because they have to be more creative, more innovative and have had to manage with lesser resources.”**

Sonia Roschnik, executive director, Geneva Sustainability Centre.

# Call to action



Climate change is one of the greatest risks to the health and longevity of current and future generations. The Middle East is home to a young population, with about half currently under 25. The population is projected to increase by over 34% by 2050, from 500m in 2023 to 675m.<sup>150</sup> As such, managing the impacts of climate change on health and longevity will be crucial, especially as the severity of the impacts become increasingly evident.

International efforts towards mitigation targets are falling behind the Paris Agreement goals, with the world on track for a temperature rise of 2.4-2.6°C, and 5°C in the Middle East, by the end of the century.<sup>151</sup> If not addressed today, climate change will have a compounding and detrimental effect on the health of future populations, with far-reaching societal and economic consequences.

The impact of climate change is hitting the Middle East region at a much quicker rate than other parts of the world, increasing the imperative for regional governments and policymakers to take meaningful action. We have identified a number of common priorities under three key pillars—knowledge empowerment, climate-smart health systems and multisector action—to guide regional stakeholders in mitigating and adapting to the impacts of climate change while also supporting the health and longevity of their populations.

## Knowledge empowerment

### 1. Build awareness, education and accountability across all sectors and all levels of society

Every sector, stakeholder and individual should be aware of climate risk factors and their potential impact on human health. They should also be knowledgeable of, and accountable for, their contribution to climate change. Healthcare workers need to inform, educate and empower their patients to protect their health, while public health campaigns need

to cultivate climate health literacy among the general public. Climate education in schools needs to empower the region's large youth population to take a leading role in influencing and advocating for responsible climate behaviour and stronger political commitment while also developing behaviours that support personal and environmental health.

## **2. Improve surveillance, data collection and monitoring**

Although the health impacts of climate change are recognised in Nationally Determined Contributions submitted to the UNFCCC, the region lacks comprehensive data and legitimate evidence of the region's climate change aspects and their direct impact on human health. Actions adopted by countries in the region largely depend on data and findings derived from international studies. Given the unique and elevated risk factors in the region, climate change policy, laws and plans in the Middle East must be supported with accurate data and ongoing surveillance. Recent developments in digital health infrastructure, health information systems and infectious disease surveillance infrastructure provide an opportunity to collect and monitor data on at-risk patients, morbidities and mortality linked to climate change.

## **3. Reinforce regional evidence on the link between climate change and health**

Although it is undeniable that climate change is adversely impacting health and wellbeing in the region, there is a need for ongoing research to establish the relationship between climate change exposure and disease incidence, particularly in areas that are unique or more pronounced in the region, such as the link between sandstorms and cardiovascular and respiratory diseases. Evidence that quantifies the health impacts of climate change in the region, in terms of preventable human suffering and unnecessary financial cost, will help to raise the alarm and build an investment case for climate mitigation and adaptation efforts. There is also a need for research and impact studies to measure the effectiveness of national mitigation and adaptation policies.

## **Climate-smart health systems**

### **4. Progress from planning to implementation of national health adaptation plans**

Although overarching climate change mitigation policies and strategies have been developed to support net-zero and renewable energy adoption, national health adaptation plans (HNAPs) have been slower to take shape. Given the accelerated rate of climate change in the region and its potentially devastating impact on the health and wellbeing of populations, developing comprehensive, feasible and implementable HNAPs is an urgent necessity. While adaptation plans will need to account for the unique country dynamics and health systems across the region,

all plans should also consider future population needs and health system requirements, the need for training and capacity building within the health sector, cross-sector coordination, and budget allocation.

### **5. Strengthen the capacity of health systems to prevent, prepare for and respond to climate change**

Strengthening the ability of regional health systems to prevent, prepare for and respond to climate risks—through the development of robust surveillance and early warning systems, and a healthcare workforce trained to identify and manage the health risks of climate change—is essential as climate-related risks intensify and pressure on health systems grows. Managing these risks will also require a focus on upstream interventions that prevent disease and promote population health.

### **6. Lead by example on national and regional decarbonisation efforts**

Health systems, particularly those in higher-income states in the region, have an imperative to adopt initiatives towards building an environmentally sustainable health sector, which includes reducing emissions and waste and holding suppliers accountable for their climate commitments. Regional healthcare systems, particularly those in the GCC, are currently in a phase of transformation that is seeing healthcare move away from traditional hospital-based infrastructure to treating patients closer to home through the wider adoption of telehealth and digital health technologies. Emerging innovations such as remote monitoring devices and AI-powered telehealth consultations provide an opportunity to improve patient experience and outcomes while removing travel to healthcare facilities and reducing health system waste.

## **Multisector action**

### **7. Integrate health into national mitigation and adaptation strategies**

The factors that contribute to the adverse impacts of climate change on health are largely beyond the control of the health system. Developing cross-sectoral national policies and partnerships is essential for mitigation and adaptation strategies that address the impact of climate change on health. Key sectors such as transport, energy, agriculture, social services, water and waste-management should be aware of and accountable for how their activities contribute to climate change and impact the health of communities. They should also undertake mitigation and adaptation activities that help progress towards a sustainable future and improved population health.

### **8. Realise the co-benefits of healthy urban design**

Cities and urban centres in the Middle East are under pressure to accommodate increasing populations and mitigate the impact of environmental exposures and climate-related disasters. Policymakers



should consider the co-benefits of public health action and environmental sustainability in current and future urban development. For example, urban infrastructure incorporating the natural environment and green space can protect biodiversity, improve air quality, reduce exposure to extreme heat and enhance mental health. Improving public transport networks and developing active transport systems such as bike sharing can increase physical activity while reducing greenhouse gas emissions. Such development will also need to consider the region's extreme summer temperatures by incorporating innovations in shading, natural ventilation and evaporative cooling.

### **9. Expand the scope of climate mitigation and adaptation beyond national borders**

Most climate-related risk factors expected to impact human health in the region are not limited by national boundaries. Climate mitigation and adaptation policies and plans must have a regional scope and feed into wider development strategies. Given that the region's countries have similar demographics and risk factors, integrating systems to share morbidity and mortality data related to climate change and surveillance of infectious diseases can help to strengthen regional climate resilience and evidence-based policymaking. Recognition of shared vulnerability also demands recognition of regional economic disparities. Wealthier Middle East nations, which contribute disproportionately to greenhouse gas emissions, will need to think beyond national borders with regard to climate action and financing.



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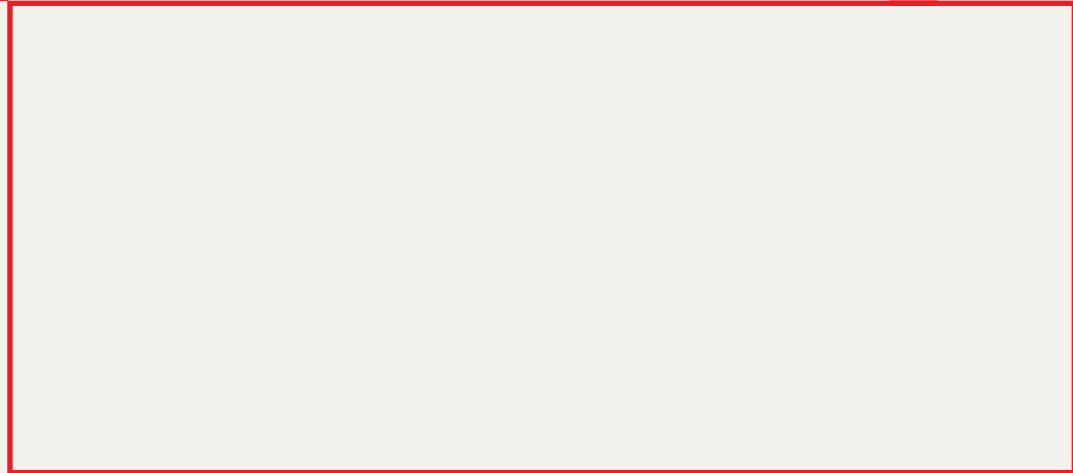
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