Healthy & Resilient Cities

Briefing Paper

Drawing on data from the 2023 report of the Lancet Countdown on Health and Climate Change, this paper aims to support mayors, urban planners, architects, engineers, health practitioners, ministries, community organisations, and the private sector to accelerate urban action on addressing climate change and its growing health impacts.

Setting the context: Climate health threats facing cities

Climate change presents a fundamental threat to the health, livelihoods, and survival of people in every country and is the biggest threat to global health of this century.[1,2,3] The health impacts of climate change are already being felt today: heat-related mortality air pollution and morbidity are rising; life-threatening extreme weather events are becoming more frequent and intense; and environmental conditions are increasingly favouring the spread of deadly climate-sensitive infectious diseases like dengue, malaria, vibriosis, and West Nile virus.[1] Beyond these direct health impacts, climate change is also affecting the socioeconomic conditions that influence people's health profile. For example, rising heat is increasingly limiting people's labour capacity, with 490 billion hours of potential labour lost in 2022 alone, resulting in total potential income losses worth US$863 billion that year.[1] Despite the rapidly growing hazards, adaptation efforts are lagging, with marked global inequities. The most vulnerable communities are facing the soaring risks unprotected.[1,4] Healthcare systems worldwide are already stretched, and the impact of additional climate-related illness could be devastating.

With 56% of the world's population (4.4 billion people) currently living in cities, and nearly 70% predicted to do so by 2050,[5] cities must take centre stage in addressing the health impacts of climate change. In a scenario where no further climate action is taken, C40 Cities research has shown that, by 2050, over 1.6 billion residents in 970 cities will face extreme heat, 800 million urban residents in 570 cities will be at risk from sea-level rise and 650 million people in 500 cities will experience increased freshwater insecurity.

On the occasion of the first-ever dedicated health day at the 28th Conference of the Parties (COP28) of the United Nations Framework Convention on Climate Change (UNFCCC), Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization (WHO); Dr Sultan Ahmed Al Jaber, President-Designate of COP28 United Nations Climate Change Conference; and Dr Vanessa Kerry, WHO Special Envoy for Climate Change and Health have called for "governments and key stakeholders around the world to come to COP28 with ambitious solutions that prevent these health outcomes – and help those already affected."[3]

Creating a new model for cities that achieves ambitious climate goals while enhancing social and economic performance and addressing public health concerns stands as one of the biggest challenges – and greatest opportunities – for health in urban centres of this era. Current practices in urban design, technology implementation, and policymaking fall short. There is currently a unique, but time-limited, opportunity to reimagine how urban planning, architecture, engineering, city mayors and city officials, health professionals, and businesses can work together alongside local communities to make the worlds' cities more healthy and resilient places to live.

Some cities are already making great strides on climate action, leading the energy transition by shifting demand to clean energy, retrofitting buildings, encouraging active and public transport modes, and changing their food and waste networks.

However, to address the health impacts of climate change at a city-level, maximise the health benefits of climate action, and prevent any unintended harms, cities need to adopt a multisectoral approach that recognises that public health is not just the concern of healthcare professionals and governments, but also of urban planners, engineers, and architects, working in collaboration with local communities. While there is no one-size-fits-all solution, as cities have their own distinct histories, cultures, and characteristics, the principle of putting health at the centre of all climate policies applies to all.

As cities accelerate urban adaptation and mitigation, there is an unprecedented opportunity to create new models for cities that put health and wellbeing at the centre of our everyday lives. Indeed, when health co-benefits are accounted for, the benefits of climate action vastly outweigh the cost of implementing the necessary interventions.[7,8] This will require moving away from a healthcare system that just reacts to disease and injury, to one that also prioritises wellbeing– focusing on prevention, self care, and personalisation and embracing digital health solutions when appropriate.

Health-centred urban redesign can contribute to substantial greenhouse gas (GHG) emissions reduction and improved resilience to climate change, while simultaneously providing immediate and substantial benefits to the physical and psychosocial health of urban populations. Urban systems and infrastructures can be transformed to enable equitable access to sustainable and high-quality foods, transition to zero-carbon energy, improve energy efficiency, and establish more resilient water and sanitation services. If made including a health lens, these changes that can lower GHG emissions and increase resilience can also reduce risk for communicable and noncommunicable diseases. Pro-social community-based city planning policies that re-imagine urban places, increase urban green and blue space coverage, and provide access to affordable and high-quality public transport can–if designed with people's health, wellbeing, and safety as a core priority–promote higher levels of physical activity, increase exposure to nature, and support more liveable cities with increased work-life proximity and a healthy social fabric. Such policies could reduce urban air and noise pollution, reduce road accidents, promote social recreation and interaction, and provide overall benefits to physical and psychosocial health. Together, these approaches provide an unprecedented opportunity to create new models for cities that reimagine healthcare both inside and outside of hospital walls, in a way that is more sustainable for both people and the planet on which their health and wellbeing depends.

Case for action: growing health threats of climate change

On average, there were 94% more annual heatwave days globally in 2013-2022 than in 1986-2005[1]

Due to the scarcity of vegetation and water bodies that provide local cooling, the high proportion of the surface area in urban centres that is covered by heat-absorbing and re-emitting surfaces, along with the heat emitted from road traffic and air conditioning units, urban centres exhibit higher temperatures than rural areas (the so-called urban heat island effect). As a result, city dwellers are particularly exposed to health-threatening extreme heat, adding strain to the body as it tries to cool down. If people are unable to regulate their body temperature it can lead to hyperthermia, heat stress, and, in the most severe cases, to heat stroke and death.[1,9] Exposure to extreme heat can also exacerbate heart, lung, or acute kidney disease; increase the risk of adverse birth outcomes, and harm to the unborn child; and increase the risk of mental ill-health.[1,9] Marginalised, minoritised, and otherwise underserved populations are particularly at risk from the adverse effects of heat exposure, which exacerbates city-level health inequities. These groups might not have necessary access to health services, especially during extreme heat events, and they might have little or no access to preventative measures.[10] People living in isolation, those living in overcrowded dwellings, or those whose homes are not adequately insulated or lack cooling services, are particularly prone to extreme heat exposure.[10] In the C40's Future We Don't Want analysis, over 1.6 billion people living in nearly 1,000 cities will face regular, extreme heatwaves in under 30 years' time unless emissions are cut.[6]
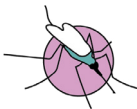
The basic reproductive number (an indication of contagiousness) for mosquito-borne dengue transmission has increased by nearly 30% from 1951-1960 to 2013-2022[1]

Environmental changes associated with climate change are altering the spread of many climate-sensitive infectious diseases. Urban environments, with large populations, plentiful vector breeding sites, and rapid rates of land-use change, are hotspots for the transmission of dengue and other vector-borne diseases.[11] Since 1990, global cases of dengue have doubled every decade; almost half of the world population is now at risk.[12] The ability to manage this growing risk of disease transmission is not being met with an increase in preparedness, leaving people unprotected in the face of the growing risk of disease transmission.

The Intergovernmental Panel on Climate Change (IPCC), in their Sixth Assessment Report, stated that "it is an established fact that human-induced greenhouse gas emissions have led to an increased frequency and/or intensity of some weather and climate extremes since pre-industrial time … in particular for extreme precipitation, droughts, tropical cyclones and compound extremes"[13]

Climate shocks and growing stresses, such as changing temperature and precipitation patterns, drought, floods, and rising sea levels degrade the environmental and social determinants of physical and mental health. Fires, floods, and storms can damage urban infrastructure, including hospitals and emergency services, making it challenging to provide necessary medical care during and after these events.[14]

Case for action: health opportunities of an accelerated response

Fine particulate matter (PM$_{2.5}$) outdoor air pollution derived from human activity (anthropogenic) was responsible for 3.3 million deaths globally in 2020[1]

Cities could play a central role in reducing air pollution, through activities that support access to clean renewable energy, phase out fossil fuels, and enable and encourage active transport. These interventions, taken together, would not only save hundreds of thousands of lives each year from improved air quality, but also reduce GHGs.

Fine particulate matter increases the risk of a range of diseases including lung disease, cardiovascular disease, numerous forms of cancer, and adverse birth outcomes.[15] Air pollution exposure as brief as a few hours can exacerbate cardiovascular and respiratory disease.[15,16] The burning of fossil fuels, the main single contributor to anthropogenic GHG emissions, and human-made climate change, caused 1.2 million of these deaths.[1] Fine particulate matter from the global transportation sector was responsible for about 460,000 deaths in 2020, with fossil fuels accounting for around 95% of all road transport energy.[1] Exposure to air pollution (and therefore its associated adverse health outcomes) tends to be particularly high in urban centres due to high levels of polluting road transportation and dirty fuel burning for heating, cooking, and other activities.[17]

With 70% of the world's population projected to live in cities within the next few decades, urban redesign has the power to provide health benefits for billions of people[5]

With the number of cities growing, embedding a health-centred approach to urban redesign will help improve air quality and building energy efficiency, increase green and blue spaces, encourage recreation and social interaction, and support substantial improvements to psychosocial and physical health outcomes, including preventing obesity, type-2 diabetes, and congestive heart failure.[19]

In low Human Development Index (HDI) countries, the proportion of urban areas with moderate or high levels of green space decreased from 18% in 2015 to 13% in 2022[1]

Urban green spaces can reduce exposure to health-threatening heat, by providing local cooling and shading.[20] Despite these benefits, on average, the global level of exposure to urban green space remains low, and countries within the low Human Development Index category had the lowest average level of exposure to urban green space, with only 13% of urban centres having at least moderate levels of exposure to greenness in 2022.[1] Urban green space coverage is often lower in less affluent urban areas, or in neighbourhoods with high density of minoritised populations, further exacerbating health inequities.[21]

In 2021, only about a third (28) of 84 countries that responded to the WHO Health and Climate Change country survey reported having climate-informed health early warning systems in place for heat-related events, and 26 (30%) of 86 countries reported having them in place for other extreme weather events. Only six (13%) of 47 countries had climate-informed surveillance systems for mental health risks[18]

Climate-informed health surveillance, early warning, and early response systems are crucial in preventing adverse health outcomes from climate-related health hazards, including extreme heat exposure and other extreme weather events. Climate change is leading to increasingly frequent and severe extreme weather events that threaten health directly, through injury, impacts on mental health, and death; as well as indirectly, by disrupting essential health-supporting services, favouring infectious disease transmission, leading to economic losses, and affecting the social fabric. Climate-informed health surveillance, early warning, and early response systems are crucial in preventing adverse health outcomes from climate-related health hazards, including extreme heat and other extreme weather events. They can help the population prepare and protect from extreme weather from these events, support the uptake of behavioural changes that reduce people's vulnerability, and give early response and treatment to those whose health is affected. These systems require a close coordination between meteorological and health services and the strengthening of the health system's capacities to respond to acute impacts from climate-related health hazards. In particular, they need to be tailored and directed towards vulnerable populations (including marginalised and minoritised communities), to avoid an exacerbation of health inequities. However, in 2021, only 30 of 78 (39%) countries that responded to the WHO Health and Climate Change country survey reported having climate-informed health surveillance systems for vector-borne diseases, 25 (32%) for waterborne diseases, 23 (35%) of 65 countries for airborne diseases, and 14 (21%) of 66 countries for zoonoses.[18]

Five key principles are needed to drive climate action that protects and enhances people's health and wellbeing:

Redesign cities with a health lens

Turn existing urban design, architecture, and city planning processes and tools into instruments for improving health outcomes across neighbourhoods and entire cities. Use principles of sustainable urban design to create healthier, more resilient cities (see page 9 for an overview of key frameworks).

Promote and enable collaboration across sectors

Enable, generate, and strengthen avenues for cross-disciplinary collaboration, recognising that public health is not just the responsibility of healthcare professionals and governments but rather of all actors with agency over the physical, economic, and environmental determinants of health, including urban planners, engineers, architects, businesses, and local communities.

Engage and involve local communities

Engage local communities and consider inequalities to local risks, needs, inequalities and cultures, and preferences to ensure that action on climate change and health is relevant and successful. As part of that engagement, inform, involve, and build residents' capacity to participate, as this is more likely to lead to increased support and impact.

Prioritise actions with climate and health co-benefits

Identify and prioritise actions with simultaneous climate change and health benefits, and enable key behaviour shifts that simultaneously improve public health, reduce greenhouse gas emissions, and build resilience.

Embrace innovation

Promote scientific research and development and closer engagement between innovation, technology, science, and policy making to design innovative approaches that deliver urban sustainable development.

Defining a health-centred city response: cross-cutting recommendations to address growing health threats of climate change and support an accelerated response

1   **Increase fair, affordable, and just access to clean renewable energy**, phasing-out the use of fossil fuels for all sources of urban energy supply, upscaling electric grids, increasing energy storage systems, and improving energy efficiency, acknowledging fossil fuel burning as the largest contributor to climate change and a major driver of air pollution.

2   **Create and resource multi-sectoral, city-level leadership groups** that can develop and implement climate and health action plans. Integrate health considerations across city-wide climate mitigation and adaptation programmes, urban planning, transportation, and infrastructure. As part of this, ensure collaboration between health, meteorological, and emergency management services.

3   **Transition away from fossil-fuel powered vehicles in cities**, including both private and public transport vehicles. Increase use of high-quality, zero-emission public transportation, and promote active transport modalities, such as walking and cycling, to help simultaneously reduce transport-derived greenhouse gas emissions, noise pollution, and non-communicable diseases.

4   **Increase the coverage of quality green space** by protecting existing sites, developing new areas, and integrating greenness into urban planning. Increase greenness in a variety of forms, including pocket parks, green corridors, tree canopies, and surface greenery such as green roofs, urban forests, and vegetated vertical surfaces.

5   **Conduct thorough city-wide health climate change and vulnerability risk assessments**, and use findings to inform interventions, prioritising actions with both climate and health benefits.

6   **Implement climate-informed surveillance, early warning, and early response systems,** in alignment with the WHO's recommendations,[7] informed by the climate change risk and vulnerability assessments, to protect urban populations from the risk of climate-sensitive infectious diseases. Use these systems to inform health policy and intervention priorities, including preventative measures like campaigns to eliminate mosquito breeding sites or to increase personal protection from mosquito bites, particularly during high-risk seasons.

7   **Build resilient, sustainable, and zero-emission health systems** in alignment with the COP26 Health Programme (see page 9 for an overview of key frameworks), and following the recommendations, priorities, and targets of the WHO's Alliance for Transformative Action on Climate and Health. Leadership from the health sector to create sustainable systems can also have a broader in impact on mitigation efforts, by helping to reduce its 4.6% contribution to global GHG emissions.

8   **Embed a health-centred, climate-resilient approach to urban redesign**, that supports architects, designers, health professionals, and city officials to collaborate in ways which deliver health benefits through climate action.

9   **Proactively engage local communities** and other key stakeholders in the design and management of urban environments, ensuring local realities and experiences shape plans and decision-making.

Goals and guidance

Global goals and commitments

- The Sustainable Development Goals, specifically Goal 11 - making cities, and human settlements inclusive, safe, resilient, and sustainable – and gaols 2, 3, 6, 7, 9, 10.

- Paris Agreement provisions relating to health 39, 40, 42, 43.

- COP26 Health Programme, the Alliance for Transformative Action for Climate and Health, and the Sustainable Markets Initiative: Health Systems Task Force.

- The European Green Deal seeks to address climate change challenges faced by cities in three ways: renovating buildings, protecting nature, and making transport sustainable.

Guidance

- The New Urban Agenda adopted at the United Nations Conference on Housing, and Sustainable Urban Development (Habitat III) in 2016 lays out standards and principles for the planning, construction, development, management, and improvement of urban areas to support cities sustainable development.

- UN-Habitat's A New Strategy of Sustainable Neighbourhood Planning: Five Principles to support compact, integrated, and connected cities.

- OECD Resilient Cities Framework explores a working definition indicators of a resilient city, and the policy actions that can be taken by city, and local government.

- Sendai Framework for Disaster Risk Reduction 2015–2030

- 2030 Districts Network is a global network of stakeholders in the built environment focused on reducing energy use, water consumption, and transportation emissions.

- C40 Heat Resilient Cities benefits tool enables city planners, and decision-makers to quantify the health, economic, and environmental benefits of common urban heat adaptation actions.

Design and building frameworks

- The Royal Institute of British Architects has developed the 2030 Climate Challenge to help architects design within a climate conscious trajectory.

- The American Institute of Architects 2030 Commitment provides a set of standards for reaching net zero emissions in the built environment, while the Framework for Design Excellence defines 10 principles of good design in the 21st century.

- The International Green Construction Code (IgCC) provides the design, and construction industry with an effective way to decrease energy usage, and carbon footprints, and establishes guidelines, and standards that promote energy efficiency, water conservation, indoor air quality, and the use of environmentally friendly materials.

- The Leadership in Energy and Environmental Design (LEED) green building certification system developed by the U.S. Green Building Council (USGBC).

- C40 Cities Climate Action Planning Framework.

- Building Research Establishment Environmental Assessment Method is a comprehensive and internationally recognised framework to guide best practice in sustainable design, and construction.

- The WELL Building Standard (v2) is a performance-based system which focuses on air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, community, and innovation.

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