UNITED FOR GLOBAL MENTAL HEALTH

CLIMATE CARES
Mental health in the climate crisis

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Protecting mental health from extreme heat

Recommendations for policy and action

Executive summary

Extreme heat is one of the most immediate and rapidly worsening consequences of climate change. It comes with serious implications for mental health. Evidence shows that exposure to high temperatures increases mortality among people living with mental health conditions, raises rates of psychiatric hospital admissions, and heightens suicide risk. Yet, mental health remains poorly integrated into heat action plans around the world.

In this report we examine 143 heat action plans and find that:

57%
mention mental health

24%
consider mental health in a meaningful way, e.g., by detailing specific mental health impacts or related interventions

14%
include specific interventions to address the mental health impacts of heat

Overall, mental health is usually only included in heat action plans in a superficial way – if it is mentioned at all – and rarely translated into concrete, resourced and targeted action.

However, around the world, governments, local organisations and communities are intervening to protect people's mental health from the impacts of extreme heat. This report showcases six case studies of successful efforts to protect people's mental health against extreme heat.

The report recommends that national, regional and local policy makers working on heat action plans and mental health action plans:

1. Recognise the negative impacts of heat on mental health.
2. Highlight the heightened risk faced by people living with mental health conditions during extreme heat, particularly those with severe mental health conditions.
3. Monitor the impacts of extreme heat on mental health to inform early-warning and heat-adaptation responses.
4. Ensure tailored and evidence-informed actions are implemented to protect and promote mental health during extreme heat.

Image: Mohammed Hassan



Introduction

The world is warming at a rapid pace. Over the course of this century, global temperatures are projected to rise by 2.3-2.5°C relative to pre-industrial levels. This is contributing to more prolonged and extreme heatwaves around the world, with growing numbers of people being exposed to dangerously high temperatures. Modelling suggests a child born today will experience on average seven times more heatwaves than their grandparents due to climate change. This is impacting our health. Already, rising global heat levels are killing one person a minute around the world.

Heat is also harming our mental health, according to a growing body of evidence.

Research has linked higher temperatures to:

- **elevated mortality among people living with mental health conditions**
- **more hospital admissions and emergency department visits for psychiatric disorders**
- **increased suicide risk**

One meta-analysis found heatwaves were associated with a 9.7% increase in hospital admissions for mental health conditions. It also identified a 1.5% increase in suicide deaths per 1°C mean monthly temperature rise. A separate meta-analysis revealed a 2.2% increase in mental health-related mortality per 1°C rise in temperature. These links appear particularly pronounced for people living with severe mental health conditions, such as schizophrenia. During the 2021 "heat dome" event in British Columbia, for example, living with schizophrenia was associated with a threefold increase in mortality risk.

Beyond these acute outcomes, heat has also been linked to worsening population-level emotions.

The reasons why we see the impacts of heat on mental health are likely to span biological, psychological and social factors, including sleep disruption, the side effects of medication, social isolation and food insecurity.

Box 1 illustrates lived experiences of the mental health impacts of extreme heat from around the world.

Despite this growing evidence, mental health remains poorly integrated into action plans designed to protect people from extreme heat. A global review of 83 heat-health action plans (HHAPs) across 24 countries found that while 76% mentioned mental health, only 22% included specific mental health interventions, and actions were rarely linked to dedicated resources or monitoring frameworks (see Box 2).

This policy brief aims to:

(i) provide a snapshot of how mental health is covered within heat action plans
(ii) use concrete case studies to show how mental health has been successfully integrated into heat action
(iii) offer practical recommendations developed by global experts for policymakers working on heat action plans on how to better consider mental health

Key terms

Climate change - A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UNFCCC).

Climate adaptation - The human process of adjusting to the actual or expected climate and its impacts in order to reduce harm or to benefit from opportunities (IPCC, 2023).

Heat - Hazardous and dangerous heat experienced over prolonged periods of time (e.g. over days) and due to weather conditions, rather than heat generally or short/acute exposures in artificial settings (e.g., saunas). The definition includes extreme heat from hot weather and heatwaves, as well as heat that is not extreme (for instance high minimum or overnight temperatures), but may still pose health risks. What constitutes dangerous or health-affecting heat will differ in different contexts depending on local baselines and interactions with other meteorological and environmental variables, such as humidity.

Mental health - Mental health is a state of mental wellbeing that enables people to cope with the stresses of life, realise their abilities, learn well and work well, and contribute to their community (WHO).

Mental disorders - A mental disorder is characterised by a clinically significant disturbance in an individual's cognition, emotional regulation, or behaviour. It is usually associated with distress or impairment in important areas of functioning. There are many different types of mental disorders. Mental disorders may also be referred to as mental health conditions (WHO).

BOX 1.

Living through heat: lived experiences of the mental health impacts of extreme heat from Australia, India, Nepal and Pakistan

Lived experiences shared by members of United for Global Mental Health's Lived Experience Advisory Group on Climate Change, the Environment and Mental Health highlight how extreme heat shapes people's emotional wellbeing, daily functioning and ability to cope with everyday life. Many of these impacts are often poorly recognised and rarely captured within formal health and emergency response systems.

Across all four countries, members described heat as becoming increasingly difficult to manage. This was the result of a combination of high temperatures, humidity, trapped indoor heat, unreliable electricity and water access, smoke exposure, crowded living conditions and poor sleep.

In **India** and **Pakistan**, prolonged power outages and homes that remained unbearably hot well into the night were said to be particularly exhausting. In **Nepal**, heat increasingly combined with flooding, drought and ecological disruption. While in **Australia**, prolonged heatwaves were closely linked to bushfires, smoke exposure and climate disaster fatigue.

Several members described the emotional burden of heat as cumulative and difficult to escape. One member reflected: *"By March, I already start dreading it. Heat is one thing, but it's the exhaustion that follows you everywhere – at home, at work, in your sleep – that nobody really talks about."* Others highlighted how homes often remained extremely hot overnight, making it difficult to rest or recover physically and emotionally.

The impacts of heat were described as contributing to exhaustion, irritability, low mood, disrupted sleep and reduced capacity to manage daily demands. Members highlighted how these problems disproportionately affected people already experiencing social or economic vulnerability, including outdoor workers, low-income households, older people living alone and those with chronic physical or mental health conditions. Women were often described as the worst hit, especially during childcare, cooking and other household chores in poorly ventilated homes.

Several reflections also linked sustained heat exposure to interpersonal tension and emotional overwhelm. As one member noted: *"The irritability, the low mood, the sense of being overwhelmed – these tend to get absorbed as personal failings rather than recognised as responses to an exhausting and largely uncontrollable environment."*

Members consistently noted that existing heat responses focus almost exclusively on protecting people's physical health, while largely ignoring emotional and psychological wellbeing. As one member observed: *"Most heat-related messaging focuses on hydration, staying indoors, or avoiding heat stroke, but there is very little discussion around mental health or emotional distress."* Crisis lines – including Australia's Lifeline and Beyond Blue, India's tele-MANAS and Nepal's national helpline – operate year-round but carry no heat-specific mandate and are not proactively activated during heat events.

Informal support systems, including neighbourhood check-ins, family support, shared cooling spaces and community networks, were described as essential during periods of extreme heat, especially when formal systems were limited, inaccessible or poorly-resourced. These experiences clearly demonstrate the need to recognise heat not only as an environmental or physical health issue, but also as a growing mental health and wellbeing challenge, requiring context- and community-informed responses.



Image: Robert Eklund

BOX 2.

Mental health in heat-health action plans

In 2025, Stewart-Ruano et al. published a global review entitled A Critical Gap in Addressing Mental Health in Heat-Health Action Plans Worldwide. It examined how mental health is addressed in 83 heat-health action plans from 24 countries, published between 2009 and 2024, covering approximately 2.2 billion people. Heat-health action plans (HHAPs) are coordinated public health policies to prevent and respond to the health impacts of extreme heat (see WHO 2026 guidance on HHAPs).

Of the heat-health plans assessed, 44 (53%) came from high- and upper-middle-income countries, while none at all came from low-income countries. Among lower-middle-income countries (39 plans), most plans came from India (35; 90%).

While 63 (76%) of plans mentioned mental health, most of these went into very little detail. Only 26 (31%) explicitly described the mental health impacts of extreme heat, and just 18 (22%) included specific mental health interventions. In most cases, references to mental health were brief and lacked detail.

The most commonly cited mental health outcomes of extreme heat were anxiety, depression, suicide and sleep disturbances. The mental health-related risk factors identified for heat stress included pre-existing mental health conditions, use of medications to treat mental health conditions, substance use and social isolation. Plans often overlooked important connections between heat and mental health, such as the effects of heat on social isolation, displacement and migration, food and water availability, economic security, and sleep.

Most interventions were at the society level, with individual or community-level support given little attention. People with mental health conditions were commonly grouped with other vulnerable populations, without tailored support. Actions to address mental health in the context of extreme heat were seldom linked to dedicated resources or monitoring frameworks.

Mental health risks from extreme heat are increasingly acknowledged, but the review concludes that most heat-health action plans do not yet translate this understanding into comprehensive, targeted and resourced mental health responses.

This policy brief expands on this review by broadening the search beyond HHAPs. It includes a wider set of documents, such as global heat-related policies and heat action plans generally.

Image: Joshua Fernandez

Main findings

- Heat action plans were identified across 40 countries, alongside 11 policies with a global focus.
- Of the 143 heat action plans we examined, 82 (57%) mentioned mental health.
- However, only 34 of the plans (24%) mentioned mental health meaningfully, e.g., by detailing specific mental health impacts or related interventions.
- People with pre-existing mental health conditions were identified as an at-risk group for heat-related mental health impacts and/or worsening health outcomes in 26 action plans (18%).
- Interventions to address the mental health impacts of heat (e.g., heat warning systems and targeted outreach for people at risk, particularly those with mental health conditions) were mentioned by only 20 (14%) of the action plans.

Detailed findings

This narrative review is based on an analysis of 143 heat-related action plans from around the world. The majority (128; 90%) were identified from the "action plans" database of the Global Heat Health Information Network (a joint World Health Organisation and World Meteorological Organisation initiative), and 15 through a targeted Google search (see the Annex for a more detailed methodology). Fifty-six (39%) of the action plans had also been included in the global review of mental health in heat-health action plans (HHAPs), highlighted in Box 2 above. The action plans were published between 2006 and 2026, with 70 (49%) published after 2022. Table 1 provides an overview of the heat action plans included in the analysis.

Beyond the countries mentioned in Table 1, countries with heat action plans included: Algeria, Argentina, Bangladesh, Belgium, Benin, Brazil, Brunei, Cameroon, Colombia, Ethiopia, France, Germany, Japan, Kuwait, Luxembourg, Macedonia, Marshall Islands, Mexico, Myanmar, Pakistan, Portugal, Saint Lucia, Saudi Arabia, Serbia, Singapore, South Africa, Syria, the Netherlands, Trinidad and Tobago, Uganda, United Arab Emirates and Yemen. This represents 21% (40/195) of countries worldwide (using the UN definition of recognised sovereign entities) with a heat action plan we were able to identify.

For the list of heat action plans included, see the extraction sheet included in the Annex.

Table 1. Overview of heat action plans included in the narrative review

Category	Sub-category	Number (n)	Percentage of heat action plans analysed (%)
Total action plans		143	100
World Bank income group	High-income countries	71	50
	Upper middle-income countries	13	9
	Lower middle-income countries	44	31
	Low-income countries	4	3
	Global policy documents	11	8
WHO Region	South-East Asia Region	39	27
	Region of the Americas	35	24
	European Region	31	22
	Western Pacific Region	13	9
	Eastern Mediterranean Region	10	7
	African Region	7	5
	Global	11	8
Countries with three or more plans	India	39	27
	USA	16	11
	Canada	11	8
	Australia	10	7
	Spain	10	7
	Austria	5	3
	Switzerland	3	2
	United Kingdom	3	2
Geographical level	City	58	40
	State/Regional	40	28
	National	34	24
	Global	11	8

How mental health is included in heat action plans

Overall, 82 of the 143 action plans (57%) mentioned mental health in the context of heat: 45 of 71 action plans (64%) from high-income countries; eight of 13 action plans (62%) from upper-middle-income countries; 20 of 44 action plans (45%) from lower-middle-income countries; two of four action plans (50%) from low-income countries; and seven of 11 global action plans (64%).

Mental health outcomes

The action plans describe a wide range of mental health outcomes associated with heat exposure. Frequently mentioned outcomes include anxiety, stress, psychological distress and depression. Several sources report increased rates of suicide and self-harm during heatwaves, as well as worsening of pre-existing mental health conditions such as bipolar disorder and schizophrenia. Other outcomes include mental fatigue, distraction, more frequent panic attacks, confusion, emotional strain and decreased productivity. Increased hospital admissions and emergency presentations for mental and behavioural disorders are also noted.

Risk factors

Risk factors for the mental health impacts of heat were mentioned at the individual, household and system levels. Individual-level risk factors included age-related vulnerability (especially older adults and children), existing physical health issues and pre-existing mental health conditions. Several action plans also highlighted occupational exposure to heat, particularly among outdoor and manual workers as risk factors for experiencing heat-related poor mental health. At the household level, risk factors included poor housing conditions and lack of access to cooling. At the system level, urban environments, overcrowding and limited green space were identified as contributing factors. Weak health systems and limited access to mental health services were also noted as factors that can exacerbate mental health risks during periods of extreme heat.

Protective factors

Action plans described protective factors that mitigate the mental health impacts of heat at the individual, community, environmental and system levels. Individual-level protective factors included adaptive behaviours such as hydration, rest and reduced exposure during periods of extreme heat. Community-level protective factors comprised social support from family, community networks and peer groups. At the environmental level, protective factors included access to cooling measures such as shaded spaces, fans and air-conditioning. Access to green space was described in several action plans as providing people with cooler environments, as well as opportunities for rest and recovery during periods of high heat, improving their psychological wellbeing. At the system level, access to health services including those for mental health – alongside community-level support to help people navigate them – was described as protective.

Mechanisms

The action plans described multiple mechanisms through which heat can affect mental health. Sleep disruption and poor-quality sleep were frequently mentioned, and were linked to fatigue, reduced concentration and impaired emotional functioning. Extreme heat was described as limiting people's mobility, discouraging outdoor social interaction and reducing participation in community activities – all of which can increase social isolation. Features of the built environment, including poor housing quality and limited cooling infrastructure, were described as exacerbating exposure and stress. High temperatures were also identified as disrupting food availability, increasing stress and anxiety levels. Some action plans linked heat to increased irritability, interpersonal conflict, aggression, and even violence and crime, contributing to fear and stress.

How the impacts of heat on mental health are addressed in heat action plans

Interventions and tools

While the majority of action plans did not include specific interventions to address the mental health impacts of heat, in those that did, a wide range of interventions were mentioned. Common interventions included heat warning systems and targeted outreach to people at risk, particularly those with mental health conditions, chronic health conditions or a lack of social support. Several action plans detailed structured check-in programmes, including daily telephone outreach to registered at-risk and isolated individuals during extreme heat events, with referral pathways to emergency or support services if people did not respond or were struggling. Other measures included:

- commissioning carers, volunteers or care workers to be in daily contact with vulnerable individuals living at home
- special summer monitoring of chronically ill patients and people living with severe mental health conditions
- adapting health and social care facilities, including hospitals and mental health institutions, to the impacts of extreme heat

Action plans also emphasised the need for awareness raising and tailored communication. They noted that heat messages are not always easily comprehensible for people living with mental health conditions. Solutions included:

- disseminating information through shelters and community outreach organisations
- educating individuals and healthcare providers about the dangers of heat for people with mental health conditions and who take medication (e.g., antidepressants and antipsychotics)

At the system level, action plans called for interventions to:

- integrate mental health into emergency preparedness and climate adaptation planning
- create targeted guides for disproportionately affected populations on how to reduce risk during extreme heat events
- support staff through flexible scheduling and psychosocial support during heatwaves
- strengthen referral pathways
- promote access to natural areas and green spaces to provide relief from heat

Examples of heat action plans that meaningfully address the impact of extreme temperatures on mental health are featured in Box 3.

Stakeholders

A wide range of stakeholders were identified as being relevant to addressing the mental health impacts of heat across health, social and community systems. Public health authorities, mental health services and health care providers at primary, community and hospital levels were mentioned frequently. Social care services, community organisations and non-governmental organisations such as the Red Cross were also repeatedly referenced, particularly in relation to outreach and support for vulnerable populations. Local and regional governments were highlighted for their roles in heat action planning, emergency preparedness and cross-sector coordination. Other stakeholders mentioned included emergency services, housing providers and urban planners, as well as community volunteers, carers and family members who support individuals with mental health conditions during heat events.

Monitoring, evaluation and research

Only the US National Heat Strategy 2024-2030 highlighted the need for monitoring, evaluation and research to improve our understanding of the mental health impacts of heat, and to monitor the prevalence and impact of implemented action plans. The focus was on advancing scientific knowledge of both acute and chronic effects across different populations, life stages, geographies, and spatial and temporal scales. It is worth noting, however, that the Trump administration has removed access to the strategy from the US government website.

BOX 3.

Heat action plans that meaningfully address the impact of heat on mental health

The 2022 Vienna Heat Action Plan identifies anxiety, alcohol-related disorders and depression as key mental health concerns during hot periods. It notes that anxiety and depression symptoms increase markedly during these periods among older and more vulnerable individuals.

The action plan explains that panic attacks may become more frequent during extreme heat, and that psychiatric medication can increase cardiovascular strain and heat vulnerability. It also notes specific risks for people with schizophrenia and dementia. The plan identifies vulnerable groups, including individuals with chronic physical and mental health conditions, and those facing social isolation or difficult socio-economic conditions. Proposed measures include:

- providing therapists and counsellors with targeted information
- strengthening neighbourhood support during heatwaves
- expanding health-advice hotlines
- developing awareness campaigns
- establishing volunteer networks to support vulnerable individuals

The 2023 South Australia Health Extreme Heat and Heatwave Strategy recognises that extreme heat affects mental health both directly, through interactions with psychiatric medications, and indirectly, through the psychosocial stress associated with crises such as drought and bushfires. The strategy notes increased risks of suicide, interpersonal conflict, irritability, aggression, domestic violence and violent crime during extreme heat events. Vulnerability is influenced by factors such as remoteness from health services, socio-economic status, and existing physical and mental health conditions – which put people at greater risk of heat stress and heat exhaustion. Suggested interventions include:

- heat vulnerability assessments
- increased monitoring of vulnerable individuals during heatwaves
- provision of information packages and use of tools such as a Heat Vulnerability Assessment Tool and a Mental Health Service Clinician Heatwave Checklist

Image: The European Space Agency

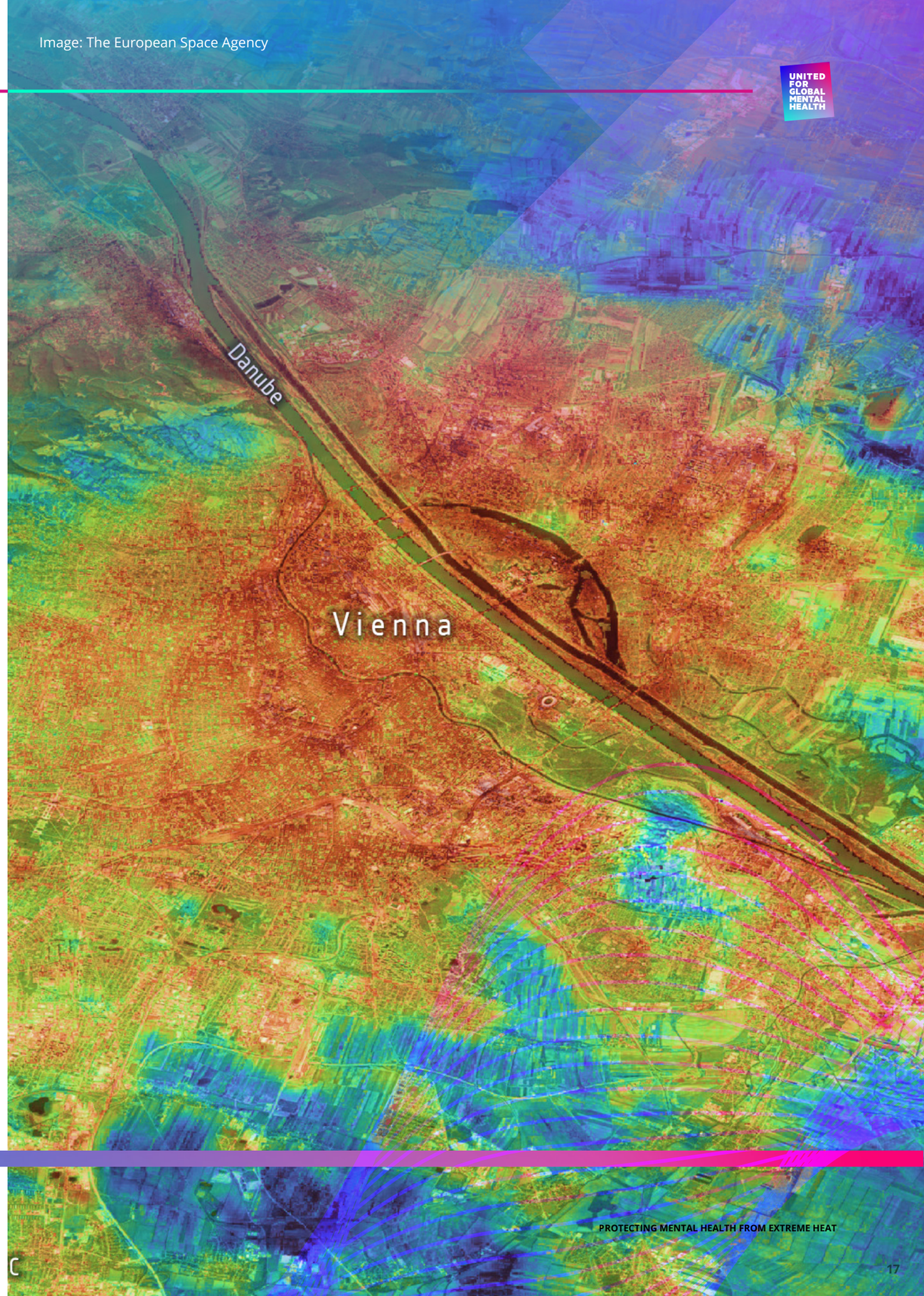
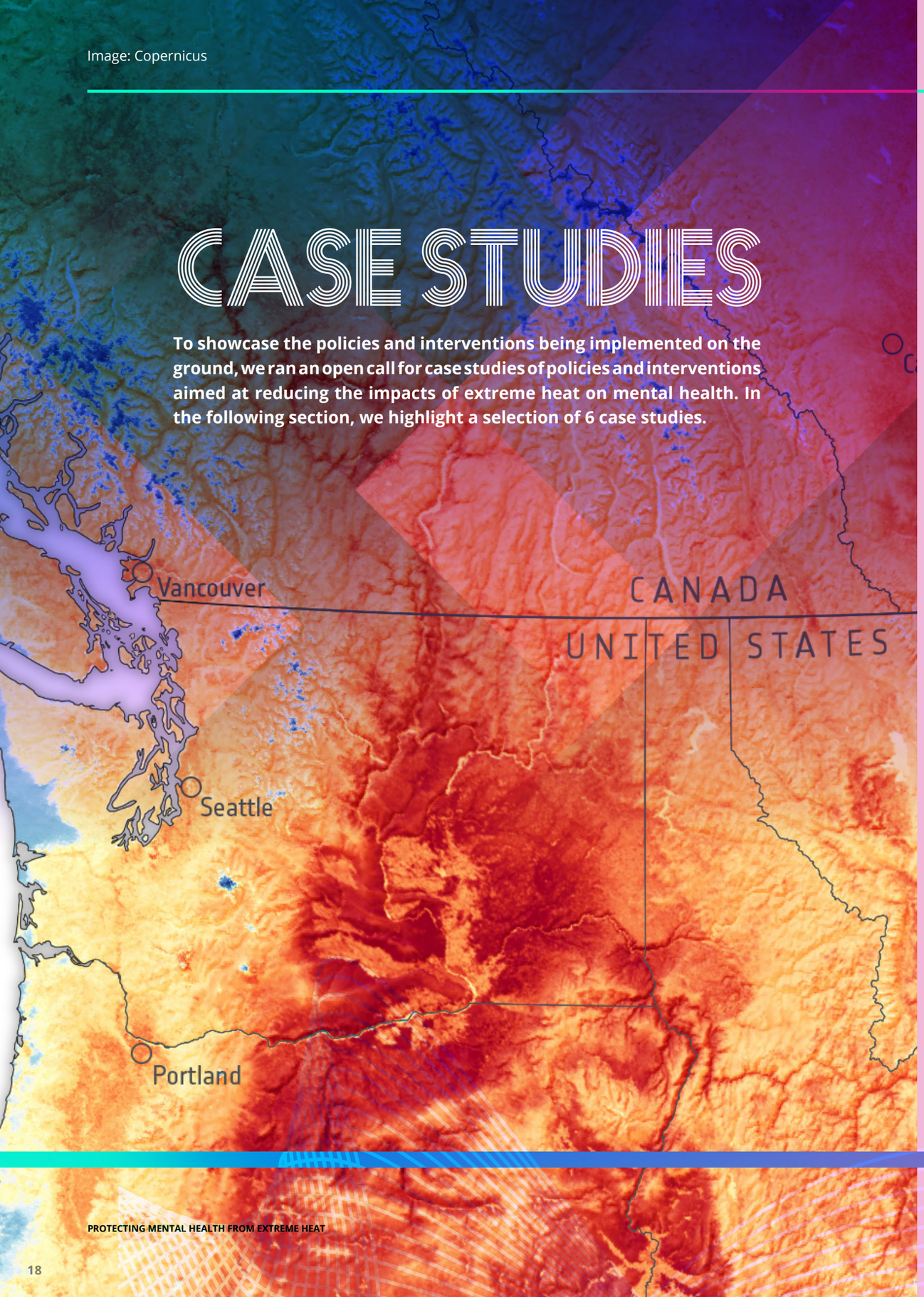


Image: Copernicus

CASE STUDIES

To showcase the policies and interventions being implemented on the ground, we ran an open call for case studies of policies and interventions aimed at reducing the impacts of extreme heat on mental health. In the following section, we highlight a selection of 6 case studies.



CASE STUDY

Preventing heat-related illness in people with severe and persistent mental health conditions: a quality-improvement educational intervention in Canada

People living with schizophrenia experienced a threefold increase in mortality risk during the 2021 "heat dome" phenomenon in British Columbia, Canada, compared to the risk of the general population. In response, a pilot quality-improvement initiative in Ontario aimed to increase the capacity of frontline mental health providers to prevent and respond to heat-related illness among people with severe and persistent mental health conditions.

A multidisciplinary team developed and delivered brief educational sessions to 26 community mental health teams, including Assertive Community Treatment (ACT), Flexible ACT and Intensive Case Management teams. Around 140 participants attended, featuring psychiatrists, nurses, social workers, case managers and support workers. They received training on recognising the signs and symptoms of heat-related illness, identifying high-risk groups, and implementing prevention and response strategies. They were provided with practical tools, including a template letter to help people access cooling devices through social assistance programmes, clinician infographics and visual reminder stickers for patients with prompts such as "am I too hot?".

Post-training surveys showed participants had:

- increased knowledge of heat risks
- greater confidence in recognising heat-related illness
- increased preparedness to intervene to support people living with severe mental health conditions

Participants also highlighted the importance of structural interventions, such as maximum indoor temperature standards for rental housing.

This case demonstrates how targeted training and simple communication tools can make mental health services more prepared for extreme heat and support climate adaptation for people living with severe mental health conditions.

CASE STUDY

South Australian heat-health warning system

The South Australian heat-health warning system was developed following the severe 2008-09 heatwave in southeastern Australia, which caused hundreds of deaths and thousands of heat-related illnesses. The system recognises that people living with mental health conditions are particularly vulnerable to extreme heat due to factors such as medication effects, social isolation and difficulties accessing care.

The government-led system combines meteorological forecasting, public health communication, emergency response and community welfare support. During declared heat events, heatwave alerts trigger public messaging and targeted outreach to vulnerable populations. A key feature is collaboration with the Australian Red Cross Telecross REDi service, which provides free daily welfare checks to registered vulnerable individuals, including people with mental health conditions. Caregivers and health workers can register people for the service using a vulnerability assessment tool.

Evaluations comparing the 2009 and 2014 heatwaves found significant reductions in ambulance call-outs and heat-related emergency presentations in 2014, after the system was implemented. The Telecross REDi service kept isolated and vulnerable individuals safer through daily monitoring and escalation when concerns arose. The system also improved coordination across government agencies and enabled more targeted support during heat events.

The South Australian heat-health warning system also has a clear economic value. A cost-benefit analysis of the system found that a single one-week activation costs approximately AU$593,000, but has an estimated benefit-cost ratio of 2.0 to 3.3. This means the system saves between two and over three dollars in averted hospital admissions and ambulance call-outs for every dollar spent.

This case highlights how integrating mental health considerations into heat-warning systems and community outreach can cost-effectively reduce heat-related harms and strengthen protection for vulnerable populations during extreme heat.

Image: Stephen Mabbs



CASE STUDY

Cooling care and protecting mental health during extreme heat in Pakistan

In Pakistan, where temperatures frequently exceed 40°C, extreme heat poses significant risks for people living with severe mental health conditions. This is particularly true in low-income communities living in poverty with limited access to cooling and adequate housing.

Two community-based mental health initiatives in Karachi and Larkana have integrated low-cost, climate-responsive approaches into routine care. During heatwaves, the Karwan-e-Hayat Institute for Mental Health Care limited clinical hours to cooler periods and increased the monitoring of patients at risk of relapse. Multidisciplinary teams worked closely with families to support hydration, cooling and continuity of care. In Larkana, the SOUL Programme provided frequent follow-ups and guidance on hydration and heat stress symptoms, as well as on improved home ventilation and adjustments to daily routines to avoid peak heat exposure.

These interventions enabled early identification and management of heat-related mental health risks.

During one heatwave, early signs of relapse in a patient with schizophrenia were identified and managed through timely outreach, medication support and family engagement, preventing hospitalisation. In Larkana, improved hydration, rest and monitoring helped stabilise patients and reduce irritability and restlessness.

This case demonstrates how community mental health services can integrate simple adaptation measures – including outreach, hydration support and family engagement – to reduce heat-related mental health risks among vulnerable populations.

Image: Adeel Shabir



CASE STUDY

Addressing heat and mental health in Delhi's homeless shelters, India

In Delhi, India, extreme heat disproportionately affects people experiencing homelessness, many of whom live in overcrowded shelters or on the streets with limited access to cooling and basic services. Prolonged heat exposure contributes to people's anxiety, irritability, sleep disruption, fatigue and, in some cases, suicidal ideation.

Between 2023 and 2025, the Housing and Land Rights Network intervened to address the psychosocial impacts of heat among homeless people. The initiative began with surveys, focus groups and case studies documenting heat-related mental health impacts. The findings informed a summer action plan shared with government agencies. Practical interventions included:

- low-cost cooling and resting points
- installation of industrial air-coolers in shelters
- distribution of heat-relief kits to people unable to access shelters

The interventions reduced people's heat-related distress and improved their wellbeing. Cooling and resting points provided relief and social interaction opportunities for thousands of people. Residents in shelters with improved ventilation reported being more comfortable and sleeping better. Participants also described valuing the opportunity to discuss their experiences and psychosocial distress, which is rarely acknowledged in emergency heat responses.

This case highlights how extreme heat exacerbates psychosocial distress among people experiencing homelessness. It demonstrates the importance of integrating mental health and equity considerations into heat action planning.

Image: Story Finder

CASE STUDY

Green roofs in Barcelona: cooling cities and supporting mental wellbeing, Spain

Barcelona's 1.7 million residents are vulnerable to the effects of climate change in the form of droughts, heatwaves and reduced water availability which is affecting the mental health of its inhabitants. Research from the Hospital Clinic Barcelona-IDIBAPS links increased warming with increased suicides and suicidal behaviour. 'Green Roofs' or 'Garden Rooftops' are an innovative method to support both urban development and mental health in the context of climate change.

In 2018 the Climate Action Plan was created by the Government of Barcelona, accounting for the goals of the 2016 Paris Climate Agreement and the predicted worsening effects of climate change. On the first page it states: "*The future of the fight against climate change is being played out in our streets and squares.*"

Receiving funding for social impact projects from the City Council of Barcelona, Adela Martínez, founder of Huertos in the Sky, developed her own enterprise to install Green Roofs in the compact neighbourhood of Eixample. In her own words, these are: *"spaces where neighbours could share, reconnect and rediscover the value of community."*

Since 2016 the 'rooftop garden' project, run by the Municipal Institute for People with Disabilities has been used to help social and mental stimulation as highlighted in a report by the European Institute of Public Administration. One study found that the Green Roof is an optimal design for 87.5% of the rooftop area assessed across Barcelona, highlighting its potential for scalability.

Dr. Sergi Ventura, Postdoctoral researcher at the Integrated System Analysis of Urban Vegetation and Agriculture (URBAG) in Barcelona, said of the Green Roofs that: "*implementing green roofs is going to be super positive not only for the reduction of temperature but for the social effect it has.*"

Image: Huertos in the Sky



CASE STUDY

Psychosocial support integrated into heatwave early action in Dhaka, Bangladesh

In Dhaka, Bangladesh, increasingly frequent and intense heatwaves contribute to psychological stress, anxiety, fatigue and reduced wellbeing, particularly among people working outdoors and low-income residents living in informal settlements.

During a record heatwave in April 2024, the Bangladesh Red Crescent Society implemented a heatwave early action protocol, integrating psychosocial support into emergency heat response. Triggered by forecast thresholds, the response established cooling centres staffed by medical teams and psychosocial support providers offering rest, hydration, first aid and counselling. Public messaging on heat stress and coping strategies reached around a million residents.

During the 13-day response, cooling centres served approximately 15,000 people, providing safe spaces to recover from heat exposure and access psychosocial support. Other interventions included the distribution of drinking water and cash assistance to households facing economic stress linked to heat impacts. The response improved awareness of heat risks and demonstrated how psychosocial support can be integrated into heat preparedness and response.

This case illustrates how forecast-based heat action can incorporate mental health and psychosocial support to strengthen community wellbeing during extreme heat events.

Image: Nahmad Hassan

CASE STUDY

Recommendations

The following recommendations set out practical steps to reduce the impacts of extreme heat on mental health.

Audience: Policy makers working on heat action plans (e.g., heat-health action plans, heat adaptation plans, heat sections of (health) national adaptation plans) and mental health policies (e.g., mental health action plans, suicide prevention plans) at the national, regional, or local level; advocates and civil society organisations interested in advocating for the protection of mental health from the impacts of extreme heat.

Objective: Provide appropriate guidance, concrete recommendations and suggested wording on the meaningful integration of mental health into heat action plans and/or on the integration of heat considerations into mental health policies. Please note that the suggested language is a starting point and should be adapted based on local policy documents that reflect the national context and circumstances.

We recommend both that existing heat action plans are updated but also that new heat action plans are developed within the ~160 countries of the world for which no dedicated heat action plan was identified.

1. Recognise the negative impacts of heat on mental health

Extensive evidence exists on the negative impacts of heat on mental health. This includes:

- evidence from the Lancet Countdown on Health and Climate Change showing that extreme heat events increase negative emotions at the population-level
- evidence of significant increases in hospital admissions and emergency department visits for mental health conditions during periods of extreme heat
- evidence showing links between heatwaves/higher average temperatures and increased suicidal behaviours

The mechanisms driving these connections are likely to span biological, psychological and social factors. At the biological level, these may include physiological changes and medication. Psychological pathways may involve sleep disruption, negative moods (such as irritability and worry about the future) and changing substance use patterns (e.g., higher alcohol consumption). Social factors may include increased violence, economic hardship, food insecurity, social isolation, disruption to personal and caregiving routines, family stress, reduced access to safe learning and recreational spaces, fewer opportunities for physical exercise, and lower availability of trusted adults and childcare services.

Certain groups may be especially impacted, including:

- particular occupational groups (e.g., outdoor workers, farmers)
- people living in poverty
- communities facing discrimination and violence
- people living in informal or overcrowded housing or experiencing homelessness
- women, particularly while pregnant
- evicted or displaced people
- those living in institutions (e.g., prisons, long-term psychiatric institutions, or elderly care homes)
- people with psychosocial disabilities or mental health conditions (including those with substance use disorders)
- children and young people
- older adults
- Indigenous communities
- people living with comorbid physical health conditions
- those who do not typically engage with mental health services

Current evidence on the mental health impacts of heat is largely derived from high-income countries. Whenever possible, locally-relevant evidence on impacts should be identified or commissioned. Stigma-related under-reporting is also often an issue when measuring certain mental health outcomes (e.g., suicides), so assessments may in some cases underestimate the true mental health impacts of heat.

Suggested content:

"Extreme heat negatively impacts mental health, by (i) worsening population-level psychological wellbeing (e.g., negatively impacting mood, sleep etc.); (ii) contributing to worsened symptoms of mental health problems, resulting in increased levels of emergency department visits and hospital admissions, as well as a higher risk of suicidal behaviour. These impacts are not distributed equally, with certain groups [to specify based on local context] experiencing worse impacts."

2. Highlight the heightened risk faced by people living with mental health conditions during extreme heat, particularly those with severe mental health conditions

People living with mental health conditions, particularly those with severe mental health conditions such as psychotic disorders, are among the most vulnerable to the effects of extreme heat. This includes experiencing worse health outcomes due to both physical and mental health symptoms, and higher mortality rates during episodes of extreme heat. For example, during the British Columbia heat dome event in 2021, living with schizophrenia was associated with a threefold increase in mortality risk. This is probably the result of intersecting vulnerabilities, because people with severe mental health conditions are generally:

- more likely to live with physical health conditions such as cardiovascular diseases, which put them at heightened risk during extreme heat
- less able to respond to the changing temperature or access adaptive resources such as adequate housing or cooling systems due to economic hardship
- more likely to face increased levels of social isolation

Severe mental health conditions also often intersect with other risk factors that make people vulnerable to heat stress, such as homelessness or living in long-term residential mental health care settings.

Suggested content:

"People living with mental health conditions, particularly those whose conditions are severe, are among the groups at highest risk from the impacts of extreme heat. They often experience worse health outcomes of heat-related illnesses and higher heat-related mortality rates."

3. Monitor the impacts of extreme heat on mental health to inform early-warning and heat-adaptation responses

There is extensive evidence on the negative impacts of extreme heat on mental health, but these impacts are not systematically monitored. For example, an analysis of heat mortality and morbidity surveillance systems across European countries found no examples of mental health impact monitoring.

Monitoring the mental health impacts of extreme heat may include capturing mental health information when analysing heat morbidity or mortality (e.g., via available data on hospital admissions, ambulance and emergency calls, GP visits, and death certificates). Indicators for mental health and heat can also be developed by linking climate and weather data with appropriate mental health outcomes (e.g., suicides, crisis hotline calls, hospital admissions for mental health conditions, as well as mental health systems indicators, such as bed availability). There are examples of monitoring the impacts of extreme heat on mental health at national and regional levels, e.g., the UK Office for National Statistics indicator on suicides attributable to extreme heat (see methodology, metadata, open-access code) – a statistic now endorsed by the UN Statistical Commission.

Where possible, data and evidence on the mental health impacts of heat should be disaggregated by key social and demographic characteristics (e.g., age, gender, disability, ethnicity, socioeconomic status) to ensure targeted responses for more at-risk groups. Data on the costs of these impacts, as well as qualitative data and insights from people with lived experience of mental health conditions, should also be collected to appropriately characterise impacts and shape responses.

Alternative monitoring mechanisms may be needed in resource-limited settings (e.g., rural and low-income areas). In such contexts, integrating indicators on the mental health impacts of extreme heat into existing routine data collection systems – such as those for noncommunicable diseases; social determinants of health; and emergency response, preparedness and recovery frameworks – can provide a practical and cost-effective approach to monitoring and surveillance. Impact monitoring should also be clearly linked to the prompt activation of appropriate adaptation responses (see recommendation 4 for guidance on responses).

Suggested content:

"It is essential that the mental health impacts of extreme heat are regularly assessed to inform timely, relevant and effective adaptation responses. To do this, it is important that (i) heat morbidity and mortality surveillance systems include disaggregated data on mental health outcomes; and (ii) weather and climate data are linked to appropriate mental health indicators."

4. Ensure tailored and evidence-informed actions are implemented to protect and promote mental health during extreme heat

While some heat action plans consider the impacts of extreme heat on mental health, few describe concrete actions to protect and promote mental health in such a context. Below are several specific actions that can be included in heat action plans. These interventions should be appropriately financed and integrated within existing health, social, environmental and emergency-response systems, rather than implemented as standalone initiatives. They should also:

- be meaningfully co-designed with people living with mental health conditions and those most affected by heat
- be culturally responsive and adapted to the local context
- avoid further exacerbating structural inequities

Direct evidence on interventions to protect people's mental health from the impacts of extreme heat is limited. Only interventions for which there is at least some indirect evidence of their impact on mental health (e.g., evidence from humanitarian crises) have been included below, but close monitoring and evaluation of these interventions when being implemented is nonetheless key. When evidence for a specific intervention is particularly limited or mixed, this is noted below.

Suggested content:

"Multiple evidence-informed interventions exist at different timescales that can be co-designed with affected communities and integrated into existing systems to protect mental health during extreme heat."

Possible interventions

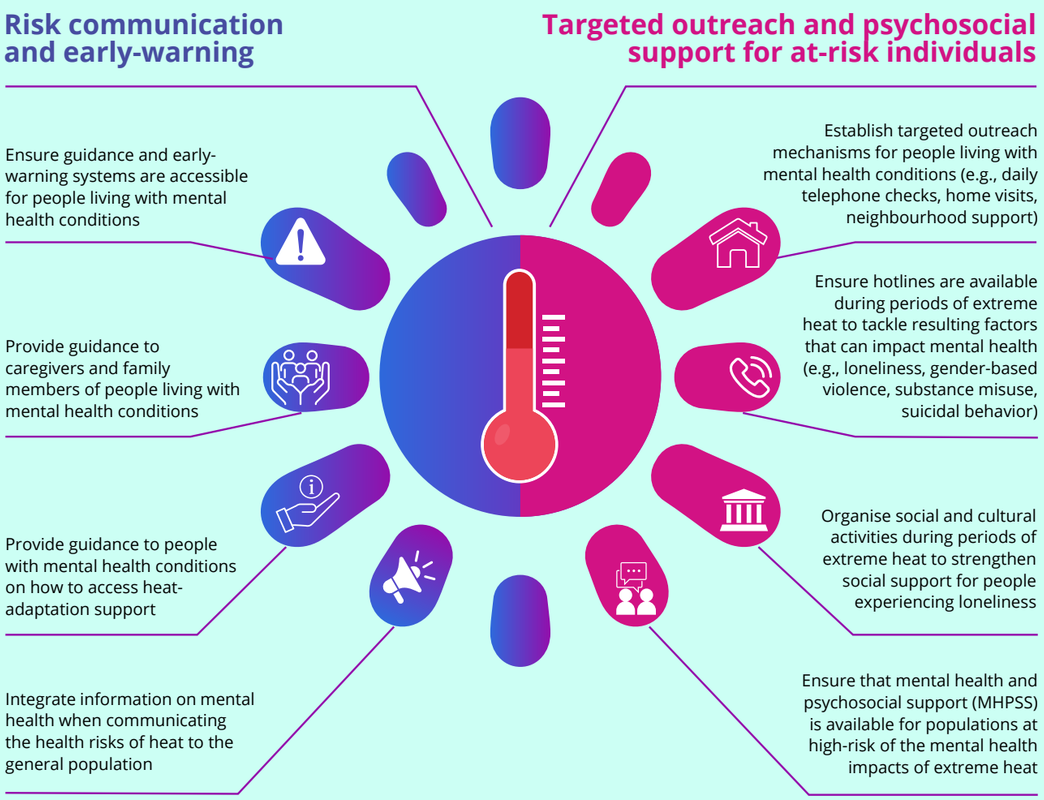
4.1. Protect people and communities before and during periods of extreme heat

(potential lead actors: public health agencies, municipalities, social services, healthcare providers, NGOs)

Risk communication and early-warning

- Ensure **guidance** on protection from the impacts of extreme heat as well as **early-warning systems** are **accessible for people living with mental health conditions and other psychosocial disabilities** (e.g., simplified graphics, easy-to-read materials, appropriate delivery mode) and are **tailored to their specific needs** (e.g., being more alert for certain symptoms, explain increased hydration requirements due to specific medication, identify ways of keeping medications at an appropriate temperature). See example on heat-wave resources from the Climate Psychiatry Alliance.
- Provide **guidance to caregivers and family members of people living with mental health conditions and psychosocial disabilities** to ensure they know how to provide appropriate support during periods of extreme heat.
- Provide guidance to people with mental health conditions and psychosocial disabilities on **how to access heat-adaptation support** (e.g., helping people apply to government incentives for accessible and affordable energy-efficient housing, and air-conditioning and energy subsidies).
- Integrate information on mental health impacts and ways to protect one's mental health more consistently when communicating the health risks of exposure to heat to the **general population** (e.g., via early-warning systems, targeted public health campaigns). See suggested content in WHO 2026 guidance on HHAPs (pg. 270).

Protect people and communities before and during periods of extreme heat in heat action plans



Targeted outreach and psychosocial support for at-risk individuals

- Establish **targeted outreach mechanisms** for people living with mental health conditions, particularly those with severe mental health conditions. This could include daily telephone checks (as with the South Australia heat-health early warning system), home visits by community mental health teams, or neighbourhood support schemes during heatwaves (e.g., Be a Buddy scheme in New York City and the "Viva Gli Anziani!" programme in Italy that supports older adults experiencing loneliness). Clear referral pathways should be in place if professional support is required.
- **Ensure hotlines are available** during periods of extreme heat to tackle resulting factors that can impact mental health (e.g., loneliness, gender-based violence, substance misuse, suicidal behaviour). Collaborate with existing mental health hotlines and consider alternative outreach methods if telephones are not widely available (see targeted outreach recommendation above).
- Organise inclusive, accessible and appropriate **social and cultural activities** during periods of extreme heat to strengthen social support for people experiencing loneliness or in vulnerable situations (e.g., outdoor activities in the cooler early morning or evening, free access to air-conditioned museums and libraries). This may include encouraging traditional or Indigenous practices to cope with temperature extremes, as well as encouraging peer support within the community.
- Ensure that mental health and psychosocial support (MHPSS) is available for **populations at high-risk of the mental health impacts of extreme heat** (e.g., people experiencing homelessness or incarceration or residing in long-term psychiatric institutions; those with physical health comorbidities; children and young people; people living alone and experiencing loneliness; older adults; those living with neurodegenerative conditions such as dementia; frontline workers; and people whose job exposes them to extreme heat, such as outdoor labourers, agricultural workers, construction workers and emergency responders). There is extensive guidance on the provision of mental health and psychosocial support in emergencies. See Mental Health and Psychosocial Support Minimum Service Package and guidance from the Red Cross Red Crescent Movement on MHPSS during heatwaves.

4.2. Adapt health and social systems

(potential lead actors: health systems, hospitals, mental health services)

Heat-resilient mental health services and facilities

- Ensure **mental health facilities are resilient to the impacts of extreme heat.** This is particularly important for in-patient and long-term residential mental health care facilities, which are often not equipped to respond appropriately to the impacts of extreme heat (see WHO Guidance for Climate Resilient and Environmentally Sustainable Health Facilities). Possible interventions aligned with WHO recommendations may include:
  - developing heat protocols within facilities
  - ensuring access to cooling systems, such as fans and air-conditioning (particularly in facilities with a high concentration of high-risk patients)
  - guaranteeing access to cool water for showering and bathing
  - providing access to drinking water
  - ensuring access to shade (e.g., providing window blinds) and green/blue spaces (e.g., tree-shaded areas)
  - avoiding leaving people in isolation or using physical restraint
  - providing lightweight and loose-fitting clothing
  - avoiding patients spending time outside or engaging in strenuous activities during the warmest hours
  - ventilating facilities during the night if the outside temperature is lower than the indoor temperature

This also applies to facilities where people particularly vulnerable to the impacts of extreme heat on mental health spend time, such as prisons or schools. Communities may also have traditional cooling methods which can be used in these settings.



- Consider how to adapt **the delivery of mental health services to the impacts of extreme heat.** This may include adapting to disruptions:
  - in access to talking therapies (e.g., because it is difficult for people to leave their house during extreme heat, or because power outages impact digital access)
  - to primary care and community mental health visits
  - to the availability of essential psychotropic medication

  In some cases, it is thought extreme heat can cause issues for people taking certain psychotropic medication, because of their potential effects on people's central thermoregulation, sweating, and their toxicity (see CDC guidance on heat and medications). At present, however, there is only limited evidence on the impact of psychotropic medications such as antidepressants and antipsychotics on core body temperature and sweating during heat stress.
- Ensure **cooling spaces** (e.g., cooling centres, libraries, malls, places of worship, community halls, shelters) are accessible and appropriately prepared for people living with mental health conditions and psychosocial disabilities. This could include:
  - ensuring there are places to store medication
  - conducting outreach to make people aware of cooling spaces
  - providing guidance on how to use them appropriately

  It is important to note how evidence on the health benefits of cooling centres remains limited and such benefits are likely transitory. Emerging approaches, such as co-designed pop-up or mobile cooling hubs (e.g., those piloted in Sydney, Australia), may help extend reach to vulnerable populations, although formal evaluation is ongoing.

Workforce preparedness and surge capacity

- **Train health professionals** and other relevant stakeholders (e.g., lay health workers, community leaders, social workers, hotline responders) to recognise, communicate about, and respond to the mental health impacts of extreme heat. This may include:
  - integrating heat management in mental health educational curricula and training mental health and psychosocial professionals on how to recognise and respond to signs of heat-related illnesses (see guidance from the Royal College of Psychiatrists)
  - training first responders on supporting people with mental health conditions who present with signs of heat-related illness
  - training first responders in Psychological First Aid and Basic Psychosocial Skills to minimise psychosocial distress
  - training general practitioners and primary health workers on educating people with mental health conditions on how to protect themselves from the impacts of extreme heat – this may include providing information on healthy sleep habits, managing irritability, the impacts of substance use during heat, and on how to stay cool and hydrated, especially while taking certain medications
- **Review staffing levels of mental health and psychosocial workers** (e.g., psychologists, counsellors, psychiatric nurses, psychiatrists, peer workers, trained community health workers) ahead of and during periods of extreme heat, and deploy them where necessary. This may include home visits to people at higher risk (e.g., people with severe mental health conditions, older adults with mental health conditions, people living alone) as well as ensuring that mental health and psychosocial workers are available in cooling centres and emergency rooms.
- Adapt **suicide prevention plans** in the context of extreme heat. This may include anticipating increased use of crisis hotlines during very hot periods, expecting a higher number of presentations in A&E, or ensuring stronger support for patients in crisis during periods of extreme heat.
- Make sure **mental health workers are aware of the risks of extreme heat for their own health** and know how to protect themselves (e.g., rest schedules, hydration, adjusted caseloads, peer support).

4.3. Address structural drivers and build heat resilience

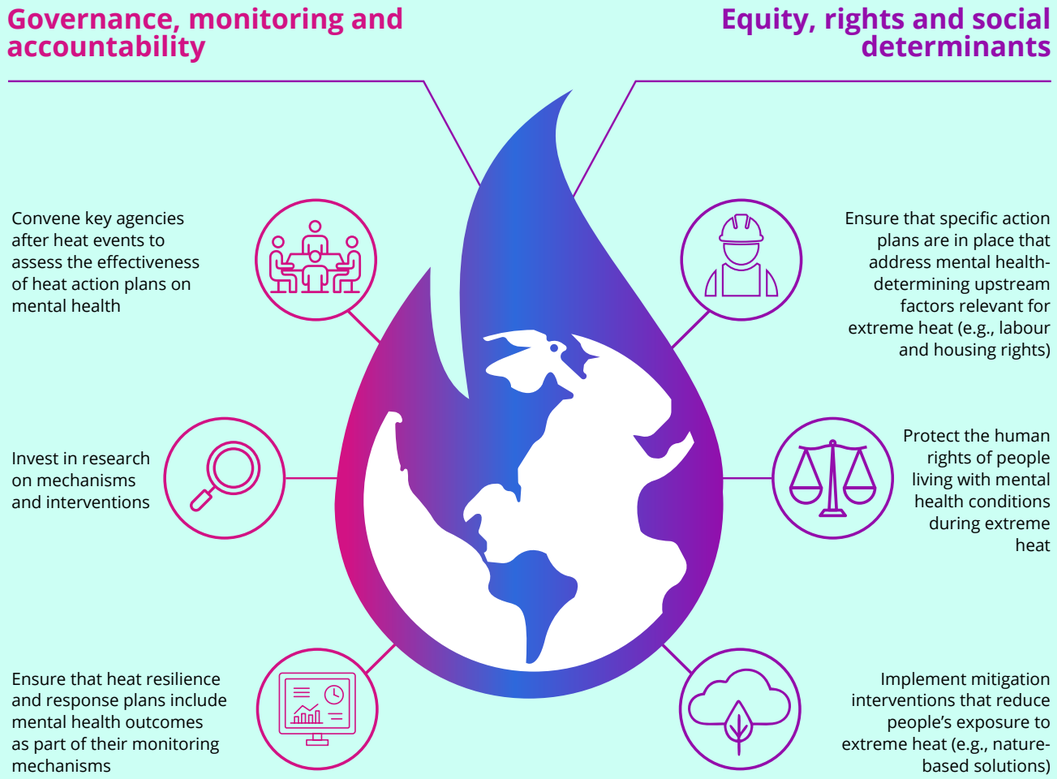
(potential lead actors: national governments, urban planners, ministries – e.g., of health or labour – and climate agencies)

Governance, monitoring and accountability

- **Convene key agencies** after heat events to assess the effectiveness of heat action plans on mental health, identify any gaps and adapt plans for future events.
- **Invest in research** to:
  - elucidate the underlying biological (including physiological), psychological, and social mechanisms that explain the association between heat and mental health, and how interventions can target them
  - identify effective interventions to promote people's mental health and protect it from the impacts of extreme heat (considering factors such as cost, cost-effectiveness, whether the target population will accept the intervention etc.)

  Where appropriate, research should include Indigenous knowledge and practices, be adapted to resource-limited settings, and align with local contexts and community practices.
- Ensure that heat resilience and response plans **include mental health outcomes as part of their monitoring mechanisms** to assess the impact of heat adaptation efforts on mental health.

Address structural drivers and build heat resilience



Equity, rights and social determinants

- Ensure that **specific action plans are in place that address mental health-determining upstream factors** relevant for extreme heat. This may include:
  - labour rights and social protection for people whose jobs are negatively impacted by extreme heat (e.g., parametric insurance for agricultural workers or farmers)
  - workplace action plans that reduce exposure to heat (e.g., adjusted work schedules)
  - rental and housing rights (e.g., moratoria on forced evictions during extreme heat)
  - appropriate urban planning and building codes
  - tackling the mental health stigma that deters people from seeking help and support when needed
- Protect the **human rights** of people living with mental health conditions, particularly those living with severe mental health conditions or psychosocial disabilities, during extreme heat, e.g., avoiding the use of restraint, which can further increase exposure to heat (if done outdoors or in poorly ventilated spaces).
- Implement **mitigation interventions** that reduce people's exposure to extreme heat. In the short-term, this may include investing in nature-based solutions, including urban planning and land management that increase people's access to heat-mitigating green and blue spaces, and providing accessible and affordable energy-efficient housing. Such measures can help reduce people's exposure to extreme heat while also positively contributing to their mental health. In the long-term, this means achieving a just, orderly and equitable transition away from fossil fuels to renewable energy.

Further reading and additional resources

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Expert roundtables to support the development of recommendations

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