

Excerpt from

Landscape of Anticipatory Action for Health in a Changing Climate

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Erin Coughlan de Perez, Leah Poole-Selters, Maya E. M. Sandhofer, Evan Easton-Calabria, Carolyn Van Sant, Mashfiqus Salehin, Sonia B. Murshed, Shampa, Shammii Haque, Ahmed I. A. Chowdhury, Mauricio Santos-Vega, Natalia Niño-Machado, Christopher Garimoi Orach, Christine Aanyu, Gley C. Atienza, Jamie T. Gundaya, Carlos P. Gundran, Leonard D. Javier, Mark Andy Pedere, Christian Jesus G. Sanchez

Heatwaves

Heatwaves negatively impact human health in different ways based on context and vulnerability factors (Arsad et al. 2022). AA is one way to reduce the negative health impacts of heatwaves alongside other adaptive strategies to reduce the likelihood and prevalence of heat illness and other heat-related impacts (e.g., infrastructure improvements, public health campaigns, etc.). This section provides an overview of the evidence on AA targeting heatwaves, along with examples of AA frameworks in Bangladesh and Argentina using the 4Ms (Model, Mandate, Method, Means) framework.

Evidence review

Extreme heat is one of the fastest-growing hazards globally, and there are increasing efforts to address the health impacts of extreme heat through AA. A hazard-driven approach is likely appropriate for heatwaves in extratropical climates that have defined heatwave events from a meteorological perspective. In these climates, there is often a high-pressure blocking system that remains in one place for a period of time, causing a multiday heatwave (often associated with dry conditions). In these circumstances, the heatwave presents as a distinct, multiday event with an approximate start and end date.

In tropical climates, however, heat action plans should be designed differently. Tropical regions of the world do not experience the same high-

pressure blocking systems, and therefore they do not record multiday events of high heat as seen in the extratropics (Coughlan de Perez et al. 2023). There is a dearth of research and epidemiological studies on heatwaves in these regions, and greater investment in understanding the dynamics of how extreme heat affects people in tropical regions will be critical for development of appropriate heat action plans. These regions might use a variety of different definitions of extreme heat that are most appropriate for health outcomes locally.

In places with multiday heatwave events, there are numerous initiatives to develop heat-health early action plans for these types of events, and new insurance products to provide healthcare coverage for individuals during these events (Rao et al. 2025, Singh et al. 2024). The substantial investment in the development of such plans has led to an evidence base documenting the cases of relative success and failure. Research on heatwave early warnings has found that warning systems alone might not be effective at saving lives (Weinberger et al. 2018). The 2022 Intergovernmental Panel on Climate Change (IPCC) report stated that “evaluations of heatwave early warning systems as a component within Heat Action Plans show inconsistent results in terms of their impact on predicting mortality rates” (Cissé et al. 2022, 92). However, few studies document the efficacy of specific heat preparedness measures. For example, a review of studies on cooling centers in the UK found no research measuring health outcomes after cooling center use (Dearman et

al. 2024). Low knowledge on the effectiveness of heat health action plans in Europe limits evidence on both success and failures, but outcomes may be linked to the critical importance of “last mile” early warnings and actions, with failures related to limited engagement with vulnerable populations, local government involvement, and local risk perception (Martinez et al. 2019).

A recent review of heat action plans in India (Singh et al. 2024) emphasized that coordination goes beyond simple communication, and it should encompass a transformational agenda that addresses the root causes of vulnerability to extreme heat:

We find that current heat management governance structures, institutional capacities, and financial mechanisms carry with them the ‘institutional thinness’ of Indian climate governance and a hangover of relief-oriented approaches in disaster management. This overlooks lessons from adaptive governance, which highlights the importance of flexible, forward-looking decision-making. Further, incremental actions such as water kiosks in public spaces and public awareness campaigns on heat impacts, while essential, often preserve the status quo, and need to be complemented with transformational, system-wide agendas such as targeted implementation of heat-resilient building codes or a better articulation of how cities can balance grey-green-blue infrastructure solutions. (Singh et al. 2024, 1)

Example of high-potential design

Model: Meteorological threshold in a weather forecast. This threshold should be designed based on impacts in the specific location, considering the relative impact of daytime temperatures, nighttime temperatures, humidity, air pollution, and duration of the extreme event.

Mandate: Coordinated actions taken by civil society and health actors.

Method: Promote hydration, especially among elderly populations. Support vulnerable populations to change practices, including outdoor workers. Offer cool spaces for people to spend time.

Means: Funding provided by civil society funds as well as government social protection schemes.

Case study: Bangladesh Red Crescent Society

Heatwaves have drawn special attention in Bangladesh in recent years.¹ An analysis of 54 years of data between 1970–2024 revealed a total of 15 distinct heatwave events in Dhaka city, with the highest temperature reaching 40.6°C. A total of 66 days exceeded the heatwave threshold temperature of 38°C, and the longest heatwave event persisted for six consecutive days, starting on April 11, 2023. In 2023, Bangladesh observed the highest temperature at Rajshahi (45.1°C). In 2024, the highest maximum temperature recorded was 38.5°C at Chuadanga and Ishurdi on April 3, 2024. A Bangladesh Red Crescent Society (BDRCS) forecast monitoring report indicated that Bangladesh set an all-time heatwave record as the BMD recorded 24 days of heatwave during April 2024, breaching 23 consecutive days of heatwave in 2019.

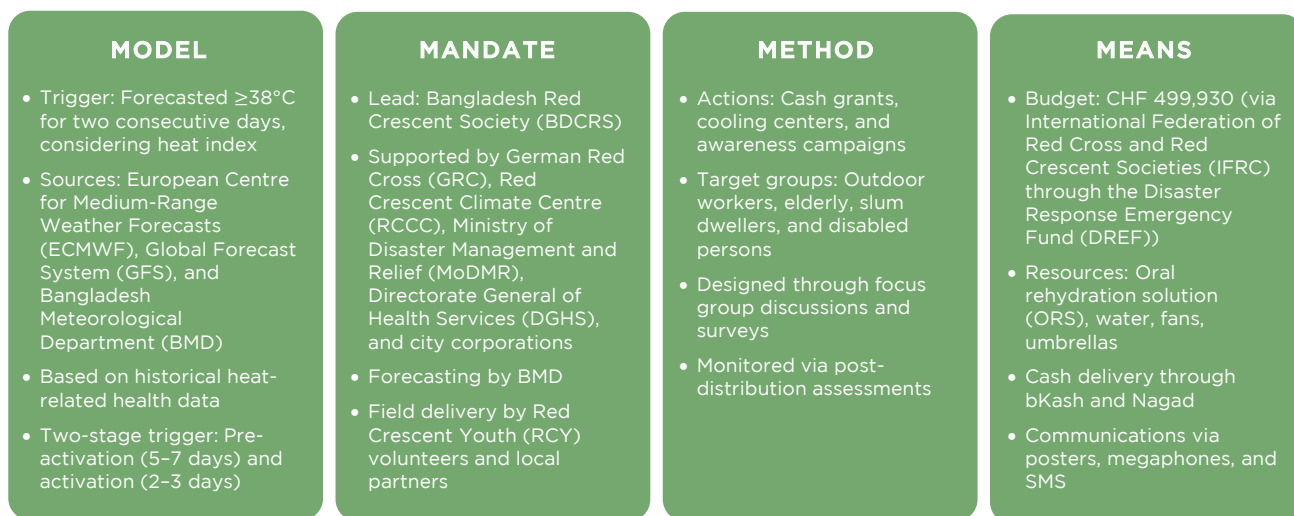
Based on previous experiences, government officials have recognized that additional measures are required to enhance preparedness for heatwaves. One respondent explained, “You see, we know, from our experience last year, that the heatwave is probably going to hit in one and half months or so. But we are still not doing anything for that.” Respondents from several organizations mentioned that the Government of Bangladesh is now working on developing a National EAP for Heatwaves.

Although a government-led EAP is still in progress, in 2024 an EAP implemented by the BDRCS was officially activated for the first time for predicted extreme temperatures in Dhaka and can be described by the 4M framework—Model, Mandate, Method, and Means (Figure 8).

Model: The EAP model relies on weather forecast data. The activation mechanism, as proposed in the heatwave feasibility study by BDRCS (2021), is summarized in Figure 8. The trigger threshold was predicted to be met during April 28 to 30, 2024. The activation committee of BDRCS formally triggered the activation on April 21, 2024 (IFRC, 2024b) with a 7-day lead time.

¹ Bangladesh Meteorological Department (BMD) defines heatwave when maximum temperature exceeds 36°C and classifies into four categories as Mild: 36–38°C, Moderate: 38.1–40°C, Severe: 40.1–42°C, Extreme: > 43°C.

FIGURE 8. The 4M framework as applied to heatwave early action in Bangladesh, led by the Bangladesh Red Crescent Society



Mandate: The mandate to implement the heatwave early action protocol (EAP) lies formally within the operational authority of the BDRCS, which carries out this role with the endorsement and financial support of the International Federation of Red Cross and Red Crescent Societies (IFRC) through the Disaster Response Emergency Fund (DREF). Humanitarian organizations active in Bangladesh, including IFRC, German Red Cross, American Red Cross, Swedish Red Cross, Swiss Red Cross, Red Crescent Youth (RCY), and Save the Children were also involved in the process. On the government side, Bangladesh Meteorological Department (BMD), Dhaka North City Corporation (DNCC), Directorate General of Health Services (DGHS), and Dhaka Metropolitan Police (DMP) were important parts of the heatwave support implementation work.

Method: Distribution of leaflets, safe drinking water, multipurpose cash grants (MPCG), and setting-up of cooling stations in severely affected areas of Dhaka city was initiated by BDRCS, with the following AA launched immediately:

- Distributing MPCG of Bangladeshi taka (BDT) 5,000 (approximately USD 40) to selected vulnerable households, with an extra 10% top-up provided to families that include persons with disabilities

- Three temporary cooling centers established in areas where exposure is highest. These cooling centers provide shaded resting spaces, access to drinking water, oral saline, and medical attention through trained paramedics.
- Mobilizing more than 250 volunteers in Dhaka to support the heatwave response activities
- Providing first-aid support and ambulance services to those affected by the heatwave
- Public awareness campaigns conducted intensively using loudspeakers and poster distributions in local languages to inform the public about heat stress symptoms, simple prevention methods, and available support services
- Outdoor workers and pedestrians supported by the direct distribution of umbrellas, caps, drinking water, and oral saline to help reduce heat exposure

Means: HW-2024 Early Action Protocol (EAP) was implemented by securing the necessary financial resources, logistical supplies, trained personnel, and strong operational partnerships. IFRC allocated CHF 499,930 under the heatwave EAP to support BDRCS and CHF 342,337 to scale up the nationwide

heatwave response to cover all phases of the intervention (IFRC 2024a and 2024b).

During the historic 2024 heatwave, the protocol reached over 300,000 vulnerable individuals in Dhaka and was expanded nationally to cover 35 to 40 districts. Post-distribution monitoring by BDRCS found that approximately 94% of households took measures to protect themselves from the heatwave (IFRC 2024b). Of them, approximately 66% received safe drinking water, 17% received a cap/umbrella, and another 17% received cooling station support from BDRCS. Additionally, most respondents reported using their MPCG support for essential needs, such as food, medical support, livelihoods, nonfood items, and safe drinking water. There is no published evaluation of the activation in terms of health benefits.

Challenges: Funding remains one of the most significant barriers to effectively integrating climate services into health management. Although climate change and heatwaves are identified as priority issues by various government bodies, poor coordination among ministries and weak institutional frameworks delay the implementation of comprehensive strategies. The National Health Strategy for Climate Resilience emphasizes interministerial coordination, yet institutional gaps continue to result in fragmented and delayed responses to heatwave emergencies.

Problems with access to quality climate data, and a lack of integrated meteorological and health data worsen the challenge of making real-time decision-making. In addition, heatwaves can be overlooked as a significant public health concern because neither decision-makers nor the public have complete information on the impacts of heatwaves.

Lack of communication or information has downstream impacts on healthcare providers, making it difficult for them to provide timely responses to the health impacts of heatwave. Lack of integration of real-time health data (e.g., disease surveillance, hospital admissions) limits the early warning systems' ability to effectively and efficiently steer preparedness for heat-related health emergencies. Box 6 shows an example of early warning systems for heat in Argentina, while Box 7 shows an example from the Philippines of monitoring systems for heat-related illness.

BOX 6. Snapshot: Argentina

Argentina developed an early warning system for extreme temperatures, which issues daily alerts for extreme heat and cold (WMO 2023).

Model: The Ministry of Health, the National Meteorological Service, the National University of Entre Ríos, the National University of La Matanza, and the University of Buenos Aires collaborated on two studies that established a relationship between extreme temperatures and mortality. This data was then used to develop thresholds, piloted in 2017, and released nationally in 2021. Each city has its own temperature thresholds corresponding to yellow/orange/red alerts. There is interest to include power cuts and water shortages in future alerts (WMO 2023).

Mandate: The National Meteorological Service communicates alerts to health and civil protection agencies nationally, and they also issue public communications to the general population. The Ministry of Health issues recommendations for healthcare at the time of the alerts (WMO 2023). There are also direct communication lines to the Argentina Red Cross and National Parks Service (Herrera et al. 2021).

Method: Public communications are issued to encourage people to take protective measures, including to drink water, watch over vulnerable groups, and reduce physical activity. The national health and civil protection agencies communicate alerts to their provincial counterparts, who are responsible for monitoring vulnerable populations (Herrera et al. 2021).

Means: National funds support the early warning system and its coordination.

BOX 7. Snapshot: Philippines

Overview: The Philippines currently monitors heat-related illnesses through its Event-Based Surveillance and Report System and is developing an extreme heat protocol headed by the meteorological agency Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) and the Department of Health (DOH).

Model: The DOH monitors heat-related illnesses through its Event-Based Surveillance and Response System. In response to rising temperatures, the government has been developing contingency plans to address extreme heat events. In March 2025, the Presidential Palace announced that it was working with the DOH and PAGASA to craft an action plan for heatwaves that could reach up to 49°C (Montemayor 2025; Ordonez et al. 2025).

Mandate: The DOH leads public health initiatives related to heat-related illnesses, while Philippines Health Insurance Corporation (PhilHealth) ensures financial protection through its benefit packages. The development of a comprehensive heat action plan involves coordination between the DOH, PAGASA, and other government agencies to establish early warning systems and response strategies (Philippine Daily Inquirer 2025).

Method: While specific early action protocols are still under development, the government has implemented various measures to mitigate the effects of extreme heat:

- **Public Health Advisories:** The DOH issues advisories to inform the public about the dangers of high heat indices and provides guidelines to prevent heat-related illnesses.
- **School Adjustments:** Schools have adapted by rearranging classes to keep children out of the midday heat and equipping facilities with fans and water stations. (Morella 2025)
- **PhilHealth Benefit Packages:** The Philippine Health Insurance Corporation (PhilHealth) offers benefit packages for heat-related illnesses. In-patient benefit packages cover conditions such as heat stroke, heat exhaustion, heat collapse, heat cramps, and sunstroke, with coverage amounts up to Philippine peso (₱)12,675.

Means: The Philippines utilizes a combination of government funds and international support to implement heatwave preparedness and response:

- **PhilHealth Contingency Funds:** PhilHealth provides coverage for heat-related illnesses such as heat stroke, heat exhaustion, and heat cramps under existing case rates, ensuring patients receive financial protection.
- **Department of Social Welfare and Development (DSWD) Quick Response Funds:** DSWD allocates Quick Response Funds to assist vulnerable populations during disasters and extreme weather events, including heatwaves, by providing emergency cash assistance and supplies.
- **Local Government Units (LGUs) Disaster Risk Reduction and Management (DRRM) Funds:** LGUs use allocated DRRM funds for local heat response activities such as operating cooling centers, public advisories, and health facility readiness.
- **International Support:** Development partners such as the Asian Development Bank and the German Red Cross have provided technical assistance for strengthening the country's heat-health early warning systems.

However, the effectiveness of response varies largely depending on the capacity of each LGU.