International Medical Corps

# Creating Heat Health Action Plans

# Table of Contents

**Table of Contents** ..... **2**
**Introduction** ..... **3**
Who Is This Document For? ..... 3
Why Heat Health Action Plans? ..... 3
How Heat Affects the Human Body ..... 5
General Principles for Heat Health Action Plans ..... 5
Health Conditions Associated with Heat ..... 7
**Steps to Creating a Heat Health Action Plan** ..... **8**
Step 1 – Initial Review/Deciding on Heat Health Action Planning ..... 8
Step 2 – The Multi-Stakeholder Platform ..... 10
Who Is Involved ..... 10
Developing an Effective Multi-Stakeholder Platform ..... 11
Step 3 – Risk, Vulnerability and Capacity Assessment ..... 11
Vulnerability to Heat ..... 13
Step 4 – Adapting Existing Services and Activities to Respond to Chronic Risks of Increased Temperatures ..... 14
4.1 Community Risk Education ..... 14
4.2 Capacity Development of Community Groups ..... 15
4.3 Capacity Development of Health Professionals ..... 16
4.4 Screening ..... 16
4.5 Personalized Advice for Patients at Higher Risk ..... 16
4.6 Adapting Clinics and Health Infrastructure ..... 16
4.7 Addressing Issues of Heat and Occupational Health for International Medical Corps/the Health Workforce ..... 17
4.8 Adapting Health Protocols to Reflect Changes in the Prevalence or Incidence of Disease Caused by Increased Temperatures ..... 17
4.9 Ensuring Health Information Systems Are Designed to Capture and Respond to Morbidities and Mortality Associated with Heat ..... 18
Step 5 – Planning and Budgeting for Adaptations to Existing Services ..... 18
What is a Heatwave? ..... 19
Step 6 – Identifying Preparedness and Response Activities for Heatwaves ..... 20
6.1 Enhanced Community Risk Education ..... 20
6.2 Outreach for Highly Vulnerable People ..... 20
6.3 Maintaining Existing Health Services During Heatwaves ..... 20
6.4 Expanding Health Services to Address the Health Impacts of Heatwaves ..... 21
6.5 Establishing Cooling Centers ..... 22
Step 7 – Risk Analysis of Preparedness and Response Activities ..... 23
Step 8 – Planning and Budgeting for Preparedness and Response Activities ..... 24
Step 9 – Linking the Preparedness Plan to Heatwave Early Warning Systems (EWS) ..... 25
Anticipatory Action ..... 26
Step 10 – Testing the Preparedness Plan ..... 26
Step 11 – Monitoring, Evaluation and Assessment of the Heat Health Action Plan ..... 27
Monitoring ..... 27
Evaluation and Assessment ..... 28
**Annex – Documents on Heat Risk** ..... **31**
**Annex – Heat Index** ..... **32**
**Annex – VCA Questions** ..... **33**
**Annex – Tools for VCA** ..... **35**
Using Secondary Data (Using Information That Has Already Been Collected and Analyzed) ..... 35
Collecting and Using Primary Data ..... 35
**Annex – Suggested Heat Health Action Plan Format** ..... **36**
**Annex – Heat and Occupational Health** ..... **38**
**Annex – Bibliography** ..... **Available online**

# Introduction

Temperatures are increasing around the world. These **increased average temperatures** are a significant driver of ill health.

The risk of **heatwaves** is also increasing—a type of natural disaster that results from short periods of extremely high temperatures, and has severe, acute health effects.

This guidance lays out the steps that International Medical Corps offices should take in developing a Heat Health Action Plan to address both the longer-term impacts of heat on health caused by increased average temperatures and the acute risk of heatwaves.

## Who Is This Document For?

This document is primarily for International Medical Corps missions and teams, to support them in facilitating the development of multi-agency Heat Health Action Plans. It can, however, be used by any organization interested in facilitating or developing a Heat Health Action Plan. Information specific to International Medical Corps processes has been put in green boxes, separate from the main text.

## Why Heat Health Action Plans?

International Medical Corps missions and teams—particularly those in areas where heat poses a significant or increasing risk to health—are encouraged to engage with ministries of health (MoH) or other actors in the development of Heat Health Action Plans in order to support the elaboration of these plans, improve preparedness, mitigate risks and ensure a prompt response.

**Heat is a serious health issue.**

- Increased global temperatures have been identified as a key source of poor health [1, 2, 3].
- Heatwaves—short periods of extreme heat—"are among the deadliest natural disasters" [4]. Significant increases in excess mortality have been recorded during heatwaves: for example, 10% in the UK in 2022 [5] and 14.7% in India [6].
- Even moderate increases in temperature (that are not considered heatwaves) have been associated with increased mortality [7, 8].
- Increased heat is also an important cause of increased morbidity, particularly among older people, people with disabilities, people with pre-existing and/or chronic conditions, pregnant women, infants and children (see box, *Health Conditions Related to Heat*).
- During periods of extreme heat, there is often increased pressure on health systems due to the increased morbidity burden [4] and stress on health staff which can lead to the system becoming overwhelmed [9,4].
- Heatwaves also impose significant financial costs on healthcare systems.

**The impact of heat on health will greatly increase in the near future.**

- Exposure (measured in person days) to extreme heat has increased significantly since the start of the century [37, 11]. Associated mortality has also increased significantly [10, 11, 12].
- By 2035, the frequency of heatwaves globally will be 8.6 times higher than it was before the industrial period.

- Over the rest of the century, projections of death rates associated with extreme heat are “staggeringly high” [13].
- Beyond the increased impacts of heatwave, there will also be significant increases in ill health associated with higher average temperatures [14].

**Many decision makers, as well as people at the highest risk, are unaware of the dangers of heat.**

- Many policymakers, health workers and members of the public in countries at the highest risk are unaware of the dangers to life and health posed by heat. “High temperatures are often seen as something to be tolerated, rather than a major health risk” [15, see also 8, 16]. The threat to health has been “largely overlooked” [3].

**The impacts of heat on health can be significantly reduced through simple actions.**

- In some parts of the world, maximum temperatures are reaching the “upper limits to survivability,” [3] which makes it almost impossible to decrease mortality without extensive use of cooling systems such as air conditioning.
- But in most countries, heat-related mortality is largely preventable through a series of activities to minimize people’s exposure and sensitivity to heat [9, 17, 15, 18, 19, 20]. Evaluations have demonstrated that Heat Action Plans that structure and organize activities such as passive cooling installations, rehydration, reduced exposure to sun and other low-resource measures can contribute to reduction of illnesses and deaths from heat. [21]
- The activities that feature in most Heat Action Plans are low cost and fairly simple [20].

## How Heat Affects the Human Body

As well as gaining heat through contact with warm air (convection), the human body can also get hotter from radiation (magnetic waves from the sun or from hot objects, such as asphalt or brick) and from conduction (heat gained from direct contact with hot surfaces, such as sitting on a metal bench).

The body loses heat in the same ways—by radiating heat from the skin, by the convection of heat into cooler air or water that is moving around the body, and by conducting heat into cooler materials (such as a wet sheet or a block of ice). The body achieves this by increasing blood flow to the skin, which moves heat from the body core to the surface. However, these **cooling mechanisms only work if the environment surrounding the body is cooler than the body** [18]. The body also loses heat through the evaporation of sweat, which is produced when body temperature increases. While this mechanism works even when external temperatures are higher than body temperature, it is strongly influenced by the amount of humidity in the air. **At high levels of humidity, sweating is much less effective at cooling the body.**

What this means is that **the temperature of the human body is influenced by a number of atmospheric factors** [9] including:

- air temperature;
- exposure to radiation (whether the body is in the sun or the shade);
- airflow (wind and drafts, which can carry warm air away from the body); and
- atmospheric humidity.

Taken together, these factors create an "apparent temperature," or "feels like" temperature, which describes how hot the body actually feels. So if the air temperature is 35 degrees Celsius but there is a strong wind, the apparent temperature will be lower than 35 degrees, and the body will respond as if the temperature was lower. But if there is no wind, and humidity is very high, the apparent temperature will be higher than 35 degrees and the body will respond as if the temperature was higher.

When considering the physiological impact of heat on health, particularly in areas that experience high humidity, it is important, if possible, to consider the apparent temperature. A fairly simple measure of apparent temperature is the heat index, which considers the combined effect of air temperature and humidity. So, for example, where the air temperature is 35 degrees, and humidity is 80%, the Heat Index (apparent temperature) is a very dangerous 57 degrees. See *Annex – Heat Index* for the table.

For more information on the effects of heat on the human body, see the International Medical Corps Heat and Health Training for Clinicians (for details, contact research@internationalmedicalcorps.org).

## General Principles for Heat Health Action Plans

Before going through the steps for designing a Heat Health Action Plan, it is important to recognize four vital principles.

1. **The plan should be developed in coordination with other stakeholders**.
   An effective plan requires expertise, knowledge and skills from a variety of different organizations, including meteorological organizations and the media [22, 9]. It also requires common public messaging, using agreed terminology [9]***. The importance of multi-agency coordination has been apparent in a number of Heat Action Plans from different countries*** [18 23, 22], and where plans have not been executed successfully, it has often been because of poor coordination between organizations.

Ideally, ***International Medical Corps should be part of a larger Heat Action Plan development that is coordinated and led by the MoH or other government agencies*** (either as a standalone activity, or as part of broader multi-hazard disaster preparedness activities). If International Medical Corps takes a lead role, it should try to hand over leadership as soon as possible to the MoH or other relevant government agency, while ensuring in the meantime that other organizations are involved and that it is clear who is responsible for doing what [22]. *A central element of International Medical Corps engagement in heat planning is to build the capacity of local actors.*

2. **The plan should consider the longer-term impacts of heat on health, as well as short-term heat emergencies.**
   While it is important to prepare for and respond to emergency events, such as heatwaves, the health effects of increased temperatures go beyond the spikes in mortality associated with heatwaves. ***Even where temperatures do not reach the level at which a heatwave is declared, higher average temperatures have negative effects on health***—increasing morbidity and mortality from a range of non-communicable diseases (NCDs) and creating conditions that are favorable for increased incidence of waterborne, vector-borne and foodborne diseases [4, 15, 7]. International Medical Corps' operations should consider how these threats to health will be addressed in regular programming. Note—*incorporation of heat into regular programming, while part of your Heat Health Action Plan, should be funded and managed as part of the country's regular health/maternal and newborn (MNH) program. This element of the plan will not be included in the EPRP.*

3. **A community health approach, with a focus on effective risk communication, should be at the heart of the plan.**
   Heat is particularly deadly when people are not aware of the danger that it poses. Lack of awareness of the effects of heat is a key driver of risk. And ***many of the most effective responses to heat are based on small changes to individual behavior*** (such as keeping hydrated or staying in shade). Activities that make people and communities aware of the risks and alert them to effective behaviors for responding to heat are central to decreasing mortality and morbidity.

4. **The plan should be designed to address the particular circumstances of population groups most vulnerable to the effects of heat.**
   Vulnerability to heat differs greatly across a population. Elderly people, people with pre-existing medical conditions, pregnant women and children are particularly vulnerable (see box, *Vulnerability to Heat*). ***The Heat Health Action Plan should be specifically designed to prioritize people who are vulnerable***, bearing in mind that these groups may require special efforts to engage with communications and services. International Medical Corps, as a medical organization, routinely encounters many of these people: this is one of the reasons that International Medical Corps is particularly well suited to working on issues of heat.

## Health Conditions Associated with Heat

Many Heat Health Plans concentrate particularly on **heat stress and heatstroke.** These are dangerous conditions, and it is important to include them in Heat Health planning. They are not, however, the only health conditions associated with heat.

Many **NCDs** have increased morbidity and mortality associated with both long-term increased temperature and with short-term heatwaves. This seems to be particularly the case for cardiovascular disease [24,25] However, “virtually all chronic diseases present a risk of death/illness due to heat.” [18] Respiratory diseases are associated with increased morbidity and mortality [27, 8, 26,15, 24], particularly in situations where high temperatures coincide and interact with periods of poor air quality. Similarly, renal disorders, [15, 27] diabetes [15, 18] and genitourinary disorders [18] are all affected negatively by higher temperatures.

Increased temperatures and heatwaves are also known to affect **pregnant women and fetuses**. Changes in pregnancy that relate to anatomical, physiologic/hormonal, metabolic and socio-cultural changes during pregnancy and childbirth increase vulnerability of pregnant women, fetuses and newborns to high ambient temperatures, leading to hypertensive disorders, gestational diabetes, preterm and still birth, and congenital anomalies among other things. This is because extreme heat can overwhelm thermoregulatory mechanisms in pregnant women, especially during labor and, increase nutritional demand of the mother during pregnancy, generating more heat and endocrine dysfunction [41].

Heat impacts MNH in various ways, such as through hindering access and utilization of MNH services and commodities. There is also some evidence that associates a decrease in total fertility rates and reduced semen quality with extreme temperatures and changing fertility preferences in various regions. Modelling data suggests there also could be 11.6 to 16 million additional cases of HIV with rising temperatures, especially among younger generations. Economic and behavioral changes may drive this linkage, such as an increase in male migration and sex-market use with higher temperatures [38,39].

There are strong associations between many **mental health conditions** and high temperatures [see 28, 29, 30].

Increased temperatures over the longer term are also associated with increased prevalence of a range of **communicable diseases:** waterborne diseases, including cholera [31,15], and vector-borne diseases, such as malaria [32, 33, 34]. In some cases, incidence of these diseases has been observed to peak during or after heatwaves.

In addition, both increased temperatures and heatwaves [35, 36] are strongly associated with **undernutrition and malnutrition**, through a variety of mechanisms.

For more details, refer to the International Medical Corps Heat and Health Training for Clinicians.

# Steps to Creating a Heat Health Action Plan

**These steps develop a plan in two parts. The first part is for adaptations to existing programs and services to address the health needs caused by long-term increases in average temperatures. The second part is for emergency preparedness and response activities to respond to heatwaves.**

1. **Initial review/deciding on heat health action planning**: Determining the degree to which increasing heat and heatwaves are a risk in the areas where International Medical Corps works and whether International Medical Corps needs to make a programmatic response.
2. **The multi stakeholder platform:** Identifying whether management and coordination groups for Disaster Risk Management of heat already exist, and whether and how International Medical Corps can play a role in these groups. Where platforms do not exist, supporting their development.
3. **Risk, vulnerability and capacity assessment:** Identifying plans, tools and guidance that have already been developed by government, civil society, and international organizations; information on risks and vulnerabilities that already exists; and the potential for partnership around heat health action planning.
4. **Adapting existing services and activities to respond to chronic risks of increased average temperatures:** The Heat Health Plan should include longer-term activities that are incorporated into International Medical Corps' routine work. These activities—such as the training of staff in heat and health—will improve the quality of the regular care that International Medical Corps and partners (government and community health providers) provide and will also develop the basis for response in emergency (heatwave) situations.
5. **Planning and budgeting for adaptations to existing services**
6. **Identifying preparedness and response activities for heatwaves:** The plan should also include preparedness and response for emergency heatwave events, as well as the activities for addressing increases in average temperatures (which are addressed in step 4 above).
7. **Risk analysis of preparedness and response activities**
8. **Planning and budgeting for heatwave preparedness and response activities**
9. **Linking the preparedness plan to Early Warning Systems:** Identifying early warning systems that can be used to trigger the plan.
10. **Testing the preparedness plan**
11. **Monitoring, evaluation and assessment of the Heat Health Action Plan**

The sections below lay out how to complete each of these steps. They also relate these steps to the EPRP tool, where International Medical Corps offices are using this tool.

## Step 1 – Initial Review/Deciding on Heat Health Action Planning

**The first step for country teams is a rapid review to understand the risks to health posed by:**

- **increased average temperatures, and**
- **heatwaves.**

This will help the team to decide:

- how great a risk the population faces from heat;
- whether to plan for increases in average temperature and heatwaves; and
- the amount of attention and resources to allocate to the Heat Health Action Plan.

As outlined above (*Why Heat Health Action Plans?*) temperatures are increasing in all parts of the world. [40]. The impacts of these increased temperatures on health are also being felt in all parts of the world. Where health systems are already fragile, and where the risks associated with heat are not well understood, these health impacts are likely to be particularly high.

Questions to ask at this stage include:

- What are the expected increases in average temperatures in this country/area?
- How and to what degree will these increases in temperature affect users of our services, and particularly users from demographic groups vulnerable to heat (see box*, Vulnerability to Heat*).
- What are the risks of heatwaves in the area where we work?
- On the basis of this information, should we take action to:
  - Adapt our regular programs to incorporate the risks of increased average temperatures? (Addressed in Step 3 – *Identifying Adaptations to Existing Services and Activities to Address Increased Average Temperatures*)
  - Plan for heatwaves? (Addressed in Step 5 – *Identifying preparedness and response activities for heatwaves*)
- At what level—national, subnational or other—should we design the plan and take action? This will influence the key stakeholders involved in the next steps. However, note that even where designing plans at the health-district level, it is beneficial to be in contact with, and advocating for, engagement with heat issues at a national level.

This step is relatively light and can be completed through desktop review and (possibly) discussions with key stakeholders. You can also contact the Technical team for assistance.

Potential **sources of information** to review include documents by the government, the World Bank, the Red Cross/Red Crescent and others. See *Annex – Documents on Heat Risk* for a full list of documents.

Wherever possible, you should also consult **government agencies** for information on heat risks**:** the National Disaster Management Organization, the National Meteorological Office and/or the Ministry of Health. You may, however, wish to leave these consultations until the next step.

In many countries where International Medical Corps works, data collection systems are weak and—as heat is only now being recognized as a risk—data have not been collected on the health impacts of heat. In these cases, it can be useful to ask **key informants** (particularly clinicians and health workers) about their observations of the relationship between heat and health, and the degree to which they see this as a risk. (Remember that the risk is increasing every year, so experience of past risks may not in all cases be a good guide to the future.)

## When Using the EPRP Tool

This is the stage where you will fill out the first columns of the HVI page of the EPRP.

You can use the data sources above to complete the “probability,” “human impact,” “property impact” and “business impact” sections of the HVI tool.

Note that “property impact” for heatwaves will generally be N/A.

## Step 2 – The Multi-Stakeholder Platform

**At this step, you will identify who is already involved in Heat Health planning and how International Medical Corps will fit into the planning and response process.**

International Medical Corps’ Heat Health Plan should be developed in coordination with other stakeholders wherever possible and ideally should be part of wider government-led disaster risk management activities.

### Who Is Involved

**The people and process involved in planning and response will differ from one country to another.**

- In some cases, planning will be conducted at a national level, while in others, plans may be more bottom up—developed at the district, province or regional level.
- The government may make specific heat plans or it may develop more complex multi-hazard emergency preparedness plans that cover flooding, droughts, tropical storms, earthquakes and a variety of other hazards. *Note that heat is often not included in these plans, and International Medical Corps teams may need to advocate for the inclusion of heat as a hazard.*
- Planning may be led by the National Disaster Management Agency or by another government agency.
- Heat plans may already exist (in which case, International Medical Corps will wish to identify how to support these existing plans) or may need to be developed.

The International Medical Corps office should identify how planning is done and how we can contribute to planning and response. A good first step is to approach contacts in the MoH, NDMA, UN Clusters or Red Cross/Red Crescent Society.

Where the government has not engaged in heat planning and does not show a strong interest in planning for heat despite evident risks, planning may be undertaken through multi-agency platforms, such as the Humanitarian Country Team or the NGO Forum.

Key stakeholders to involve or consult are:

- MoH
- National Disaster Management Authority
- National Meteorological Authority
- National Red Cross/Red Crescent Society (National RCRC societies are often engaged and have skills in early warning and preparedness planning.)
- National Public Health Emergency Management (PHEM) Centers or Emergency Coordination
- The Humanitarian Country Team/Clusters

- NGO Forum
- Media organizations
- Citizen/civil society organizations (representatives of patients or broader population)

### Developing an Effective Multi-Stakeholder Platform

Whichever platform is used and whichever organizations are involved, experience and evaluations suggest that the following elements are important for effective multi-stakeholder heat planning and should be put in place as the plan is being created:

1. **Clear roles and responsibilities** – Clarity around:
   a. which organization has overall authority for heat preparedness and response;
   b. who/which organizations are involved in making which decisions;
   c. how decisions are made; and
   d. who/which organizations take the lead/have delegated authority to make specific (often sectoral) decisions without reference to the group or to the "lead" organization.

   A RACI Matrix, which outlines different levels of responsibility, or similar tool can be useful in clarifying the organization of heat preparedness and response.
2. **Common communication channels** for use during heat response. Different organizations may use different communication technologies—mobile phones, landlines or handheld radios—and may find that they are unable to communicate with one another during an emergency response. Organizations should clarify how they will communicate:
   a. aligning communication technologies to the degree possible;
   b. clarifying contact people and contact information for each organization;
   c. developing a "communication tree" to cascade information;
   d. agreeing on whether there is need for an emergency operations center or other coordinating location, its function, location and staffing; and
   e. agreeing on any schedule of regular coordination meetings.
3. **Clarity and agreement around early warning systems and triggers,** and more broadly, the situations under which coordination and heat response activities will be initiated. (See *Step 9 – Linking the Preparedness Plan to Heatwave Early Warning Systems.*)
4. **Clarity and agreement around public messaging**. It is important that key messages are aligned, so as not to cause confusion among the public. (See *Section 4.1 Community Risk Education.*)
5. **Clarity and agreement around any common services available to responding organizations**— for example warehousing or transport services.

## Step 3 – Risk, Vulnerability and Capacity Assessment

**In this step, you will collect and analyze more detailed information on heat risks, the capacity of local actors to respond to these risks and any important gaps in capacity that need to be addressed in the plan. This information forms the basis of the Heat Health Plan.**

International Medical Corps teams should, to the degree possible, conduct this step with other stakeholders (see *Step 2 – The Multi-Stakeholder Platform*), as these stakeholders will have much of the relevant knowledge and will be important (and often leading) partners in the creation and implementation of plans.

The questions in the *Annex – VCA Questions* are key elements that should be considered in the assessment. They relate specifically to health (including elements of MNH, mental health and psychosocial support (MHPSS) and nutrition).

This assessment may well be **conducted with partners** conducting complementary assessments in sectors such as shelter, FSL and education.

This step might be conducted through a review of available literature and data, interviews and meetings with key stakeholders, workshops or a combination of these approaches. For more information on techniques, see the Annex – *Tools for VCA*.

Some of this information will often already be available to International Medical Corps, as it will have been **collected during multi-sectoral needs assessments** (MSNAs).

Where existing heat preparedness planning has been conducted by the government, UN or other NGOs, **much of this information will already be available**.

**A list of specific questions to ask is included in *Annex – VCA Questions.***

At the end of this step, you should have developed a (shared) understanding of the following:

Which organizations are active or potentially active in addressing the threats of heat to health?

- **Risks** of increased heat occurring:
  - What is the likelihood and severity of increased average temperatures?
  - What is the likelihood and severity of heatwaves?
  - How prolonged are they likely to be?
  - At what times of year are they likely to occur?
- **Vulnerability** to increased average temperatures and heatwaves:
  - How will increased temperatures affect mortality and morbidity? Are specific population groups at high risk?
  - How would heatwaves affect mortality and morbidity? Are specific population groups at high risk?
- **Capacities:** What actions have been taken with respect to:
  - Emergency (heatwave) preparedness planning?
  - Risk communication?
  - Capacity development of health staff?
  - Risk reduction for facilities and supply chains?
  - Early warning systems?
  - Health information systems?
- What are the **gaps**?

## When Using the EPRP Tool

This is the stage where you will fill out the remaining columns of the HVI page of the EPRP.

In conversation with national stakeholders, you can fill out the sections on “preparedness” and “response capacity.”

## Vulnerability to Heat

**The danger posed by heat differs significantly depending on several physiological and social factors. This means that certain groups are particularly vulnerable to ill health and death because of increased temperatures. Important groups to consider in the Heat Health Action Plan are:**

**The elderly**—Heat-related deaths occur predominantly among older people [4, 42, 43, 27, 26, 7, 15, 18, 9]. This can largely be explained by the fact that older people "have reduced thermoregulatory responses: sweating rate, skin blood flow and cardiovascular function…. Aging is also associated with physiological changes in renal function that increase the risk of renal failures" [9].

**People with pre-existing health conditions—**In heatwaves, most mortality seems to come from the worsening of existing health conditions, rather than from heatstroke [9, 15, 218]. A wide variety of NCDs are associated with heat-related mortality (see box, *Health Conditions Associated with Heat*). In particular, several authorities cite cardiovascular disease as the main cause of heat-related death [3], although these figures should be treated with caution [9], as they may reflect the way that data are collected and studies designed.

Heat exposure can also increase the toxicity of certain medications or decrease their efficacy, and certain medications can interfere with the body's cooling responses [18, 9].

**Pregnant women**—Pregnancy raises the vulnerability of women to heat, as a result of raised body temperatures [15] and less effective thermoregulation [4]. Some studies have suggested that women in general are more vulnerable to the effects of heat than men [9], but the evidence is not clear [44]. Additionally, exposure to high temperatures during pregnancy can negatively affect **fetal development** and pregnancy outcomes. Extreme heat can lead to complications like preterm birth, low birth weight, stillbirth and birth defects, especially when heat exposure occurs during critical developmental periods [45].

**Children and infants** are often cited as being at higher risk to heat than adults [4, 33, 7, 15, 18] as a result of their differing metabolism and the fact that they are reliant on carers to regulate their environment and provide adequate fluid intake [18].

**People suffering from malnourishment**—This category of people is not widely discussed in the literature, but data from International Medical Corps/MoH Mali suggests that mortality rates of severely malnourished children are 2.75 times higher during the hottest three months of the year when compared to the other nine months of the year.

**People with disabilities**—For people whose health conditions are impacted by temperature sensitivity or thermoregulation, such as multiple sclerosis or spinal cord injuries, high ambient temperatures may negatively impact their health. Further, several medications taken to address impairment influence thermoregulation.

**People in urban areas—**Urban areas are generally hotter than rural environments: materials such as concrete and asphalt store heat, population densities and the use of heat-emitting technologies tend to be higher in cities. This creates what is known as the "urban heat island effect" [18, 15, 9, 8].

**Unhoused people and people living in informal settlements—**These people are often seen as being particularly vulnerable to extreme heat as a result of the densely packed housing, poor building materials, limited vegetation and lack of access to public services and amenities in informal settlements or areas where unhoused people congregate. [8, 9, 15]. In some cities, temperatures in informal settlements have been measured as being significantly higher than in other parts of the city [20].

**People working outdoors—**Outdoor work is an important risk factor for heat-related illness (HRI) [18, 4, 20, 11].

## Step 4 – Adapting Existing Services and Activities to Respond to Chronic Risks of Increased Temperatures

**In the fourth step, you will decide on actions that International Medical Corps and/or partners will take to address the chronic and long-term health risks of increased average temperatures (as opposed to preparedness activities for emergency heatwave responses, which are covered in section 5).**

As temperatures increase in all areas of the world, International Medical Corps teams should consider how they will adapt their programming to take the health impacts of increased heat into account.

At this step, the International Medical Corps team and partners should identify key activities that International Medical Corps or partners should consider incorporating into their routine health, nutrition, MHPSS, and water, sanitation and hygiene (WASH) programming to address the increased risk. Activities will often relate to health systems strengthening, in areas such as surveillance, diagnosis and management of NCDs or pregnancy-related complications.

As in other areas of programming, International Medical Corps teams should focus on integrated approaches and interventions that will have greatest impact. For more on integrated working, see International Medical Corps QARI Guide to Program Integration (contact research@internationalmedicalcorps.org for more information).

This section provides a list of key activities for International Medical Corps teams and partners to consider. The list is not exhaustive, and teams may identify other activities based on the risk, vulnerability and capacity assessment above.

### 4.1 Community Risk Education

Given the often-low levels of knowledge of the threat posed by heat—and the potential for community awareness to decrease the negative impacts of heat—community risk education is a central element of heat action plans.

Risk education is an ongoing activity: people should hear messages all year and not only when a heatwave is about to occur (although the intensity of messages should increase when a heatwave is forecast).

Heat health messaging can be included with other health-related messaging.

Messaging around the health risks of heat generally includes:

- sources of heat information—where to get heat forecasts and how to link to early warning systems;
- how to keep homes cool;
- how to keep out of extreme heat, if outdoors;
- how to keep the body cool and hydrated;
- how to help others;
- what to do for community members who are particularly vulnerable (pregnant women, infants, people living with NCDs, the elderly);
- how to respond to heat exhaustion and heat related illnesses; and
- how to store medications to protect them from heat-related degradation.

Good messaging:

- is **brief** and memorable;
- **builds on what people already know** (focus groups, or knowledge, attitude and practice surveys can be useful to get a sense of what people understand around heat risk, as well as the media that are most likely to be effective for communication);
- is co-developed or **tested with the community,** or with the specific vulnerable groups it is aimed at, before being widely used;
- incorporates **clear action statements**, so that people know what to do to respond to heat threats;
- uses **a variety of media**, including text messages, local radio, poster displays in public places and messaging by religious figures and health workers;
- is **shared and used by multiple organizations**, or at least uses the same language and key messages, to prevent confusion; and
- has specific messages, often delivered through targeted means, tailored to **key audiences** (such as the elderly).

Some particular groups to consider in the communication plan include:

- **Children and adolescents**—sharing messages with children at school has been a successful way of spreading messages in the community.
- **Caregivers**—Children, people with disabilities and the elderly are all at high risk because they may not have control over their environment and rely on caregivers. Ensuring that caregivers are aware of the threat of heat is important.
- **Employers**—Some occupational groups may be at particularly high risk, and educating employers about these risks, as well as incentivizing employers to educate their workforce, can be an effective approach to decreasing risk.
- **The elderly**
- **People with underlying conditions such as NCDs** that increase vulnerability to heat.
- **Pregnant women**

Note that International Medical Corps developed key messages on heat that can be adapted to the local context. For more information, contact research@internationalmedicalcorps.org.

Other examples of public messaging include:

- Americares
- WHO Europe, Annex 1 – recommendations for the public during heatwaves
- UNICEF
- Oxfam UK has recently produced guidance on public messaging that you can find here.

## 4.2 Capacity Development of Community Groups

In many countries, International Medical Corps works with community volunteers and community associations in the areas of health, nutrition, MHPSS, protection and WASH. These individuals and community groups are very important for communicating and translating health education messages to people who are particularly vulnerable to heat, such as carers of young children or people suffering from mental health conditions.

International Medical Corps should include messages related to heat risks in capacity development activities for these groups.

## 4.3 Capacity Development of Health Professionals

Building the knowledge and skills of health professionals around heat and health is an important element of most Heat Health Action Plans.

Ideally, information on heat and health should be embedded in the basic pre-service and in-service curriculum for health providers, with refresher training occurring regularly before the heat season.

Training should include information about how heat affects human health and wellbeing, including the potential effects of heat on multiple organ systems, MNH, mental health conditions, protection/violence against women and girls and nutrition. It should also include information on clinical responses and storage of medicines.

Training should be tailored to different audiences and cadres—from clinicians to community health workers.

International Medical Corps has produced a training course for clinicians, and another course for community health workers.

## 4.4 Screening

Because individuals with certain health conditions are at heightened risk, there is an argument for increasing screening for conditions that are associated with increased heat-related mortality but that might be unknown to patients. Please note, however, that this would need to be part of MoH programing and would require significant additional resources.

## 4.5 Personalized Advice for Patients at Higher Risk

Patients at higher risk of heat-related illness (HRI) or mortality (see box, *Vulnerability to Heat*) should receive personalized advice as part of routine primary care. This might include the creation of a personal Heat Health Plan, including advice on:

- where and how to receive forecast information for hot periods;
- actions they will take to keep homes cool;
- actions they will take to remain hydrated and keep themselves cool;
- any changes to medication required during hot periods and proper storage of medications; and
- where to get help and support—family, neighbors and others who can provide assistance during hot periods.

Further guidance on creating personal Heat Health Plans is available from Americares. International Medical Corps has adapted this guidance for low-resource contexts. Reach out to the Technical Advisors for access.

Clinicians may need to discuss changes to medication during hot periods for patients taking medications that decrease the ability to thermoregulate. Further information on this, which should be read in conjunction with the respective country's MoH essential pharmaceuticals list, can be found from Americares.

## 4.6 Adapting Clinics and Health Infrastructure

Ensuring that International Medical Corps-supported facilities are safe and cool in hot weather is particularly important because many of the users of our facilities—elderly people, pregnant women and people with NCDs—are extremely vulnerable to heat. It is also important to ensure that medical supplies and drugs are kept at optimum temperatures.

As countries become hotter, and the threat of heatwaves increases, International Medical Corps teams should consider, wherever possible:

- Measures for active or passive cooling of buildings. (Guidance on passive cooling of buildings is forthcoming.) Note the recommended temperatures for health facilities:
  - Operating rooms/clean workrooms/endoscopy suites: 20°–23°C
  - Delivery and patient rooms: 24°C
  - Other rooms and areas: 21°–24°C
  - Temperatures outside of the above ranges, as well as humidity levels outside of 30-60% relative humidity, may give rise to greater stress and higher risk of infection.
- Measures to ensure that supplies of clean water are assured for health facilities, recognizing that, during hot seasons (and particularly heatwaves), demand for water will increase.
- Additional measures to keep water cool and, where necessary, to test and purify water for facilities, as hotter temperatures favor increased pathogen activity and may decrease the efficacy of chlorine and other purification measures.
- Enhanced measures to ensure that medicines are kept at recommended storage temperatures, along with regular maintenance of refrigeration equipment.

Note that, in countries or locations where there are high risks of other weather hazards (such as floods or cyclones), measures to adapt to increased heat should be taken along with measures to increase the resilience of infrastructure to these other hazards.

The WHO checklist for ensuring that health facilities (including water and electricity supplies) are resilient to extreme weather can be found here.

## 4.7 Addressing Issues of Heat and Occupational Health for International Medical Corps/the Health Workforce

Just as adapting facilities is necessary for patient health, we must also consider how to keep staff members safe. The following steps can be taken to ensure the occupational safety of health workers.

- In preparation for heat events, host a heat stress awareness session for staff members.
- Ensure awareness of hot weather conditions among staff members.
- Limit staff exposure to heat and/or exertion.
- Establish a cool rest area for staff.
- Ensure sufficient hydration and nutrition for staff.
- Consider how to ensure cooled toilet facilities.
- Establish a formal monitoring system for staff heat experiences.
- Ensure access to a staff treatment area for HRI, including heat stroke.

See *Annex – Heat and Occupational Health* for a fuller list of activities under each of these headings.

For examples of workplace heat protection plans, reference Workplace Heat Protections Across the Globe.

## 4.8 Adapting Health Protocols to Reflect Changes in the Prevalence or Incidence of Disease Caused by Increased Temperatures

Increased temperatures contribute to a variety of health conditions through a range of mechanisms (see box, *Health Conditions Associated with Heat*). As temperatures increase,

the prevalence and incidence of these conditions can also be expected to increase, and in some cases their geographical ranges will change as conditions become more or less favorable to pathogens and vectors.

International Medical Corps and partners should be aware of these likely changes in incidence/prevalence and seasonality in areas where they provide health services. Key diseases of concern should be identified at *Step 3 – Risk, Vulnerability and Capacity Assessment*. The following diseases, which have strong associations with changes in temperature, should be considered:

- cardiovascular diseases;
- respiratory diseases;
- vector borne diseases, particularly malaria, dengue and schistosomiasis;
- waterborne diseases including cholera and bacterial GI diseases;
- foodborne diseases including Salmonella;
- malnutrition and undernutrition;
- HIV; and
- mental health conditions.

As part of the Heat Health Action Plan, International Medical Corps teams and partners should consider how they will address the emergence or increases in prevalence or incidence of these diseases in their activities.

### 4.9 Ensuring Health Information Systems Are Designed to Capture and Respond to Morbidities and Mortality Associated with Heat

Given the potential for increases in morbidity and mortality and for the emergence of diseases in areas where they have not previously occurred as a result of increasing average temperatures, a robust surveillance system is required to effectively detect and report any of these occurrences. Many countries have existing integrated disease surveillance and response systems, that have provisions to detect any unusual “events” at the community or health-facility levels. Depending on the existing system, the Heat Health action plan might include the following.

- Reactivating or strengthening the existing disease surveillance and response system through refresher training to community volunteers/community health workers (CHWs), distribution of data collection tools, support for timely submission of weekly epidemiological reports and support for data analysis for decision making.
- If heat-related morbidities and mortalities are detected, and the IDSR tools do not capture that, coordinate with the local MoH to incorporate the disease(s) into the mandatory reportable list/tool.

## Step 5 – Planning and Budgeting for Adaptations to Existing Services

**In this step, you will determine responsibilities for the activities outlined in the section above, the additional costs required for the activities and potential sources of funding.**

Determine:

- Who will be responsible for these activities within the International Medical Corps team/partner organizations?

- Who will be involved in delivering these activities? Will they be internal or external to International Medical Corps? Will the country office need to hire additional staff?
- Will there be additional non-staff costs?
- Will any technical support or technical materials be required? Where will you get this support?
- What is the budget required for these activities?
- Where will funding come from?

Note that most of the activities outlined here are relatively simple and low cost. In many cases, the country teams can mainstream them into regular activities (such as regular training/capacity building or regular building maintenance). Wherever possible, activity design and budgeting for these activities should take place as part of the development of larger proposals to donors, rather than being designed as a separate project for separate funding.

Higher cost and broader scale activities, such as screening, adapting health information systems, and—in some cases—updating health protocols will not be implemented by International Medical Corps alone and will require actions at the policy level, more comprehensive planning and funding commitments from the MoH.

## What is a Heatwave?

**Broadly speaking, a heatwave can be defined as an unusually hot period relative to the local environment that leads to negative health outcomes for humans [9].**

Definitions of what an "unusually hot" temperature is and of how long the period is **differ greatly from one country to another** [43, 23, 6, 9].

There is no single **temperature** at which heat becomes dangerous—the danger of heat relates to what people who live in an area are used to [43, 20, 2, 6 ]; thus, mortality rates in some countries increase at temperatures that would be seen as normal in others. In the UK, for example, mortality increases above 22 degrees Celsius and increases very significantly above 29 degrees Celsius [660]. As a result of this geographical variation, heatwaves are generally defined as periods when the temperatures are in the very highest ranges *for that particular area* at that time of year.

Because the impact of temperature on health outcomes can also be strongly related to atmospheric **humidity** (see box, *How Heat Affects the Human Body*), some, but not all, countries use a definition of heatwave that also includes an element of humidity [23,15,16,9].

Heatwave definitions also differ in terms of the **duration of hot weather**. In some cases, a single day of hot weather can be defined as a heatwave [9]. However, as heat-related mortality seems to be strongly affected by nighttime temperatures (where nights are hot, the body is not able to cool down) [23], and mortality has been seen to increase significantly over a period of days [43, 23,6, 9], many countries define heatwaves as periods of two, three or more days of high temperatures.

Finally, some definitions of heatwaves take account of **seasonality**. There is evidence that the mortality associated with heatwaves differs depending on when in the year the heat occurs: heatwaves seem to be more deadly when they happen earlier in the hot season [43, 9, 20]. Some definitions of heatwave take this into account, setting different thresholds for the heatwave at different times of year [9].

## Step 6 – Identifying Preparedness and Response Activities for Heatwaves

**The sixth step for International Medical Corps operations in areas at risk of heatwaves is to decide on actions that we and/or our partners will take to prepare for and respond to heatwaves.**

In this step, the International Medical Corps team and partners should identify key activities that we or our partners should consider implementing to prepare for heatwaves. These are additional activities that are not a part of standard operations and that are necessary to prepare for heatwaves and ensure continuity of service, address additional requirements for health services, and prevent health facilities from becoming overwhelmed.

This section provides a list of key activities for International Medical Corps teams and partners to consider. The list is not exhaustive, and teams may identify other activities based on the risk, vulnerability and capacity assessment above.

### 6.1 Enhanced Community Risk Education

When periods of extreme heat are forecast, community risk education (see section above, *Step 4 – Adapting Existing Services and Activities to Respond to Chronic Risks of Increased Average Temperatures)* should increase, with more frequent messages across multiple media, and additional messages around the timing and duration of impending heatwaves, and the location of health facilities and cooling centers.

### 6.2 Outreach for Highly Vulnerable People

The Heat Health Action Plan should include mechanisms for outreach to people in vulnerable groups (see box, *Vulnerability to Heatwaves*) who live alone. This involves creating a register of people who would benefit from, and consent to, outreach visits; identification of people who will conduct visits (this can be community health WASH and nutrition workers, community volunteer groups or peer support groups, or neighbors); and scheduling of visits during periods of extreme heat and heatwaves.

Where International Medical Corps does not set up the outreach system, we can support by connecting vulnerable patients with the organizers of these outreach activities through personal heat health planning (see *Personalized Advice for Patients at Higher Risk* above).

Whoever is responsible for the register of vulnerable people should ensure that systems are in place for regularly updating the list.

### 6.3 Maintaining Existing Health Services During Heatwaves

Plans should be made at the health facility or district level to ensure continuity of health services during heatwaves. These plans should include the following.

- Adjusting operational hours of health facilities and other (non-emergency) health services to decrease the risk to patients and staff and ensuring that these changes in hours are publicized.
- Considering the use of mobile clinics or telemedicine options to decrease patients' exposure to heat in visiting clinics.
- Ensuring that shaded areas are available for people to wait for health and other services.
- Ensuring that there is sufficient water available for users of health facilities, recognizing increased needs for water during heatwaves and potentially ensuring that stocks of bottled water are available.

- Ensuring that measures are taken to prevent staff members from succumbing to the heat. These may include changes in uniform regulations and ensuring regular rest and hydration breaks (see section on occupational health above)
- Moving particularly vulnerable inpatients to cooler areas of the building and providing fans where electricity is available and *only* in air temperatures of 35° C or below [9, 661].
- Educating patients and caregivers on precautions and measures to be taken to mitigate complications of heat-related conditions.
- Ensuring that patient heat plans are prepared for all high-risk patients; this will include dosage adjustments for certain affected medications and providing patients with extra dosage before peak heat periods to prevent them from visiting the clinics during heatwaves.
- Regular testing of all cooling and refrigeration equipment to ensure that medicines can be properly stored in a heatwave. Some examples include:
  - Insulin: max 30° C per package, but recent data show no significant impacts on stability when stored at 37° C or in cycling temps from 25-37° C for up to 28 days).
  - Glucagon (up to 30° C).
  - GLP-1 RA (up to 25° C).
  - Other diabetes-specific considerations: sweating and insulin pumps or CGMs; accuracy of meters and test strips in extreme temps; walking on hot surfaces with peripheral neuropathy.
  - Heat-stable carbetocin (HSC), while a more heat stable alternative to oxytocin, which requires continuous refrigeration at 2° C to 8° C, is not immune to extreme heat. HSC maintains at least 95% of its potency for at least three years at 30°, but drops to only six months at 40° C.
  - There are also general stability concerns in extreme heat for the following:
    - EpiPen, naloxone, biologics, antibiotics, maternal and newborn health commodities, etc.

## 6.4 Expanding Health Services to Address the Health Impacts of Heatwaves

In addition to ensuring that regular services are provided during heatwaves, health authorities need to plan to meet the additional health impacts of heatwaves. These can be significant—there are a number of examples of health services being overwhelmed by increased needs during heatwaves. Measures should include:

- Preparation of stocks of medications and equipment for treatment of heatstroke and increased incidence of coronary and respiratory diseases, as per MoH treatment protocols and essential drugs list.
- Ensuring that surge staffing is available—additional staff who are able to:
  - recognize HRI (signs and symptoms);
  - recognize danger signs of HRI (sign and symptoms);
  - provide first-line treatment to the patient (lower body temperature, correct fluid, electrolyte, glucose imbalances/deficiencies); and
  - refer complicated cases.
- Making additional bed space available (for inpatient facilities).
- Ensuring preparedness for managing medical emergencies related to cardiovascular disease, respiratory disorders, and obstetric and newborn emergencies, including availability of necessary medications, equipment and trained staff.

- Establishing or increasing availability of transport and/or communication means for referrals from primary healthcare centers and cooling centers (see *Establishing Cooling Centers* below) to secondary facilities.
- Considering the use of mobile teams to respond to heat-related health needs.
- Making communication materials on heat and health available in facilities in the form of leaflets, posters, etc.

## 6.5 Establishing Cooling Centers

As part of the Heat Health Action Plan, International Medical Corps may plan where and how to open cooling centers. Alternatively, International Medical Corps may collaborate with other organizations to train cooling center volunteers, or to provide transport from cooling centers to health facilities.

Cooling centers are facilities established during heatwaves to give people—especially people who are particularly vulnerable to heat—a place to rest and lower their body temperature. In environments where electricity is available, they are generally air conditioned, as this is the most effective way of cooling the body down.

Where air conditioning is not available, cooling centers can be in any structure that is cooler than the external environment: community buildings that are built using passive cooling techniques—as is often the case with traditional buildings in hot areas—or even shaded temporary structures in green spaces, as these can be several degrees cooler than surrounding areas, especially cities. These facilities are particularly important where people are working outside in the heat, or where people live in temporary structures that have high internal temperatures.

When determining what to use as cooling centers or where to place temporary cooling centers:

- Think about who is vulnerable and who will use the centers, and ensure that the proposed centers are close to where they will be needed.
- Ensure that the facility will be as cool as possible.
    - If an established building, such as a community hall or religious building, ensure that it is designed to remain relatively cool during hot periods.
    - Do not use schools as cooling centers during the school year.
    - If using a temporary shelter, plan to locate it in a shaded area, ideally one with greenery. Avoid placing on asphalt or concrete.
    - If using a temporary shelter, place on an east/west axis to avoid having a long wall exposed to the sun all day.

More detailed guidance on the location of cooling centers is available from the IFRC here: Guidance on Location – Activity Sheet 6.

In terms of amenities and services:

- ensure a minimum of two square meters of space per person;
- ensure an adequate supply of clean drinking water;
- ensure that basic amenities, such as toilets, are available or accessible;
- consider making safe storage facilities available;
- consider separate facilities for men and women;
- make information on heat and health available in the cooling center, with volunteers who can train users in basic heat precautions; and

- make transportation available to transfer people exhibiting signs of heat stress to a medical facility.

Cooling centers should be staffed by trained personnel, with first aid training and an understanding of the health implications of heat.

On arrival at the cooling center, users should be screened for signs of heat stress, and appropriate action should be taken.

Further guidance from IFRC on establishing cooling centers is available here.

### When Using the EPRP Tool

This is the stage where you will fill out the first part of the "Scenario Planning and Activities" page of the EPRP.

Add "Heatwave" as the **Scenario**.

Give an overview of the plan in the **Intervention** section.

Put each element of the plan (for example, "enhanced community risk education") under the **Preparedness/Planning/Response/Close Out** sections as relevant.

Split each element of the plan into its key activities and put these under Activity Description.

## Step 7 – Risk Analysis of Preparedness and Response Activities

***In this step, you will consider potential challenges or constraints that may prevent you from activating your Heat Health Action Plan if a heatwave occurs.***

Note that, in addition to challenges related to security and access, etc., heatwaves can lead to:

- failure of electricity supplies because of extreme loads (for air conditioning) being placed on the electricity grid;
- unsafe working conditions for staff;
- disruption to services, markets, supply chains and logistics because of workers being unable to work safely;
- increased demand for water, and in some cases failure of water supplies (particularly where access to water relies on electricity for pumping);
- disruption to transport systems caused by expansion of rail tracks or melting of asphalt on roads and runways; and
- high demand for qualified staff and challenges engaging staff.

If the country has previously been affected by heatwaves, it is worth reflecting on the impact that these heatwaves had beyond health.

## When Using the EPRP Tool

This is the stage where you will fill out the “Risk Analysis and Context/Risk Mitigation” page.

Add the key activities you identified at the last step in the **Potential Interventions** box.

Then consider risks to these activities and complete the **Context/Challenge/Risk** columns.

Finally, consider what you will need to do to mitigate the risks (e.g., solar power or generators as backups to main electricity services). Put these elements in the **Mitigation** column.

## Step 8 – Planning and Budgeting for Preparedness and Response Activities

**In this step, you will decide who will lead and undertake the activities, and the materials and budget you need to implement the plans.**

For each element of the plan, consider

- Who will be responsible for these activities in the country office?
- Who will be involved in delivering these activities? Will they be internal or external to International Medical Corps? Will the country office need to hire additional staff?
- What other materials will be required, and what will they cost?
- Will any technical support or technical materials be required? Where will you get this support?
- What is the budget required for these activities?
- Where will funding come from?

Note that you may be able to include the budget for the heatwave response under a crisis modifier in a regular donor proposal (a crisis modifier is a contingency fund that the donor agrees to make available if a crisis, such as a heatwave, occurs). Information on ECHO’s crisis modifiers is available here.

You may also be able to access anticipatory action funding to pay for the cost of heatwave response (see box, *Anticipatory Action*). Anticipatory action funding is available from some donors to pay for responses that take place *before* an emergency, such as a heatwave, occurs. It is agreed in advance so that it can be released as soon as an early warning is given.

Finally, you may be able to access funding to pay for the response from country-based pooled funds.

## When Using the EPRP Tool

This is the stage where you will fill out the second part of the “Scenario Planning and Activities” page of the EPRP and the “Resources” page of the EPRP.

On the “Scenario Planning and Activities” page, for each activity, say who is **responsible**, who **accountable**, who needs to be **consulted** and who needs to be **informed** in the relevant columns.

On the “Resources” page, add **medical supplies** needed, **nonmedical supplies** and **other needs,** the **number needed** and the **unit cost.** Under **staff roster,** add human resource needs.

## Step 9 – Linking the Preparedness Plan to Heatwave Early Warning Systems (EWS)

**In this step, you will link your preparedness plan to an early warning system to ensure that actions are taken in good time and to allow the preparedness plan to be eligible for anticipatory action funding.**

Response plans for heatwaves are most effective when they are related to a heat early warning system. Two or three days of early warning will allow International Medical Corps and partners to put plans into operation before the heatwave occurs to provide a more effective response.

Linking the preparedness plan to an early warning system is also attractive to donors who wish to support anticipatory action frameworks (see box, *Anticipatory Action*).

International Medical Corps teams should use early warning systems developed by national authorities wherever these exist.

Where national authorities (particularly the MoH/meteorological office) have not established early warning systems, International Medical Corps teams and partners should encourage them to do so. Establishing heat EWS is a highly technical process and beyond the scope of this guidance. More information may be available from UNDRR, WMO, the Risk-Informed Early Action Partnership or the Red Cross/Red Crescent society in your country.

International Medical Corps teams may also consider using regionally developed EWS that cover the country of operation. These EWS have generally been developed in coordination with the national meteorological offices and should have official support in the country of operation, but you should still discuss their use with the MoH and other government counterparts (as the MoH may not regularly use or even be aware of them).

It is important to note that the various regional EWS use different ways of measuring heat stress, and are not always comparable with each other

**For East Africa/Horn of Africa (IGAD region)**, IGAD ICPAC produces forecasts of heat stress one week in advance, and you can sign up to receive updates.

**For Africa**, the African Center of Meteorological Applications for Development produces forecasts of extreme heat one week in advance, which are available online as part of their Multi-Hazard Outlook. The Multi-Hazard Outlook uses the threshold of 45° C apparent temperature (a measure of heat and humidity combined) over two days as the threshold for severe heatwaves.

**Globally**, the European Centre for Medium-Range Weather Forecasts (ECMWF) produces forecasts of the heat index (a measure of heat and humidity combined) globally and for specific regions (using the drop-down menu). The forecasts are for a week in advance but are given on an hourly basis; use the slider on the website to see how temperatures will evolve over the week and how long high temperatures will last.

The “danger” level for ECMWF is a heat index of 39.4° C, and “extreme danger” is a heat index of 51° C. These are based on experience in the USA. As thresholds to use for launching a preparedness plan, the danger level is probably too low, as in some cases it would lead to the plan being triggered at least once a year.[1] However, if an area is forecast

[1] The maximum temperature in Mopti, Mali, (before counting the additional stress from humidity) has been above 41 degrees every year since 2010.

to remain constantly at the danger level for 72 hours (you can check this using the slider on the website), you can consider using this as a threshold. The extreme danger level, on the other hand, is very high. If an area is forecast to be in extreme danger for any period of time, this is sufficient to launch the plan.

Note that, whichever EWS and system you use, it is important to be clear on the following:

- Who in the office is responsible for monitoring EWS forecasts?
- When should they be monitored" (Daily? Weekly? All year? Only in the hot season?)
- How many days in advance should you start actions on the basis of the forecast?

### Anticipatory Action

Anticipatory action (sometimes called forecast-based action) is a type of disaster risk management that aims to launch a humanitarian response immediately before a hazard—such as a heatwave or flood—or in the very earliest stages of the disaster.

By acting early, anticipatory action programs can decrease the impact of the event on people affected—by giving time for people to evacuate themselves and their belongings from an area about to be flooded, for example. This, in turn, means that the impacts of the disaster are lessened, and that the response activity is smaller and generally more efficient than it would otherwise be.

In a typical anticipatory action program, activities to respond to a disaster are decided in advance in a preparedness plan. These activities are costed, and the budget required to pay for them is set aside in a contingency fund, which will only be spent if the plan needs to be implemented. The preparedness plan and budget are linked to an early warning system. Stakeholders agree in advance on a threshold at which the early warning system will trigger payments and the activation of the preparedness plan. For a heat plan, the threshold is likely to be when weather forecasts say that a certain temperature or heat index measurement will be exceeded continuously for a period of two or three days. When this happens, the money is disbursed and the actions in the preparedness plan are carried out.

## Step 10 – Testing the Preparedness Plan

In this step, you will test the preparedness and response actions for heatwaves to ensure that they will work when required.

To do this, choose a testing method—either a "tabletop" test or a simulated response—and ensure that all key stakeholders are involved.

A tabletop test is a discussion-based exercise where stakeholders walk through a plan step by step, trying to identify gaps and ensuring that everyone understands their roles.

In a simulated event, you would simulate the heatwave itself and carry out the actions in the heatwave plan—mobilizing surge staff and setting up mobile cooling centers, for example. Simulations require significantly more planning and a budget to carry out and will only generally be undertaken for larger and more complex plans.

## Step 11 – Monitoring, Evaluation and Assessment of the Heat Health Action Plan

**In this step, you will decide how to monitor the implementation of the plan and how to evaluate the plan. These decisions are made as part of the design of the plan.**

Heat Health Action Planning is a new area, both for International Medical Corps and for many other organizations. Because of this, it is important to monitor, evaluate and learn from these plans when they are implemented. All Heat Health Action Plans should include monitoring and evaluation (M&E) activities.

### Monitoring

Monitoring is the systematic, routine tracking of how the Heat Health Plan is being adopted, implemented and integrated into broader preparedness efforts. It allows International Medical Corps teams and partners to assess whether planned actions are being delivered on time, in the right way and by the appropriate actors.

In many cases, the Heat Health Plan will form part of a broader project or program and should therefore be linked to the logframe or results framework of that program. If your plan includes activities to adapt existing services (see Step 4 – *Adapting Existing Services and Activities*), then this work will be done under existing programs, and the M&E element will be part of those programs. If the plan is a standalone activity, it will need its own results framework. In either case, indicators relevant to the plan should be clearly integrated into the project logframe to enable routine monitoring through established reporting mechanisms.

Monitoring should typically include two complementary types of indicators:

1. Adoption indicators: *Are key actors using and aligning with the plan*?
2. Implementation indicators: *Are the planned activities being effectively carried out*?

If possible, a third type of indicator can be included:

3. Quality indicators: *Are activities being delivered to an appropriate standard*?

However, measuring quality may require more detailed monitoring approaches such as direct observation, structured checklists, post-drill reviews or feedback from communities and staff. It is often more practical to assess quality as part of an **impact** evaluation (see below).

### Examples of Monitoring Indicators

| Type of Indicator | Examples |
|---|---|
| **Adoption** | • Number of stakeholders (e.g. MoH, local authorities, partners) who have formally signed off on the Heat Health Plan<br>• Percentage of target facilities or administrative units where the plan has been disseminated and endorsed<br>• Number of organizations using common messages for risk communication and community engagement activities |
| **Implementation** | • Number of training events held for CHWs<br>• Number of health facilities where resilience to heat has been assessed<br>• Number of health facilities where action has been taken to improve resilience<br>• If heatwave occurs, number or percentage of action plans triggered in response to heat alerts or early warnings<br>• If heatwave occurs, timeliness of response activities following heat alerts<br>• If heatwave occurs, number of consultations by mobile teams |
| **Quality** | • Percentage of clinicians who judge training sessions to be useful or very useful<br>• Percentage of users who judge cooling centers to be useful/very useful<br>• Proportion of heat preparedness actions implemented that meet minimum quality standards (e.g. International Medical Corps internal standards, Cluster standards)<br>• Percentage of risk communication messages tested and rated as clear and actionable by community members |

## Evaluation and Assessment

Evaluation helps determine how well the Heat Health Plan worked in practice and what can be improved for future iterations. Evaluations can explore a wide range of questions, from how effectively activities were implemented to what outcomes were achieved.

Wherever possible, evaluations should be planned *before* an activity to ensure that the information needed for the evaluation is conducted *during* the activity (see *planning evaluations*, below). Before implementing the Heat Health Plan, it is important to think about a future evaluation and define what the evaluation should achieve. Common objectives include:

- identifying which activities are most effective or should be revised;
- improving how activities are implemented;
- assessing whether activation triggers were timely and appropriate;
- evaluating coordination with local authorities and partners; and
- determining whether the plan contributed to reduced mortality, morbidity or service disruption.

Evaluations typically focus on one or both of the following:

### Process Evaluation

Process evaluation assesses *how the plan was implemented*. Key questions include:

- Were planned activities completed as expected and on schedule?
- What supported or hindered successful implementation?
- Were coordination and communication effective?

Often, process evaluation looks at the implementation of activities and their direct output. (Was this training conducted? How good was it? What worked and didn't?) These are normally easier to conduct than impact evaluations and rely on qualitative methods such as interviews, focus group discussions and document reviews. A common format is the *after-action review*, where stakeholders reflect on what worked, what didn't and why.

### Impact Evaluation

Impact evaluation assesses *what changed as a result of the plan.* This may include:

- health outcomes (e.g., reduced mortality or morbidity during heatwaves);
- functional outcomes (e.g., primary healthcare clinics remaining functional during heatwaves); and
- behavioral outcomes (e.g., increased community knowledge or action taken based on early warnings).

Impact evaluations are generally more complex to conduct than process evaluations. They often require extensive data such as mortality or morbidity figures, which may be difficult to access or unreliable. Moreover, attributing observed outcomes directly to the preparedness plan can be challenging, especially without a clear counterfactual (i.e. knowing what would have happened if there hadn't been a plan).

Because of this, impact evaluations often focus on intermediate outcomes—measurable changes that are plausibly linked to the plan, which will contribute to higher-level outcomes (such as decreased mortality) but are easier to track than the higher-level outcomes. Examples include:

- increased community knowledge and preparedness behaviors following risk communication activities; and
- improved health facility readiness (e.g., increased availability of emergency stocks or functioning backup power systems).

These intermediate outcomes are more feasible to measure and can serve as meaningful proxies for longer-term impact. Since impact evaluations aim to assess change over time, they typically require baseline and endline data collection to compare conditions before and after the plan's implementation.

### Key Evaluation Design Questions

Whether examining process, impact or both, any evaluation should consider:

- Which elements or activities should be evaluated?
- What are the key questions and indicators?
- What data is needed, and how will it be collected?
- Who will use the results, and how will they inform future planning?

## Using Evaluation Results

Similarly, regardless of the evaluation's focus, it is important to define how the evaluation results will be used. When considering your evaluation, you should define:

- how findings will be shared with stakeholders;
- who is responsible for acting on the results; and
- when and how the preparedness plan will be revised.

## Planning Evaluations

Evaluations should be planned well in advance, ideally during the design phase of the Flood Preparedness Plan. Early planning allows appropriate and feasible selection of research questions, identification of suitable indicators, the collection of baseline data and the integration of evaluation activities into the overall implementation timeline. It is strongly recommended to consult your M&E Advisor for support in drafting the evaluation scope of work and selecting suitable methodologies.

For more detailed guidance on evaluation design, methods and tools, refer to the International Medical Corps M&E Evaluation Guidance Document (for more information, contact research@internationalmedicalcorps.org).

# Annex – Documents on Heat Risk

To understand the health risks posed by increased average temperatures and heatwaves:

- The National Adaptation Plan (NAP) for the country, where available. NAPs outline the risks from weather hazards and environmental stresses that the government thinks are priorities for action and the actions that the government has determined will best address these risks. However, not all countries have developed NAPs, and where they have, they do not always address the health sector. In some cases, and particularly if the country does not have a NAP, information on heat risk may be available in the Nationally Determined Contribution document).
- The National Capacity and Vulnerability Assessments with a focus on heat and health, where this exists. (Not all counties have this, and where they have been completed, you may need to liaise with MoH to access them.)
- World Bank Resource 1; Resource 2; Resource 3. Note that these reports are not available for all countries.
- Red Cross/Red Crescent reports (not available for all countries)

Note however that these documents often concentrate on heatwaves and overlook the health threats of increased temperatures: you may wish to "round out" these conversations with Key Informant discussions.

To get a better idea of the likelihood that the country/area will be affected by heatwaves:

- The Thinkhazard web tool provides a helpful classification of heat risk (and other hazards, such as flooding) for countries and parts of countries. The information is available for all countries but is not very detailed, and it is advisable to check it against the GRI tool, below.
- The GRI Risk Viewer tool, Hazard/Extreme Heat function. Information is available for all countries and all parts of countries.

  To use, go to "Hazard" on the menu at the top of the page, and then click on "Extreme Heat" (click on the eye icon). The display will show a pixelated map. The default view shows the annual probability of extreme heat in an area, from 0% to 100%. The information shown is for the year 2020. Note that you can zoom in to a particular country or area within a country.

  Under "Heatwave," change the "Epoch" to 2030 in the dropdown menu, and the "RCP"[2] to 6.0 in the dropdown menu. This gives a projection for the likelihood of extreme heat in the year 2030 using a particular model (called GFDL-ESM2M). Again, the color of the pixels shows the percentage chance of extreme heat in any given year by 2030. By changing the model used, you can see different predictions—note that making predictions of heatwaves is not an exact science but depends on the model used. GFDL ESM2M is the model used by National Oceanic and Atmospheric Administration (NOAA) in the United States.

[2] RCP stands for Representative Concentration Pathway. An RCP is a set of assumptions that are used to model future greenhouse gas emissions (GHGs) and, thus, future temperatures. They range from very optimistic assumptions on how quickly the world will reduce GHGs—RCP 2.6—to very pessimistic assumptions—RCP 8.5. RCP 6 is an intermediate assumption, where GHGs are strongly reduced from around 2060 onwards. The choice of RCP becomes more important if you are using the tool for a longer-term forecast of heatwaves—for 2080, for example.

# Annex – Heat Index

The table below outlines the heat index. The heat index is a way of describing the apparent temperature—how the body feels at a given temperature and level of humidity. In humid environments, this is particularly important—as the table shows, in an environment where the humidity is 80% and the air temperature is 34° C, the body will experience a temperature of 52° C.

## Temperature/Humidity Index

| Relative Humidity % | Temperature C | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
| 40 | 27 | 28 | 29 | 30 | 31 | 32 | 34 | 35 | 37 | 39 | 41 | 43 | 46 | 48 | 51 | 54 | 57 |
| 45 | 27 | 28 | 29 | 30 | 32 | 33 | 35 | 37 | 39 | 41 | 43 | 46 | 49 | 51 | 54 | 57 | |
| 50 | 27 | 28 | 30 | 31 | 33 | 35 | 36 | 38 | 41 | 43 | 46 | 49 | 52 | 55 | 58 | | |
| 55 | 28 | 29 | 30 | 32 | 34 | 36 | 38 | 40 | 43 | 46 | 48 | 52 | 54 | 58 | | | |
| 60 | 28 | 29 | 31 | 33 | 35 | 37 | 40 | 42 | 45 | 48 | 51 | 55 | 59 | | | | |
| 65 | 28 | 30 | 32 | 34 | 36 | 39 | 41 | 44 | 48 | 51 | 55 | 59 | | | | | |
| 70 | 29 | 31 | 33 | 35 | 38 | 40 | 43 | 47 | 50 | 54 | 58 | | | | | | |
| 75 | 29 | 31 | 34 | 36 | 39 | 42 | 46 | 49 | 53 | 58 | | | | | | | |
| 80 | 30 | 32 | 36 | 38 | 41 | 44 | 48 | 52 | 57 | | | | | | | | |
| 85 | 30 | 33 | 36 | 39 | 43 | 47 | 51 | 55 | | | | | | | | | |
| 90 | 31 | 34 | 37 | 41 | 45 | 49 | 54 | | | | | | | | | | |
| 95 | 31 | 35 | 38 | 42 | 47 | 51 | 57 | | | | | | | | | | |
| 100 | 32 | 36 | 40 | 44 | 49 | 56 | | | | | | | | | | | |

| | Caution | | Extreme Caution | | Danger | | Extreme Danger |
|---|---|---|---|---|---|---|---|

# Annex – VCA Questions

Specific areas to consider/questions to ask of other stakeholders during the vulnerability and capacity assessment (VCA) step are:

- Does a heat action plan exist, or is a heat action plan being developed?
  - How might International Medical Corps participate in any multi-agency plan?
  - What coordination exists for the plan?
  - *If no plan exists*, is information available on previous episodes of extreme heat (temperatures, duration, seasonality) and on forecasts of extreme heat in the future?
  - *If no plan exists*, is information available on the health impacts of episodes of extreme heat (morbidities/numbers of people seeking healthcare services, mortality, causes of mortality, challenges faced by health services)?
  - *If no plan exists*, is information available on particular segments of the population who were affected and how they were affected?
  - Does the heat action plan include longer-term activities that address the consequences of increased average temperatures on health?
  - *If not, or if no plan exists,* is information available on the health impacts of episodes of increased average temperatures (morbidities/numbers of people seeking healthcare services, mortality, causes of mortality, challenges faced by health services)?
  - *If not, or if no plan exists,* is information available on particular segments of the population who were affected and how they were affected?
- Do standard curricula for health professionals include content on heat and health?
- Do standard curricula for CHWs include content on heat and health?
- Does the MoH have surge capacity to address critical incidents that could be deployed in a heatwave?
- Are health facilities designed and prepared to be resilient and respond to heatwaves?
- Have any KAP (knowledge, attitudes and practices) surveys been conducted on how citizens understand the health impacts of heat?
- Have common/official messages on heat and health been developed?
- Is there an agreed common language to use in messaging related to heat and health?
- Do existing integrated disease surveillance systems have provisions for detecting and reporting heat-related morbidities and mortalities? If not, is there room for adapting the existing system to capture these, and what inputs would this require?
- Does a heat early warning system exist, or is an early warning system under development?
  - If a heat early warning system exists, how are alerts provided to partners (e.g., International Medical Corps)?
  - If a heat early warning system exists, how are alerts provided to the general public?
  - If a heat early warning system exists, what are the thresholds for determining a heatwave?
  - If no system exists, are reliable forecasts of temperature available?
  - If no system exists, are reliable forecasts of the heat index (see box, *How Heat Affects the Human Body*) available?
- Are there any existing anticipatory action plans (see box, *Anticipatory Action*) for heat emergencies operational in the country? If so:
  - Which organizations are involved?

- Which actions are planned? Can International Medical Corps activities coincide with these activities?
- How will anticipatory actions be funded? Can International Medical Corps also access these funds?

# Annex – Tools for VCA

Vulnerability and capacity assessments can take different forms, and a mix of methods is often used. Some methods that can be helpful include:

## Using Secondary Data (Using Information That Has Already Been Collected and Analyzed)

Identifying existing research, reports and analysis and then synthesizing them to produce key information for the VCA. These might be government risk maps or reports, government health data, previous humanitarian risk assessments or even previous International Medical Corps MSNAs.

Secondary data review is particularly useful as a way to understand elements of the VCA such as heat risk, baseline health status of the population and numbers of people at risk.

Secondary data review is often cheap and relatively quick to conduct.

## Collecting and Using Primary Data

There are a number of different ways to collect new information—each method has strengths and weaknesses and is generally good for getting a specific type of information.

**Key informant interviews** (KIIs) with stakeholders such as local authorities, health workers, disaster management officials and community leaders are useful for getting expert insight, and for reality-checking information from secondary data review.

KIIs can be used to get a better idea of whether heat EWS are available and how they work, or of the degree to which the health system has taken action to build skills and resilience to heat, for example.

KIIs are a good way to get this sort of information quickly and easily (as long as you can access the experts).

**Focus group discussions** with community members or with groups such as CHWs are a good way to explore knowledge and opinions—what people think about a topic, what they know and don't know, and what they think should be done.

In a heat VCA, focus groups can be used to understand how much clinicians, CHWs, nutrition workers and community members know about the risks of heat and what they think priority actions should be. They can also be used to get the perspectives of particular groups, such as pregnant women or people living with NCDs.

Focus group discussions can provide a lot of useful information in a short time when they are well organized and facilitated. They are generally more complicated to arrange than KIIs but less complicated than surveys.

**Representative surveys**: These aim to provide a statistically accurate (valid and reliable) statement of a situation across a large group of people. Surveys can tell you, for example, the rate of malnutrition or of other health conditions in a population. They can also tell you what a population as a whole thinks about a certain topic.

In a heat VCA, surveys would be used to understand baseline health status (although normally you will be using surveys that have already been conducted as secondary data, rather than conducting new surveys). You may also use KAP surveys along with (or as an alternative to) focus groups to develop communications materials and strategies. Surveys may also be an important element of the evaluation of any plan.

Representative surveys require careful design by people with skills in this area and are one of the most costly techniques for collecting and analyzing information.

# Annex – Suggested Heat Health Action Plan Format

**This is a suggested format for a multi-agency heat preparedness plan, which can be used as a common document by all participating organizations. The format includes information on the early warning system for heatwaves that will be used (if an early warning system is in use) and on the triggers that would be used to launch the plan's activities. As such, it can be used as an anticipatory action protocol—a document agreed upon by donors and response organizations that forms the basis of anticipatory action planning and funding.**

**This format does NOT replace International Medical Corps' own internal EPRP document, and International Medical Corps teams should complete the EPRP for their own planning purposes. Instructions for completing the EPRP are in the green boxes in the sections above.**

1. Country and location (district/region) of Heat Health Action Plan
2. Brief assessment of risks and vulnerabilities related to heat

   Include:
   - long-term risks of increased average temperatures;
   - emergency risks of heatwaves;
   - population groups vulnerable to these risks;
   - number of people to be covered by plan; and
   - number of people in vulnerable groups.
3. Participating organizations

   *X [Lead organization]*

   *A, B, C [Participating organizations]*
4. Arrangements for coordinating participating organizations
5. Adaptations to existing services to address risks of increased average temperatures

   *Activity 1 (e.g., community risk education)*
   - *Brief description of activity and number/nature of people to be reached*
   - *Monitoring information to be collected for activity, if any*
   - *Organization responsible for activity*
   - *Budget required and funding source for activity*

   *Activity 2, etc.*
6. Early warning system and triggers for emergency response to heatwaves
   - *EWS that will be used*
   - *Trigger that will be used (temperature, heat index measurement, period at this temperature, etc.)*
   - *Arrangements for monitoring the EWS*
   - *Arrangements for sharing EWS information with participating organizations and the public*

7. Preparedness and response activities for heatwaves
   *Activity 1 (e.g., community risk education)*

   - *Brief description of activity and number/nature of people to be reached*
   - *Monitoring information to be collected for activity, if any*
   - *Organization responsible for activity*
   - *Budget required and funding source for activity*

   *Activity 2, etc.*
8. Arrangements for testing preparedness and response activities
9. Arrangements for evaluation of Heat Health Plan

# Annex – Heat and Occupational Health

The following is a more detailed set of activities to ensure the health of staff during heatwaves.

1. In preparation for heat events, host a heat-stress awareness session for staff.
   a. Encourage staff to stay healthy, hydrate and maintain a basic level of aerobic fitness.
   b. Encourage heat acclimatization planning and use progressive exposure to improve thermal tolerance.
2. Ensure awareness of hot weather conditions among staff.
   a. Provide information on local weather conditions and forecasts as well as associated risk, particularly when conditions change.
   b. Monitor workers for signs and symptoms of heat-related illness
   c. Create a buddy system for informal peer-to-peer monitoring of heat stress, following a protocol that is appropriate to your context.
   d. In conditions conducive to heat stress, avoid situations where staff work alone.
   e. Supervisors are also responsible for monitoring staff for the signs and symptoms of heat stress.
3. Limit staff exposure to heat and/or exertion.
   a. Consider needed staffing levels to enable surge/shadow rotations to facilitate break and rest periods.
   b. Schedule work that may result in the rapid storage of body heat and/or increase body core temperature for manageable periods of time. Follow this with exposure to cooler areas to dissipate body heat and reduce the risk of heat stress. This could involve directing staff to tasks or wards requiring different levels of PPE.
   c. Work/rest cycles are an established approach but may not always be practicable. Mechanical aids (e.g., trolleys) can also help to reduce physical workloads and, as a result, the body's metabolic heat production.
4. Establish a cool rest area for staff.
   a. Provide a cool area for staff and schedule adequate time for cooling during rest breaks.
   b. Ensure air conditioning and ventilation systems are regularly inspected and maintained, and operate at the correct settings.
   c. In many places, electric fans may be more accessible but may help transmit the virus indoors, and in very hot and dry environments, these can increase heat stress.
   d. Consider supplementing with ice slurry consumption where cooling facilities are not available or are insufficient, particularly in humid conditions.
   e. Consider the use of cooling devices under protective garments, such as vests with phase-change materials, ice or equivalent.
5. Ensure sufficient hydration and nutrition for staff.
   a. Provide cool water and access to food in clean (and ideally cool) areas.
   b. Encourage staff to self-monitor their hydration. Practical options include displaying simple urine-color charts in toilet facilities and providing weighing scales in changing rooms so that staff can weigh themselves before and after each shift to calculate fluctuations in their body mass (and therefore hydration level).

6. Consider how to provide cooled toilet facilities.
    a. Providing toilet facilities in hot areas encourages staff to continue hydrating rather than reducing their fluid intake to avoid urinating until they can reach a toilet in a cooler area. This reduces their risk of dehydration due to the combined effects of heat and a lack of fluids.
7. Establish a formal monitoring system for staff heat experiences.
    a. Encourage workers to report heat stress symptoms.
    b. Consider issuing a brief anonymous staff survey to monitor heat-stress symptoms and the adequacy of control strategies.
    c. Create a critical incident log to record heat illness and near misses. This can inform future policies as well as the training of new staff.
8. Ensure access to a treatment area for staff suffering from heat-related illness, including heat stroke.
    a. Provide access to cooling facilities for staff to rapidly reverse excessively high core body temperature.
    b. Where immersion in cool water is not practical, apply cold towels and/or ice packs to the body.