Heat and OSH Policy Brief

June 2024

Best practices in the GCC region and beyond

1. Heat and OSH in the Arab region and beyond

In the vast stretches of the Arab region, the sun reigns with an intensity that touches all aspects of life. This is particularly true for the region’s workforce who, especially during the summer, face the relentless challenge of workplace heat exposure (WHE) [1, 2]. During WHE, the heat radiated by the environment and the working muscles surpasses the body’s physiological cooling mechanisms that normally help maintain a healthy temperature. This is not just about feeling hot — it is a serious occupational health and safety (OSH) risk that can cause everything from nausea and exhaustion to life-threatening heat stroke as well as to drastic reductions in productivity with devastating effects on the economy [3, 4].

In the Arab region, and especially in the GCC, with its predominance of high temperatures and often very humid conditions, WHE is a daily reality for many workers, especially those in outdoor or poorly ventilated environments like construction, agriculture, mining, as well as oil and gas extraction [1, 2]. These are the people who build the towering skylines and cultivate the scarce arable lands, often in conditions that push the human body to its limits [5]. The challenge of WHE is not just the heat; it is also about access to water, shade, and rest, combined with the need to meet high demands and tight schedules [5, 6]. It is about how these elements impact people who are out there working, building, and growing the necessities of our everyday lives [5, 6].

But WHE is not just an issue for the Arab world. As global temperatures rise, WHE is becoming a concern in places that never expected to face such scorching conditions [3, 4, 7]. It is a worldwide problem that calls for global action as well as local solutions [8-10].

To contribute to the International Labour Organization’s (ILO) mission for improvement of working conditions and to support its constituents in realizing the fundamental principle and right to a safe and healthy working environment, the ILO Qatar Office and the MoL organized in May 2023 the “International Conference on Occupational Heat Stress: Implementation of Practices, Sharing of Experiences” in Doha. The objective of this conference was to exchange scientific knowledge on the impact of WHE, to present prevention and mitigation policy responses, as well as relevant good practices. Governments as well as workers’ and employers’ organizations from around the GCC region (and Iraq, Jordan) shared their perspectives with practitioners, scientists, and policy makers from around the world. No region is spared from the climate crisis, and the experiences and lessons learned from the Americas, Africa, Asia, and Europe all resonated with what is being felt in the Arab region.
This Policy Brief aims to shed light on the silent epidemic of WHE, to explain why it matters, and to showcase ways to protect workers. It also presents a summary and synthesis of the outcomes from the above-mentioned conference in Doha, regarding the drivers and constraints associated with the burden of WHE in the Arab region and beyond, outlining key components of both global and national-level actions to protect the health and well-being of workers. It focuses on the drivers of WHE — from the natural temperatures to the way we work — and what is standing in the way of safer workplaces. Finally, it also shares the best practices from the Arab region and other countries that were discussed at the above-mentioned ILO conference.

Ultimately, this document is designed to guide policy makers and inform relevant stakeholders not specialized in WHE. The goal is to foster understanding and spur action, aiming for a future where the warmth of the sun is a comfort, not a threat, to those who labour under its gaze.

2. Heat and OSH in the GCC region

The following subsections provide an overview of the legislative measures and actions taken to protect workers from WHE in the GCC region. These are also summarized in Table 1.

2.1. Bahrain

In Bahrain, the Ministry of Labour has established protocols to shield workers from the hazards of WHE during the summer months. According to the “Order No. 3 for 2013 regulating working hours outdoors”, workers are not allowed to work outdoors between 12:00 and 16:00 from July 1 to August 31 each year [11]. In addition, employers are required to set a work schedule in accordance with these “prohibited work hours” and place it where all workers can see it and labour inspectors can review it during inspection visits. Workers in the oil and gas installations, as well as those who work in emergency maintenance are excluded from these rules, and the employer has to take the necessary precautions to protect them from WHE [11]. Furthermore, employers are mandated to provide the appropriate safety equipment and ensure the safe use and storage of materials, as well as to educate their workforce about the inherent dangers of WHE [12].

2.2. Kuwait

In Kuwait, the Ministerial Decision “No. 535/2015” has established the “Noon Work Ban” for summertime working hours. Accordingly, outdoor work is prohibited between 11:00 and 16:00 from 1 June to 31 August. This legislation does not cover workers in the country's oil and gas sectors [13, 14]. Furthermore, these restrictions are enforced when the temperature rises to more than 48.89°C [15].

2.3. Oman

In Oman, the “Article 16/3-3 of Ministerial Resolution No. 286/2008 as amended by Ministerial Resolution No. 322/2011” has established the Noon Work Stoppage. This regulation prohibits outdoor work, particularly in construction sites, from 12:30 to 15:30 between June 1 and August 31 [16-18]. Furthermore, the Ministry of Health has introduced guidelines to prevent heatstroke, underscoring the critical need to avoid extended heat and sun exposures. The Ministry of Labour further emphasizes the importance of OSH and mandates employers to educate their workforce about potential occupational hazards, including WHE, and the necessary protective measures [17, 19]. Additionally, organizations like the Oman Society for Petroleum Services adopt the Thermal Work Limit as a critical heat stress index, to guide rehydration and work-rest schedules, ensuring compliance with these regulations for safe working conditions in extreme heat [20].

2.4. Qatar

The Ministry of Administrative Development, Labour and Social Affairs in Qatar introduced the Ministerial Decision No.16 during 2007 to limit workers’ exposure to WHE. To inform a possible update of the legislation on WHE, the Ministry of Administrative Development, Labour and Social Affairs, The Supreme Committee for Delivery and Legacy and the ILO collaborated to support research and policy discourse. In 2019, they conducted a large research study into WHE [1]. The research aimed at measuring the impact of WHE on the health and productivity of workers, particularly those performing manual labour outdoors. In total, the research investigated WHE in a construction site of a 2022 World Cup stadium with more than 4,000 workers and a comprehensive heat stress management plan, as well as in a farm with fewer precautions in place. The study collected and analysed data covering more than 5,500 working hours, including different parameters of the workers’ mental and physical health, their physiology, as well as their labour effort.
The study recorded high levels of WHE in outdoor workplaces, particularly in the middle part of the day [1]. Despite this, workers were able to perform their roles safely, when effective mitigation measures were in place. Very few workers experienced high core body temperatures, and this was for short amounts of time. One of the key reasons why workers, particularly, at the World Cup site were at low risk to physiological heat strain, was because they were empowered to self-pace and take frequent breaks and were also supported by a number of other heat mitigation strategies. Another interesting finding was that many workers were dehydrated at the start of their shifts, which highlights the importance of effective hydration training and education. Finally, the study found that workers were more likely to stay cool if they replaced the dark-coloured overalls that they typically wore with loose, light-coloured, and durable clothing made from breathable fabrics [1].

The research by ILO and the Ministry of Administrative Development, Labour and Social Affairs provided a scientific basis on which to propose adjustments to Qatar’s existing legislation to further protect workers from WHE. In May 2021, the Government of Qatar announced Ministerial Decision No.17, a new legislation which replaced the Ministerial Decision No.16 of 2007 and introduced additional measures. The new legislation states that work must stop if the Wet-Bulb Globe Temperature (WBGT) rises above 32.1 °C. The WBGT is the most effective indicator to assess the impact of WHE on human health and productivity [21-23]. The goal of the WBGT threshold is to have a level of heat exposure that could extend over hours, where healthy adults can perform their typical work routine without a significant risk to their health [1, 24]. The research performed by ILO and the Ministry of Administrative Development, Labour and Social Affairs showed that this risk remains low as long as WBGT remains below 32.1 °C, which is a threshold similar to that adopted in several other countries [1, 3].

In addition to the WBGT threshold, the new legislation includes an expansion of the prohibited working hours to ensure that workers are effectively protected from WHE. The Ministerial Decision No.17 is applied every year from June 1 to September 15, and no work is allowed to be performed in direct sunlight or in open workplaces between the hours of 10:00 and 15:30. It also mandates that employers provide workers with annual health checks (important to early diagnose those who are more susceptible to heat-related disorders) and to educate them to remain fit for duty.

Based on data collected by the Qatar Red Crescent during the summer of 2021, hospitalizations from WHE in Qatar were reduced by more than half (odds ratio 0.45 to 0.48) after adoption of the Ministerial Decision No.17 (Figure 1) [25].

2.5. Saudi Arabia

In Saudi Arabia, the Ministry of Human Resources and Social Development has implemented rules and regulations to protect workers from WHE during the summer months. According to Ministerial Decree “No. (3337), dated 14/05/2014”, no outdoor work is permitted from 12:00 to 15:00 during the period June 15 to September 15 each year [26-28]. Additionally, the Ministry has prepared a guide for preventing the effects of WHE that includes strategies for breaks, providing rest areas, and access to hydration during the hottest hours of the day. The guide emphasizes the importance of staying hydrated by regularly drinking fluids every 15 to 20 minutes. It also promotes teamwork, encouraging workers to avoid working alone and always seek assistance from others. If workers experience any health symptoms, they are advised to stop working and inform their colleagues nearby. The guide further stresses the need for workers to take breaks and wear light coloured clothing that minimizes heat absorption [29].

Based on the legislation, employers are also required to equip workplaces with devices that measure temperature and humidity, to provide workers with water, and to adjust work schedules in a way that minimizes prolonged daily exposure to WHE. The employer responsibilities also include establishing designated zones for rest breaks and annual health checks to diagnose early workers who are more susceptible to heat-related disorders [27, 29].

2.6. United Arab Emirates

The Ministry of Human Resources and Emiratisation in the United Arab Emirates has established the “Midday Break Decree” under the “Decree No. 401 of 2015” [30]. This legislation aims to minimize WHE and prevent heat related illnesses among workers. The decree mandates that outdoor work is prohibited from 12:30 to 15:00, between June 15 and September 15 each year [30]. Additionally, the United Arab Emirates government has initiated the “Safety in the Heat” program, with the support of the Abu Dhabi Public Health Centre, to raise awareness about heat-related illnesses and injuries [31]. The Abu Dhabi Public Health Centre provides guidance for employees and employers who work in WHE conditions, aiming to educate 800,000 workers and employers on the best ways to stay healthy and cool when working in the heat [32, 33]. For employees the program focuses on the importance of staying hydrated, maintaining an intake of salt, taking rest breaks, and promptly reporting any health concerns. For employers it highlights the need for scheduling shifts, helping employees adjust gradually to WHE, reducing work demands, providing access to cool water and rest areas, as well as closely monitoring those at risk. The program also includes training and education on managing heat related illnesses to equip both employers and employees with knowledge and practices for ensuring safety and well-being in WHE conditions [31].
### Table 1. Summary of legislation to protect workers from heat stress in the GCC countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Legislation code (Ministerial decision)</th>
<th>Prohibited work hours</th>
<th>Thermal Stress Indicator used for guidance</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Period of enforcement</td>
<td>Hours daily</td>
<td></td>
</tr>
<tr>
<td>Bahrain</td>
<td>No. 3 (2013)</td>
<td>July 1 to August 31</td>
<td>12:00 – 16:00</td>
<td>---</td>
</tr>
<tr>
<td>Kuwait</td>
<td>No. 535 (2015)</td>
<td>June 1 to August 31</td>
<td>11:00 – 16:00</td>
<td>---</td>
</tr>
<tr>
<td>Oman</td>
<td>No. 286 (2008) No. 322 (2011)</td>
<td>June 1 to August 31</td>
<td>12:30 – 15:30</td>
<td>---</td>
</tr>
<tr>
<td>Qatar</td>
<td>No. 17 (2021)</td>
<td>June 1 to September 15</td>
<td>10:00 – 15:30</td>
<td>WBGT</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>No. 3337 (2014)</td>
<td>June 15 to September 15</td>
<td>12:00 – 15:00</td>
<td>Heat Index</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>No. 401 (2015)</td>
<td>June 15 to September 15</td>
<td>12:30 – 15:00</td>
<td>---</td>
</tr>
</tbody>
</table>
3. Heat and OSH internationally

A number of practitioners, scientists, and policy makers from around the world were present at the “International Conference on Occupational Heat Stress: Implementation of Practices, Sharing of Experiences”. They shared lessons learned and national-level actions from the Americas, Africa, Asia, and Europe. These are summarized in the following subsections and in Table 2.

3.1. Greece

Several collective agreements (e.g., construction, courier services, ship repair) were in effect in Greece until 2010, which included different air temperature limits (36, 37 and 38°C) to protect workers from WHE [34]. While these collective agreements are not in effect since 2010, a lot of progress to protect workers from WHE has been made in Greece in the last seven years through a collaboration among the Ministry of Labour and Social Affairs, workers’ and employers’ organizations, the Hellenic National Meteorological Service, and scientists (FAME Lab, an Environmental Physiology research group at the University of Thessaly) [34]. This work has resulted in an integrated protection framework to protect workers from WHE based on evidence gathered in the country’s workplaces as well as synthesis of relevant international evidence [34].

The protective measures are designed to mitigate an increase in workers’ core body temperature beyond 38°C. To do this, a range of measures have been planned, including adaptations to work schedules and personal protective equipment, technical and organisational measures to limit WHE, as well as considerations for non-acclimatized workers [34]. All these measures are based on WBGT levels, with complete work interruption foreseen when WBGT raises beyond 32.5°C for low intensity work, 31.5°C for moderate intensity work, 30.5°C for high intensity work, as well as 30°C for very high intensity work [34]. Employers are advised to measure WBGT at the workplace using appropriate validated equipment, while the simplified version of the WBGT (incorporating only air temperature and relative humidity) is suggested as an alternative for micro-enterprises that may not be able to purchase sophisticated equipment to perform comprehensive assessments [34].

In addition to recommending WBGT measurements at the workplace, the developed framework to protect against WHE provides employers and workers with validated estimations of WBGT. Specifically, the Hellenic National Meteorological Service in collaboration with the Ministry of Labour and Social Affairs as well as the FAME Lab developed a model to provide forecasts of WBGT throughout the country. A large-scale validation of the model showed that the forecasts underestimated WBGT by 1.15°C, compared to in-situ measurements using portable weather stations [34]. This underestimation is considered acceptable since this is a forecast with a 48-hour horizon, not real-time observation requiring specialized equipment/measurements [34].
Furthermore, the FAME Lab developed a WBGT estimation and forecasting application for smartphones. A large-scale validation study compared the WBGT estimated by the smartphone application with WBGT measurements from all over Greece collected using portable weather stations. The results showed that the smartphone application underestimated WBGT by 1.2°C [34]. This underestimation is considered acceptable since this is a real-time estimation from the closest weather station and/or a forecast with a 4-day horizon and not real-time observations requiring specialized equipment/measurement [34].

A pilot phase of the above-described framework was launched in the summer of 2021 by the Ministry of Labour and Social Affairs as well as collaborating partners (workers’ and employers’ organizations, and FAME Lab) which included adopting the proposed measures, assessing WHE in small and large worksites, as well as education and training for workers and occupational health and safety professionals [34]. Based on the results of the pilot phase, a circular to mitigate WHE was issued before the summer of 2022 by the Ministry of Labour and Social Affairs [35]. Thereafter, in the summer of 2023, the Ministerial Decision No. 65581 was adopted to address a specific heat wave which lasted 14 days in July [36]. The Ministerial Decision No. 65581 included a selected range of the above-described measures and, by design, ceased to apply in August 2023. The permanent legal integration of the developed framework is the next crucial step.

3.2. India

In 1950, India published the guideline “Factories Act (No. 63 of 1948)” [37, 38] to safeguard the health and well-being of factory laborers who work in WHE. These guidelines require employers to ensure that Wet-Bulb Temperature does not exceed 30°C in factory workrooms. Moreover, information is provided in the form of a table which indicates which combinations of Dry-Bulb (air temperature) and Wet-Bulb (accounts for humidity) temperatures should not be exceeded during work [37, 38]. In addition to the above WHE rules for factories, the Indian National Disaster Management Authority in collaboration with the Ministry of Home Affairs have published the “National Guidelines for Preparation of Action Plan - Prevention and Management of Heat Wave” to protect the Indian workforce in the face of heat extremes [39]. These guidelines emphasize on (1) educating workers, (2) ensuring proper hydration, (3) regulating work schedules, and (4) providing necessary medical facilities. The same guidelines highlight the importance of acclimatizing workers to high temperatures to reduce risks to their health while they work under WHE. They also highlight the need for employers to provide access to cool drinking water during work, as well as encourage workers to consume traditional beverages that will help them to stay hydrated throughout their shifts [39]. Recognizing the risks associated with WHE, the guidelines recommend rescheduling physically demanding jobs to cooler times of day, as well as increasing the frequency and duration of work breaks during periods of extreme temperatures [39], in line with well-grounded research findings. In addition to the above, special attention is given to pregnant workers and workers with underlying medical conditions. Lastly, the same guidelines advise workers to take measures against sun exposure by wearing breathable light-coloured clothing as well as by using hats and/or umbrellas [39].

3.3. Japan

The Japanese legislation includes the “Industrial Safety and Health Act” which was first published in 1972 and has received several revisions, the most recent one being in 2018 [40]. This legislation mandates that employers should take the necessary measures to prevent health impairments due to exposure to high temperatures and recommends regular medical checkups and environment monitoring during hazardous work operations. In addition, the Ministry of Health, Labour and Welfare has produced the “Workplace Heat Stroke Prevention Measures Manual” [41], a relevant Circular [42] as well as other documents and campaigns [43] which include extensive guidance for avoiding WHE at work. This guidance uses WBGT to provide recommended upper thresholds of WHE for different work activities, with very high intensity work not recommended beyond 25°C, high intensity work not recommended beyond 26°C, moderate intensity work not recommended beyond 28°C, low intensity work not recommended beyond 30°C, and any work being inadvisable beyond 33°C. These values are meant for acclimatized workers, while the respective thresholds for unacclimatized workers are 20, 23, 26, 29, and 32°C WBGT. To complement these legislative measures, the guidelines emphasize the importance of controlling the workplace environment, shortening work hours during hot periods, ensuring regular hydration, and promoting health management [41]. In addition, the Climate Change Adaptation Law issues heatstroke alerts based on forecasted WBGT values [44]. Moreover, guidelines have been developed to address heat-related risks during specific scenarios, such as radioactive cleanup work [40, 44].
3.4. Mexico

The Federal Regulation of Occupational Health and Safety (Reglamento Federal de Seguridad y Salud en el Trabajo in Spanish) was released in Mexico in 2014 [45]. The regulation, which was adopted in February 2015, provides employers with guidelines on how to protect workers from WHE. Specifically, employers should detect workplaces with hazardous thermal conditions and take reasonable actions to reduce potential risks to the health of their workers. These actions include: (1) placement of safety signs that restrict access to thermally hazardous areas, (2) implementation of heat-mitigation strategies when necessary, and (3) provision of personal protective equipment to workers. The same regulation requires employers to (1) provide their workers with regular medical checkups, (2) inform them about the risks associated with WHE, and (3) offer relevant training to those working under extreme WHE. Additionally, the regulation prohibits assigning pregnant workers to work tasks that involve exposure to unsuitable thermal conditions or work outdoors with extreme conditions that could lead to serious health risks [45].

3.5. Singapore

The Singaporean Ministry of Manpower in collaboration with the Ministry of Health have published a comprehensive set of guidelines designed to safeguard outdoor workers from the adverse impacts of WHE. These recently-updated guidelines [46, 47] which have been implemented with immediate effect, are based on a well-grounded four-point approach: acclimatization, hydration, rest, and shade. Specifically, a gradual heat-acclimatization period is essential for workers who are new to Singapore or those who are returning to the country after long vacations. Equally important is the emphasis on hydration, with workers encouraged to drink water at least 300 ml hourly, ensuring that dehydration and its associated health impacts are mitigated [46, 47]. But hydration alone is not enough. Recognizing the significant burden that accompanies physical labor under the sun, the Singaporean guidelines mandate regular work breaks in shaded areas. This becomes especially important when the WBGT exceeds 32°C. In such hot and humid conditions, people who perform intense manual labour should take a minimum 10-minute break in the shade every hour [46, 47]. When WBGT reaches or exceeds 33°C, these breaks should be extended to 15 minutes per hour. Moreover, those with underlying health conditions should take extended breaks, tailored to their medical needs. In addition, to ensure real-time responsiveness, employers, particularly from the construction sector, shipyards, and the process industry, are directed to use WBGT meters for hourly temperature monitoring. For broader applicability, other industries can use dedicated mobile applications for the assessment of workplace thermal conditions. To ensure quick identification of any heat-injury symptoms, the use of a buddy system – two or more workers working together – is encouraged [46, 47].

3.6. South Africa

The Republic of South Africa has published guidelines, namely the “Occupational Health and Safety Act: No. 85 of 1993”, to safeguard its workforce from the adverse impacts of WHE, paying special attention to those engaged in intense manual labor [48]. Specifically, when the hourly average WBGT exceeds 30°C, employers in South Africa should proceed with heat-mitigating actions aiming to reduce WHE [48]. If it is not feasible to work in a cooler workplace, it is suggested that employers should ensure that workers are medically certified (by a registered medical practitioner) to work in the heat. In addition to the aforementioned medical certification, a key component of the South African guidelines is the heat acclimatization of workers. This is a vital component to ensure that workers are not suddenly overwhelmed by the hot workplace. Hydration is equally emphasized in the guidelines, with a requirement for workers to consume a minimum of 600 ml of water every hour. Last, the guidelines require the workers to be trained in the precautions to be taken to avoid heatstroke, as well as require the employer to provide the means whereby every worker can receive first-aid treatment promptly in the event of heatstroke [48].
## Table 2. Summary of legislation to protect workers from heat stress in selected countries internationally.

<table>
<thead>
<tr>
<th>Country</th>
<th>Legislation code (Ministerial decision)</th>
<th>Basis for guidance</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Thermal Stress Indicator</td>
<td>Maximum thresholds for work</td>
</tr>
<tr>
<td>Greece</td>
<td>No. 65581 (2023)</td>
<td></td>
<td>≤32.5°C (low intensity work) ≤31.5°C (moderate intensity work) ≤30.5°C (high intensity work) ≤30°C (very high intensity work)</td>
</tr>
<tr>
<td>India</td>
<td>No. 63 (1948) (Factories Act)</td>
<td>---</td>
<td>≤30°C</td>
</tr>
<tr>
<td>Japan</td>
<td>Industrial Safety and Health Act</td>
<td>---</td>
<td>≥33°C (very low intensity work) ≤30°C (low intensity work) ≤28°C (moderate intensity work) ≤26°C (high intensity work) ≤25°C (very high intensity work)</td>
</tr>
<tr>
<td>Mexico</td>
<td>Federal Regulation of Occupational Health and Safety</td>
<td>WBGT</td>
<td>---</td>
</tr>
<tr>
<td>Singapore</td>
<td>Workplace Safety and Health Act</td>
<td>Heat Index</td>
<td>---</td>
</tr>
<tr>
<td>South Africa</td>
<td>No. 85 (1993)</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
4. Updated knowledge on WHE

During the conference in Doha in May 2023, representatives from governments and policy makers, as well as workers’ and employers’ organizations together with practitioners, scientists, and policy makers from around the world shared their perspectives as well as updated evidence on WHE. Their call was abundantly clear: WHE can induce more than just heat injuries and performance degradation. It presents a major challenge for the physical and mental health of the working population, causing increased risk-taking and decreased concentration and resulting in accidents beyond its direct impact. It is essential to enhance the legislation, raise awareness and launch behavioural change campaigns among workers, employers, and the general public on WHE levels, risks associated to high heat and measures to be taken.

While WHE overwhelmingly affects outdoor workers in physically demanding jobs such as agriculture and construction, sight should not be lost of the impact on workers in indoor environments where the temperature is not regulated, such as in the garment sector in Southeast Asia. In all cases, although the safety and health of workers must be the priority, there is an economic and productivity impact of WHE due to reduced labour supply (number of hours worked) and labour productivity (output during those working hours). Importantly, prevention and protection against WHE does not reduce, but enhances productivity.

All workers, regardless of age, gender, and nationality, are affected by WHE. Specific groups of workers, such as people with pre-existing or recently acquired medical conditions, or pregnant women, are even more vulnerable to the effects of WHE. The inclusion of tailor made, and effective social protection and health services need to take this into account. Especially regarding migrant workers, as they are often at particular risk for heat-related illness. In the context of the efforts for the creation of social protection systems for migrant and temporary workers, special attention must be given to the identification and mitigation of WHE related diseases. Responses need to be context-specific, and solutions cannot be transferred completely from one context to another. Therefore, while we can and should learn from one another, we should remain acutely aware that solutions need to be tailored to labour markets and other circumstances.

Many of the policy responses related to WHE were published during the last decade, reflecting how this is a new area for policy action. The impact of climate change on human health has received far less attention than the impact of climate change on the environment. Climate impacts on OSH still has large gaps in the evidence. To make occupational health impact assessments more precise, additional data on health and productivity impacts in real work situations is needed. Research priorities include:

- Achieving a better understanding of environmental changes, the long-term effects of exposure to extreme WHE, specific impacts of WHE from the sun for outdoor workers, with specific focus on the impact on different vulnerable groups such as older workers, pregnant women, and people with acute or chronic health conditions.
- Assessing the relative effectiveness of different WHE mitigation strategies across jobs in major industries including construction, agriculture, fisheries, and energy, to ensure that the optimum measures are used in each case.
- Studying the risks arising from adaptation and mitigation actions to climate change and WHE (e.g., less use of air conditioning) and to ensure that the most effective but also most sustainable and environmentally neutral solutions, such as use of climate friendly building materials are adopted.
- The gender-related aspects of WHE, including specific vulnerabilities, prevention and mitigation needs, and work arrangements.
- The use of AI as well as mobile technology and applications for supporting OSH and for protecting workers’ health and productivity from climate change.

Wearable technology can be harnessed to inform solutions or to prevent and mitigate WHE. Nevertheless, while wearable technology can and should be tapped for solutions, effective low-cost and practical measures exist, and there is no need to re-invent the wheel. There is evidence of the efficacy of protocols such as WERS (water, electrolytes, rest, and shade), and the experience from Qatar and several other countries illustrate that awareness raising, training, implementation and enforcement can reduce the risk of heat stress on workers.
The implementation of adaptation measures at the workplace level are key but will not be sustainable and effective in the long-term, unless there is also an investment in strengthening institutions and improving policies, regulations, and enforcement at the national level. The complexity of climate change impacts and the associated cross-sectoral effects call for a more systemic and collaborative approach to considering how OSH is affected by climate change and how OSH can be supported. Effective solutions require collective action among a wide range of stakeholders at different levels, including governments, employers, and workers. The WHE is not the responsibility of one actor alone. The involvement of employers and workers in the design of interventions is crucial, because they are the best placed to implement preventive and mitigating measures and take appropriate action at the workplace. Involving employers and workers through a process of social dialogue facilitates ownership and promotes sustainability.

Regional and international collaboration is essential for the exchange of knowledge and practices, as well as the coordination of the relevant research and policy design and implementation – noting that solutions need to be contextualized to local realities. A regularly updated compendium of heat preparedness and response strategies should be created to aid exchange, learning, and customized adoption.
5. CONCLUSIONS AND KEY TAKE-AWAYS

The above sections explore the multifaceted challenge of WHE in the GCC region and beyond. From examining the local initiatives in the GCC region to drawing lessons from international practices, this document offers a robust synthesis of strategies to mitigate the risks associated with WHE. Here are the key conclusions and take-aways from this analysis:

1. Global relevance of WHE

The Arab region, known for its high temperatures and often humid conditions, experiences a significant burden of WHE, especially in outdoor or poorly ventilated work environments. The present analysis underscores that WHE is not just an issue confined to the Arab region but a global OSH concern. This is attributed to rising global temperatures, making WHE a pertinent issue in various parts of the world.

2. Legislative responses in the Arab region

All countries in the region have implemented specific measures to protect workers from WHE. For instance, Bahrain’s «Order No. 3 for 2013» regulates working hours outdoors, Kuwait’s «Noon Work Ban» restricts outdoor work during peak heat hours, and Qatar’s Ministerial Decision No.17 introduces a WBGT threshold to regulate work conditions. These legislative actions underscore the region’s commitment to addressing WHE.

3. International perspectives and actions

The wealth of experiences and lessons from countries that participated in the “International Conference on Occupational Heat Stress: Implementation of Practices, Sharing of Experiences” demonstrates the global nature of WHE and the diverse strategies employed to combat it. For example, Greece’s integrated protection framework, India’s guidelines for factory labourers, and Japan’s heatstroke at work campaigns provide varied approaches to handling WHE.

4. Scientific foundation for policy making

The collaboration between the ILO, the Supreme Committee for Delivery and Legacy and the Ministry of Administrative Development, Labour and Social Affairs in Qatar, which resulted in comprehensive research on WHE, illustrates the importance of evidence-based policy making. The study’s findings, such as the effectiveness of self-pacing and frequent breaks, dehydration issues, and the benefits of light-colored clothing, are instrumental in shaping effective WHE policies and guidance.

5. Effective strategies for mitigating WHE

The present document highlights several key strategies to combat WHE, including acclimatization programs, work-rest cycles, hydration protocols, use of personal protective equipment, and the importance of education and training, as well as other technical and organizational measures. These strategies are vital in creating safer working environments.

6. Economic and productivity impacts of WHE

The present analysis sheds light on the economic implications of WHE, including its impact on labour productivity. This aspect is crucial for understanding the broader significance of addressing WHE beyond the immediate health concerns.

7. Worker empowerment and inclusive solutions

One of the central themes emerging from the present analysis is the importance of empowering workers and stakeholders through knowledge, training, and the implementation of protective measures. Equally important is to ensure that the developed solutions are inclusive and consider the needs of vulnerable groups, such as migrant workers and those with pre-existing medical conditions. This approach not only ensures the well-being of workers but also enhances their productivity.

8. Importance of contextualized solutions

The present document calls for context-specific solutions, recognizing that strategies effective in one region may not be directly transferrable to another. This underlines the importance of adapting best practices to local labour markets and environmental conditions.

9. The role of policy makers and stakeholders

The present document underscores the vital role of policy makers and stakeholders in acknowledging the seriousness of WHE and taking concerted actions to mitigate its impact. It calls for a collaborative approach involving governments, employers, workers, and international organizations.

10. Future research and technology utilization

Highlighting the areas where additional research is needed, the present analysis points to the potential of technology, including artificial intelligence and mobile applications, in advancing OSH practices and protecting workers from the impacts of WHE and climate change.

In summary, this policy brief provides a holistic view of the challenges posed by WHE, offering insights into both regional and global good practices. It emphasizes the need for a combined effort of local and international actions, driven by scientific research and best practices, to ensure the health and safety of workers in hot environments. The ultimate aim is a future where WHE is a manageable factor rather than a significant occupational hazard.
References


6. Onarheim KH, Phua KH, Babar Z, Flouris AD, Hargreaves S. Health and social needs of migrant construction workers for big sporting events. BMJ. 2021;374:m1591. Epub 2021/08/07. doi: 10.1136/bmj.m1591. PubMed PMID: 34353809; PubMed Central PMCID: PMC82843462; and have no interests to declare.


15. ILO. One is too many. The collection & analysis of data on occupational injuries in Qatar. Doha, Qatar: International Labour Organization; 2021.


