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Climate Centre

QUICK REFERENCE GUIDE

HEAT AND THE PRIVATE SECTOR
HEATWAVE PREPAREDNESS

OVERVIEW

Heatwaves can cause widespread injury and death through dehydration, exacerbation of preexisting medical conditions and heat stroke. Heatwaves also result in decreased worker productivity—in 2017, an estimated 153 billion hours of work were lost due to extreme heat (2). Due to climate change, heatwaves are expected to become more common and more severe, particularly in countries in the global south.

Source: USAID Afghanistan ASAP Project

According to projections based on labor force trends and a global temperature rise of 1.5°C by 2100, 2.2 percent of total working hours worldwide will be lost to high temperatures in 2030—a productivity loss equivalent to 80 million full-time jobs. Similarly, economic losses due to heat stress at work are projected to increase to US$2.4 trillion in 2030, with the impact of heat stress being most pronounced in lower–middle- and low-income countries (3).

The effects of these heatwaves will be more severe in cities due to the urban heat island effect, which will in turn affect businesses and industry, as the majority of businesses and workers are concentrated in urban areas. As a result, businesses have an important role to play in protecting workers from the effects of extreme heat, both for the sake of their employees as well as to protect business operations. Private sector partners can easily put in place—and are often required by law to put in place—safety measures to protect staff from heat exposure, particularly during the hottest part of the day and for staff working outdoors or in hot indoor conditions.

Key Impacts

WORKER HEALTH

Increased risk of serious health impacts
Increased risk of workplace injury
Exacerbated preexisting conditions

BUSINESS

Decreased worker productivity
Damage to equipment and machinery
Disrupted business services

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This document was prepared under the Adaptation Thought Leadership and Assessments (ATLAS) Task Order No. AID-OAA-I-14-00013 and is meant to provide a brief overview of heat's effect on urban environmental issues. The key resources at the end of the document provide more in-depth analysis. The contents of this report do not necessarily reflect the views of USAID.

HEAT RISKS FOR THE PRIVATE SECTOR

Outdoor work is prevalent worldwide in both developed and developing countries. For example, according to the U.S. Bureau of Labor Statistics, nearly half of all jobs in the United States (15 million) required outdoor work in 2016 (8). Other workers facing heat risks are employed in factories, warehouses and other locations that either generate indoor heat or are insufficiently cooled. Below is an illustrative list of professions that would be at increased risk during a heatwave (5, 6, 8):

Private Sector **HEALTH RISKS**
Groups most as risk
Outdoor workers
Physical laborers
Workplaces with indoor heat-generating appliances or machinery
Workers in offices without cooling

- Outdoor laborers
- Construction workers
- Farm workers
- Building and grounds maintenance workers
- Road maintenance workers
- Roadside vendors
- Workers in the leisure and hospitality sector, including golf courses, nature parks and recreational camps
- Foresters and loggers
- Workers in the mining, quarrying and oil and gas extraction sectors
- Utility workers
- Police and firefighters
- Truck and bus drivers
- Delivery drivers
- Transport hub workers (airports, bus stations, etc.)
- Warehouse workers
- Factory workers
- Security guards
- Workers in bakeries, kitchens and laundries (sources with indoor heat-generating appliances)
- Any indoor worker in an office without cooling or other climate controls

HEAT, WORKER SAFETY AND BUSINESS OPERATIONS

HEAT AND WORKER SAFETY

People release 65 percent of their body heat through radiation, 23 percent through evaporation of perspiration from the skin, 10 percent through convection and 2 percent through conduction. When the temperature of the surrounding air is 35°C/95°F or higher, radiation, convection and conduction stop working, and evaporation (i.e.,

Private Sector HEAT IMPACTS	
Worker Health	Serious health problems including heat stroke and heat exhaustion
	Other health problems including cramps, rashes and fatigue
	Increased risk of workplace injury
Business Operations	Decreased worker productivity
	Damage to equipment and machinery
	Delays or damage to services essential for business operations, such as transport and energy

sweating) is all that is left to cool the body (1). At this threshold, serious health problems can occur, including: heat stroke, fainting, heat exhaustion, cramps, rashes (also called prickly heat) and fatigue. Long-term health problems—such as kidney damage—can also occur from prolonged exposure to heat (9).

Heat risk becomes acute when individuals have preexisting heart, lung or kidney conditions, even at lower temperatures. Business owners and managers may not be aware of these conditions, however, and extra caution should be exercised during high heat events.

Even where health problems do not appear, excessive workplace heat can lead to poor memory, loss of concentration, short attention span, carelessness and difficulty following instructions. Heat can also increase the risk of injuries due to sweaty palms, fogged-up safety glasses and dizziness (1, 5, 6). A National Aeronautics and Space Administration (NASA) study concluded that when the temperature is 35°C/95°F for an extended period, workers can make up to 60 unnoticed mistakes per hour (7).

Extreme heat events can also result in poor air quality, and air pollution, such as ground-level ozone and particulate matter pollution, has been linked with both acute and chronic health effects such as heart disease, respiratory diseases and allergic disorders. Workers—particularly outdoor workers and workers with preexisting conditions—will be exposed to additional air pollution, and this could result in health issues that are compounded by heat exposure (3).

HEAT AND BUSINESS OPERATIONS

As mentioned above, even at temperatures lower than 35°C, workers begin to make more mistakes. At 33°C–34°C, for example, people working at moderate intensity lose 50 percent of their work capacity (3). Excessive heat can reduce the operational lifespan of equipment and can cause computers and other machinery to overheat.

Extreme heat events can also disrupt services necessary for business operation. Extreme heat significantly affects transportation by damaging roadways, delaying trains and grounding airplanes. Heat can also increase peak energy demand, decreasing electrical grid stability and contributing to brownouts and blackouts.

STEPS TO REDUCE RISK

Employers have a responsibility, often required by law, to ensure the safety and health of their workers. By ensuring that employees are working in a safe and comfortable environment, employers benefit through increased morale, productivity, efficiency and fewer errors. Changes to reduce heat risk for workers typically involve three areas: (1) the physical environment, (2) the day-to-day workplace practice and (3) workplace operations and planning (2, 3, 4, 5, 6).

Changes to the physical workplace environment

- Add air conditioning to offices or workplaces if possible, or air-condition a designated cooling room. If adding air conditioning is not possible, add fans to workplaces and break areas.
- Reduce sources of indoor heat and humidity such as steam leaks and wet floors, and site mechanical systems away from workers.
- Reassess interior layouts of buildings, placing infrequently used common spaces and storage areas in hotter parts of the building, and work areas and frequently used common spaces in cooler parts of the building.
- Implement green infrastructure strategies to reduce heat, such as:
    - Installing a green or vegetated roof.
    - Painting a roof white, or installing reflective or heat-absorbing shielding or barriers.
    - Ventilating the building during cooler periods in the evening or overnight.
    - Installing blinds on existing windows and/or replacing existing windows with glazed or tinted windows.
    - Planting trees across western facing windows to reduce direct sun exposure in the afternoon.
    - Switching to energy-efficient appliances, equipment and lights to limit waste heat.
- Erect shade cloth to reduce direct sun exposure and heat in outdoor work areas.
- Provide shaded rest areas and site water points in the shade to encourage hydration.

Changes to work practice

- Provide workers with suitable personal protective equipment, and provide training on the proper care and use of heat-protective clothing and equipment, as well as the added heat load caused by exertion, clothing and personal protective equipment.
- Encourage or require outdoor workers to cover exposed skin with a long-sleeved shirt and a hat with a brim or flap that protects the ears and neck.
- Encourage outdoor workers to use sunscreen with a sun protection factor (SPF) of at least 15 on any exposed skin.
- Schedule heavy work and physical labor for early in the morning or late in the afternoon or evening instead of the hottest midday hours.

FOUR SIMPLE STEPS TO REDUCE HEAT RISK

1. Provide **shaded rest area**(s)
2. Provide **cool, clean water** in rest area(s)
3. Provide workers with **more frequent breaks**
4. **Modify work schedule** so strenuous outdoor work occurs in the early morning or evening

- During hot weather, give workers more frequent breaks and/or assign additional workers to the job.
- Allow workers, particularly new workers, to become acclimatized to hot conditions by limiting work hours initially and gradually increasing workers' time over a period of time (e.g., one week).

Changes to workplace operations

- Implement a heat alert program in the event of a heatwave forecast and provide early risk communication in-person or via SMS or email.
- Incorporate heatwave adaptation procedures (e.g., modified work schedule, increased breaks) into standard operating procedures.
- Add heat to existing emergency response plans within the workplace to avoid detrimental health impacts.
- Provide a heat stress training program for all workers and supervisors covering the following topics: the importance of taking breaks in the shade and hydration, recognizing heat stress symptoms, onsite first aid treatment, and how/when to obtain medical assistance in the event of an emergency.
- Hang heat health and safety posters in frequently used common areas.
- To the extent possible in view of health and privacy laws, employers should be aware of employees' potential health conditions or medications that could impact their heat tolerance.
- Develop a heat acclimatization plan to gradually increase workers' time in hot conditions over 7 to 14 days. For new workers, the schedule should be no more than 25 percent of the usual duration of work in the heat on day 2 and no more than a 25 percent increase on each additional day.

Key Resources

- Using the Heat Index: A Guide for Employers (OHSA 2019)
- Overview: Working in Outdoor and Indoor Heat Environments (OSHA 2019)
- Heat Stress for Workers (CDC-NIOSH 2019)

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