International Labour Organization

Heat at work: Implications for safety and health

A global review of the science, policy and practice

PART I: WHAT DO WE KNOW?

A changing climate: BEYOND HEAT

A cocktail of hazards for workers

Excessive Heat

Solar UV radiations

Extreme weather events

Air pollution

Vector-borne diseases

Agrochemicals

UN Secretary General Global call for action on heat

“A new report from the International Labour Organization being released today, warns that over 70% of the global workforce—2.4 billion people—are now at high risk of extreme heat”

António Guterres

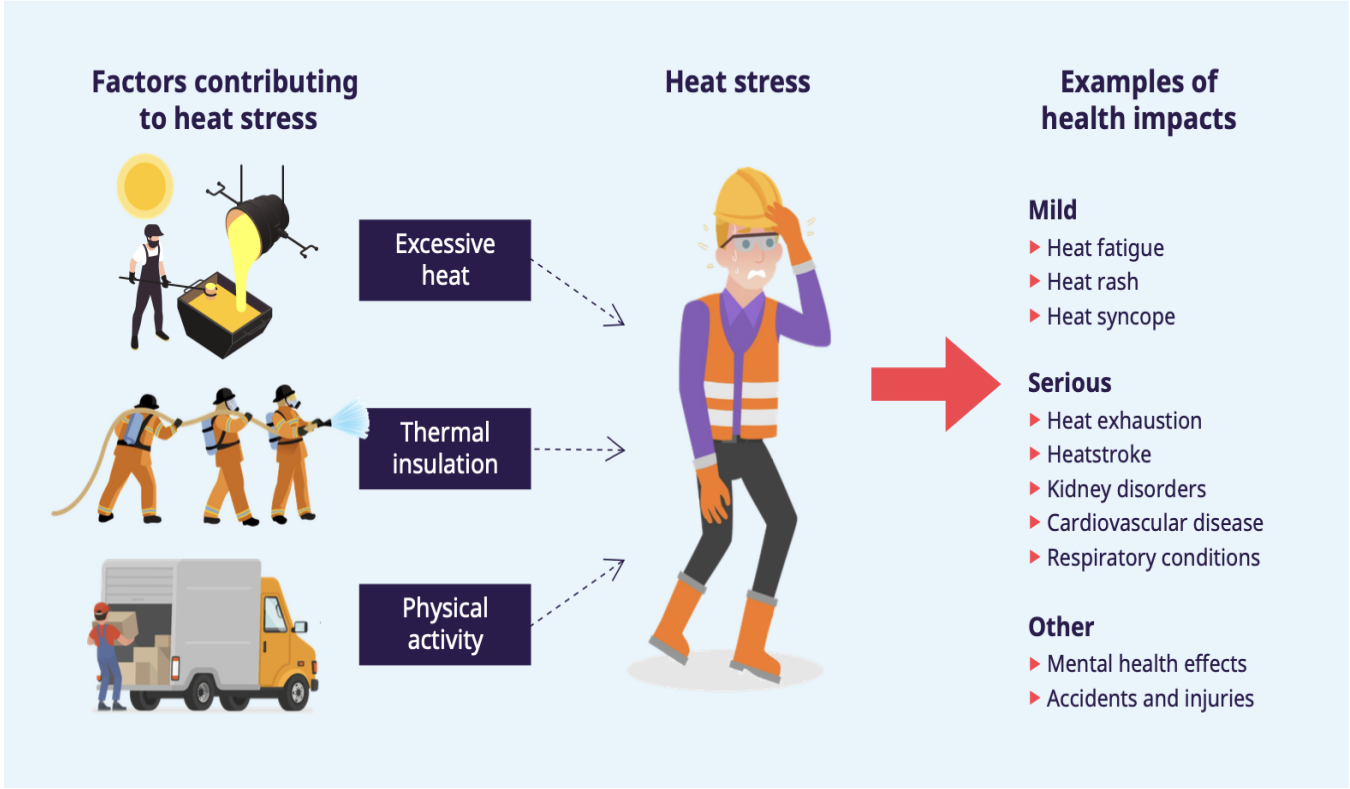
Secretary-General of the United Nations

International Labour Organization

Heat at Work

- Maintaining a core body temperature of around 37°C is essential for normal function.
- Heat-related risks for workers are influenced by:

1. **Excessive heat** - the combined interaction of increased air temperature/humidity, limited air flow and radiant heat sources (for example, heat-emitting sources and machinery).
2. **Thermal insulation** - the impact of clothing and personal protective equipment (PPE).
3. **Physical activity** - metabolic heat is generated when performing physical tasks.



International Labour Organization

How excessive heat impacts the safety and health of workers

Mild effects

- Heat fatigue
- Heat cramp
- Heat rash
- Heat oedema
- Heat syncope

Serious effects

- Heat exhaustion
- Heatstroke
- Fluid/electrolyte disorders
- Acute/chronic kidney injury
- Cardiovascular/respiratory diseases

An increase in risks due to additional hazards

- Other climate change hazards (UV radiation, air pollution etc)
- Chemicals in the workplace

Mental health effects

- Psychological distress
- Anxiety
- Irritation & anger
- Reduced focus & concentration

Accidents and injuries

- Altered emotional states
- Hot surfaces and ill-functioning equipment
- Unsafe use of PPE

International Labour Organization

Globally

2.41 billion workers

70 per cent of the working population

are exposed to excessive heat

This results in

22.85

million non-fatal injuries

and

18,970

deaths annually

Regions with the **highest** workforce exposure to excessive heat:

Africa
92.9% of the workforce

The Arab States
83.6% of the workforce

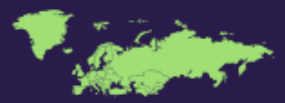
Asia and the Pacific
74.7% of the workforce

Regions with the **highest proportion** of occupational injuries attributable to excessive heat:

Africa
7.2% of all occupational injuries

The Americas
6.7% of all occupational injuries

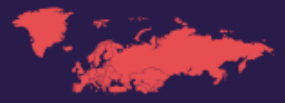
Region with the **most rapidly increasing** workforce exposure to excessive heat since 2000:



Europe and Central Asia
17.3% increase

Regions with the **most rapidly increasing** heat-related occupational injuries since 2000:

The Americas
33.3% increase



Europe and Central Asia
16.4% increase

International Labour Organization

US$361 billion

could be saved globally

if OSH measures to prevent occupational injuries related to excessive heat were implemented.

9/10

worker exposures to excessive heat occur **outside of a heatwave.**

8/10

occupational injuries linked to excessive heat occur **outside of a heatwave.**

26.2 million

people living with **chronic kidney disease** attributable to heat stress worldwide.

Excessive heat

Every year, at least

2.41 billion
workers exposed

22 million
occupational
non-fatal injuries

2.09 million
disability-adjusted
life years (DALYs)

18,970
work-related deaths

Solar UV radiations

Every year,

1.6 billion
workers exposed

Over

18,970
work-related deaths
due to nonmelanoma
skin cancer alone

Vector-borne diseases

Every year, over

15,170
work-related deaths

Air pollution

Every year,

1.6 billion
workers at risk of exposure

860,000
work-related deaths

Agrochemicals

Every year,

873 million
workers at risk of
exposure

Over

300,000
deaths

Extreme weather events

Wildfires

Flooding

Major industrial
accidents

Health impacts include

Heat stroke

Accidents

Cardiovascular
disease

Malaria

Dengue

Lyme disease

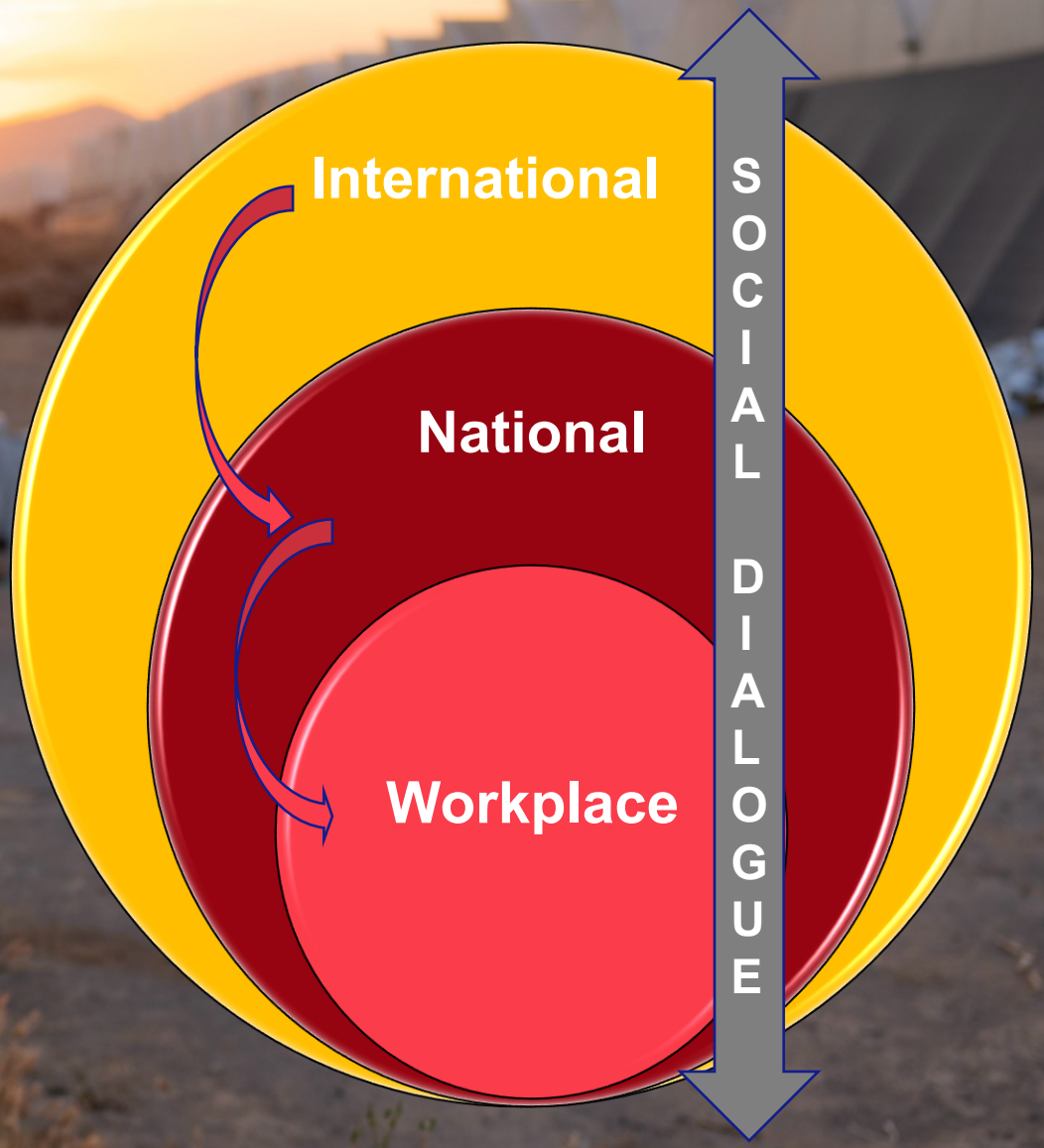
Respiratory
diseases

Cancers

among many others

PART II: WHAT CAN WE DO?

Multi-level responses

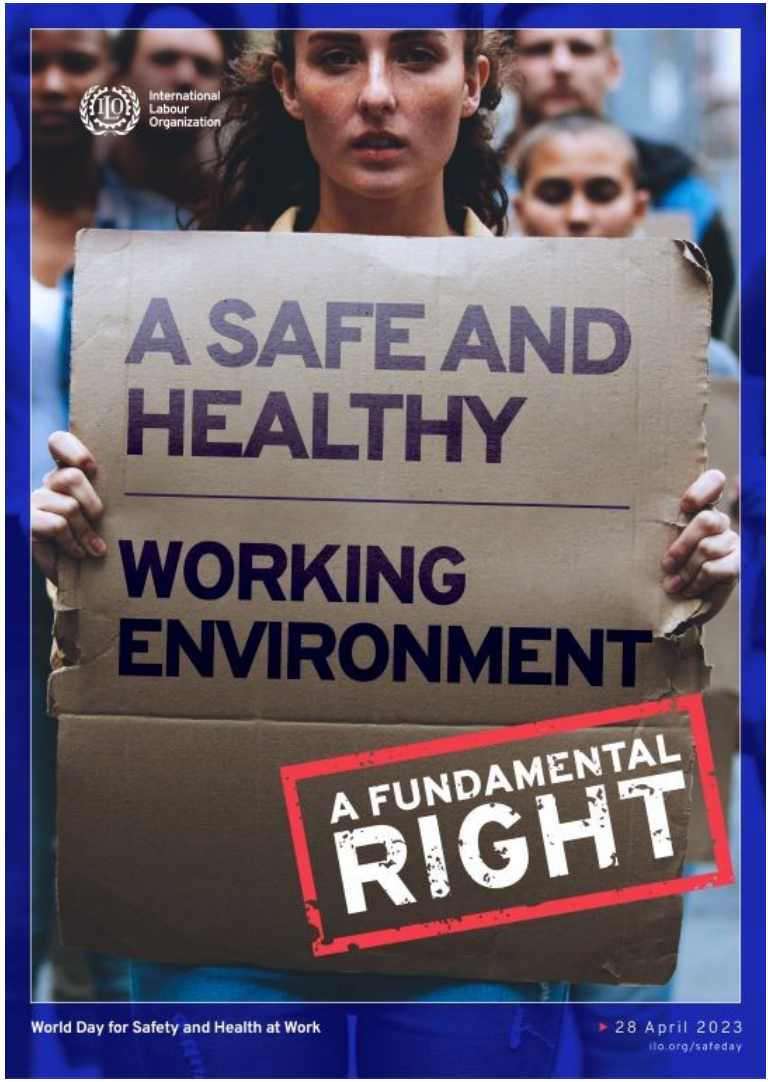


International Labour Organization

A safe and healthy working environment as a fundamental principle and right at work

- In 2022, the International Labour Conference (ILC) included **“a safe and healthy working environment”** in the ILO’s framework of fundamental principles and rights at work
- Fundamental conventions: Occupational Safety and Health Convention, 1981 **(No. 155)** and Promotional Framework for OSH Convention, 2006 **(No. 187)**
- All Member States have **an obligation** to promote and realize the right to a safe and healthy working environment, **whether or not they have ratified ILO Conventions.**

PARADIGM SHIFT TO A RIGHTS BASED APPROACH



International Labour Organization

An analysis of national legislation to address heat stress from 21 countries across the world showed some common provisions for workplace level measures:

Participatory risk assessment in the working environment integrating excessive heat.

Provision of cool, shaded and ventilated rest areas.

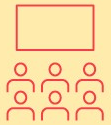
Identification of and targeted strategies for worker groups at high risk, including outdoor and indoor workers, those in informal economies and and micro, small and medium enterprises (MSMEs), among others.

Heat acclimatization measures for workers without recent heat exposure.

Use of the wet bulb globe temperature (WBGT) as a potential heat stress indicator to assess the level of heat exposure, with varying safety thresholds based on work intensity.

Personal protective equipment (PPE) designed to protect workers from heat stress.

Hydration strategies, including adequate sanitation facilities, especially for female workers.



Education and awareness on heat stress and heat-related illnesses.

Rest, breaks or modified work schedules to limit or avoid exposure to excessive heat, including the ability to self-pace.

Regular medical check-ups and health monitoring.

International Labour Organization

Examples of legislation regarding maximum temperature thresholds in the workplace

ILO region	Country	Heat stress assessment	
		Heat stress indicator	Safety threshold (work intensity / risk)
Africa	Mozambique*	Air temperature	33°C (mining operations only)
	South Africa	WBGT	30°C
The Americas	Brazil	WBGT	31.7-33.7°C (very low intensity work) 20.7-24.7°C (very high intensity work)**
	Chile	WBGT	32.2°C (low) 31.1°C (mod.) 30.0°C (high)
	Costa Rica	Heat Index and WBGT	<91 (low risk) 91-102 (mod. risk) 103-124 (high risk) ≥125 (extreme risk)
The Arab States	Qatar	WBGT	32.1°C
	Saudi Arabia	Heat Index	25-29°C (low risk) 30-38°C (mod. risk) 39-51°C (high risk) ≥52°C (extreme risk)
Asia and the Pacific	China	Air temperature	37-39°C (high risk) >39°C (extreme risk)
	India	Wet Bulb Temperature	30°C
	Japan	WBGT	33.0°C (sedentary) 30.0°C (low) 28.0°C (mod.) 26.0°C (high) 25.0°C (very high)
	Singapore	WBGT	32°C (mod. risk) 33°C (high risk)
Asia and the Pacific	Thailand	WBGT	34.0°C (low) 32.0°C (mod.) 30.0°C (very high)
	Vietnam*	Air temperature (indoor only)	34°C (light) 32°C (medium) 30°C (heavy)

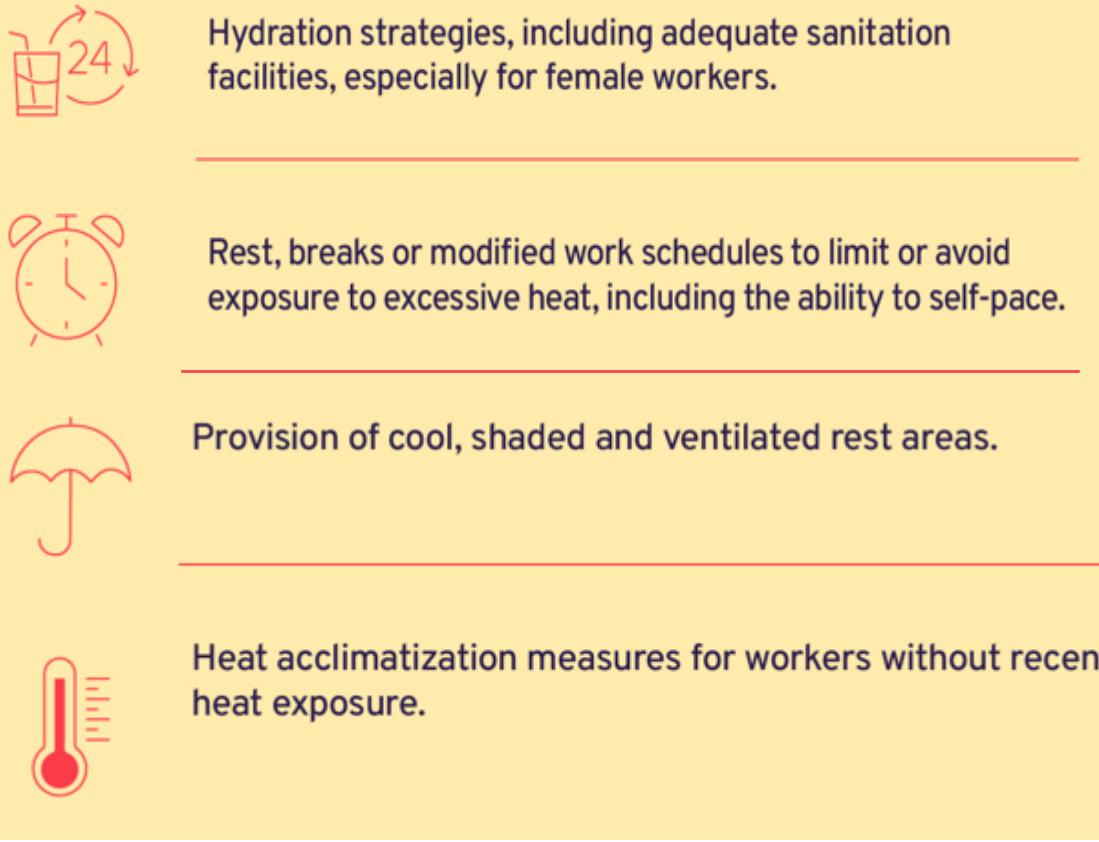
ILO region	Country	Heat stress assessment	
		Heat stress indicator	Safety threshold (work intensity / risk)
Europe and Central Asia	Armenia*	Air temperature	40°C
	Austria*	Air temperature	25°C (low physical stress) 24°C (normal physical effort)
	Belgium	WBGT	29.0°C (low) 26.0°C (mod.) 22.0°C (high) 18.0°C (very high)
	Cyprus	WBGT	32.2°C (low) 31.1°C (mod.) 30.0°C (high)
	Greece	WBGT	32.5°C (low) 31.5°C (mod.) 30.5°C (high) 30.0°C (very high)
	Hungary*	Air temperature	31.0°C (intellectual) 31.0°C (light) 29.0°C (medium) 27.0°C (heavy work)
	Latvia*	Air temperature (indoor only)	28°C
	Portugal*	Air temperature	22°C (commercial, office and service establishments only)
	Slovenia*	Air temperature	28°C
	Spain	Air temperature	27°C (sedentary work) 25°C (light work)
		Relative humidity	70 per cent (all other rooms) 50 per cent (rooms with risk of static electricity)
		Air flow	0.25 m/sec (normal conditions) 0.75 m/sec (active work in excessive heat)

International Labour Organization

WORKPLACE LEVEL: Adapting national guidance to enterprises

- Number of evidence based research initiatives have identified practical and low-cost measures:

- Adequate hydration + sanitation strategy
- Rest breaks or modified work schedules + ability to self-pace
- Cool, shaded and well ventilated rest areas
- Acclimatization periods for workers without recent heat exposure
- Light, breathable and appropriate PPE



TAKE AWAY

- No need to re-create the wheel, existing tools like Risk Assessment and Hierarchy of Controls
- Without further research, these are actions that can be implemented NOW

International Labour Organization

Where do we go from here: Priorities for the World of Work

1. **UN Call to Action on Extreme Heat :** UN-wide action to address extreme heat, with ILO leading the agenda for all world of work issues, including OSH for workers

2. **ILO constituents** have made it clear that prevention and control strategies for **OSH and extreme weather events and changing weather patterns** need to be developed as a **matter of urgency. First ever ILO tripartite meeting of experts on OSH and CC hazards is scheduled to develop policy guidance (Feb 2026).**

3. **Social dialogue must be the foundation for action – to guarantee uptake of policy guidance.**

4. A global **multi-disciplinary expert group on climate change and OSH** should be established to work together to propose harmonized and evidence-informed heat stress assessment and intervention models and protocols.

5. International, inter-governmental and **cross-sector collaboration** should be a priority in order to share knowledge, resources and best practices addressing workplace heat stress.

> When heat comes, it's invisible. It doesn't bend tree branches or blow hair across your face to let you know it's arrived. The ground doesn't shake. It just surrounds you and works on you in ways that you can't anticipate or control. You sweat. Your heart races. You're thirsty. Your vision blurs. The sun feels like the barrel of a gun pointed at you. Plants look like they're crying. Birds vanish from the sky and take refuge in deep shade. Cars are untouchable. Colors fade. The air smells burned. You can imagine fire even before you see it.
>
> ▶ **Jeff Goodell,** Author "The Heat Will Kill You First"

QUESTIONS?

Dr Halshka GRACZYK

graczyk@ilo.org