

PROTECTING THE VULNERABLE FROM HEATWAVES: A GAP IN POLICY

Exposure to high temperatures impacts human health but some individuals are more at risk due to higher exposures or differential susceptibility. This policy brief summarises evidence on vulnerable groups and prevention measures in heat health action plans.



Key messages

- Evidence on heat-related vulnerable groups has grown considerably in recent years.
- People who are most at risk of heat-related death, medical event or heat injury are elderly, children, pregnant women, socially deprived groups, outdoor workers, and people with chronic conditions.
- Heat plans and prevention measures include training and education for social and health workers, housing retrofit, subsidies for indoor cooling and information campaigns.
- Emergency measures can be targeted to high-risk individuals: active outreach for elderly, isolated and high-risk individuals, opening of cooling centres and rescheduling of work shifts for at risk outdoor workers.
- There is limited evidence of the formal evaluation of heat public health interventions and response measures, and a lack of evidence regarding effectiveness for vulnerable groups.
- More documentation and research is needed on the measures and activities put in place.
- Most current evidence is for school-based interventions for athletes and individual protective cooling equipment for outdoor workers.
- Need to raise urgency for socially deprived, homeless, chronically sick, and mental illness groups – which are neglected by health and social care system.

Vulnerable population subgroups: physiopathological mechanisms and heat-related health effects

Category	Heat effect
Older persons (identified as most vulnerable)	Increased morbidity and mortality in elderly, especially those with multiple chronic conditions, socially isolated and with reduced mobility
Children	Morbidity for renal disease, asthma exacerbations, electrolyte imbalance and gastroenteritis
Pregnant women	Increased risk of preterm births, low birth weight and congenital anomalies
Socio-educational deprived groups	Higher risk of heat-related mortality and morbidity
Workers	Increase in occupational hazards (injuries, accidents) and heat-related illnesses such as dehydration, heat stress, heat stroke or cardiovascular, respiratory and renal disease. Sectors most at risk are agriculture and construction and workers engaged in labour intensive outdoor activities
Gender	Differences in heat-related morbidity and mortality by gender intersecting with other factors (age, pre-existing chronic conditions, social isolation & occupation)
Athletes	Exertional heat-related illness during strenuous exercise in the heat

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Clinical vulnerability factors and mechanisms

Cardiovascular diseases (CVDs)

Reduced ability to enhance body cooling through cardiac work. Heat is considered a risk factor for morbidity and mortality for total and specific CVDs (e.g. acute myocardial infarction, stroke, irregular heart beat and heart failure).

Respiratory diseases

Heat can cause rapid breathing or deep breathing, as well as tightening of muscles, obstructing airflow. Asthma and other lung diseases are exacerbated by heat and can be fatal.

Psychiatric and neurologic disorders

Heat is related to morbidity and mortality for depression, psychiatric disorders and substance abuse and for Alzheimer, Parkinson's disease and dementia.

Kidney/urologic disease

Heat-related dehydration causes electrolyte imbalance and renal function impairment, which increases morbidity and mortality for acute kidney disease and chronic renal insufficiency.

Diabetes

Heat is related to bad glycaemic control and reduced cardiovascular compliance.

Chronic pharmacological treatment

Heat-related dehydration interacts with chronic therapy impairing thermoregulation.

Preventive measures in place towards vulnerable groups

Preparatory interventions and long-term measures



Education and training programs

for social and healthcare workers, implemented as stand-alone measures or included in heat plans, suggest an improved knowledge on heat-related risks and the ability to identify and monitor vulnerable patients in the healthcare facilities. Some programs aim to train social workers operating in vulnerable neighbourhoods to promote and strengthen community cohesion and communication to improve awareness and response. Education of healthcare workers focuses on the identification of signs and symptoms of heat stress, the monitoring of high-risk patients and the management of heat emergencies.



Housing, buildings and spatial planning measures

Retrofitting and green infrastructures have been implemented to reduce children's exposure to heat in schools through participatory processes involving children, teachers, parents, and school staff. Hospital and nursing homes increased outdoor green areas to provide natural shade.

For the elderly and low-income groups, a variety of interventions are used, including providing money subsidies for cooling, renovating deprived neighborhoods, conducting information campaigns, and creating cooling centers.





Information campaigns

Passive information campaigns, sometimes part of heat plans, disseminated through flyers and posters, social media, press conferences, phone alerts, apps, and hotlines, are often aimed to reach various vulnerable groups (elderly, people with chronic diseases, pregnant women, children, homeless and outdoor workers). In conjunction with other interventions, such as water distribution or personal protective equipment, dissemination of heat alerts and health advice to elderly people seems effective in promoting behavioural change.



Acclimatisation interventions in workers and athletes

Acclimatisation strategies are implemented at the start of the summer to enhance adaptation and reduce heat-related illness or injuries for athletes. Acclimatisation procedures are also beneficial to workers such as soldiers and firefighters who work in hot regions or in contact with fires, and require significant physical effort.

Interventions and emergency measures during heat waves



Active outreach/active surveillance

Active outreach, whether formally included in the heat plan or stand-alone, implemented through phone calls, home visits (providing health monitoring) reduce mortality during heatwaves for isolated elderly, fragile, or mentally ill individuals. Additionally, volunteers may provide periodic assessments and information, as well as help with everyday tasks, to isolated vulnerable people and the homeless.



Cooling centres and other facilities

These consist of offers of public cooling spaces, such as opening of community or senior centres and public libraries for vulnerable people, or free tickets to movie theatres and cool space for homeless people during heat waves.



Healthcare facilities emergency protocols

As part of a heat plan, specific measures in retirement homes and healthcare facilities were activated during heat waves, such as indoor temperature control measures (e.g. natural or mechanical ventilation, sunshades, AC), and monitoring of patients (e.g. hydration, clothing, medication, sun avoidance, activities reduction). However, no evidence on hospital emergency procedures (e.g. discharge postponing, clinical pathways for heatstroke patients) has been retrieved in the literature.



Protection measures in workers and athletes

The rescheduling of training sessions and work shifts, frequent breaks in the shade, and cooling interventions (lightweight clothing, hydration and cooling strategies), showed evidence of reducing heat-related symptoms and injuries in outdoor workers and athletes. Some mitigation practices included preventive measures for co-exposure to heat and wildfires, such as better-balanced work/rest ratios or hydration protocols, for firefighters involved in wildland fire suppression.

Gaps

- While the evidence on risk and vulnerabilities factors is consistent, that on the implementation and evaluation of heat health preventive measures specifically aimed at vulnerable populations is scarce.
- Most evidence on the existence of heat health adaptation plans comes from High Income Countries, but evaluations of their implementation and effectiveness are rarely performed and/or disseminated.
- There is a growing need for reporting, monitoring and evaluation of prevention measures.
- Several vulnerable groups rely on passive information campaigns. There is need to integrate active preventive measures.
- No evidence emerges regarding preventive measures targeting vulnerable people co-exposed to heat, wildfires, droughts, and air pollution, except on preventive strategies for firefighters, exposed to both heat and wildfires.
- Plans and interventions should undergo periodic updates to account for the change of vulnerable groups.

Vulnerable groups	Interventions targeted to vulnerable groups: evidence from the literature							
	Information 	Cooling 	Workplace 	Education 	Healthcare 	Social 	Urban 	Number of interventions per vulnerable group
Older people	++++	++		++	+	++	+	
Children	+	+			+		+	
Low SES		+		+		+	+	
Chronic diseases	++	+		+	+	+	+	
Athletes	+	++++						
Workers	++	++++	++++	+	+			
Pregnant women	+			+				
Homeless	+	+		+				
N. of reports or articles reporting each intervention								

Number of articles describing each intervention:

- 1-3: +
- 4-6: ++
- 7-9:+++
- 10-13: +++++

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