

Heat-related illness

Heat-related illnesses are a growing problem worldwide due to an increase in extreme heat events, and have been the subject of several reviews which may be helpful to us in primary care (NEJM 2019;380:2449, BMJ 2022;378:e070762, NEJM 2022;387:1404).

In the 20 years from 2002 to 2022, there was a 54% increase in heat-related mortality in people aged >65y (NEJM 2022;387:1404). When we think of heat illness, we might consider heatstroke to be our biggest concern, but other conditions can also be exacerbated by increased temperatures – such as IHD, renal and respiratory disease, and mental health conditions. In addition, a number of medications may increase the risk of heat-related illness. Our role in primary care might include not just the recognition and management of heat-related illness, but also taking action to reduce the risk in our more vulnerable patients.

Vulnerability to heat illness

Vulnerability to heat illness might result from external factors such as exposure to heat (outdoor workers/athletes), socioeconomic factors (access to cool spaces, ability to relocate if needed, social isolation) and individual factors that increase susceptibility (BMJ 2022;378:e070762, NEJM 2022;387:1404).

Those at increased risk include:

- The elderly (mortality can be >50% (NEJM 2019;380:2449)).
- Pregnant women.
- Pre-pubertal children.
- Athletes.
- Outdoor workers.
- Patients with chronic conditions.
- Patients who are socially isolated, or those with a history of substance misuse disorder.
- Those on certain medications, including diuretics, antidepressants, anticholinergics, antihypertensives, antipsychotics, lithium (NEJM 2022;387:1404).

Classification

Heat illnesses are classified into 2 subtypes:

- Classic heat illness:
 - Due to excessive environmental heat and poor ability to dissipate that heat (NEJM 2019;380:2449).
 - Affects our vulnerable patient groups.
 - Mortality if not promptly treated is as high as 80% (NEJM 2022;387:1404).
- Exertional heat illness:
 - IMPORTANT! High environmental temperature NOT required: physical exertion causes excess metabolic heat which overwhelms usual compensatory mechanisms.
 - Affects soldiers, firefighters, agricultural workers, athletes, festival-goers (alcohol/drugs increase the risks).
 - Can occur within 60mins of starting exercise, even if done same activity before without problems.
 - Mortality quoted at up to 33% (NEJM 2022;387:1404).

The spectrum of heat illness

The BMJ reminds us that not all heat illness is heatstroke, and that determining the severity of the illness helps us decide what treatment is needed and how urgently (BMJ 2022;378:e070762).

Severity	Heat-related condition	Pathology
Mild	Heat cramp	Painful muscle spasm in arms, abdomen or legs following activity.
	Heat rash	Blockage of sweat glands leads to pruritic superficial vesicular rash.
Moderate	Heat exhaustion	Core body temperature is normal or only mildly increased.

		Fatigue, weakness, nausea, headache, faintness, clammy skin.
	Heat syncope	Syncope due to pooling of blood after standing immobile in heat. Diagnosis of exclusion.
Severe	Heatstroke	A multisystem life-threatening condition, described below.

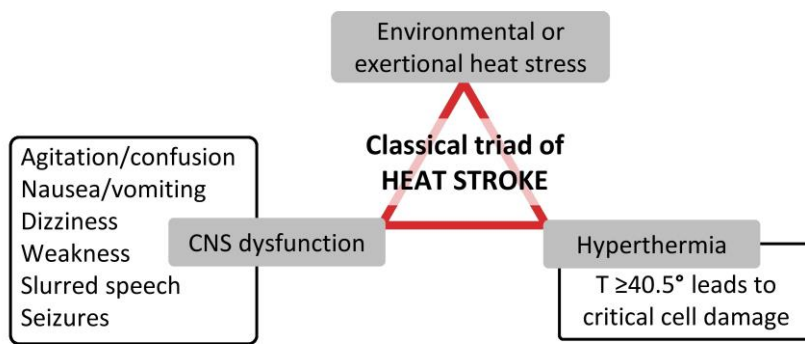
Heatstroke presentation

When the body's compensatory mechanisms are overwhelmed:

- Rapid rise in core temperature.
- Fall in central venous pressure and cardiac collapse.
- Increased GI permeability, allowing toxins into the systemic circulation.
- Cell anoxia and inflammatory response.

This can lead to:

- Systemic inflammatory response syndrome ('sepsis without the bacteria').
- Multi-organ failure.
- CNS dysfunction.



Other symptoms:

- Flushed (excessive peripheral dilatation) or pale (circulatory collapse).
- Tachycardia, tachypnoea, hypotension.
- Profuse sweating and wet skin (in exertional heatstroke).
- Dry skin (in environmental heatstroke because sweat glands fail to respond).

Treatment

Severe heat illness

Very rapid cooling is the mainstay of initial treatment (the longer the body's temperature is >40.5°, the worse the prognosis) (NEJM 2022;387:1404). Start immediately while waiting for ambulance: delay only to do cardiopulmonary resuscitation!

In primary care, this means:

- Immersion in ice cold water is the treatment of choice (unlikely to be available in primary care (!), but may be available at sporting events).
- If not available, **pour copious amounts of water over the individual and fan them to increase evaporative loss** (NEJM 2019;380:2449).

In the elderly with environmental heatstroke, **ice packs, wet packs and fans may be better tolerated** (but less effective at achieving rapid heat loss). (Infusions of ice cold fluids also used but unlikely to be available in primary care!)

Moderate heat illness

- External cooling measures such as ice packs in axillae and groins (BMJ 2022;378:e070762).
- Rehydration with oral fluids and electrolytes as needed.
- Monitor condition.

Mild heat illness

- Loosen clothing and allow evaporative cooling (BMJ 2022;378:e070762).
- Oral rehydration.
- Corticosteroid creams for itch if needed.

	Heat-related illness • Incidence of heat-related illness is rising worldwide due to an increase in extreme heat events. • Heat-related illness occurs on a spectrum from mild to life-threatening. • In severe heat illness, rapid cooling is needed – use immersion in ice water if possible. • Patients with chronic conditions or taking certain medications are at greater risk.
	Consider identifying patients vulnerable to heat illness in your practice, and providing information on recognition and avoidance at their next annual review.
	