

Extreme heat

Factsheet for clinicians

Periods of extreme heat can have serious impacts on at-risk members of the community. Clinicians, particularly those in general practice, emergency departments and pharmacies, have a key role in preventing and managing heat-related illness.

Definition of extreme heat and heatwave

There is no single internationally accepted definition of extreme heat or heatwave. In general, heatwave is known as a period of abnormally and uncomfortably hot weather that could impact on human health, community infrastructure and services. In Victoria **extreme heat** is defined as the minimum mean temperature that is likely to impact on the health of a community, known as the Department of Health & Human Services' heat health temperature threshold. When the heat health temperature threshold is reached or exceeded a heat health alert is triggered. More information about the heat health alert system and how to subscribe to receive alerts can be found at <www.health.vic.gov.au/environment/heatwaves-alert.htm>.

How the body is affected by heat

Regulation of body temperature

- The body can lose heat to, and gain heat from, the environment.
- Heat loss is controlled by the flow of blood to the skin and evaporation of sweat.
- When the environment is hot, sweating is the main means by which the body can increase heat loss.
- Sweating and heat loss can be impaired by humidity, excess fat, skin disorders and excessive layers of clothing.
- Heat loss can be helped by wind or fanning, and water.

Dehydration

- It is possible to sweat up to 15 litres per day.
- Thirst does not match all fluids lost by sweating, even if fluids are freely taken.
- Mild to moderate dehydration increases cardiac work and reduces the fluid available for sweating.
- Even mild dehydration is associated with increased risk of injury, heat stress illness and poorer performance of complex tasks.



Heat-related illness

Some illnesses or conditions can occur as a direct result of excessive heat such as heat rash, cramps, exhaustion, heat stroke and exertional heat stroke. Most importantly, heat may also exacerbate existing medical conditions such as heart disease. Additional to the direct impacts of heat, clinicians should consider the possible contribution of heat to other more common clinical presentations during extreme heat.

The following conditions may be precipitated or worsened by dehydration:

- **altered mental state**
- **cardiovascular impairment**
- **electrolyte disturbances**
- **renal impairment**
- **urolithiasis**
- **falls.**

The following may occur due to extreme heat:

- exacerbations of **asthma** and other **respiratory illnesses**
- **gastroenteritis**, mostly due to poor food handling and storage.

Direct heat-related illnesses

Illness	Cause	Symptoms
Heat rash	Inflammation of the sweat glands	Erythematous papular rash, pruritus, secondary infection
Heat cramps	Loss of salt in sweat affects muscle relaxation	Cramps in the abdomen, arms or legs
Heat exhaustion	Dehydration with poor blood flow affecting the brain and heart	Flushed or pale complexion and sweating, tachycardia, muscle cramps, weakness, dizziness, headache, nausea, vomiting, syncope
Exertional heat stroke	Core temperature rise precipitated by intense or prolonged exercise in hot weather	As for heat stroke, plus rhabdomyolysis and renal failure
Heat stroke	Core temperature rise with widespread organ injury	As for heat exhaustion, plus hyperthermia, shock, arrhythmia, dry skin with no sweating (skin may be damp from earlier sweat), altered mental state, ataxic gait, convulsions, unconsciousness and death



Medication and hot weather

Some prescribed medications can increase the risk of heat-related illness or may be less effective or more toxic when exposed to high temperatures. Most drugs need to be stored below 25 °C, particularly emergency drugs such as antibiotics, adrenergic drugs, insulin, analgesics and sedatives. Care planning for vulnerable people during hot weather should include consultation with their GP and pharmacist about the use and storage of medications.

Mechanisms for medication increasing the risk of heat-related illness

Mechanisms	Drug class or sub-class	Examples	
Reduced vasodilation	Beta-blockers	Atenolol, metoprolol, propranolol	
	Triptans	Sumatriptan, zolmitriptan	
Decreased sweating	Anticholinergics	Tricyclic antidepressants	Amitriptyline, clomipramine, dothiepin
		Sedating antihistamines	Promethazine, doxylamine, diphenhydramine
		Phenothiazines	Chlorpromazine, thioridazine, prochlorperazine
		Other anticholinergics	Benztropine, hyoscine, clozapine, olanzapine, quetiapine, oxybutynin, solifenacin
	Beta-blockers	Atenolol, metoprolol, propranolol	
Increased heat production	Antipsychotic drugs	Clozapine, olanzapine, quetiapine, risperidone	
	Stimulants	Amphetamines, cocaine, thyroxine	
Decreased thirst	Antipsychotics	Haloperidol, droperidol	
	Angiotensin-converting enzyme (ACE) inhibitors	Enalapril, perindopril, ramipril	
Dehydration	Alcohol		
	Diuretics	Furosemide, hydrochlorothiazide, acetazolamide, aldosterone	
	Stimulant laxatives	Senna extract, bisacodyl	
Aggravation of heat illness by worsening hypotension in vulnerable patients	All antihypertensives, particularly vasodilators (nitrates, calcium channel blockers)		
	Nitrates	GTN, isosorbide monnitrate	
	Calcium channel blockers	Amlodipine, felodipine, nifedipine	
Increased toxicity for drugs with a narrow therapeutic index in dehydration	Various	Digoxin, immunosuppressants, lithium, metformin, warfarin	

Prevention and mitigation

When seeing patients who may be at risk of heat-related illness, clinicians can take the opportunity to provide education, assess supports and optimise medical management.

At-risk groups

Individual characteristics	Over the age of 65, infants and young children, overweight or obese, pregnant or breastfeeding, low cardiovascular fitness, not acclimatised
Chronic illness	Heart disease, hypertension, diabetes, cancer or kidney disease, alcohol and other substance use, mental illness
Conditions that impair sweating	Heart disease, dehydration, extremes of age, skin disorders, congenital impairment of sweating, cystic fibrosis, quadriplegia, scleroderma, people taking medications with anticholinergic effects
Acute illness	Dehydration, infection
Impairment of activities of daily living	Poor mobility, cognitive impairment
Social factors	Live alone or socially isolated, low socioeconomic status, homeless
Occupation/recreation	Exercising vigorously in the heat or working in a hot environment

Steps to consider when reviewing patients

Identify

- Identify patients at risk of heat-related illness.

Educate

- Take the opportunity to educate those at risk about how to manage their health during hot weather. Advise them on how to adjust their behaviour, on how to store and take medication, and to drink fluids during hot weather. Encourage appropriate behaviour such as reducing excessive clothing and using cooling devices at home, and discourage avoidance of fluids due to continence issues.¹

- Educate carers of children, older people and people with cognitive impairment or disability.
- Provide written information, with details of support services, helplines and emergency services.
- Consider including heat advice and a pre-summer medical assessment into routine care for vulnerable people with chronic diseases.

Be aware

- Be aware of the potential side effects of medicines and consider optimal dosing during periods of hot weather.
- Be aware that high temperatures can adversely affect the efficacy of drugs.

Monitor

- Monitor fluid intake and drug therapy, especially in older people and those with significant comorbidities.

Assess and manage

- Assess patients who are experiencing heat-related illness, and manage as appropriate (for example, fluids, cooling, observation, specific treatments as indicated).

Follow-up/referral

- Have a low threshold for admission to hospital, referral to ED and/or urgent respite placement for vulnerable individuals.
- Consider the need to optimise the home environment (home temperature, cooling facilities, etc.), available supports and follow-up for at-risk individuals.

Drinking recommendations

During hot weather, people need to drink, even if they are not thirsty. Patients should receive drinking recommendations appropriate to their health status, particularly those who have a decreased perception of thirst. Carers also need to maintain adequate hydration.

Fluids are not just limited to water; they can be icy poles, weak tea or cordial. Salt tablets, sports drinks or electrolyte-carbohydrate supplements offer no benefits and may be harmful because of high osmotic load. Excessive drinking of pure water can lead to severe hyponatraemia, potentially leading to complications like stroke and death.

¹ Department of Health & Human Services resources: www.health.vic.gov.au/environment/heatwaves-community-resources.htm

Planning for extreme heat

Review your knowledge

- Understand the mechanisms of heat illnesses, clinical manifestations, diagnosis and treatment.
- Recognise the early signs of heatstroke, which is a medical emergency.
- Be aware of how to initiate proper cooling and resuscitative measures.
- Be aware of the risk factors in heat-related illness.

Review your practice and systems

Planning

- Appoint a person responsible for planning a heat response.
- Hold team meetings to discuss the practice's response to a heat, develop a written policy, review the practice's triage policy and conduct yearly heat meetings prior to summer to refresh practice staff.
- Develop and implement a communication policy to keep staff updated if extreme heat is forecast.
- Plan for staff shortages during periods of extreme heat.
- Have a plan in case the power goes out such as what to do with vaccine fridges.
- Remember the practice is a community service that may have additional responsibilities during extreme heat.

Clinical tools

- Consider including heat-related content in assessment tools and management plans for vulnerable patients. For example, consider adding a question in the over-75 health assessment that asks a patient to consider their personal care during extreme heat.

Facility environment

- Ensure the practice is heat-friendly for patients and staff, with a cool waiting room, water available, blinds closed to block the sun and staff breaks for drinks.

Information and resources

- Keep in contact with the Primary Health Networks for heat health alerts from the Chief Health Officer at <www.health.vic.gov.au/environment/heatwaves-alert.htm>.
- Have phone numbers of key resources within easy access – emergency departments, local Home and Community Care (HACC) services, Royal District Nursing Service (RDNS) – as well as the Better Health Channel at <www.betterhealth.vic.gov.au>.
- Have up-to-date heat health take-home resources for patients and their carers.

Discussion and evaluation

- After extreme heat, have an evaluation meeting with staff to discuss how they dealt with it, what went well, what needs improvement and provide feedback to the Primary Health Network.

Key messages

- Periods of extreme or prolonged heat can affect health by both causing direct heat-related illness and by precipitating or exacerbating other medical conditions.
- Those particularly at risk of heat-related illness include the elderly, children, those with significant comorbidities, those with cognitive impairment and those who have inadequate social supports.
- Some prescribed medications can increase the risk of heat-related illness or may be less effective or more toxic when stored at high temperatures.
- Health professionals can reduce the likelihood or severity of health-related illness by identifying those vulnerable and implementing strategies to minimise the risk. For example, health professionals can educate at-risk patients and their carers about how to stay healthy in the heat by adjusting their behaviour, storing and taking medications and drinking fluids.
- Pre-summer planning may assist in reducing the health impacts on patients, carers and staff.

Contacts and resources

Emergency respite

- Carers Victoria 1800 242 636 or Carelink 1800 052 222 (business hours)
- Veterans' Home Care assessment service: 1300 550 450 (business hours) (for emergency after-hours respite call Carelink above)
- Annecto Emergency After-Hours Response Service (Victoria) 1800 72 72 80 (5 pm–9 am weekdays, 24 hours on weekends and public holidays). Free short-term personal care, respite crisis management, telephone and in-home support for older people, people with a disability or carers who do not have funded assistance.
- Local governments often provide respite services

NURSE-ON-CALL – 24 hour health advice on 1300 60 60 24

Heatwave community information resources

(Victorian Government Health Information) – community information to support people to take care of themselves, family, friends and neighbours in the heat. Also available in community languages at <www.health.vic.gov.au/environment/heatwave>.

Chief Health Officer health alerts can be found at <www.health.vic.gov.au/chiefhealthofficer>.

Additional information about health service demand during periods of extreme heat is available from the Department of Health & Human Services at <www.health.vic.gov.au/environment/heatwave>.

- This resource was produced by a working group from the Australian College of Emergency Medicine (Public Health Committee), General Practice Victoria and the Royal Australian College of General Practitioners.