



# Working from the same page consistent messages for CDEM

## PART B: Hazard-specific information



# Heat

► Learn about your community's risks from a heat wave.

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### **CORE ACTION MESSAGES IN THIS CHAPTER (p8)**

- ▶ **Determine your risk.**
- ▶ **Reduce heat stress indoors and outdoors.**
- ▶ **Learn to recognise the symptoms.**
- ▶ **Act in time.**

**For general readiness, every household should create and practice a Household Emergency Plan and assemble and maintain Emergency Survival Items and a Getaway Kit. In addition, every household should take heat wave-specific precautions and plan for and practice what to do if a heat wave occurs.**

**Please note: Core Action Messages should be read in conjunction with the rest of the text in this chapter.**

## Awareness messages

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### Why talk about excessive heat?

Severe heat waves have caused catastrophic crop failures, thousands of deaths from hyperthermia, and widespread power outages due to increased use of air conditioning. For outdoor activities, heat waves reduce workability dramatically. In addition to physical stress, excessive heat causes psychological stress, to a degree which affects employee performance. A lack of public recognition of the danger that high temperatures pose adds to the lethality of heat waves. Heat wave warnings, if any, often do not carry the weight of other natural disaster alerts.

Heat waves have, for instance, accounted for more deaths in Australia than any other natural hazard, yet they remain one of the least-studied and most-underrated hazards ([www.ema.gov.au](http://www.ema.gov.au)). A record heat wave scorched Europe in August 2003, claiming an estimated 35,000 lives. In France alone, 14,802 people died from the searing temperatures – more than 19 times the death toll from the SARS epidemic worldwide.

In Auckland and Christchurch, an average of 14 heat-related deaths occur per year in people aged over 65, but this may rise due to climate change to approximately 28, 51 and 88 deaths for warmings of 1, 2 and 3 degrees Celsius, respectively.

Except during major heat waves, heat-related deaths often go unreported because they are often assumed to be the result of an existing ailment, and few governments systematically keep records of them.

Heat waves take the greatest human toll in cities. Urban centres, where the area of heat-absorbing dark roofs and pavements exceeds the area covered by cooling vegetation, are like “heat islands” and can be as much as 5 degrees Celsius warmer than the surrounding countryside. While people in rural areas generally receive some relief from the heat when temperatures fall at night, urban areas stay warmer over all hours of the day and night. Air pollution, which usually is worse in cities than in the rural areas, can also exacerbate the health-damaging effects of high temperatures by further stressing the body’s respiratory and circulatory systems.

There is no universal definition of a heat wave; the term is relative to the usual weather in the area. Commonly, a heat wave is described as a prolonged period of excessive heat. The definition recommended by the World Meteorological Organization is when the daily maximum temperature exceeds the average maximum temperature by 5 degrees Celsius on more than five consecutive days. Heat waves are rare events that vary in character and impact. They could become more frequent, intense and longer with climate change and resulting in more heat-related deaths.

### How serious can it be?

Heat waves can have severe impacts on human health, and can cause *heat cramps*, *heat exhaustion*, *heatstroke*, *sunburn* and *heat rash*. Heat can kill by pushing the human body beyond its limits. Under normal conditions, the body’s internal thermostat produces perspiration that evaporates and cools the body. However, in excessive heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. Several studies

have shown that the elderly and less fit people are particularly vulnerable to heat-related illness and death. Low fitness levels lead to a low cardiovascular reserve and thus to low heat tolerance. Young children and those who are sick or overweight are also more likely to become victims of excessive heat. In addition, men sweat more than women do, and therefore become more quickly dehydrated and more susceptible to heat illness.

### Heat and human health: Impact and treatment

**Heat cramps** are muscular pains and spasms, usually in the abdomen, arms or legs, caused by heavy exertion in high heat. Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion. Heat cramps are often the first sign that the body is having trouble with the heat.

If you have heart problems or are on a low sodium diet, get medical attention for heat cramps. If medical attention is not necessary, take these steps:

- Stop all activity, and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in 1 hour.

**Heat exhaustion** is the body's response to an excessive loss of the water and salt contained in sweat. Exhaustion can occur when someone strenuously exercises or works in high heat and humidity. In someone suffering from heat exhaustion, blood flow to the skin increases while blood flow to vital organs decreases, resulting in a mild form of shock. If not treated, body temperature will continue to rise and the person may suffer heatstroke. Those most prone to heat exhaustion are the elderly, people with high blood pressure, and people working or exercising in a hot environment.

Warning signs of heat exhaustion include:

- heavy sweating
- paleness
- muscle cramps
- tiredness
- weakness
- dizziness
- headache
- nausea or vomiting
- fainting.

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and

breathing will be fast and shallow. If heat exhaustion is untreated it may progress to heatstroke. Seek medical attention immediately if:

- symptoms are severe, or
- the victim has heart problems or high blood pressure.

Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than 1 hour.

Cooling measures that may be effective include:

- cool, non-alcoholic beverages, as directed by your doctor
- rest
- cool shower, bath, or sponge bath
- an air-conditioned environment
- lightweight clothing.

**Heatstroke** (also known as sunstroke) is a life-threatening condition when the body becomes unable to control its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. The body temperature of someone suffering from heatstroke can rise so high that brain damage and death may result if the body is not cooled quickly.

Warning signs of heatstroke vary but may include:

- an extremely high body temperature (above 39.4 degrees Celsius, orally)
- red, hot, and dry skin (no sweating)
- rapid, strong pulse
- throbbing headache
- dizziness
- nausea
- confusion
- unconsciousness.

If you see any of these signs, you may be dealing with a life threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place in a cool shower; spray with cool water from a garden hose; sponge with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.

- Monitor body temperature and continue cooling efforts until the body temperature drops to 38.5 degrees Celsius.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim alcohol to drink.
- Get medical assistance as soon as possible.
- Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heatstroke. If this happens, keep the victim from injuring themselves, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

**Sunburn** should be avoided because it is damaging to the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention. Symptoms of sunburn are well known: skin becomes red, painful, and abnormally warm after sun exposure.

Consult a doctor if the sunburn affects an infant under 1 year of age or if these symptoms are present:

- fever
- fluid-filled blisters
- severe pain

and avoid repeated sun exposure.

- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.

**Heat rash** is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children. Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort, but avoid using ointments or creams - they keep the skin warm and moist and may make the condition worse. Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

### **Heatstroke in animals**

Animals are also susceptible to heatstroke, or hyperthermia, which needs to be treated as an emergency, as it is with people. Signs in animals include excessive panting; increased body temperature, heart rate, or respiratory rate; unusual salivation; collapse, stupor, seizures, or coma; redder than normal mucous membrane (gums, for example); or capillary refill that is too fast. Be aware also of signs of dehydration, which also needs to be treated urgently.

### CORE ACTION MESSAGES

- ▶ Determine your risk.
- ▶ Reduce heat stress indoors and outdoors.
- ▶ Learn to recognise the symptoms.
- ▶ Act in time.

#### How can I protect myself in a heat wave?

Preventing the effects of heat requires individual measures, emergency planning and reduction of heat stress in the indoor and outdoor environments.

The best ways to be protected from the ill effects of excessive heat are to dress appropriately, stay indoors, refrain from strenuous work or exercise during the hottest part of the day, and stay hydrated. Spending at least two hours a day in air conditioning significantly decreases a person's risk of heat-related illnesses.

The duration of excessive heat plays an important role in how people are affected by a heat wave. Studies have shown a significant rise in heat-related illnesses when excessive heat lasts more than two days.

Pets, horses, and farm livestock are also susceptible to difficulties from excessive heat. Animals do not perspire and rely on panting, wetting down, shade, cool earth, and drinking water for cooling. Animals cannot explain their needs, so it is up to people to take extra care during heat waves to ensure their animals' needs are met.

If you are at risk from excessive heat, you should:

1. Discuss with members of your household the precautions they should take to stay safe in excessive heat. Everyone should know what to do in the places where they spend time. Some places may not be air conditioned or safe during a heat wave, so plan alternatives.
2. Drink more fluids (non-alcoholic), regardless of your activity level. Don't wait until you're thirsty to drink. During heavy exercise or labour in a hot environment, drink 2-4 glasses of cool fluids each hour.  
**Warning:** if your doctor generally limits the amount of fluid you drink or has you on water pills, ask your doctor how much you should drink while the weather is hot.
3. Don't drink liquids that contain caffeine, alcohol, or large amounts of sugar – these actually cause you to lose more body fluid. Also, avoid very cold drinks, because they can cause stomach cramps.
4. Replace salt and minerals. Heavy sweating removes salt and minerals from the body. These are necessary for your body and must be replaced. The easiest and safest way to replace salt and minerals is through your diet. Drink fruit juice or a sports beverage during exercise or any work in the heat. Do not take salt tablets unless directed by your doctor. If you are on a low-salt diet, ask your doctor before changing what you eat or drink - especially before drinking a sports beverage.

5. Stay cool indoors. The most efficient way to beat the heat is to stay in an air-conditioned area. If you do not have an air conditioner or evaporative cooling unit, consider a visit to a shopping mall or public library for a few hours.
6. Discuss with a doctor any concerns about members of the household who are taking medications or have medical conditions that may cause poor blood circulation or reduced ability to tolerate heat. A doctor can advise you about temporary changes to medication or other activities that can relieve the effects of heat.
7. Electric fans may provide comfort, but when the temperature is higher than 35 degrees Celsius, fans will not prevent heat-related illness. Taking a cool shower or bath, or moving to an air-conditioned place is a much better way to cool off. Wear as little clothing as possible when you are at home. Choose lightweight, light-coloured, loose-fitting clothing. In the hot sun, a wide-brimmed hat will provide shade and keep the head cool.
8. Avoid too much sunshine. Sunburn slows the skin's ability to cool itself. The sun will also heat the inner core of your body, resulting in dehydration. Use a sunscreen lotion with a high sun-protection factor (SPF) rating.
9. Always apply sunscreen 30 minutes before going outdoors and reapply according to package directions.
10. Avoid extreme temperature changes. A cold or even a cool shower taken immediately after coming indoors from hot temperatures can result in hypothermia, particularly for elderly and very young people.
11. Never leave anyone alone in closed vehicles. Temperatures inside a closed vehicle in the sun can reach more than 60 degrees Celsius within minutes. Exposure to such high temperatures can kill in minutes. Even on days that feel pleasantly warm outside, temperatures in a closed vehicle can rise high enough to kill children and pets.
12. Although anyone at any time can suffer from heat-related illness, some people are at greater risk than others. Visit adults at risk at least twice a day and closely watch them for signs of heat exhaustion or heatstroke. Those at greatest risk of heat-related illness include:
  - Older persons (aged 65 or older);
  - Infants (age under 1);
  - People who are overweight;
  - The homeless;
  - The poor;
  - People who are socially isolated;
  - People with mobility restrictions or mental impairments;
  - People taking certain medications (e.g., for high blood pressure, depression, insomnia);
  - People engaged in vigorous outdoor exercise or work or those under the influence of drugs or alcohol.

### **How can I protect myself in a heat wave? (continued)**

13. Pace yourself. If you are unaccustomed to working in a hot environment, start slowly. If you must work faster, pick up the pace gradually. If exertion in the heat makes your heart pound and leaves you gasping for breath, STOP all activity, get into a cool area, or at least in the shade, and rest, especially if you become lightheaded, confused, weak, or faint.
14. Schedule outdoor activities carefully. If you must be out in the heat, try to plan your activities so that you are outdoors either before noon or in the evening. While outdoors, rest frequently in a shady area. Resting periodically will give your body's thermostat a chance to recover.
15. Use a buddy system. When working in the heat, monitor the condition of your co-workers and have someone do the same for you. Heat-induced illness can cause a person to become confused or lose consciousness.
16. Eat small meals and eat more often. Large, heavy meals are more difficult to digest and cause your body to increase internal heat to aid digestion, worsening overall conditions. Avoid foods that are high in protein, such as meats and nuts, which increase metabolic heat.
17. If you are aged 65 years or older, have a friend or relative call to check on you twice a day during a heat wave. If you know anyone in this age group, check on them at least twice a day.
18. Adjust to the environment. Be aware that any sudden change in temperature, such as an early summer heat wave, will be stressful to your body. You will have a greater tolerance for the heat if you limit your physical activity until you become accustomed to the heat. If travelling to a hotter climate, allow several days to become acclimated before attempting any vigorous exercise, and work up to it gradually.
19. Conserve electricity not needed to keep you cool. During periods of excessive heat, people tend to use a lot more power for air conditioning. Conserve electricity not used to keep you cool so power can remain available and reduce the chance of a community-wide outage.
20. Use common sense.
21. Check on your animals frequently to ensure that they are not suffering stress from the heat. Make sure they are indoors or in the shade. Provide plenty of water for drinking as well as for cooling the animals. If you see signs of heat stress, call your veterinarian. Very young and older animals, as well as animals with short snouts, are more susceptible to problems with heat.

### **If you must be out in the heat**

22. Limit your outdoor activity to morning and evening hours.
23. Cut down on exercise. If you must exercise, drink two to four glasses of cool, non-alcoholic fluids each hour. A sports beverage can replace the salt and minerals you lose in sweat. Warning: if you are on a low-salt diet, talk with your doctor before drinking a sports beverage. Remember the warning in point 22 above.
24. Try to rest often in shady areas.

25. Protect yourself from the sun by wearing a wide-brimmed hat and sunglasses and by putting on sunscreen of SPF 30 or higher. The most effective products are labelled “broad spectrum” or “UVA/UVB protection”.

### **Making your home safer**

To make your home safer during a heat wave, you should:

26. Make sure your home is properly insulated. This will help you to conserve electricity and reduce your home’s power demands for air conditioning. Put weather stripping around doors and windows to keep cool air inside.
27. Check air-conditioning ducts for proper insulation. Insulation around ducts prevents cool air from leaking and keeps it directed through the vents.
28. Protect windows from the sun. Hang shades, draperies, awnings, or louvers on windows receiving morning or afternoon sun. Outdoor awnings or louvers can reduce the heat entering the house by as much as 80 percent.
29. Use an attic fan. If you have a fan installed to vent warm air out of your attic, use it to help keep your home cool.

**Note:** For impact on human health and immediate treatment, see page 4.

### **How to prevent heatstroke in animals**

30. Ensure they have enough space and shade. Consider temporary shade.
31. When planning to plant vegetation, consider where livestock are likely to gather for long periods of time and think about planting trees for shade.
32. Increase airflow, especially if animals are held within yards, sheds, kennels, etc.
33. If planning a dairy shed or yards consider not only about shade but also air circulation and sprinkler systems for cooling. Ensure that livestock have enough space. This will reduce body heat and increase air circulation.
34. Avoid moving or exercising animals in peak daytime temperatures.
35. Adjust feed schedule in ruminant animals to evenings so that digestion occurs in cooler hours.
36. Ensure animals have enough water – water intake can double in high temperatures and humidity.
37. Provide wet-down facilities. Use a sprinkler or sprayer but do not wet piglets or sheep.

### **If heatstroke occurs in animals**

38. If an animal is suffering from heat stroke, cool it as quickly as possible (**See** also page 4). Use a hose, sprinkler or fan.
39. If dairy farming, provide cows with more space in the yards whilst waiting to be milked and use a sprinkler system.

## Action messages

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**Emergency planning** Heat waves are often accompanied by power failures, and failures to the water supply. Heat waves should be included in emergency planning at local and national levels. It is essential to understand community vulnerabilities and the level of support that is currently provided.

**Heat warning systems** Note that currently in New Zealand MetService does not provide a heat warning service.

## Heat general information

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### Media and community education ideas

40. Publish a special section in your local newspaper with emergency information about heat waves. Included contact information for local emergency services and the nearest hospitals.
41. Feature interviews with local doctors about the dangers of sunburn, heat exhaustion, heatstroke, and other conditions caused by excessive heat.
42. Arrange for special programs to provide air conditioners to vulnerable people in their homes.

### Fiction and facts

**Fiction:** Beer and other alcoholic beverages satisfy thirst in excessive heat.

**Fact:** Although beer and alcoholic beverages appear to satisfy thirst, they actually cause further body dehydration. You should limit your intake of alcoholic beverages in excessive heat. Drink plenty of water. Your body needs water to keep cool. Drink plenty of fluids even if you do not feel thirsty. (People who have epilepsy or heart, kidney, or liver disease; are on fluid-restricted diets; or have a problem with fluid retention should consult a doctor before increasing their consumption of fluids.)

**Fiction:** It's always good to exercise, no matter how hot it is.

**Fact:** Many heat emergencies are experienced by people exercising or working during the hottest parts of the day. Reduce, eliminate, or reschedule strenuous activities. If you must do strenuous activity, do it during the coolest part of the day which is usually in the morning between 4:00 a.m. and 7:00 a.m.

**Fiction:** Heatstroke (sunstroke) is not life-threatening.

**Fact:** Heatstroke or sunstroke is life threatening. If someone has heatstroke, his or her temperature control system, which produces sweat to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

**Fiction:** You will get sunburned only on really hot days.

**Fact:** Sunburn (and tanning) results from exposure to ultraviolet (UV) radiation, which is distinct from the light and heat emitted by the sun. You cannot see or feel UV rays. They can, however, be quite damaging. UV exposure has been linked to skin cancer and other skin disorders, cataracts and other eye damage, and immune-system suppression. The ozone layer absorbs most of the sun's harmful UV rays, but this layer has thinned in recent years as a result of the emission of ozone-depleting chemicals. This thinning can lead to a greater chance of overexposure to UV radiation.

### Useful links

- [www.euro.who.int/document/Gch/HEAT-WAVES%20RC3.pdf](http://www.euro.who.int/document/Gch/HEAT-WAVES%20RC3.pdf)
- [www.redcross.org/services/hss/tips/heat.html](http://www.redcross.org/services/hss/tips/heat.html)
- [http://en.wikipedia.org/wiki/Heat\\_wave](http://en.wikipedia.org/wiki/Heat_wave)
- [www.isse.ucar.edu/heat/](http://www.isse.ucar.edu/heat/)
- [www.floridadisaster.org/bpr/EMTOOLS/Severe/heatwave.htm](http://www.floridadisaster.org/bpr/EMTOOLS/Severe/heatwave.htm)
- [www.maf.govt.nz/mafnet/rural-nz/adverse-events/](http://www.maf.govt.nz/mafnet/rural-nz/adverse-events/)
- [www.rural-support.org.nz/](http://www.rural-support.org.nz/)

**Useful numbers**

Your important emergency household plan telephone numbers. Fill this out and keep this leaflet with your emergency items.

Contact	Details
Local authority emergency helpline	
Insurance company 24-hour	
Insurance number and policy number	
Local radio station (Frequency )	
School	
Family and neighbours	
Bank phone number and details	
Work phone numbers	
Medical Center/GP	
Local police station	
Vet/kennel/cattery	
Local hotel or B&B	
Gas supplier and meter number	
Electricity supplier and meter number	
Water supplier and meter number	
Electrician	
Plumber	
Builder	