

Heatwave Plan for Victoria 2009–2010

Protecting health and reducing harm from heatwaves



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Foreword

Australians are generally accustomed to living in hot weather and are known to be resilient in hot conditions. For this reason, many Australians are complacent about extreme heat events and do not believe that they may be susceptible to heat-related illnesses.

The events of the January 2009 heatwave in Victoria resulted in an estimated 374 additional deaths than for the same period over the past five years and serve as a stern reminder that the impact of heatwaves on human health is real and life-threatening.

It is expected that climate change will increase the frequency and intensity of heatwaves in Victoria.

Heatwaves can affect anybody including the young and healthy, however, there are certain population groups that are more at risk than others. This includes people 65 years and over, people with a chronic medical condition or disability and people living alone.

Heat-related illness can range from mild conditions such as a rash or cramps to very serious conditions such as heat stroke, which can kill.

With the early arrival of extreme hot weather this year and a high probability of a very hot summer ahead, it is crucial that Victoria has a heatwave plan in place that will:

- ensure health information and support is readily available to the community, at risk Victorians and their carers
- develop partnerships and collaborative arrangements to better respond to heatwaves
- increase understanding of the health impacts of heatwaves on communities and increase their capacity to respond during heatwaves
- manage public health emergencies during heatwaves more effectively
- develop long-term and sustainable behavioural change to minimise the impacts of heatwaves on health and wellbeing.

Since 2006, the Victorian Government has undertaken significant work aimed at preparing Victoria and the community for the possible impacts of a heatwave.



The *Heatwave Plan for Victoria* consolidates all local, regional and statewide heatwave health-related activities to date including:

- the Heat Health Alert System to notify councils, departmental program areas, hospitals and health and community service providers of impending heatwaves and to activate their heatwave plans and responses
- building the capacity of councils to support members of their communities most at risk of heat-related illness by providing funding to incorporate heatwave responses into the municipal planning process
- support and funding of services that provide health and wellbeing checks for people at risk during a heatwave including community registers, the ‘Keeping in Touch’ program and Personal Alert Victoria
- public health messaging and communication resource dissemination in relation to staying healthy during a heatwave
- the Heat Health Intelligence Surveillance System to monitor and assess the human health impact of a heatwave.

To minimise the health impacts of extreme heat, the plan ensures:

1. a coordinated statewide response to heatwaves
2. a consistent community-wide understanding of the health impacts of heatwaves and how to stay safe and help others.

The World Health Organisation considers heat-related illness and death to be preventable conditions and supports the introduction of heatwave plans. Internationally, heatwave plans have been developed and introduced in Europe and North America and have proven to be an effective public health response to extreme heat.

The *Heatwave Plan for Victoria* is a new document that will be reviewed after every summer and continuously modified and revised to ensure its effectiveness in minimising the public health impact of heatwaves.



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Contents

1	Executive summary	1
2	Understanding heatwaves	3
2.1	Defining a heatwave	3
2.2	Defining a heatwave threshold	3
2.3	Victoria’s heat health system	3
2.4	Urban heat islands	4
3	The effects of heat on health	5
3.1	Impacts of a heatwave	5
3.2	How the human body is affected by heat	5
3.3	Heat-related illness	6
4	High-risk factors	7
5	Protective factors	9
6	Laying the foundations	10
7	Victoria’s Heatwave Plan	14
7.1	The heatwave framework	14
7.2	Pre-heatwave—Day 6 to Day 1 prior to forecast event	18
7.3	During heatwave—Day 0	20
7.4	When a heatwave becomes an emergency	21
7.5	Post-heatwave	22
8	Communication Resources	23
8.1	<i>Heat-related illnesses</i> information sheet	24
8.2	<i>Heatwave—important health information for summer</i> brochure	26
8.3	<i>Staying healthy in the heat</i> poster	27
8.4	<i>Staying healthy in the heat</i> promotional label	28
8.5	Telephone script for service providers	29
9	Appendices	30
9.1	Media releases	30
9.2	Victorian Heatwave Strategy	32
9.3	Summer preparedness kit: Health and Community Services	36
9.4	Heatwave Planning in Australia and overseas	37
9.5	Preparing a heatwave plan	40
9.6	References	41

1 Executive summary

This document guides the Department of Health and the Chief Health Officer in the response to heatwaves in Victoria.

The role of the Chief Health Officer is supported by the Health Protection Branch in liaison with the Prevention and Population Branch of the Department of Health.

The Health Protection Branch has the overarching responsibility for the coordination of heatwave activities. This includes monitoring the Bureau of Meteorology forecasts and sending heat health alerts and disseminating public health messages to local councils, departmental program areas and health and community service providers.

The Prevention and Population Health Branch is responsible for the monitoring and surveillance of data to assess the impact of a heatwave on human health as well as long-term policy and planning within the *Environments for Health Municipal Public Health Planning Framework*.

Preparation to assist individuals, communities, organisations and health and community service providers in Victoria to minimise the harmful health impacts of heatwaves has been ongoing during 2009.

The intensity and subsequent impact of the January 2009 heatwave demonstrated that future responses must be based on a statewide understanding of impacts and actions, with greater emphasis on coordination and documentation.

The *Heatwave Plan for Victoria* provides a master document bringing together relevant resources, action plans and initiatives to minimise health impacts in the event of a heatwave in the 2009–2010 summer season.

As Australians are generally accustomed to living with hot weather and are generally resilient to its effects, part of the plan emphasises improving community-wide understanding of what heatwaves are, the serious impacts they can have on human health and actions people can take to protect themselves, their families and community.

Definitions of a heatwave are provided which firstly address the technical definition required to trigger certain heatwave actions and responses from a range of government agencies and health and community service providers. A second definition for use in the public arena is also provided to ensure community members understand when a heatwave occurs.

International and Australian experience shows that those most at risk of illness or death during a heatwave are predominantly older people, people with a chronic medical condition or disability and people living alone or socially isolated.

Heat-related illness occurs when the body is unable to adequately cool itself and ranges from mild conditions such as a rash or cramps to life-threatening conditions such as heat stroke.

This plan details the roles and responsibilities of the government sector during a heatwave with reference to relevant agencies which interact with the government sector. Actions in the plan are directed at a range of levels, targeting directly those individuals who are most at risk during heatwaves and also individuals and organisations who care for Victorians who are most susceptible to heatwaves as well as health and community service providers that come in frequent contact with at risk populations.



The heatwave framework

The Department of Health provided funding to councils and developed the *Heatwave Planning Guide*—consisting of strategies, templates and background information—to assist councils and their officers to coordinate key heatwave actions for the 2009–2010 summer.

Actions developed through 13 pilot projects involving 22 local councils to develop and integrate heatwave plans into their own plans for Municipal Public Health and Municipal Emergency Management are presented in this plan and the remaining 57 councils that received grants to develop their own heatwave plans for the 2009–2010 summer are documented.

Since 2006, a number of heatwave activities and resources have been developed and implemented. The outcomes of this work and resources including the *Heatwave Planning Guide* can be found on the department's website at <http://www.health.vic.gov.au/environment/climate/heatwave.htm>

A key element of all local council activity centres on home and community care (HACC) services, which provide direct support to clients often most at risk from the harmful health impacts of heatwaves.

The role of 23 new and seven enhanced community registers operated at the local community level by the Office of Senior Victorians with support from Victoria Police is also explained, as are action plans developed by a range of health and community service organisations including Red Cross, Royal District Nursing Services, Personal Alert Victoria and Nurse-on-Call.

In developing this *Heatwave Plan for Victoria* the department has also developed a suite of public health communication resources to support local councils and health and community service organisations. Additionally, the department coordinated a structured stakeholder consultation program to ensure statewide integration of efforts during extreme heat events at the state and local government level and with non-government health and community service providers.

Specific consultation with the Bureau of Meteorology, General Practice Victoria, Ambulance Victoria and the Australian College of Emergency Medicine dealt with plans for forecasting, identifying and managing extreme heat events and the associated public health implications for the 2009–2010 summer.

Heatwaves this summer

Heat Watch—the Department of Health will raise community awareness of forecast hot temperature through statewide distribution of public health messages.

Heat Health Alert (6 days to 1 day prior to the forecast heatwave)—the Department of Health will issue a Heat Health Alert to local councils, departmental program areas, hospitals, health and community service providers and other key organisations up to six days prior to an imminent heatwave to ensure stakeholders are prepared to activate their heatwave response plans.

During a heatwave—the department may issue a further **Heat Health Alert** notifying all stakeholders of the heatwave and where appropriate, recommending councils and all relevant organisations to activate their own heatwave response plans. The department will also maintain close contact with key organisations to ensure coordinated efforts regarding provision of services, information and public health messages and collection of monitoring and surveillance data.

In the event that prolonged extreme heat or subsequent, simultaneous events such as major power failures or infrastructure failures requires the heatwave to be declared an emergency, Victoria's existing **State Emergency Management Arrangements** will be activated.

At the conclusion of an individual heatwave event, a review of actions and impacts will be undertaken. The department has also made plans for a more detailed review of response actions, surveillance data gathered and lessons learned from any heatwave events during the 2009–2010 summer for application to the continuing efforts to plan for and minimise the harmful health impacts of heatwaves in Victoria.

2 Understanding heatwaves

2.1 Defining a heatwave

Clearly defining a heatwave is difficult given factors such as humidity, demographics, urban or rural design issues and acclimatisation. These factors mean that similar temperatures might have a different impact in different environments or communities. As a result, there is no single internationally accepted definition of a heatwave. The definition is dependent on the impact on human health, community infrastructure and services.

In this plan a heatwave has been defined in two ways to ensure responsible agencies and key service providers share a consistent technical definition, but equally importantly, to assist the broader Victorian community in understanding the definition and associated implications of a heatwave.

General definition—a period of abnormally and uncomfortably hot weather that could impact on human health, community infrastructure and services.

For service providers, the ‘technical definition’ will provide a common, statewide understanding of what classifies as a heatwave. It will also serve as the basis of the Heat Health Alert System and the trigger point at which to activate heatwave actions and plans.

Technical definition—a minimum temperature ‘threshold’ that is likely to impact on the health of a community as detailed below.

2.2 Defining a heatwave threshold

There is a well known relationship between elevated night-time temperature and increased mortality and morbidity during periods of hot weather in Melbourne.¹ Calculating the average daily temperature from nine am one day to nine am the following day takes into consideration a hot day followed by a hot night. This lack of ‘relief’ from the heat appears to result in increased mortality in the elderly.²

The mean temperature for any given day is the average of the forecast daily maximum temperature and the forecast overnight minimum temperature for that day (which is the daily minimum for the following day).

Calculating the mean temperature

The mean temperature is calculated from the forecast **daily maximum** (in this case Tuesday) and the forecast overnight temperature which is the **daily minimum for the following day** (in this case Wednesday).

An example of this calculation is demonstrated below:

Melbourne

Tuesday

Min: 20 °C

Max: 38 °C

Wednesday

Min: 25 °C

Max: 31 °C

Mean calculation for Tuesday

$$(38+25)/2 = 31.5^{\circ}\text{C}$$

The threshold for Melbourne = mean of 30°C.

The temperature forecast indicates that the threshold will be exceeded.

This calculation will be repeated for each of the seven days included in the daily forecast.

2.3 Victoria’s heat health system

A heat health threshold is the actual or calculated temperature above which illness and death increases above a baseline measure. These temperatures will constitute a minimum trigger level that prompts a heat health watch. The thresholds vary depending on geographic location, demographic profile of the community and other vulnerability factors.

Victoria’s Mildura district (incorporating the local government areas of Mildura, Swan Hill, Buloke and Gannawarra) experiences more frequent and higher temperatures than the remainder of the state. Communities in this region have demonstrated greater adaptation to hot weather and so higher thresholds are used for this region.

Heat Watch aims to raise community awareness of forecast hot temperatures through the release of public health messages via communication resources such as information sheets and pamphlets, media engagement, community register operators and the health and community services sector.

1 Skinner, Loughnan, Nicholls, Tapper, 2008

2 Loughnan, Nicholls, Tapper, 2009

A regional heat watch will be activated when a maximum temperature of 36°C or above is forecast in Victorian regions other than Mildura. The threshold for activating a heat watch in the Mildura district is a maximum forecast temperature of 40°C or above.

Heat Health Alert (6 days to 1 day prior to a forecast heatwave) aims to issue heat health alerts to local governments and service providers advising the activation of state and local heatwave responses. The alert will be issued as an e-mail, SMS or both.

A region based response will be activated when a mean temperature threshold of 30°C or above is forecast in any region of the state except the Mildura district. The threshold for the Mildura district is a forecast mean temperature of 32°C or above.

Table 1: Heat health alert threshold

Local Government Area (LGA)	Heat health alert threshold (mean °C)
All local government areas in Victoria (except Mildura district)	30
Mildura district (Mildura, Swan Hill, Buloke and Gannawarra LGAs)	32

2.4 Urban heat islands

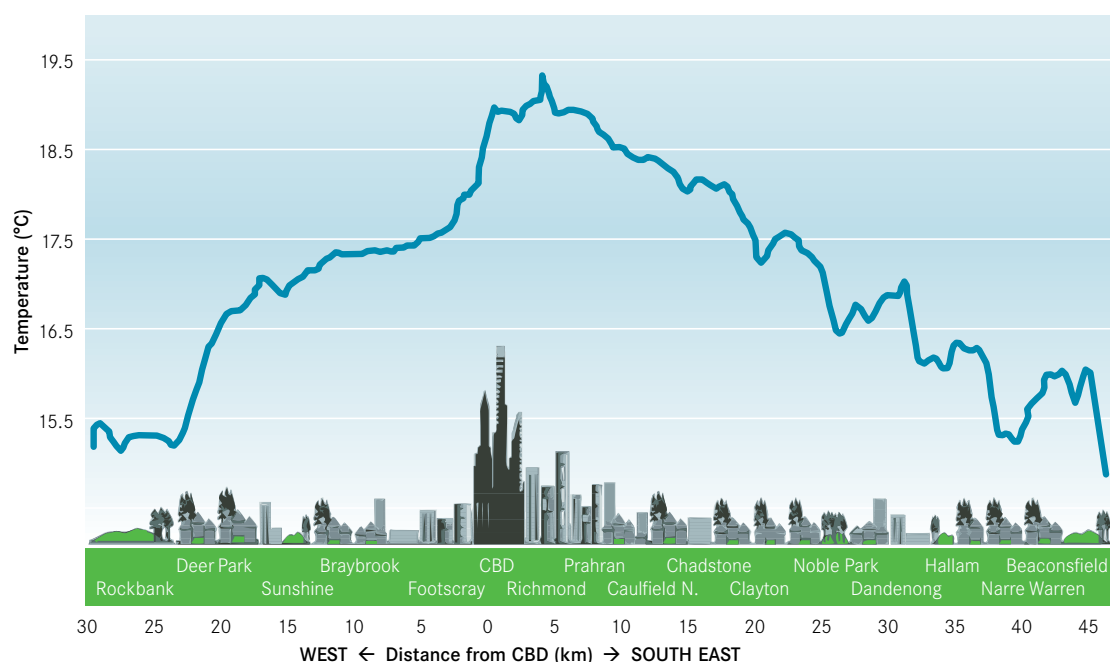
The ‘urban heat island’ (UHI) effect occurs in urbanised environments where built areas become warmer particularly in the night than the surrounding rural areas. This is due to common construction materials absorbing and retaining more of the sun’s heat.³ Metropolitan Melbourne regularly exhibits a distinct UHI effect as illustrated in the graph below.⁴

The graph illustrates Melbourne’s heat island effect on night time temperatures in March 2006 and the variability due to urban form and development, rather than climate change. The UHI effect adds to the warming from heatwaves.

The form and intensity of the UHI varies both spatially and temporally depending on the local meteorological conditions, geography and urban development.

For this reason, many people who live in regional areas believe they are less susceptible to heat-related illnesses, which is not the reality. There are many factors that affect an individual’s ability to cope in extreme hot conditions including health, demographic profile and regular contact with people.

Graph 1: Spatial variability of the Melbourne urban heat island (1:00 am, 23 March 2006)⁵



3 Loughnan, Nicholls, Tapper, 2009

4 Morris, Simmonds, 2000

5 Coutts, Beringer, Tapper, 2009

3 The effects of heat on health

3.1 Impacts of a heatwave

International and Australian experience show that heatwaves increase the incidence of illness and death particularly for people most at risk which may include older people, those with a chronic medical condition or disability and people living alone or socially isolated.

Heatwaves also rarely occur in isolation. Infrastructure failure or other natural emergencies can add another level of stress on a community and services. For example, power outages will impact on people's ability to run air conditioners, bushfires will increase vulnerability by reducing air quality and public transport disruptions will hinder people's ability to reach a cooler location.

Monash University's 'Hot Spots Project—A spatial vulnerability analysis of urban populations to extreme heat events' found that the public health outcomes of heatwaves depend on the level of exposure (timing, frequency, intensity and duration of the heatwave), the extent of the event and the demographic profile of the exposed population, population sensitivity and the prevention measures in place.⁶

More recently, the January 2009 heatwave that resulted in 374 additional deaths demonstrated that prolonged extremely high temperatures are a major hazard for Victorians. We must now expect and continue to prepare for heatwaves in order to reduce harm.

There is also a need for greater community consciousness about the impacts of heatwave and how to respond. A 2008 UK report into perceptions of heatwave risks based on interview studies of older people showed that 'few respondents considered themselves either old or at risk from the effects of heat, even though many had some form of relevant chronic illness'.⁷

3.2 How the human body is affected by heat

Regulation of bodily temperature

For optimum bodily functioning, body temperature needs to remain within a narrow range. Normally, body temperature varies over the course of the day.

The human body generates heat from muscle activity and metabolism of food. During exercise, heat production can increase ten-fold and raise core body temperature. The body can lose heat to the environment in cooler circumstances and gain heat from hot surroundings.

The temperature of the skin determines heat loss or gain. Skin temperature is determined by the flow of blood to the skin. Evaporation of sweat from the surface of the skin, and in small amounts of water from breathing, urine and faeces contribute to cooling the body. When the environment is hot, sweating is the only means by which the body can lose heat. It is possible to sweat up to 1600 millilitres per hour and up to 15 litres per day. More humid environments make it more difficult for sweat to evaporate and cool the body.

In a hot environment:

- the skin becomes flushed as blood vessels open
- sweating increases
- breathing is more rapid
- the appetite is suppressed automatically by the brain to reduce heat from the metabolism of food
- individuals become lethargic to reduce heat producing muscle activity.

Important factors contributing to regulation of body temperature in hot environments include:

- fat conducting heat poorly, leading to greater heat build-up for obese people
- heat loss from the skin may be trapped by excessive layers or thicknesses of clothing
- the rate of heat loss is increased by wind or fanning
- water conducting heat away from the body better than air.

As a longer term way to improve the body's ability to adapt to extreme heat events, regular exercise in warm weather increases the efficiency of sweating and aerobic fitness. This in turn improves people's tolerance to high temperatures and is considered an effective longer-term way for people to acclimatise themselves for hotter conditions.

⁶ Loughnan, Nicholls, Tapper, 2009

⁷ Journal of Public Health, 2009

Dehydration

Exercise in a hot environment frequently results in dehydration because thirst does not match all fluids lost by sweating. Even mild dehydration is associated with increased risk of injury, heat stress illness and poorer performance of complex tasks.

Mild to moderate dehydration increases work for the heart. It also reduces fluid available for sweating, to circulate to extremities or flush the kidneys.

3.3 Heat-related illness

Even when the body sweats to its maximum capacity, the body may still gain more heat than it can lose.

This leads to a rise in body temperature. An excessive rise in core body temperature affects the brain's ability to control body temperature resulting in a decrease in sweating.

Heat-related illness occurs when the body is unable to adequately cool itself. Heat-related illness can range from mild conditions such as a rash or cramps to very serious conditions such as heat stroke, which can kill. Most commonly, heat may worsen the condition of someone who already has a medical condition such as heart disease. Prevention is the best way to manage heat-related illness.

Heat cramps are muscle pains or spasms, usually in the abdomen, arms or legs. They may occur as a result of strenuous activity in a hot environment because the loss of salt in sweat affects muscle relaxation. Heat cramps may also be a symptom of heat exhaustion.

Heat exhaustion is a serious condition that can develop into heat stroke. It occurs as result of dehydration with poor blood flow affecting the brain and heart. Warning signs may include pale complexion and sweating; rapid heart rate; muscle cramps and weakness; dizziness and headache; nausea, vomiting and fainting.

Heat stroke occurs when the body is unable to control its core temperature and prevent the temperature rising rapidly. Widespread organ injury may occur, but the immediate effects are usually seen in the brain with unconsciousness, fits, altered behaviour, confusion or symptoms of cerebrovascular stroke. The symptoms may appear the same as for heat exhaustion but the skin may be dry with no sweating and the person's mental condition worsens. They may stagger, appear confused, have a seizure, appear to have a stroke or collapse and become unconscious. This is a life-threatening emergency.

Table 3: Heat-related illnesses

Disorder	Symptoms	What to do
Heat cramps	<ul style="list-style-type: none"> • muscle pains • spasms in the abdomen, arms or legs 	<ul style="list-style-type: none"> • Stop activity and sit quietly in a cool place • Increase fluid intake • Rest a few hours before returning to activity • Seek medical help if cramps persist
Heat exhaustion	<ul style="list-style-type: none"> • pale complexion and sweating • rapid heart rate • muscle cramps, weakness • dizziness, headache • nausea, vomiting • fainting 	<ul style="list-style-type: none"> • Get the person to a cool area and lie them down • Remove outer clothing • Wet skin with cool water or wet cloths • Seek medical advice
Heat stroke (a life-threatening emergency)	<ul style="list-style-type: none"> • same symptoms as heat exhaustion • dry skin with no sweating • mental condition worsens, confusion • seizure • appear to have a stroke or collapse • unconsciousness 	<ul style="list-style-type: none"> • Call an ambulance • Get the person to a cool area and lie them down • Remove clothing • Wet skin with water, fanning continuously • Position an unconscious person on their side and clear the airway

Although heat cramps, heat exhaustion and heat stroke may occur, other conditions are seen far more commonly and may not be recognised as heat-related illness.

These include:

- confusion
- kidney stones
- heart complaints
- asthma and other respiratory illness due to pollution
- falls
- gastroenteritis, mostly due to poor food handling.

The most common causes of death seen during heatwaves are cardiac, asthma and other respiratory illness, kidney disease, diabetes, nervous system diseases and cancer.

4 High-risk factors

Some population groups are at greater risk during a heatwave than others due to factors such as their age, health, location or occupation.⁸ The following population groups are most susceptible to heat-related illness:

- people over the age of 65, particularly those living alone
- infants and young children
- the overweight or obese
- pregnant and breastfeeding mothers
- people with a chronic medical illness, such as heart disease, high blood pressure, diabetes, cancer or kidney disease
- people with health conditions that impair sweating including people with heart disease, dehydration, extremes of age, skin disorders (including sunburn, prickly heat and extensive scarring from burns), congenital impairment of sweating, cystic fibrosis, quadriplegia, scleroderma and those taking medications with anti-cholinergic effects
- people with a physical disability including those with limited or poor mobility
- people with cognitive impairment who may not understand the need to change behaviour in extreme heat or may not be able to identify or communicate their own state of hydration or discomfort
- people taking medications that interfere with the body's ability to regulate temperature
- people with mental health problems
- people who exercise vigorously in the heat
- people who are dehydrated
- people with low cardiovascular fitness
- people who are unable to acclimatise
- people who have an infection
- people with problematic alcohol and other substance use
- people who live alone or socially isolated
- people with low socioeconomic status
- homeless people
- non-English speaking people.

Because older people have a reduced ability to adapt to summer heat, they are more prone to heat stress. They are more likely to have a chronic medical condition and to be taking medication that may interfere with the body's ability to regulate temperature.

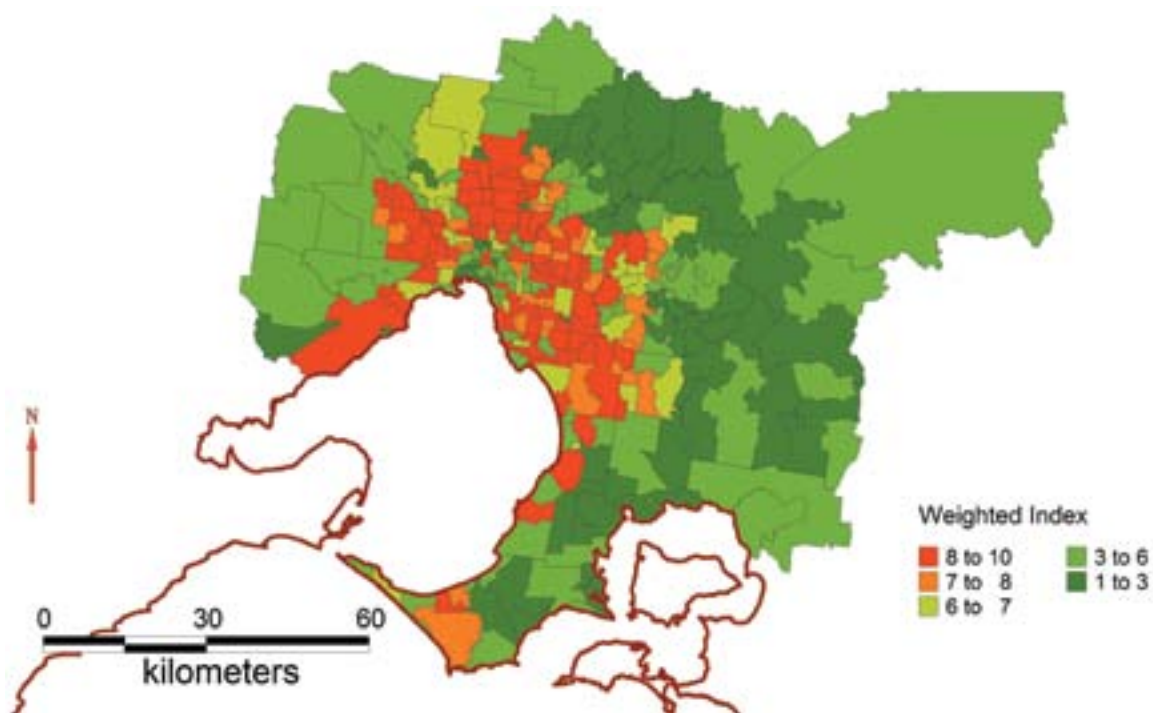
The Department of Health commissioned Monash University to develop a spatial vulnerability map to identify the areas of metropolitan Melbourne with populations that are most vulnerable to the health impacts of heatwave. The index ten represents the highest indicator of vulnerability.

Factors that were used to determine vulnerability to heat-related illness include:

- age (65+, 0–4 yrs)
- burden of disease
- aged care facilities
- low socio-economic status
- urban design
- single person household (65+)
- measure of disability
- population density
- ethnicity
- urban heat island (dense and high-rise areas that absorb and retain heat well into the night).



Graph 2: Spatial vulnerability map of Melbourne metropolitan area showing the vulnerability index for each post code area with ten representing the highest indicator of vulnerability



5 Protective factors

A crucial step in building Victoria's capacity to cope with heatwaves is improving understanding of extreme heat conditions, the risks they pose to human health and the steps individuals, communities and organisations can take to minimise these risks.

Accordingly, communication now aims to actively educate people on understanding the risks to human health posed by heatwaves and the actions that can be taken to minimise these risks.

Information is targeted directly at people most susceptible to heat-related illness and also provided to individuals and organisations with a direct responsibility to care for these people, as well as to others, such as pharmacists and GPs, who have a broader health-care relationship with many Victorians most at risk during heatwaves.

Primary public health messages for preventing heat-related illnesses

- Heat-related illness can affect anybody and must be taken seriously.
- People most at risk during a heatwave are:
 - people over 65 years
 - infants
 - people with a medical condition
 - people who live alone or socially isolated
 - people who have a disability.
- Keep hydrated by drinking extra water, even if not thirsty (Note: If your doctor normally limits your fluids, check how much to drink during hot weather).
- Avoid alcohol because of its dehydrating effects.
- Look after yourself and check up on older, sick, or frail friends, neighbours and relatives.
- Spend as much time as possible in cool or air-conditioned buildings (e.g. shopping centres, libraries, cinemas, community centres).
- Keep yourself cool by using damp towels and taking cool showers in the day and night.
- If you must go out, stay in the shade and take plenty of water with you. Wear a hat and light-coloured, loose fitting clothing.
- Block out the sun during the day by drawing the curtains and blinds and open up windows and doors when there is a cool breeze.

- Watch out for news reports that provide more information during a heatwave.
- Do not leave anyone in parked vehicles.
- Avoid strenuous activity like sport, home improvements and gardening.

In addition, a range of secondary public health messages will also be communicated which make recommendations on preparatory and preventative actions people can take to further reduce risks presented by extreme heat conditions.

Preparing yourself for hot weather

- Improve your aerobic fitness.
- Lose excess weight.
- See your doctor and make sure your medical condition is as well controlled as possible.
- Undertake regular moderate exercise in warmer weather prior to severe hot weather to enable your body to adapt and cope better with hot weather.

Preparing for a heatwave

- Have your air-conditioner serviced.
- Look at the things you can do to make your home cooler such as installing awnings, insulation, shade cloth or external blinds on the sides of the house facing the sun.

Changing routine

- Plan your day in a way that allows you to stay out of the heat.
- Limit outdoor activity to morning or evening when it is cooler.
- Buy a few extra items to make sure you have enough food at home to last over the hot period.
- Try to pay bills online or over the phone.

Power failure/transport disruption

- Think about what you would do if a heatwave caused loss of electricity or disrupted public transport.
- In the event of a power outage, ensure you have a torch, fully-charged telephone or mobile phone, battery-operated radio and sufficient batteries.

Pets

- Ensure your pets and animal companions are also well hydrated and have plenty of shade when they are outside.

6 Laying the foundations

Legislative and policy framework

The Victorian Government provides a number of legislative frameworks with direct relevance to heatwaves in terms of managing their immediate impacts but also planning for their future management and improving prevention of negative health impacts. These include:

- the *Emergency Management Act 1986*
- the *Planning and Environment Act 1987*
- the *Public Health and Wellbeing Act 2008*
- the provision of consistent statewide policy and regulation.

The *Our Environment, Our Future—Sustainability Action Statement 2006* sets out a whole-of-Victorian-Government policy, identifying heatwave planning in local government as a priority and specifically identifies community and local government level as the most appropriate setting.

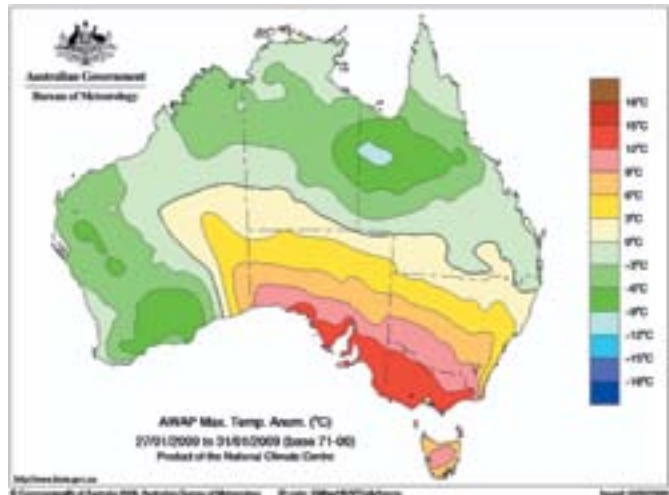
To support this work, the Department of Health developed the *Victorian Heatwave Strategy* (see appendix 9.2) which aims to:

- provide a framework to support on-going multi-agency and multi-sectoral heatwave preparedness and response across Victoria in order to minimise heat-related morbidity and mortality
- build the capacity of communities and individuals to self manage their response to heatwaves
- raise awareness about the impact of heatwaves on illness and death
- develop a system to provide an appropriate level of coordinated support from health, community and emergency services
- commission research to better understand heatwaves
- assist local councils in developing and implementing heatwave plans.

Chief Health Officer's Heatwave Report 2009

An exceptional heatwave affected south-eastern Australia in late January 2009. The heatwave in Victoria was of unprecedented intensity and duration with maximum temperatures 12–15°C above normal for much of Victoria, whilst Melbourne endured three consecutive days of temperatures above 43°C. This was a period during which Victoria experienced the most extreme temperatures with many records set for high day and night time temperatures, as well as for the duration of extreme heat.

Graph 3: Maximum temperature anomalies for the period 27–31 January 2009



Earlier this year, the Chief Health Officer launched a detailed report providing an analysis of the health impacts of the January 2009 Victorian heatwave. One of the major findings of the report was that there were 374 excess deaths over those occurring in the same period over the previous five years.

Key findings of Chief Health Officer's report on the January 2009 Victorian heatwave

- a 25 per cent increase in metropolitan Ambulance Victoria total emergency cases and a 46 per cent increase over the three hottest days
- a 34-fold increase in metropolitan Ambulance Victoria cases with direct heat-related conditions (61 per cent in those 75 years and older)
- a 12 per cent overall increase in emergency department presentations, with a greater proportion of acutely ill patients and a 37 per cent increase in those 75 years and older
- an eightfold increase in direct heat-related emergency department presentations (46 per cent in those aged 75 years and older)
- an almost threefold increase in patients dead on arrival (69 per cent being 75 years and older) at emergency departments
- there were 374 additional deaths over what would be expected: a 62 per cent increase in total all-cause mortality.

The report is available on the website of the Chief Health Officer www.health.vic.gov.au/chiefhealthofficer/downloads/heat_impact_rpt.pdf

Research to develop heat thresholds for Victoria

A temperature (or heat health) threshold is the actual, or calculated temperature above which illness and death increases above a baseline measure. The thresholds vary depending on geographic location, demographic profile of the community and other vulnerability factors.

The Victorian Government commissioned Monash University to conduct research in relation to temperature thresholds that lead to health problems for Melbourne and ten other regions across Victoria.

The Monash model explored the relationship between temperature (maximum, minimum and mean daily temperatures) and excess deaths. The identified threshold is the actual or calculated mean temperature which results in the greatest contribution to increased deaths.

The temperature thresholds indicate to councils and stakeholders the minimum temperature at which to trigger their heatwave plans and responses.

Pilot projects

In 2008, the Department of Health funded 13 pilot projects involving 22 local councils to undertake the process of developing and implementing a heatwave plan into existing municipal plans, such as the Municipal Public Health Plan or the Municipal Emergency Management Plan. The projects identified:

- current heat-related policies
- practices and actions for responding to extreme heat events
- council's capacity to respond to extreme heat events
- effective ways of communicating with their communities.

Specific heatwave plans developed by the pilot projects include:

- City of Greater Bendigo Heatwave Implementation Plan
- City of Melbourne Heatwave Response Actions
- City of Wodonga Heatwave Plan
- Hobsons Bay City Council Local Heatwave Response Plan
- Southern Grampians and Glenelg Heatwave Strategy
- Latrobe City Council Heatwave Strategy Community Education Plan.

More detail of the heatwave pilot projects can be found at: http://www.health.vic.gov.au/environment/downloads/heatwave_pilot_projects.pdf

Outcomes from the heatwave pilot projects include:

- Baw Baw Shire Heatwave Vulnerability Study
- City of Whitehorse—integration strategy for heatwave prevention, preparation, response and recovery across several key interrelated council action areas
- Yarra City Council Environments for Health Heatwave Framework
- Hume City Council—key heatwave messages for residents, and identification of the characteristics of an effective heatwave response strategy
- Western Port Greenhouse Alliance—identification of organisational factors needed to ensure an effective response to heatwave for its local council members
- Wimmera Primary Care Partnership—identification of at risk population groups and key stakeholder consultation for its local councils
- Cities of Stonnington and Port Phillip Heatwave Adaptation Project—identification of heatwave policies and strategies concerning young people and people with insecure housing.

Table 4: Councils involved in heatwave pilot project

Baw Baw Shire Council
City of Greater Bendigo
Hobsons Bay City Council
Hume City Council
Latrobe City Council
Melbourne City Council
City of Port Philip and City of Stonnington
Southern Grampians and Glenelg Primary Care Partnership
Western Port Greenhouse Alliance (Bass Coast Shire Council, Cardinia Shire Council, City of Casey, Frankston City Council and Mornington Peninsula Shire Council)
Wimmera Primary Care Partnership (Horsham Rural City, West Wimmera, Hindmarsh and Yarriambiack Shires)
Whitehorse City Council
Wodonga City Council
Yarra City Council

Climate Change and Human Health Conference

Victoria convened the first, and currently only national conference on Climate Change and Human Health in 2007. This conference explored the current knowledge about the human health and social impacts of heatwaves.

Keeping in contact with people susceptible to heatwave illness

Victoria supports a range of mechanisms that provide established communication channels with people who are at risk of heat-related illness.

Community registers aim to provide support for people who wish to remain in their homes but need occasional contact to verify their wellbeing. A largely volunteer group of service providers offer regular calls on request and hold a database including emergency contacts that can be used in circumstances such as a medical emergency or a health problem. Victoria Police and councils also support these registers.

Personal Alert Victoria (PAV) is a personal monitoring service that responds to calls for assistance and is funded by the Victorian Government through the Department of Health. PAV enhances the confidence of frail, older people and people with disabilities who are isolated and vulnerable to live independently in their own home by providing contact 24 hours a day.

The department is working with these services and others who use telephone contact to communicate to older people to ensure that consistent public health messages and telephone script content are being used by the different services:

- Community Registers
- Housing and Community Building Branch's 'Keeping in Touch' program
- Personal Alert Victoria
- Council vulnerability registers of aged care clients
- Seniors Information Victoria.

Heatwave Planning Guide

The *Heatwave Planning Guide* was developed to assist local councils in addressing heatwaves at a community level. The guide draws from the experiences of the 13 pilot projects and the January 2009 heatwave as well as international knowledge. The guide provides councils and their officers with templates, strategies and background information with an emphasis on identifying and protecting 'at risk' population groups.

The guide incorporates the principles used by existing municipal planning frameworks such as the *Environments for Health Planning Framework*. This approach has been adopted in order to align heatwave planning requirements with existing municipal planning processes.

Victorian council heatwave plans

In addition to the 13 pilot projects that involved 22 councils, the Department of Health provided funding to the remaining 57 councils in Victoria to develop their own heatwave plans. Each council was also provided with:

- information about heatwaves and municipal planning
- guidance on how to develop a heatwave plan
- examples of stakeholders and partners to consider in the planning process
- recommended actions to incorporate in the heatwave plan
- advice on developing a communication strategy.

Table 5: Councils with grants to develop a heatwave plan for 2009–2010

Alpine Shire Council	Greater Geelong City Council	Moreland City Council
Ararat Rural City Council	Greater Shepparton City Council	Mount Alexander Shire Council
Ballarat City Council	Hepburn Shire Council	Moyne Shire Council
Banyule City Council	Indigo Shire Council	Murrindindi Shire Council
Bayside City Council	Kingston City Council	Nillumbik Shire Council
Benalla Rural City Council	Knox City Council	Northern Grampians Shire Council
Boroondara City Council	Loddon Shire Council	Pyrenees Shire Council
Brimbank City Council	Macedon Ranges Shire Council	Queenscliffe Borough
Buloke Shire Council	Manningham City Council	South Gippsland Shire Council
Campaspe Shire Council	Mansfield Shire Council	Strathbogie Shire Council
Central Goldfields Shire Council	Maribyrnong City Council	Surf Coast Shire Council
Colac Otway Shire Council	Maroondah City Council	Swan Hill Rural City Council
Corangamite Shire Council	Melton Shire Council	Towong Shire Council
Darebin City Council	Mildura Rural City Council	Wangaratta Rural City Council
East Gippsland Shire Council	Mitchell Shire Council	Warrnambool City Council
Gannawarra Shire Council	Moira Shire Council	Wellington Shire Council
Glen Eira City Council	Monash City Council	Whittlesea City Council
Golden Plains Shire Council	Moonee Valley City Council	Wyndham City Council
Greater Dandenong City Council	Moorabool Shire Council	Yarra Ranges Shire Council



7 Victoria's Heatwave Plan

The heatwave arrangements outlined in this section set out the roles and responsibilities of the Victorian Government, local councils, emergency management and the health and community service sector. The arrangements encompass advice, services and information resources aimed at minimising the health impact of heatwaves on at risk Victorians and the broader community.

The plan addresses early detection and provision of warnings for forecast extreme heat conditions. It also provides systems through which key stakeholders in the state and local government and the health and community sectors can collaborate to ensure effective coordination of efforts.

The actions are explained to address the heatwave framework and then the specific timeframes of: i) pre-heatwave; ii) during a heatwave; iii) when a heatwave becomes an emergency; and iv) post heatwave.

7.1 The heatwave framework

Actions taken to prepare Victoria for the 2009–2010 summer and importantly to support longer-term heatwave planning have been implemented directly by the department, by local government and other key organisations using funding from the department and by a range of health and community service organisations with their own expertise and capabilities.

Victorian Government departments

The **Department of Health** is responsible for:

- Funding for Victorian councils to develop their own heatwave response plans and to support people at risk within their community who may be unable to effectively prepare and plan for an emergency, including extreme heat.
- Guidance and resources to support councils in the development of their plans including:
 - information about heatwaves and municipal planning
 - guidance on how to develop a heatwave plan and communication strategy
 - examples of stakeholders and partners to consider in the planning process
 - recommended actions to incorporate in the heatwave plan.
- Working with Personal Alert Victoria to provide additional support during a heatwave to more than 22,000 frail aged clients.

- Guidance for aged care services in the *Summer Preparedness Kit* to ensure quality care for those living in aged care services and the community. The kit comprises:
 - the residential aged care services bushfire ready resource to help residential aged care service providers put plans in place
 - summer strategy for home and community care funded organisations
 - a further resource to support aged care residential services during periods of heatwave is being finalised.
- Public health messages and communication materials for people at risk and their carers, people or organisations with a relationship or contact with an at risk group and the general community. The communication materials include information sheets, pamphlets, posters, newsletters, as well as various paraphernalia produced by some councils. The public health messages and communication material will reach people at risk and their carers, people or organisations that have a relationship or contact with at risk Victorians and the general community through:
 - Ambulance Victoria
 - Better Health Channel website
 - Community registers
 - Disability Services (Disability Accommodation Services newsletter)
 - General practitioners
 - Information Victoria
 - KidSafe
 - Newspaper articles
 - Nurse-on-Call
 - Office of Housing ('Over the Fence' newsletter)
 - Peak bodies (Aged and Community Care Victoria, Alzheimer's Australia, Carers Victoria, KidSafe, MS Society)
 - Personal Alert Victoria
 - Pharmacists
 - Royal District Nursing Services
 - Seniors Information Victoria
 - Victorian councils.
- Establishment of a system of consultation and communication with health and community service providers and key organisations to understand their heatwave response systems and assist in ensuring optimum integration with statewide efforts.

Hospital and Health Service Performance Division, Department of Health

The Hospital and Health Service Performance Division is responsible for governance, performance, acute funding and policy settings for public hospitals and health services including sub-acute, some residential aged care and ambulance services across Victoria.

Mental Health and Drugs Branch, Department of Health

The Mental Health and Drugs Branch is responsible for people with reduced cognitive awareness and capacity to care for themselves and a high level of disadvantage due to the quality of their home environment and for drugs. The group is diverse and clients are treated in a wide range of settings and by a diverse service sector. Many are treated in their home or community service setting rather than in residential services and many are Housing and Community Building tenants. The broader community information campaigns, along with support from the service providers will be the principal means of supporting this at risk group.

The branch is currently reviewing its standard communication channels, which will be used to send information to service and care providers prior to and during high danger days. These channels include:

- sector meetings (child and adolescent, aged)
- non-government organisation service provider meetings.

Aged Care Branch, Department of Health

The department has implemented a summer strategy for older Victorians to identify and respond to a range of events that generally occur during summer as well as ensure service continuity during emergencies such as bush-fires and heatwaves. The resources are provided to all Victorian aged care services.

Disability Services Division, Department of Human Services

Victorians with disabilities are supported in their home environments or residential services. Residential services are managed by government, the non-government sector or private operators. The health and wellbeing of clients is managed through a range of service protocols.

To support all service providers, the government will:

- include heat health information and tips for staying cool in regular newsletters
- conduct service sector forums to provide advice on managing clients during a heatwave
- identify planning implications to minimise the health impacts of a heatwave.

Communication channels with service providers and residential properties are well established in the event that communication during a heatwave is required.

Housing and Community Building Branch, Department of Human Services

The Housing and Community Building Branch (often referred to as the Office of Housing) is the largest landlord in Victoria with some tenants considered at risk of heat-related illness. They have recently announced the expansion of the 'Keeping in Touch' program to include all 7,000 public housing tenants aged 75 years and above. The program offers a regular weekly contact service and those eligible tenants who elect to take up the offer receive a telephone call from the department checking the tenant's health and wellbeing. If a tenant does not answer the phone, their next of kin, or their local housing office will be notified to make an urgent visit. All the department's high-rise apartment buildings are equipped with electrical generators to operate core functions and elevators to ensure that tenants will be able to safely exit premises in the event of a power outage.

Office of Senior Victorians (OSV), Department of Planning and Community Development

With funding provided by the Department of Health, the OSV with support from Victoria Police is responsible for the implementation of 23 new and seven enhanced community registers in local communities around Victoria. The registers are one of the multiple communication channels used to reach older people and those who may be isolated due to a disability to help ensure their safety over summer. The community registers will be staffed by volunteers and located at local police stations.

The Department of Health is working with OSV to ensure that each register is delivering consistent public health messages in relation to extreme hot weather.

Table 6: Existing seniors and community registers receiving enhancement funding

Police Service Area/Location	Register Name
Bellarine	Bellarine Police Community Support Register Inc.
Cardinia	Cardinia Senior Citizens Register
Glen Eira	City of Glen Eira Community Register
Maryborough—Central Goldfields and Pyrenees	Maryborough Senior Citizens Register
Melton	Melton Seniors Register
Moreland	Moreland Senior Citizens Register
Sunbury (City of Hume)	Sunbury Alone Register

Table 7: New registers expected to commence operating in December 2009

Police Service Area/Location	Register Name
Bairnsdale, East Gippsland	Bairnsdale and District Community Register
Bayside	Bayside Community Register
Boroondara	Contact and Care at Boroondara
Corangamite	Corangamite Community Register
Hume, Broadmeadows	Hume Community Register
Moorabool	Bacchus Marsh Seniors and At Risk Register
Yarra Ranges	Yarra Ranges Police Community Safety Register

Table 8: New registers expected to commence operating by February/March 2010

Police Service Area/Location	Register Name
Campaspe	Campaspe Shire Community Register
Knox	Knox PSA Community Register
Macedon Ranges	Macedon Ranges Community Register
Moonee Valley	Moonee Valley Community Safety Register
Surf Coast Shire	Surf Coast Community Support Register
Wyndham	Wyndham Community Safety Register

Table 9: New registers expected to commence operating in 2010

Proposed Start Date	Police Service Area/Location	Register Name
Early 2010	Ballarat	Ballarat Community Support and Safety Register
Early 2010	Brimbank	Brimbank Community Register
Early 2010	Corangamite	Otways Community Safety Register
Mid-2010	Frankston	Frankston Community Register
To be advised	Geelong	Geelong Community Support Register
Mid 2010	Hobsons Bay	City of Hobsons Bay Community Register
Mid 2010	Kingston	Kingston Community Safer Living Register
To be advised	Melbourne	North Melbourne Community Register
Mid 2010	Warrnambool and Moyne Shire	Moyne Shire Living Confidently Register
Mid 2010	Warrnambool and Moyne Shire	City of Warrnambool Living Confidently Register

Working with Local Government

With funding and guidance provided by the Department of Health, Victorian councils are responsible for addressing risks associated with heatwaves at a community level and developing a heatwave plan to minimise these health risks. At a minimum, the plan should include:

- management approval
- agreement on what plan or plans heatwave strategies will feature in
- identification of at risk groups and their needs
- engagement of health and community service providers and other relevant agencies
- identification and agreement on goals and strategies
- trigger for activation of the plan
- evaluation strategy post-heatwave.

Through their heatwave plans, local councils have committed to a range of activities that will support people in the community who are more susceptible to heat-related illnesses. These strategies include identifying the most susceptible aged care or home and community care (HACC) clients to contact during periods of extreme heat and providing additional training for HACC workers.

Over the summer, many councils will commence media campaigns which will include the distribution of media releases and placement of advertisements in local newspapers to raise awareness of heatwaves and educate the community on how to stay safe in the heat. Councils will also provide public health information to service providers, community groups and other stakeholders to pass directly on to community members.

Department of Health working with Local Government

Victorian councils are responsible for planning for communities particularly in relation to the community's health and wellbeing. There are many potential activities to make communities a better place for people to live, to work and be active in as the climate gets hotter. Policies in relation to shade, planning green recreational and urban spaces and restoring recreational and sporting facilities that have suffered through extended periods of drought can all be part of municipal planning processes.

Since its release in 2001 the *Environments for Health Municipal Public Health Planning Framework* has become a standard reference for those involved in public health planning at a local government level. It covers the built/physical, natural, social and economic environments.

The *Public Health and Wellbeing Act 2008* will strengthen the role of local government through the municipal public health planning process. The State Public Health and Wellbeing Plan which the Minister is required to produce, will identify objectives that reflect the whole-of-government response needed to make a significant impact on environmental factors that cause ill health and therefore will provide a blueprint for local action through municipal plans. To assist with this new era of municipal public health planning a set of policy and practical guides has been produced to support the *Environments for Health Planning Framework*. They are intended to provide local government with up to date information on resources that can assist with the development of municipal public health plans and related developments in public health policy, legislation and practice.

The Department of Health Local Government Planning Site can be found at:

<http://health.vic.gov.au/localgov/>

The policy guides that support local government to assist communities adapt to a hotter climate through their Municipal Public Health Planning can be found at:

http://www.health.vic.gov.au/localgov/downloads/enviro_climate_change.pdf

http://health.vic.gov.au/localgov/downloads/enviro_urban_design.pdf

Working with other agencies

The **Victoria State Emergency Service** provides guidance on operating emergency relief centres which local councils are encouraged to follow in the event of a heatwave.

With specific reference to aged care, Commonwealth funded service providers must deliver appropriate care and services to residents and actively work to provide a safe environment that minimises fire and other emergency risks. Services such as **home and community care, Personal Alert Victoria** and **Royal District Nursing Service** are prepared to provide advice and support to older clients during heatwave conditions and to ensure business continuity.

Worksafe is responsible for providing guidance on working in hot conditions which is particularly applicable for people working outdoors in hot weather or working where heat may be generated as part of the work. The guidance is available at: <http://www.worksafe.vic.gov.au/wps/wcm/resources/file/eb4d940c7937af6/guidance%20working%20in%20heat3.pdf>

Australian Red Cross will provide at risk Victorians and the general community with an emergency REDiPlan containing information on how to cope with hot weather including tips on how to cope with heat, stay cool, signs and symptoms of heat-related illnesses and looking out for others in the community.

7.2 Pre-heatwave—Day 6 to Day 1 prior to forecast event

Victorian Government departments

The Health Protection Branch, Department of Health will monitor the Bureau of Meteorology forecasts and send heat health alerts to communicate forecast heatwaves to local councils, departmental program areas, hospitals, health and community service providers, and other key organisations. Up to six days prior to the forecast heatwave event an e-mail alert, followed by an SMS alert when Bureau of Meteorology senior forecasters provide confidence of the predicted high temperatures, will provide councils with early warning.

The alerts will only recommend that local councils and key organisations start to prepare (six to one days prior to the event)⁹, to activate their heatwave response plans. Often, as with most local governments, the heat health alerts will act as a direct trigger for stakeholder action. However, the alerts may also be sent to some organisations just for information as these organisations will independently take action.

In all cases the heat health alerts will aim to raise awareness and in some cases it may be used to inform organisations of the potential for service impacts for example, Personal Alert Victoria.

These alerts will go to various key organisations including:

- All local governments
 - local stakeholders including home and community care services, meal delivery services, maternal and child health services
- Department of Health groups
 - Aged Care Branch
 - Disability Services Division
 - Hospital and Health Service Performance Division
 - Mental Health and Drugs Operations Branch
 - Portfolio Services Branch (Media Unit)
 - Public Housing and Community Building Branch
 - Regional public health staff
- Direct Service Providers
 - Ambulance Victoria
 - Municipal Association of Victoria
 - Red Cross
 - Nurse-On-Call
 - Personal Alert Victoria
 - Royal District Nursing Service
 - Medical professionals including General Practice Victoria, Royal Australian College of General practitioners, Melbourne Medical Deputising Service
 - Pharmacists
 - Bureau of Meteorology
 - Office of Senior Victorians
- Indirect Service Providers
 - Aquatics and Recreation Victoria
 - Life Saving Victoria
 - Kidsafe.

⁹ The day of the event is considered Day 0, therefore Day 6 is the beginning of the 7-day forecast period.

Heat Health Alert System

The Department of Health **heat health alert system** will be implemented throughout the 2009–2010 summer and will comprise the following elements:

Heat Watch aims to raise community awareness of forecast hot temperatures through the release of public health messages via communication resources such as information sheets and pamphlets, media engagement, community register operators and the health and community services sector.

A regional heat watch will be activated when a maximum temperature of 36°C or above is forecast in Victorian regions other than Mildura. The threshold for activating a heat watch in the Mildura district is a maximum forecast temperature of 40°C or above.

In anticipation of hot weather, the Chief Health Officer and the Department of Health will make public announcements or disseminate public health messages through the media.

Heat Health Alert (6 days to 1 day prior to the forecast heatwave) aims to issue heat health alerts to local governments and service providers advising the activation of state and local heatwave responses. The alert will be issued as an e-mail, SMS or both.

A region-based response will be activated when a mean temperature threshold of 30°C or above is forecast in any region of the state except the Mildura district. The threshold for the Mildura district is a forecast mean temperature of 32°C or above.

During a heatwave (day 0)

During a heatwave the department may issue a further heatwave alert.

Once the heat health alert is issued, local councils, departmental program areas and health and community service providers will respond in accordance to their own heatwave plans.

At this stage, the Chief Health Officer and the Department of Health will make another public announcement or disseminate public health messages through the media regarding the current heatwave and how to stay safe and healthy.

Working with Local Government

Victorian councils will notify staff, volunteers and service providers of the impending heatwave and increase support where possible. Pre-heatwave activity will mainly involve preparation of services including:

- increasing contact to at risk Victorians via telephone calls and/or home visits
- opening of the heatwave hotline or 'on-hold' telephone message
- increasing home and community care services to clients
- extending pool operating hours
- opening emergency relief centres
- providing additional fluid to at risk Victorians
- issuing media releases on the heatwave situation and how to stay safe.

Working with other agencies

Personal Alert Victoria (PAV) have planned to increase staff and continue to closely monitor the health of more than 22,000 clients which include frail people, older people and those with disabilities 24 hours a day, seven days a week. Clients use a neck pendant and personal alarm systems to inform PAV staff of their health and wellbeing and request assistance during a medical crisis.

Nurse-on-Call will continue to provide immediate, expert health advice over the phone 24 hours a day, seven days a week.

Through their representative peak bodies, **general practitioners** and **pharmacists** will provide public health information and medical advice in relation to staying safe in hot weather to at risk groups and the general community.

Royal District Nursing Services will continue to make home visits to clients to check on their health and wellbeing and ensure that they are aware of the impending heatwave and how best to stay safe in hot weather.

Australian Red Cross have defined their roles as one of outreach and personal support and will partner with health and community service providers to provide additional support to at risk Victorians during a heatwave including personal home visits or assistance with shelter management.

7.3 During heatwave—Day 0

Victorian Government departments

The **Chief Health Officer** in partnership with the **Departments of Health and Human Services Emergency Coordination Centre** will coordinate actions of the health and community sector and provide advice in relation to public health messaging.

Department of Health may issue another heat health alert to local councils, departmental program areas, hospitals and health and community care service providers to notify them to enact their heatwave plan.

Department of Health will continue to work with **Office of Senior Victorians** and **Housing and Community Building** to ensure that consistent public health messages and telephone scripts are used by registers such as the community registers and ‘Keeping in Touch’ program.

Aged Care Branch, Mental Health and Drugs Branch and Disability Services Division will also be notified through the heat health alert system and respond in accordance with their relevant plans and care protocols.

Working with Local Government

Victorian councils will activate their heatwave plans which will include enhanced actions from the pre-heatwave phase. Contact will be made with Victorians at risk via telephone or home visits to ensure their safety and wellbeing, with increased HACC services provided to clients.

Local media and health and community services providers will be informed of the heatwave and asked to assist in the provision of important health information and advice on how to stay healthy in the heat to Victorians at risk and the general community. Additional services may include the opening of a heatwave hot line, extension of swimming pool operating hours, providing additional fluid to at risk Victorians and the opening of emergency relief centres.

Working with other agencies

Ambulance Victoria (AV) is a key partner in the Victorian response to heatwave. They are trusted members of the health care sector, and are prominent providers of key heat health messages. An agreement between the department and AV ensures that consistent public health messages are delivered to the community via media interviews, media releases and other communication channels.

Ambulance Victoria has also developed a heatwave plan that aims to:

- ensure the maintenance of normal operational response and manage the increased demands placed on AV during a sustained heatwave
- assure staff safety and welfare during this period
- effectively link the AV heatwave plan and emergency response plan to facilitate the above aims.

General practitioners and **pharmacists** will continue to provide public health information and medical advice in relation to staying safe in hot weather to at risk Victorians and the general community.

Service providers such as hospitals those operating community residential units and residential aged care will implement their plans as appropriate.

Personal Alert Victoria will increase staff and continue to monitor the health of more than 22,000 clients which include frail people, older people and those with disabilities 24 hours a day, seven days a week.

Nurse-on-Call will continue to provide immediate, expert health advice over the phone 24 hours a day, seven days a week.

Royal District Nursing Services will continue to make home visits to clients to check on their health and wellbeing and ensure that they are aware of how best to stay safe in the current hot weather. In the event that a client cannot be reached due to the extreme hot weather, nurses will make telephone calls and alternative arrangements to ensure the safety of the client.

Workplaces are responsible for the occupational health and safety of employees including their wellbeing in hot weather. The priority of workplaces should be to keep employees and volunteers safe with particular care for those who work outdoors or are susceptible to heat-related illnesses. The second priority is to ensure business continuity and the provision of services to those considered to be at risk during a heatwave.

Australian Red Cross will continue to provide support to health and community service providers for people who are considered at risk during a heatwave including personal home visits and assistance with shelter management.

7.4 When a heatwave becomes an emergency

The emergency management response in Victoria is detailed in the *Emergency Management Manual Victoria* (EMMV). The philosophy of the EMMV is one of prevention, response and recovery. The prevention of emergencies or the lessening of their severity is a key concern in emergency management planning. Local government is one of the key response agencies in emergency management with designated planning, response and recovery roles.

Australia-wide, emergency management response planning is increasingly one of an all-hazards approach with the same systems, actions and infrastructure being used regardless of the nature of the emergency. The *Heatwave Planning Guide* encourages councils to respond to heatwave in the prevention, preparedness, response and recovery framework.

Some heatwaves will not require actions during the response and recovery phases and at risk communities, individuals and service and care providers will be able to protect themselves or others based on the information that has been distributed as part of the prevention phase.

However, some heatwaves will be of such intensity that actions will be required through the municipal and state emergency management plans. Circumstances that are likely to require such a response include:

- record breaking or extreme heat events
- code red fire danger days
- power and public transport failures
- extreme demand on essential medical services such as ambulance, hospital and doctors.

Under the state's emergency management arrangements, **Victoria Police** are the coordinating body for response to emergencies. In the absence of a defined or designated control agency, Victoria Police will assume that role or have the authority to appoint a control agency. As the impacts of heatwave may include infrastructure such as electricity generation and distribution or transport failure as well as human health impacts, Victoria Police will play a key role in ensuring appropriate responses are being undertaken by responsible agencies. Discussions are planned for 2010 to resolve the control agency status and to include a designated control agency in the EMMV.

The **Health and Human Services Emergency Coordination Centre** (H&HSECC) provides the structure for both departments to deliver the following functions:

- hospital and health services coordination
- emergency management coordination
- public health emergency management
- emergency communications
- recovery
- business resilience/business continuity.

Victorian Health Emergency Coordination (VHEC) provides the Hospital and Health Services Coordination function and focuses on the incident's impact within and across Victoria's health services. From response to recovery, it has a strategic role in coordination, leadership and appropriate support. The department will have an overview of all major incidents and when necessary will ensure arrangements are made for a well coordinated response.

The VHEC function is on standby at all times and can be activated at short notice in response to an emergency incident. It will:

- analyse the scope, status and likely impact of the emergency incident on the Victorian hospital system
- communicate with, and share intelligence amongst key stakeholders; health services, ambulance services in Victoria, the department's regional and central offices and the Minister for Health
- act as a central hub for information on the availability of resources and facilitate the appropriate allocation of these
- take a command role if an incident is on a scale which threatens to overwhelm Victorian health services.

Following notification of a heat health alert that could have potential for major public health consequences, services and agencies such as hospitals, residential aged care facilities and Ambulance Victoria will implement their plans and responses.

The Health Protection Branch will monitor for the conditions that comprise a heat watch or heat alert situation and notify the H&HSECC of Heat Health warnings or public health information that need to be issued or circulated.

The **State Health Emergency Response Plan (SHERP)** is a sub-plan of the Victorian State Emergency Response Plan. SHERP is a whole-of-health response plan to emergencies including mass casualty incidents, complex trauma events, mass gatherings and other incidents impacting people's health. SHERP ensures a safe, effective and coordinated health and medical response to emergencies by:

- establishing an incident management structure for health agencies that interfaces and works with the incident management structure established by the control agency
- coordinating health resources from the incident site through to affected hospitals
- managing pre-hospital resources and the hospital interface
- coordinating resources to manage the health impacts of an incident.

The principles outlined in SHERP apply in any emergency including mass gatherings and public events and from small complex incidents to major incidents requiring a coordination and management framework.

7.5 Post-heatwave

The **State Emergency Recovery Plan** details the recovery arrangements and systems that are 'all-hazards' focused to support impacted individuals, families, neighbourhoods and communities in the immediate and longer term post an emergency event. The Department of Human Services leads the Emergency Recovery arrangements at state and regional levels with local government coordinating the delivery of recovery service at the local level. The Emergency Recovery system operates with four pillars being people, economic, built and natural environments and is supported by many agencies that all have responsibilities to delivery recovery services in the aftermath of an emergency event.

In addition to the range of protective and preventative actions established for Victoria's 2009–2010 summer, systems for monitoring and surveillance of impacts during extreme heat events this summer will continue contributing valuable data and knowledge to inform ongoing heatwave planning.

Building on the system developed following the January 2009 heatwave, the **Department of Health** (Prevention and Population Health Branch) will use the Heat Health Intelligence Surveillance System to track and provide a report on the human health impact of heatwaves over the 2009–2010 summer by collecting and assessing the following data:

- Ambulance Victoria—case assessments that are recorded as heat related (defined as heat stress, heat stroke and dehydration) and cardiac arrests
- Melbourne Medical Deputising Service—information regarding heat-related diagnoses and records of deceased patients
- The Victorian Emergency Minimum Dataset—dataset that contains de-identified administrative and clinical data detailing presentations at Victorian public hospitals that have 24-hour emergency departments
- Deaths reported to the State Coroner's Office—data of deaths that have resulted directly or indirectly from accident or injury (which may include the effects of heat) where the identity of the person is not known or where a medical practitioner has been unable to provide a death certificate
- Victorian Registry of Births, Deaths and Marriages—Victorian mortality data
- Personal Alert Victoria—record of missed calls, medical emergencies and cancellations
- Victorian Health Emergency Coordination—hospital data including emergency department presentations and hospital admissions during specific incidents with potential high public health impacts

Using all data collected, plus a thorough appraisal of the experiences of all key stakeholders during the 2009–2010 summer, the Victorian Government, councils and the health and community service sector will conduct a review of the heatwave plan and responses post-summer to continue improvements to the statewide and local response to heatwaves.

8 Communication Resources

A suite of communication resources have been developed by the Department of Health to encourage and educate individuals and the community to be aware of the impact of extreme heat on human health. The resources aim to promote knowledge of strategies to care for oneself and others during these periods.

The information is available in a range of formats with a number of resources translated into community languages. The resources contain formats in easy to read language that will convey simple strategies to stay safe during heatwaves.

The communication resources have been made available to local government and service providers to distribute or adapt to be appropriate for their client group, while promoting consistent health messages.



8.1 Heat-related illnesses information sheet

Public Health Information

Preventing heat-related illness



What is heat-related illness?

Heat-related illness occurs when the body is unable to adequately cool itself. The body normally cools itself by sweating, but sometimes sweating isn't enough and the body temperature keeps rising.

Heat-related illness can range from mild conditions such as a rash or cramps to very serious conditions such as heat stroke, which can kill. Heat may worsen the condition of someone who already has a medical condition such as heart disease.

Prevention is the best way to manage heat-related illness.

Disorder	Symptoms	What to do
Heat cramps	<ul style="list-style-type: none"> • muscle pains • spasms in the abdomen, arms or legs 	<ul style="list-style-type: none"> • Stop activity and sit quietly in a cool place • Increase fluid intake • Rest a few hours before returning to activity • Seek medical help if cramps persist
Heat exhaustion	<ul style="list-style-type: none"> • pale complexion and sweating • rapid heart rate • muscle cramps, weakness • dizziness, headache • nausea, vomiting • fainting 	<ul style="list-style-type: none"> • Get the person to a cool area and lie them down • Remove outer clothing • Wet skin with cool water or wet cloths • Seek medical advice
Heat stroke (a life-threatening emergency)	<ul style="list-style-type: none"> • same symptoms as heat exhaustion • dry skin with no sweating • mental condition worsens, confusion • seizure • appear to have a stroke or collapse • unconsciousness 	<ul style="list-style-type: none"> • Call an ambulance • Get the person to a cool area and lie them down • Remove clothing • Wet skin with water, fanning continuously • Position an unconscious person on their side and clear the airway

Preventing heat-related illness



Who is at risk of heat-related illness?

Anyone can suffer from heat-related illness, but those most at risk are:

- Older people (>65 years), particularly those living alone without air conditioning
- Infants
- The overweight or obese
- Pregnant and nursing mothers
- People with a chronic illness, such as heart disease, high blood pressure, diabetes, cancer or kidney disease
- People with health conditions that impair sweating such as scleroderma, cystic fibrosis and extensive scarring from burns
- People with limited or poor mobility
- People taking medications that may interfere with the body's ability to regulate temperature.

Because elderly people have a reduced ability to adapt to summer heat, they are more prone to heat stress. They are more likely to have a chronic medical condition and to be taking medication that may interfere with the body's ability to regulate temperature.

What you can do to prevent heat related illness in yourself or others

Before the hot weather:

- See your doctor and make sure your medical condition is as well controlled as possible
- Undertake regular moderate exercise in warmer weather prior to severe hot weather to enable the body to adapt and cope better with hot weather.

Once the weather is hot:

- Drink plenty of water and non-alcoholic fluids. (Note: If your doctor normally limits your fluids or you are on fluid tablets, you may need to check how much to drink while the weather is hot)
- Avoid alcohol because of its dehydrating effects
- Stay indoors, if possible with air-conditioning, or in the shade
- Take a cool shower or bath
- Wear lightweight, loose-fitting clothing
- Reduce physical activity
- Check on older, sick and frail people who may need help coping with the heat
- Never leave anyone in a closed parked car
- Don't rely on fans to cool people unless they are well hydrated and there is adequate ventilation
- Know the signs and symptoms of excessive heat exposure and know how to respond.

If you must be out in the heat

- Limit outdoor activity to morning or evening hours
- Protect yourself from the sun and **slip, slop, slap** when outside by using sunscreen, wearing a hat and covering exposed skin
- Rest regularly in the shade and drink fluids frequently.

Important contact information

For 24 hour health advice contact Nurse-on-Call on 1300 60 60 24

For life threatening emergencies telephone 000

If you are deaf, or have a hearing impairment or speech impairment, contact Nurse-on-Call through the National Relay Service (NRS) on www.relayservice.com.au:

- TTY users phone 133 677 and ask for 1300 60 60 24
- Speak and Listen users phone 1300 555 727 and ask for 1300 60 60 24
- Internet relay users connect to the NRS on www.iprelay.com.au/call/ and ask for 1300 60 60 24

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December 2009

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8.2 Heatwave—important health information for summer brochure

Heat-related illnesses

Disorder	Symptoms	What to do
Heat cramps	<ul style="list-style-type: none"> muscle pains spasms in the abdomen, arms or legs 	<ul style="list-style-type: none"> Stop activity and sit quietly in a cool place Increase fluid intake Rest a few hours before returning to activity Seek medical help if cramps persist
Heat exhaustion	<ul style="list-style-type: none"> pale complexion and sweating rapid heart rate muscle cramps, weakness dizziness, headache nausea, vomiting fainting 	<ul style="list-style-type: none"> Get the person to a cool area and lie them down Remove outer clothing Wet skin with cool water or wet cloths Seek medical advice
Heat stroke (a life-threatening emergency)	<ul style="list-style-type: none"> same symptoms as heat exhaustion dry skin with no sweating mental condition worsens, confusion seizure appear to have a stroke or collapse unconsciousness 	<ul style="list-style-type: none"> Call an ambulance Get the person to a cool area and lie them down Remove clothing with water, fanning continuously Position an unconscious person on their side and clear the airway

Heatwave

Important health information for summer

Important contact information

For 24 hour health advice contact
Nurse-on-Call on 1300 60 60 24

For life threatening emergencies
telephone 000

For this brochure and other information in:

Arabic	Greek	Mandarin
Cantonese	Italian	Turkish
Croatian	Macedonian	Vietnamese

Please go to:
www.health.vic.gov.au/environment/heatwave

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Also published on www.health.vic.gov.au/environment/heatwave.

Authorised by the Victorian Government, 50 Lonsdale Street, Melbourne.

What is a heatwave?

A heatwave is a period of unusual and uncomfortable hot weather that could impact on human health, community infrastructure such as the power supply and public transport, and services.

Heatwaves can affect anybody and cause illnesses such as heat cramps, heat exhaustion, and heat stroke which may be fatal.

Here are some things you can do to take care of yourself and look out for family, friends and neighbours who may need help coping with the heat.

Coping with the heat

- Keep hydrated by drinking extra water, even if not thirsty. (Note: if your doctor normally limits your fluids, check how much to drink during hot weather).
- Look after yourself and check up on older, sick, or frail friends, neighbours and relatives.
- Spend as much time as possible in cool or air-conditioned buildings (for example shopping centres, libraries, cinemas, community centres).
- Keep yourself cool by using damp towels and taking cool showers in the day and night.
- If you must go out, stay in the shade and take plenty of water with you. Wear a hat and light-coloured, loose fitting clothing.
- Block out the sun during the day by closing curtains and blinds and open up windows and doors where there is a cool breeze.
- Watch out for news reports that provide more information during a heatwave.
- Do not leave children, adults or animals in parked vehicles.
- Avoid strenuous activity like sport, home improvements and gardening.

Preparing for a heatwave

- Have your air-conditioner serviced.
- Look at the things you can do to make your home cooler such as installing awnings, shade cloth or external blinds on the sides of the house facing the sun.

Preparing for a power failure

- Think about what you would do if a heatwave caused loss of electricity or disrupted public transport.
- In the event of a power outage, ensure you have a torch, fully-charged telephone or mobile phone, battery-operated radio and sufficient batteries.

Who is most at risk?

Anyone can suffer from heat-related illness, but those most at risk are:

- people over 65 years old, particularly those living alone without air conditioning
- pregnant women, breast feeding mothers and infants
- the overweight or obese
- people with a chronic or mental illness
- people with health conditions that impair sweating
- people with limited or poor mobility
- people taking medications that may interfere with the body's ability to regulate temperature.

8.3 Staying healthy in the heat poster

Staying healthy in the heat

Heatwaves can affect anybody— here are some things you can do to stay healthy in the heat

Keep hydrated by drinking extra water, even if not thirsty
(Note: If your doctor normally limits your fluids, check how much to drink during hot weather)

Look after yourself and check up on older, sick, or frail friends, neighbours and relatives

Spend as much time as possible in cool or air-conditioned buildings
(For example, shopping centres, libraries or cinemas)

Keep yourself cool by using damp towels and taking cool showers in the day and night

If you must go out, stay in the shade and take plenty of water with you. Wear a hat and light-coloured, loose fitting clothing

Block out the sun during the day by closing the curtains and blinds and open up windows and doors when there is a cool breeze



**For 24 hour health advice contact
Nurse-on-Call on 1300 60 60 24
For life threatening emergencies dial 000**

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A Victorian Government initiative  **Victoria**
The Place To Be

8.4 *Staying healthy in the heat* promotional label

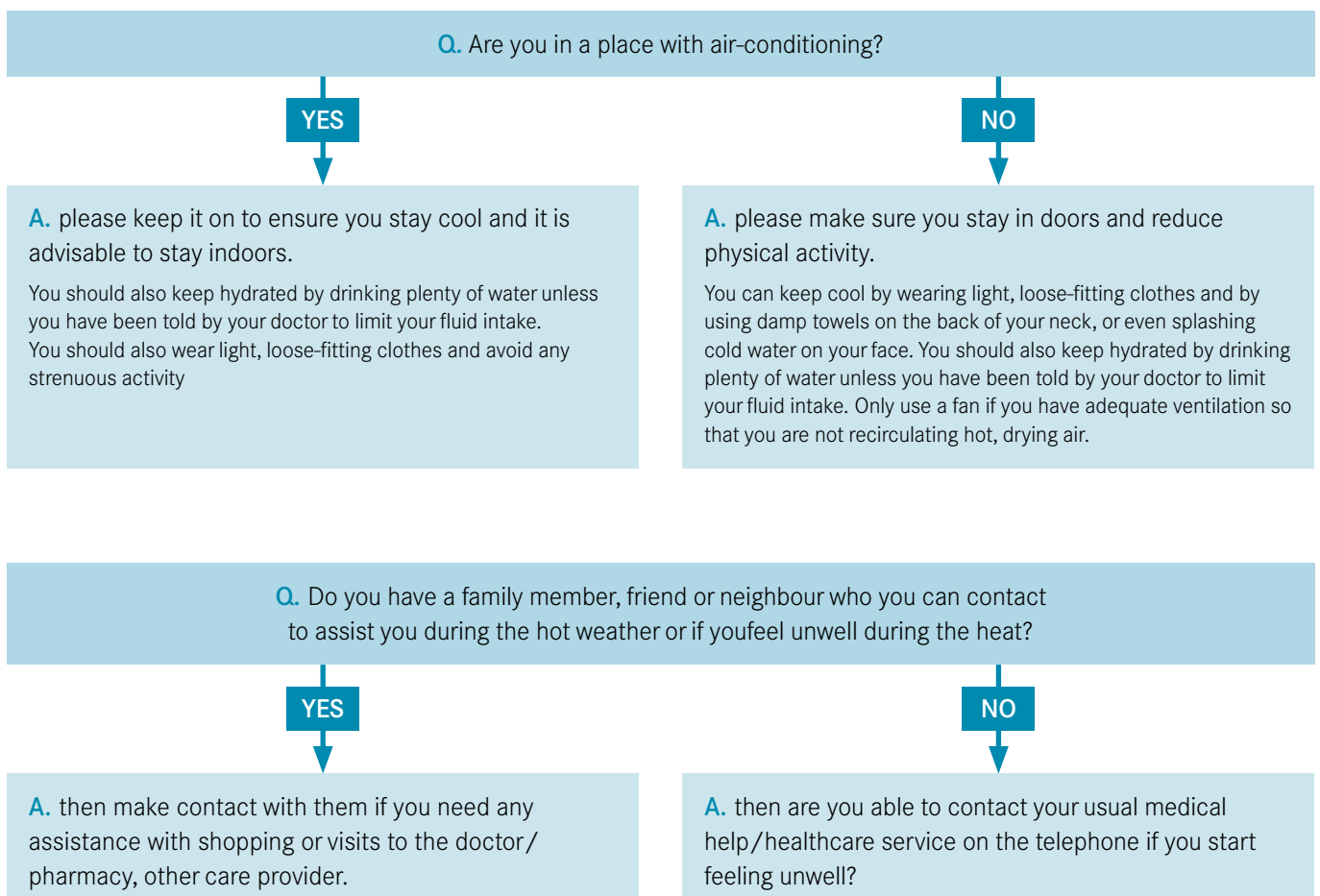


8.5 Telephone script for service providers

Information regarding heatwave events as they approach and as they occur will be promoted through mainstream media and through a range of health and community organisations.

These scripts have been prepared for use by service providers or call centres who are talking to people at risk of heat-related illness during a heatwave event or period of extreme heat.

Messages and information contained in the department heatwave resources can be used in the days prior to a heatwave if service providers have a prevention program in place.



Note: if an individual/caller expresses any concern for their welfare during a call implement your standard emergency protocols.

9 Appendices

9.1 Media releases

'Keeping in Touch' media release

New Supports for Vulnerable Older Victorians

Friday, 20 November 2009

More than 7,000 older Victorian public housing tenants living alone will be eligible for wellbeing checks to help them cope with this summer's heat, Minister for Housing Richard Wynne announced today.

Mr Wynne said the new Keeping in Touch—public housing contact service was developed by the Brumby Labour Government for tenants aged 75 and older as part of its commitment to supporting Victoria's most vulnerable residents.

"We know that as people get older there is a need to maintain regular contact to ensure that they are healthy and safe," Mr Wynne said.

"That's why I'm pleased to announce we are taking action with the statewide roll out of this service, which is a practical way to keep in contact with our older residents, many who live alone and are aged 75 years and older. This is particularly important during the hotter summer months."

The Office of Housing will contact eligible tenants to ask if they would like to be a part of the program, which includes weekly phone calls from a Department of Human Services support worker.

Mr Wynne said residents could also sign up to the service at any time by phoning an information line to register.

"Then, during the weekly calls, support workers will ask about the tenant's health and wellbeing. If a resident does not answer the phone after a number of attempts, their next of kin, or their local housing office will be notified to make an urgent visit," Mr Wynne said.

He said the Keeping in Touch program had been running as a pilot across public housing in Melbourne's northern and western suburbs since April this year, with positive results.

"The feedback we have received from our tenants during this pilot has been very encouraging; with tenants indicating the new service is much appreciated," Mr Wynne said.

This program is in addition to the Government-funded network of 11 Older Person Support Workers who are engaged to support and actively monitor the health of residents in high rise public housing.

Mr Wynne said that on top of the wellbeing checks, a program to keep public housing tenants informed about how they can beat the heat would start next month.

"All public housing residents will receive a leaflet and fridge magnet, providing practical advice about how to keep cool and the warning signs of heat exhaustion. Posters will also be displayed on major housing areas," Mr Wynne said.

Public housing residents who are aged 75 years and over and living alone who are interested in registering for the Keeping in Touch program can call 1800 269 250 between 9am–5pm Monday to Friday.



Home and community care funding media release

Isolated Victorians helped to be fire ready

From the Minister for Community Services

Monday, 23 November 2009

Isolated and vulnerable Victorians will receive extra help with emergency planning and heatwave preparation ahead of the fire season.

Minister for Community Services Lisa Neville today announced \$1.25 million in grants to councils or other community based agencies to support frail people, older people and those with disabilities to develop personal emergency plans.

Ms Neville also announced the location of the 23 new and seven existing Community Registers that will receive assistance through \$1 million funding announced earlier this year.

“We understand Victorians are concerned about the welfare of the most isolated members of our community, particularly during heatwaves and days of catastrophic fire days,” Ms Neville said.

“This new funding will enable people who receive support from the Home and Community Care program to access extra assistance to prepare for the upcoming fire season.

“It is about helping them connect with family, neighbours or friends in their community who can offer support before or during an emergency.

“This may include helping them prepare to leave their property in the event of a fire, or having Council workers draw blinds, ensure there is water in the fridge or making their home more comfortable on very hot days.”

Ms Neville also urged Victorians to keep a close look out for vulnerable people living in their community this summer.

“We all need to make sure vulnerable seniors and people who may be isolated due to a disability in our community are safe and secure,” Ms Neville said.

“That is why we also provided \$1 million towards new and expanded Community Registers.

“Community Registers enable vulnerable Victorians, including older people or people with a disability who live alone, to receive important information about local conditions and safety issues through regular mail outs, newsletters or telephone calls.

“They are run by community volunteers out of local police stations or other nearby locations including council offices, with local police support.

“During a heatwave, Registers can be used to check on the welfare of people prone to heat stress.”

Ms Neville said Community Register funding was still available and the Government would continue to work with Victorian Police to establish registers at suitable sites,” Ms Neville said.

“I would encourage anyone interested in volunteering or assisting in setting up a community register in their area with the local police to contact the Office of Senior Victorians for more information.

“Community Registers will play an important role, but it is also vital that we keep an eye on our family, friends and neighbours by regularly checking on them in times of extreme weather.”

Ms Neville urged anyone concerned about their own welfare, or the welfare of a neighbour or friend, to contact Nurse-on-Call on 1300 60 60 24 or 000 in an emergency.

The new Community Registers, previously called Seniors Registers, will boost the total numbers across Victoria from 22 to 45—more than double the number in operation last year.

For more information about where the closest community register is or how to set up a new community register, please contact the Office for Senior Victorians on 9208 3874 or email enquiries@seniors.vic.gov.au

9.2 Victorian Heatwave Strategy

Victorian Heatwave Strategy

Department of Health, Public Health Branch, October 2007

Background:

Climate change is expected to increase the frequency and intensity of heatwaves in Victoria. Heatwaves are known to be the cause of excess deaths and illness as evidenced during heatwaves elsewhere in the world.

Climate change models include a large range of uncertainty related to unknown factors such as future emissions, demographic changes and technological advances.

By 2030, Melbourne's climate is likely to have warmed by 1°C with an annual rainfall of 10 to 15 per cent less, creating a climate similar to Adelaide's present day climate. Forecasts into 2070 are available and predict warming between 1 and 3°C.

Melbourne currently has an annual average of nine days in which the temperature exceeds 35°C. The latest climate change predictions forecast that this may increase to 11–13 days by 2030 and 12–26 days by 2070. In a region of more extreme temperatures such as Mildura that currently experiences an annual average of 32 days that exceed 35°C, the increase is forecast to be 36 to 43 days by 2030 and 39 to 76 days by 2070.

A prolonged heatwave in Western Europe during 2003 resulted in an estimated 35,000 excess deaths due to heat, mainly among older people. In Melbourne, it has been estimated that heat may contribute to almost 300 deaths per year amongst people aged 65 years and above. Given various climate change scenarios and population changes, heat-related mortality may increase four-fold by 2050.

The Bureau of Meteorology defines a heatwave as a period of excessively hot and uncomfortable weather that adversely affects human health. The threshold conditions for a heatwave vary around the world based on the demographic structure and acclimatisation of the population, and consequently there is no universally accepted definition. Preliminary research has indicated that a mean daily temperature of 30°C or a minimum overnight temperature in Melbourne of 26°C can result in an increase in mortality in people aged 65 years and over.

The World Health Organisation advises that during a heatwave episode body temperature increases in response to the environment and metabolism. This additional heat load must be dissipated to maintain a body temperature of 37°C, a process known as thermoregulation. Older people

and those chronically ill may have an impaired capacity for normal thermoregulation and therefore an impaired capacity to adapt to extremes of heat.

Heat-related illness can include heatstroke, heat exhaustion, fainting, cramps and dehydration. These conditions only account for a minority of the health impact of heat waves with mortality primarily due to cardiovascular, cerebrovascular and respiratory disease.

While anyone is at risk from heat-related illness some people are at greater risk than others. They include:

- people over 65 years of age
- infants
- people with pre-existing medical conditions, particularly cardiovascular, respiratory or renal diseases
- people who are socially isolated or who cannot care for themselves
- people who are dehydrated or overexert in hot temperatures
- people who are overweight or have low fitness
- people who live in certain types of buildings and are unable to cool themselves
- people of lower socio-economic status
- people taking certain medications
- people who work outdoors or in buildings with little or no protection from external weather conditions.

The impact of heatwaves is also more pronounced in cities due to the 'urban heat island effect' and a greater number of vulnerable people. Heatwaves tend to produce more severe impacts in the early summer season, as short-term acclimatisation increases the population's ability to cope with heat later in the season.

The World Health Organisation considers that heat-related morbidity and mortality are preventable conditions, and supports the introduction of heatwave plans to reduce these impacts. Internationally, heatwave plans have been developed and introduced in Europe and North America have proven to be an effective public health response to extreme heat. Heatwave plans generally involve a variety of community-based interventions that are initiated when heatwave conditions are forecast. These interventions can range from the provision of advice about heat and health, guidance for health, social and community care workers to increased contact and assessment of vulnerable people in home and institutional settings.

Objectives:

1. To provide a framework to support an on-going multi-agency and multi-sectoral heatwave preparedness and response across Victoria in order to minimise heat related morbidity and mortality.
2. To build the capacity of communities and individuals to self manage their response to heatwaves.
3. To identify and carry out required additional research to support these objectives in the longer term.

Rationale:

Municipal councils are the closest level of government to communities and have access to local knowledge about the demographic, social and human service features of their districts. People naturally seek help from their local council during emergencies and the ensuing recovery process. This was recognised in the *Our environment our future: Sustainability Action Statement 2006* in the priority identifying the need to respond to heatwave and develop a Victorian Heatwave plan involving communities and local government.

Heatwave is an extreme event that creates risks to public health and can result in medical emergency requiring responses from the health and emergency services sector. The aim of this strategy is to create a supportive environment and ensure people are adequately informed about heatwave, the possible health impacts and the actions they can take while caring for themselves and others in order to reduce the impact of heat related symptoms and the need for emergency responses.

Planning to achieve this outcome will require an integrated and multi-dimensional approach, such as those currently being utilised by councils in Victoria. Planning for, and management of emergencies in Victoria includes preparedness, awareness, mitigation, response and recovery. The *Environments for Health Planning Framework* encompasses the built, social, economic and natural environments.

The following service features and collaborations of local government, supported by legislated requirements, make this sector an ideal domain in which to develop community responses to heatwave events.

- Municipal councils manage the majority of community-based services—home and community care (HACC), meals-on-wheels maternal and child health. Through these services, municipal employees have links with many of the community members who are vulnerable to the impact of heatwave such as older people, the isolated and very young children.

- Municipal councils have legislated planning requirements including the Municipal Public Health Plan (section 29B of the *Health Act 1958*) and the Municipal Emergency Management Plan (section 20 of the *Emergency Management Act 1986*)
- Municipal councils utilise structured, tested planning frameworks to undertake planning activities in the areas of health and emergency management (*Environments for Health—Municipal Public Health Planning Framework, Municipal Public Health Emergency Management Guidelines, Emergency Management Manual Victoria, Part 6 Guidelines for Municipal Emergency Management Planning*).
- Municipal councils currently participate in collaborations such as Greenhouse Alliances, Primary Care Partnerships and in some cases produce joint plans such as Municipal Public Health Plans.

The role of municipal councils will be defined throughout the course of the proposed pilot projects. The success of the project will rely on the strengths of councils, including the wealth of knowledge relating to the demographics of their communities and awareness of the vulnerable sections of their communities and their level of governance. They also have existing systems and communication channels that will facilitate the transfer of information and notifications that will trigger a heatwave alert system broadly into the community and the facilities that house vulnerable parts of the population.



The other important factor will be the role of key stakeholders including general practitioners, the community health sector, the metropolitan and rural ambulance services, the aged care sector and carers, who have a key role in supporting the vulnerable in their homes and residences. A process of engaging with these important groups is underway.

Collectively, these factors will enable councils and communities to be ready for those times during a heatwave event when the community needs effective responses and support.

Implementation Arrangements:

The implementation of this plan is one of several projects being conducted under the Human Health and Climate Change Project.

The project will be managed by a project manager reporting to an implementation committee consisting of representatives of the department's Public Health Branch, Emergency Management Branch and Regional Offices, the Department of Sustainability and Environment, the Bureau of Meteorology and Local Government. This committee will report to the departments' Human Health and Climate Change Project Steering Committee.

Funding:

Funding for the implementation of the Victorian Heatwave Emergency Plan has been provided to the Public Health Branch under the *Our environment our future sustainability action statement 2006*. A total of \$2.927 million has been allocated to this project over the 2006–7, 2007–8, 2008–9, 2009–10 financial years.

Action 1: Better understand the impacts of heatwaves on mortality and morbidity

A strong understanding of the impacts of heatwaves on mortality and morbidity in Victoria is fundamental to the design of public health strategies to manage these impacts into the future. As a research priority of the Climate Change and Human Health Project, the department is continuing to commission research to better understand the current issues around heat and health in Victoria and how they may change in the future. Work completed to date includes the development of a pilot heat/health surveillance system to monitor heat-related morbidity in the Melbourne metropolitan area, and the analysis of the temperature/mortality relationship in Melbourne to establish a heat alert threshold for the heatwave warning system. Current

and future research includes an assessment of the skills and knowledge of medical practitioners and carers when managing older people during extreme heat events, a spatial vulnerability analysis of Melbourne communities to identify populations most at risk of experiencing heat impacts and the development of heat alert thresholds for regional Victoria.

Action 2: Develop a heatwave warning system

A heatwave warning system issues an alert when heat events are forecast which are likely to impact on health. These alerts can initiate timely public health interventions such as the provision of public information and the activation of heatwave response plans at a municipal level. The alert thresholds are based on the local relationship between the thermal environment and health and thus would be expected to vary across different locations to reflect differences in local climate (temperature and humidity), demographic and health characteristics, the built environment and health and community services.

The department is working with the Bureau of Meteorology to develop a national heatwave warning service to provide a basis for heatwave warnings in all States and Territories including metropolitan and regional Victoria. This service will operate in a similar manner to the existing Bureau weather alert system, and alerts will be disseminated to the media, local governments, emergency and health services. While the national service is in development, the department will operate an informal heatwave warning system during the 2007–2008 summer and issue alerts to local governments.

Action 3: Pilot development of local heat wave response plans

A maximum of ten (10) pilot projects will be funded to develop innovative local response plans to heatwave conditions focussing on the vulnerable members of the community by December 2007.

Councils participating in the pilot projects will be expected to:

- utilise an existing municipal plan to develop responses to a heatwave alert or warning system
- identify any partnership platforms involved in their planning processes
- identify service sectors and key stakeholders who will participate in the responses

- participate in community awareness raising strategies
- identify communication strategies to communicate with vulnerable populations and/or their carers
- identify critical community resources.

Funding mechanism

An invited submission process will be undertaken to identify municipal councils who wish to participate in the pilot project. Departmental Funding and Service Agreements will be used to fund the selected projects.

Action 4: Develop a guide to local heatwave response plans

A consultant/organisation will be contracted to synthesise a standard toolkit/framework and accompanying guide to support all Municipal Councils to implement heatwave planning.

Funding mechanism

A Request for Tender will be undertaken to appoint a consultant/organisation. This will require an advertised submission, a selection process and a departmental contract as the purchasing tool.

Actions 5: Fund development of local heatwave response plans

Funding and support for the remaining 69 Municipal Councils in the 2008/9 and 2009/10 years to implement the development of local heatwave response plans.

Councils will be provided with the standardised toolkit/framework and guidance to facilitate the implementation of heatwave planning.

Funding mechanism

This phase of the strategy involves new funding to all agencies in the sector, and can be distributed using direct allocation and the Departmental Funding and Service Agreement.

Actions 6: Evaluation of implementation of Victorian Heatwave Strategy

A consultant/organisation will be contracted to evaluate knowledge of the Victorian Heatwave Strategy by stakeholders to determine how effectively the template/framework has been implemented in Victoria.

Funding mechanism

A Request for Tender will be undertaken to appoint a consultant/organisation. This will require an advertised submission, a selection process and a departmental contract as the purchasing tool.

Action 7: Host a major conference into the health effects of climate change during the second half of 2007 featuring the impacts of heatwaves

This will be a major conference bringing together local, national and international speakers to showcase research and discuss the health impacts of climate change including heat waves and heat stress.

Action 8: Work with emergency services organisations and other agencies to raise their awareness about the potential of heatwaves to cause significant community impacts

Heatwaves are not yet widely recognised in Australia as having the potential to cause widespread community impacts. We will work with other emergency services organisations through provision of briefings and planning to increase the awareness of heatwaves including the potential of amending the Emergency Manual Victoria to include heatwaves in the definition of emergency. We will also work with other community support agencies to increase their awareness of the potential impacts on their clients and their services.

Action 9: Provide community messages about heatwaves and health

We will develop additional information resources to inform the community and health care professionals about the actions that they can take at a personal and neighbourhood level to mitigate against the effects of extended heatwaves on health. This will include information sheets and messages to be distributed when extended periods of heat are predicted based on the heatwave warning system.

9.3 Summer preparedness kit: Health and Community Services

Days of extreme fire danger usually coincide with heatwaves or extreme temperatures. In addition to fire preparedness, the community needs to develop strategies to care for themselves and their families in the heat.

Information on how to prepare for the 2009–10 summer has been jointly prepared by the Department of Human Services and Department of Health by the Emergency Management Branch.

Health and Human Services Emergency Management

Preparing for the 2009-10 summer season—clients and services

The Department of Human Services and the Department of Health are preparing for potential emergency situations in the next summer season. These may occur as a result of bushfires and/or extreme weather events.

Both departments are keen to work closely with our partners in the community sector to prepare for the next fire season and potential impacts on our services, clients and staff.

Emergency preparedness is important for all our services and clients, but particularly for those who are most vulnerable, including children, older people, and people with a disability.

There is increased attention being focused on emergency preparedness for the forthcoming summer months. There are predictions of high temperatures and fire risk potential in Victoria.

There are 52 areas in Victoria that have been specifically identified as high risk for bushfires, but other areas may be equally affected. This means that all organisations need to be prepared.

It will be particularly important to be prepared well in advance when days with a fire danger rating of 'catastrophic/code red' are forecast, but your bushfire preparedness planning should cover the whole fire season.

In preparing advice and resource materials for our own services and sector organisations, both departments are considering carefully the nature of the facilities, the clients and the services provided, and the links to broader state-wide and local emergency planning arrangements.

Specific materials are being prepared for each service type and client group, to feed into emergency planning being undertaken at a regional, municipal and individual organisational level.

- Some information, prepared for residential aged care providers, HACC providers, community disability service providers and people with a disability, is included in this kit. More materials relating to these services and clients will be provided in coming weeks.
- Materials will also be available in coming weeks relating to public and community housing, homelessness support services, out of home care services for children and young people, youth justice custodial facilities, mental health and drug services, community health services and hospitals.

If you would like to receive this publication in an accessible format please email preparedness@dhs.vic.gov.au
This document is also available in pdf format at www.health.vic.gov.au/bushfire

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PREPARE. ACT. SURVIVE.
FireReady 

9.4 Heatwave Planning in Australia and overseas

Although heatwaves do not cause the same physical damage as other extreme weather events such as floods or storms, the death toll that often accompanies a heatwave is generally substantially higher.

The need to respond to heatwaves has resulted in the emergence of dedicated heatwave plans. Such plans usually include a series of activities that are put into effect in the time leading up to and during a heatwave. Heatwave planning is evolving as the impact of extreme heat is better understood.

Australian experience

Heatwave planning has only just begun in recent years in most Australian States and Territories, with most activity outside Victoria to date being in Queensland and New South Wales. Both states have a two-tiered alert system, although they are quite different in scope and detail.

The heatwave response planning framework developed in Queensland focuses on emergency services. The *Queensland Heatwave Response Plan* comes under Queensland Health, which coordinates multiple agency responses and provides communication strategies to inform health care professionals, carers and the community.

The plan focuses on working with the media to provide information to the general public, having designated roles for ambulance and other emergency services and encouraging utility agencies not to terminate services to anyone during a heatwave.

In the Central Coast area of New South Wales, a pilot project was conducted in 2007. The resultant *New South Wales Central Coast Pilot Plan* promotes prevention strategies. Once activated, the plan details media activity to provide heatwave information to the general public. The Division of General Practice is also advised, with the aim that general practitioners will then distribute heatwave pamphlets and information to their patients.

International experience

United States of America

Heatwaves in the United States in 1980 were reportedly responsible for an estimated 1700 heat-related deaths¹⁰, while more than 80,000 additional deaths¹¹ occurred during the European heatwave of 2003.

An article titled *Municipal Heatwave Response Plans*, published in the American Journal of Public Health reported in 2003 that ‘while municipalities must be prepared for heatwaves, many at-risk cities had minimal or no heatwave response plans’. In more recent years this has improved, with more cities or states conducting heatwave planning.

Examples include:

- Extreme Weather Operations Plan—Chicago, Illinois
- Southwest Ohio Heat Watch/Warning System—Dayton, Ohio
- Contingency Plan for Excessive Heat Emergencies—California
- Hot Weather Health Watch/Warning System—Philadelphia, Pennsylvania
- Plan for Excessive Heat Conditions 2007—Milwaukee, Wisconsin.

10 Centres for Disease Control Prevention, 2003

11 European Commission, 2003

Heatwave plan elements

Each includes heat alert systems combined with planning and raising community awareness of heatwave hazards and strategies to respond to heatwaves.

Activities undertaken ahead of a heatwave include:

- promoting ‘buddying’ systems
- coordinating service providers
- preparing cooling centres
- educating health professionals
- identifying vulnerable individuals
- targeting agencies (such as nursing homes) with large numbers of vulnerable individuals
- disseminating information
- working with the media
- checking building standards.

During a heatwave, strategies include:

- activating the ‘heatline’ telephone service
- opening cooling centres
- relocating people, if necessary
- extending service delivery and opening hours of services and facilities
- maintaining daily contact with certain people on a register
- managing utilities to ensure power, gas and water supplies
- delivering support to vulnerable individuals, including homeless people
- disseminating information
- increasing the number of medical and emergency service personnel on duty
- rescheduling outdoor events
- deploying extra tow trucks to help motorists in difficulty
- communicating with service providers.

Canada

In Toronto, Ontario, the *Hot Weather Response Plan* incorporates a two-tiered system of heat alert and extreme heat alert strategies.

In addition to the strategies in common with those detailed in the U.S. examples, the Toronto plan also includes the following:

- providing boarding homes with ‘Hot Weather Protection Plan’ packages
- checking drinking water fountains
- planning roles of different response agencies
- following up reviews and reports of heatwaves from the previous summer
- providing transport to cooling centres
- ceasing any disconnections of utilities to those who have not paid accounts
- providing hot weather safety messages for pet owners.

England

Active heatwave planning occurs at a national level in England. A *Heatwave Plan for England—Protecting Health and Reducing Harm from Extreme Heat and Heatwaves* sets out what will happen before and during a severe heatwave.

The core elements of the plan are:

- A Heat-Health Watch system based on Met Office forecasts operates during the summer months and triggers levels of response from the Department of Health and other bodies.
- Advice and information are issued by the Department of Health directly to the public and to health and social care professionals—particularly those working with vulnerable population groups.
- Hospitals and nursing homes provide cool areas and monitor indoor temperatures to reduce the risk of heat-related illness and death in vulnerable populations.
- Extra help may be available from health and social care services, the voluntary sector, families and others to care for those most vulnerable. This is determined locally and based on existing relationships between statutory and voluntary bodies.

- The media provides advice to people quickly, both before and during a heatwave.
- Long-term, multi-agency planning to adapt to and reduce the impact of climate change; this includes greening the built environment increasing energy efficiency and improving shading around and insulation of buildings.

World Health Organisation

The World Health Organisation recommends a set of general principles and core elements of Heat-Health Action Plans that can inform the dimensions of heatwave prevention, preparation, response and recovery.

The core elements of heat-health action plans include:

- agreement on a lead body
- accurate and timely alert systems
- a heat-related health information plan
- a reduction in indoor heat exposure
- particular care for vulnerable population groups
- preparedness of the health and social care system
- long-term urban planning
- real-time surveillance and evaluation.

The World Health Organisation has also published a resource: *Improving public health responses to extreme weather/heatwaves—EuroHEAT*.

The document is available at www.euro.who.int/Document/E92474.pdf



9.5 Preparing a heatwave plan

In July 2009, the Department of Health developed the *Heatwave Planning Guide*. The guide provides local councils and community organisations with a framework that can be used to develop heatwave plans and support their local community during heatwaves.

The material is based on the experiences of the local councils involved in the 13 pilot projects as well as international experience. The guide provides councils and community organisations with templates, strategies and background information with an emphasis on identifying and protecting vulnerable population groups.

The guide incorporates the principles used by existing municipal planning frameworks such as the *Environments for Health Planning Framework*. This approach has been adopted in order to align heatwave planning requirements with existing municipal planning processes such as the Municipal Public Health Plan and the Municipal Emergency Management Plan.

The guide draws on the experience of 13 pilot projects funded by the Department of Human Services in 2008 and involving 22 local councils to undertake the development of a heatwave plan that could be implemented into existing municipal plans. It is further supported by the experience of the January 2009 heatwave as well as international and national experience in heatwave planning.

Heatwave planning includes:

- identifying vulnerable population groups and the risks they face
- identifying and agreeing on effective strategies, agency coordination and response planning to address those risks
- implementing and activating the plan
- evaluating and updating the plan regularly.

Table 11: Desirable position at the end of the implementation phase of the planning cycle

Action area	Outcome
Raising awareness and capacity to manage heatwave events	<ul style="list-style-type: none"> • All business units within council are aware of heatwaves as an issue and the council heatwave plan. • Capacity of the community and the council to prepare for and respond appropriately before, during and after a heatwave has been optimised. • A risk assessment of the proposed actions is conducted.
Determining appropriate actions	<ul style="list-style-type: none"> • Actions to address risks to vulnerable population groups before and during heatwaves are identified and implemented. • Long-term planning actions are identified and implemented.
Integration of council plans and strategies	<ul style="list-style-type: none"> • The heatwave plan is written. • Heatwaves are recognised in the Council Plan, Municipal Public Health Plan and Municipal Emergency Management Plan. • Council heatwave plan is integrated into other council plans, strategies and policies—and vice versa.
High-level commitment and adoption of the heatwave plan	<ul style="list-style-type: none"> • Senior management recognise and support inclusion of heatwave in high-order council plans. • Senior management and elected members actively participate in the implementation of the heatwave plan. • Council adopt the heatwave plan and follow through on the actions and activities contained in the plan.

The *Heatwave Planning Guide* can be found on the department's website at <http://www.health.vic.gov.au/environment/downloads/planning-guide.pdf>

9.6 References

- Abrahamson, V, Wolf, J, Lorenzoni, I, Fenn, B, Kovats, S, Wilkinson, P, Adger, W.N, Raine, R 2009. 'Perceptions of heatwave risks to health: interview-based study of older people in London and Norwich' *Journal of Public Health*, vol. 31, no.1, pp 119–126. <<http://jpubhealth.oxfordjournals.org/cgi/reprint/31/1/119>>.
- Centres for Disease Control Prevention 1993, 'Heat-related deaths—United States 1993' *Morbidity and Mortality Report*, vol. 42, no. 28, pp. 558–560. CDC, Atlanta, Georgia.
- Coutts, A.M, Beringer, J, Tapper, N.J 2009, 'Changing Urban Climate and CO2 Emissions: Implications for the Development of Policies for Sustainable Cities', *Urban Policy and Research (in press)*, Routledge, Taylor and Francis Group. Copyright © 2009 Editorial Board, Urban Policy and Research.
- Department of Human Services 2006, *Climate Change: Health Impacts of Heat in Victoria*, Melbourne.
- Department of Human Services 2008, Heatwave pilot projects, Melbourne. <http://www.health.vic.gov.au/environment/downloads/heatwave_pilot_projects.pdf>.
- Department of Human Services 2009, *Heatwave Planning Guide: development of heatwave plans in local councils in Victoria*, Melbourne <www.health.vic.gov.au/environment/climate/heatwave.htm>.
- Department of Human Services 2009, *The Victorian Experience*, <http://www.health.vic.gov.au/environment/downloads/pres_john_carnie.pdf>.
- Department of Sustainability and Environment 2006, *Our Environment, Our Future Sustainability Action Statement 2006*, Melbourne, <<http://www.dse.vic.gov.au/ourenvironment-ourfuture/>>.
- European Commission 2003, 'Report on excess mortality in Europe during summer 2003', *2003 Heatwave Project, La Canicule de 2003 en Europe*, European Commission.
- Frumkin, H, McMichael, A.J 2008, *Climate change and public health: thinking, communicating, acting*, American Journal of Preventative Medicine vol. 35 no. 5 pp. 403–410. <<http://www.bvsde.paho.org/bvsacd/cd68/HFrumkin.pdf>>.
- Health Canada 2009, 'Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity', Change and Health Office, Safe Environment Directorate <www.hc-sc.gc.ca/ewh-semt/climat/eval/index-eng.php>.
- Ibrahim, J, McInnes, J 2008, *Reducing Harm to older persons in Victoria from extreme hot weather*, Monash University for Department of Human Services Victoria, Melbourne <http://www.health.vic.gov.au/environment/downloads/reducing_harm_monash.pdf>.
- Loughnan, M 2009, *The Importance of 'Place': Victorian Climate Change Adaptation Program*, Monash University, <<http://www.health.vic.gov.au/environment/downloads/loughnan.pdf>>.
- Loughnan, M, Nicholls, N and Tapper, N 2009, *Temperature thresholds associated with increased mortality in ten major population centres in rural Victoria*, Australia, Monash University for the Department of Human Services, Melbourne.
- Loughnan, M, Nicholls, N and Tapper, N 2009, *Hot Spots Project: A spatial vulnerability analysis of urban populations to extreme heat events*, Monash University for Department of Human Services, Melbourne (unpublished).
- McGregor, G 2009, *Heatwaves: Causes, Consequences and Responses*, University of Auckland, <http://www.health.vic.gov.au/environment/downloads/mcgregor_presentation.pdf>.
- Morris, C.J.G, Simmonds, I 2000, 'Associations between varying magnitudes of the urban heat island and the synoptic climatology in Melbourne, Australia', *International Journal of Climatology*, vol. 20, issue 15, pp.1931–1954.
- Nicholls, N, Skinner, C, Loughnan, M, and Tapper, N 2008, 'A simple heat alert for Melbourne, Australia', *International Journal of Biometeorology*, vol. 52, pp. 375–384.
- Office of the Chief Health Officer 2009, *January 2009 Heatwave in Victoria: an Assessment of Health Impacts*, Department of Health, Melbourne, <http://www.health.vic.gov.au/chiefhealthofficer/downloads/heat_impact_rpt.pdf>.

U.S Department of Commerce National Oceanic and Atmospheric Administration 2007, *County of Fresno: Heat Emergency Contingency Plan*, <http://www.co.fresno.ca.us/uploadedFiles/Departments/Public_Health/Divisions/PPC/content/Articles/content/Heat_Health_and_Safety/Fresno%20County%20Heat%20Emergency%20Contingency%20Plan%20-%20Combined.pdf>.

Woodward, A 2009, *Climate Change—how can we turn threat into an opportunity for better health*, University of Auckland, <http://www.health.vic.gov.au/environment/downloads/woodward_presentation.pdf>.

World Health Organisation 2009, *Improving public health responses to extreme weather/heat-waves—EuroHEAT, Copenhagen*. <http://www.euro.who.int/__data/assets/pdf_file/0010/95914/E92474.pdf>.

