

Preparation of residential aged care services for extreme hot weather in Victoria, Australia

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Abstract

Objectives. The purpose of this study was to describe preparations for extreme hot weather at Victorian public sector residential aged care services for the 2010–11 summer, and to examine the role of the *Residential Aged Care Services Heatwave Ready Resource* in this process.

Method. Qualitative data was collected through semi-structured interviews of senior staff of Victorian public sector residential aged care services. Interviews were conducted at monthly intervals from November 2010 to March 2011, and data were analysed thematically.

Results. All interviewees described pre-summer preparations for hot weather undertaken at the health services they represented. Staff awareness and experience, and having a heatwave plan, were reported to have facilitated heat preparedness, whereas challenges to preparations mainly concerned air conditioning. The *Residential Aged Care Services Heatwave Ready Resource* was used to inform heatwave plans, for staff and family education, and as an audit tool.

Conclusions. An extensive and well-considered approach to minimisation of harm from extreme heat by a sample of residential aged care services is described, and the *Residential Aged Care Services Heatwave Ready Resource* is reported to have supported the heatwave preparedness process.

What is known about the topic? Heatwaves cause illness and death and are likely to become more frequent and severe in the future. Residents of aged care services are particularly vulnerable to harm from heatwaves. The *Residential Aged Care Services Heatwave Ready Resource* has been developed to support staff of residential aged care services in Victoria to prepare for heatwaves.

What does this paper add? This exploratory study provides insight into the types of preparations for extreme hot weather that are undertaken at Victorian residential aged care services before and during summer.

What are the implications for practitioners? A combination of staff knowledge and experience, and having a heatwave plan, supported by a publication that includes educational resources and a checklist is reported to facilitate the preparedness of Victorian residential aged care services for extreme hot weather.

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Introduction

Episodes of extreme hot weather, also referred to as ‘heatwaves’, are known to cause illness and death.^{1,2} This was clearly illustrated when unprecedented heatwaves across Western Europe during the summer of 2003 led to between 50 000 and 70 000 excess deaths.^{3,4} In Australia, heatwaves are estimated to have caused more than 4000 deaths over the past 200 years, twice that due to either floods or cyclones.⁵ Exposure to this hazard is likely to increase in the future as a consequence of global warming; climate-model projections indicate a rise in average temperatures across south-eastern Australia of up to 1.5°C by 2030 if climate scenarios are within the range of those considered by the Intergovernmental Panel on Climate Change,

and heatwaves are very likely to become more frequent, intense and longer lasting.^{6–8}

During late January to early February 2009 an exceptionally severe heatwave occurred across south-eastern Australia, with record high temperatures experienced over 87% of the state of Victoria, including a peak of 48.8°C (119.8°F) in the north-west town of Hopetoun.⁹ During the first week of this heatwave an estimated 374 excess deaths occurred in Victoria, with most deaths occurring among those aged 75 years or over.¹⁰ The event was characterised by a substantial increase in health service demand, prolonged disruptions to electricity supplies and public transport systems and, in its final days, catastrophic bush fires that claimed another 173 lives.^{10–12}

The health burden of extreme heat events is consistently observed to fall predominantly on older people.^{2,13} A combination of factors contribute to this vulnerability, including age-related changes in the physiological capacity for thermoregulation¹⁴ and alterations to the sensation of thirst and thirst satiation.¹⁵ Other known risk factors for death during heatwaves are also found more commonly among this age group, including chronic illness,¹⁶ use of certain medications, social isolation,¹⁷ lower socioeconomic circumstances,¹⁸ confinement to bed, reduced mobility, cognitive decline and dependence on others for care. Studies of heatwaves in Germany,¹⁹ the Netherlands,²⁰ Italy²¹ and France² have identified residents of nursing homes as a vulnerable sub-group of the older population. More than 400 excess deaths occurred among nursing home residents in Germany during the 2003 heatwave, with greatest susceptibility observed for residents aged over 90 years with the highest care needs.¹⁹

In Australia, nursing homes, termed 'residential aged care services' (RACS), provide care for older people who can no longer live at home due to the effects of ageing, illness or disability.²² Seven out of 10 permanent residents of Australian RACS have high-level care needs, and more than half are aged over 85 years.²³ In Victoria around 800 RACS provide care for up to 43 000 residents. One-quarter of Victorian RACS are public sector services operated by the State Government Department of Health.^{23,24}

Heatwaves are sudden events and their impact is swift, with most deaths occurring on the same day or within 1–4 days of heat exposure.^{1,25,26} Strategies to minimise harm must therefore include pre-summer planning, education of health professionals and carers, and targeted support of vulnerable groups.²⁷ After the severe 2009 heatwave the Victorian Department of Health commissioned a written publication to assist staff of RACS to prepare for extreme hot weather. This publication, the *Residential Aged Care Services Heatwave Ready Resource* (the 'Resource'), is a practical manual in plain-language style that includes information about heatwave planning and the impact of extreme heat on health, educational resources for staff, residents and families, and a heat-preparedness checklist.²⁸ The publication was distributed to all RACS in Victoria before the 2010–11 summer.

The aim of the present study is to describe preparations for extreme hot weather made at Victorian public sector RACS before and during the 2010–11 summer, and to examine the role of the *Resource* in this process.

Method

Approach

Qualitative data about preparations for the 2010–11 summer at Victorian public sector RACS were collected through a series of semi-structured interviews with senior staff of a sample of Victorian Health Services. This approach was chosen to allow a 'real-time' view of practices and events as they unfolded, and to provide interviewees with the opportunity to describe experiences and perceptions in detail, as well as the flexibility to discuss issues not initially anticipated.²⁹

Interviewee recruitment

Interviewees were recruited from a group of senior nursing and managerial staff of Victorian public sector RACS who had participated in a working group that reviewed the *Resource* at an early draft stage. Members of this working group had been invited to review the draft on the basis of their representativeness of the Victorian Aged Care sector. Potential interviewees were invited to participate in the current study after written permission had been received to do so from the Chief Executive Officer of the Health Service with whom they were employed.

Semi-structured interviews

Four rounds of semi-structured interviews were conducted from late November 2010 to early March 2011, at ~4-week intervals. Interviews were based on closed and open-ended questions predetermined by both researchers, and communicated to study participants before each interview. Questions were designed to gather information about interviewees and the RACS where they were employed, preparations for hot weather before and during the summer season, barriers and facilitators to preparations, and advice for others, as well as access, use and perceived usefulness of the *Resource*. Actions taken during hot weather were explored but are not discussed in this paper. Wording of questions and the order in which they were asked varied according to interview progression, and interviewees were given the opportunity to raise topics or issues they considered relevant but had not been introduced by the interviewer. Attention was paid to avoidance of prompting and clarification of interviewee intention. Interviews were conducted by telephone at pre-arranged times, and lasted up to 30 min each.

Data collection

During interviews, data were recorded as handwritten notes by the interviewer. Following each interview, notes were rewritten in an orderly format and sent to the interviewee for verification of accurate representation of the interview conversation.³⁰ Any identified inaccuracies were corrected to the satisfaction of the interviewee.

Data analysis

Interviewee-verified data were analysed thematically using a framework approach.³¹ Data were collated according to interview, and also across interviews according to interview topic and study objectives, providing a narrative about that topic from each interviewee across the study period. The assembled data were carefully read and re-read by the interviewer, and organised by 'cutting and pasting' into categories based on emerging broad themes and issues. Each category was then scrutinised for sub-themes, which were coded by hand and further sorted. Finally, summary information was collated into chart format to facilitate interpretations that addressed the study aims. At regular meetings the researchers discussed study progress and data interpretation. A summary of findings was externally scrutinised by a Department of Health committee.

Ethics

Approval for this study to proceed was received from Human Research Ethics Committees of Monash University and LaTrobe

University, as well as from the Human Research Ethics Committees of participating Health Services as required. Informed consent was obtained from each interviewee before they participated in their first interview.

Results

Fourteen Health Service campuses, all located in non-metropolitan areas of Victoria, were represented by one interviewee at each of four interviews. Most interviewees were female, senior nursing or managerial staff, aged 45 years or over, who had worked in the aged care sector for more than 10 years. Characteristics of the 23 RACS operated by these 14 health service campuses are provided in Table 1.

Preparations for hot summer weather

Four main themes were evident regarding preparations for hot weather: heatwave plans; early preparation activities; preparations during hot weather forecast periods and innovative ideas.

Heatwave plans

Twelve of 14 health service campuses had written heatwave plans in place at Interview 1. Reasons given for not having a written heatwave plan were staff absences and lack of time.

Activities to promote staff access and understanding of heatwave plans described by 11 interviewees included audits of staff knowledge, distribution of multiple hardcopies throughout facilities, compulsory information sessions, staff meetings and easy to understand computer instructions and ‘desktop’ links to electronic documents.

Early preparation activities

All interviewees described measures undertaken before summer at RACS to prepare for hot weather. Most common preparations were: installation, repair and maintenance of air conditioning units; staff education including monthly meetings, topic-specific seminars and staff newsletters; review of heatwave plans; ensuring several days’ supply of drinks and fluid-rich foods, including those for residents requiring thickened drinks or diabetic cordial; testing the working order of power generators;

Table 1. Physical and level of care characteristics of the residential aged care services discussed by interviewees (n = 23)

Characteristic	Number
Size	
>30 beds	10
≤30 beds	13
Level of care	
High	10
Low	4
Combination of care levels	9
Air conditioning	
Throughout building	15
Common areas, not bedrooms	8
Adjacent to acute-care hospital	
Yes	16
No	7

and preparation of newsletters and pamphlets with heat-health messages for residents and families (Table 2).

Preparations during a hot weather forecast period

The seven interviewees representing health service campuses that had received hot weather warnings discussed preparations during a forecast period. Most commonly staff were informed of the hot weather forecast and reminded of procedures to follow, including offering extra drinks and keeping buildings cool. Checks were made for adequate supplies of drinks and fluid-rich foods, planned resident outings were rescheduled or cancelled, and maintenance staff were asked to check air conditioning systems.

Innovative ideas

Several interviewees discussed innovative ideas for summer preparation, several of which addressed issues specific to RACS locations (Box 1).

Barriers and facilitators

Barriers

Air conditioning was the most frequently discussed challenge to hot weather preparation (n = 11). Old equipment, limited

Table 2. Measures undertaken at residential aged care services to prepare for hot weather before summer

Pre-summer preparations	Number who discussed doing this (n = 14)
Heatwave plans	
Review of emergency plans	7
Review heatwave plan	6
Buildings and facilities	
Air conditioners	12
Power generators	5
Refrigerators	2
Drinking fountains	2
Outside awning blinds	1
Double-glazed windows	1
Outside shade areas	1
Education	
Staff education	10
Newsletters/pamphlets	9
Family meetings	5
Adequate supplies	
Check all supplies	6
Thickened fluids	4
Diabetic cordial	1
Staffing	
Staff roster	1
Staff welfare	1
Staff contact details	1
Residents	
Light summer clothing	3
Hats and sunscreen	1
Completed ‘Resource’ checklist	4

Box 1. Innovative preparations for extreme hot weather described by interviewees

- Provided cooling neck-ties for all residents and staff
- Provided a drink fountain and pamphlets with heat-health information in the facility foyer for visitors
- Helped long-term residents feel more comfortable if the need for relocation arose by regularly practicing getting into and travelling in a bus
- Placed a thermometer in the medication storage area to monitor ambient temperature
- Put covers over air conditioners to keep locusts out
- Encouraged staff to update their house insurance and fire plans
- Checked that the outside awning blinds were user friendly for staff
- Ensured facility cars had bottles of water in case of breakdown in remote areas
- Nominated a staff member to check on other staff during hot weather
- Included protocol in the heatwave plan for a message to be sent to staff when a 'cool change' arrived, so that windows could be reopened where appropriate

capacity due to restricted power supply, lack of air conditioning for bedrooms, variable temperatures throughout buildings, delayed repairs and inappropriate air conditioner types (including evaporative coolers in humid kitchens and air conditioners unable to 'recirculate' air on smoky days) were described.

One of the air conditioners in the dining room has conked out. It works for about 30 minutes and then needs to be turned off. It is 20 years old. (Interviewee 1)

...the air conditioning system was serviced before Christmas, when the hot weather actually arrived the system was still not working properly. (Interviewee 3)

Location-specific issues also posed challenges ($n=2$). Salty sea air at a RACS located near the coast corroded metal components of air conditioners and awning blinds. Access to air conditioner replacement parts and service personnel was limited at a RACS in a remote rural location.

There is a lack of flexibility regarding delivery of parts, which may be delivered by passenger bus and not courier. . . A staff member has to be available to meet the bus even if it drives through in the middle of the night. (Interviewee 12)

Facilitators

Staff awareness of the dangers of heat for older people was the most commonly reported facilitator of preparations for hot weather ($n=7$).

Staff at the facility are very good. They are very aware of the dangers to the elderly [of] hot weather...they have worked at the facility for a long time...they have lived for a long time in an area that experiences a lot of hot weather, and many have considerable life experience of caring for others. (Interviewee 3)

Staff are all very supportive of measures taken to as they are aware of the dangers of extreme heat. (Interviewee 7)

Having a documented heatwave plan ($n=3$), good air conditioning ($n=3$), a good backup power generator ($n=1$) and a regular maintenance program ($n=1$) were also reported to facilitate preparedness.

Having a documented heatwave protocol, and the Heatwave Ready Resource, has been helpful...during preparations for hot weather, staff meetings, or review of policies. (Interviewee 7)

Being attached to a large hospital with regular maintenance of equipment [has helped]. (Interviewee 8)

Advice to others

A range of advice was offered for others preparing for hot weather in a RACS (Table 3).

The Residential Aged Care Services Heatwave Ready Resource

Use

Twelve of 14 interviewees reported that the *Resource* had been used at some time, either leading up to or during the study period. Most commonly the *Resource* had been used to inform review of heatwave plans. Other uses were staff education, the development of educational materials and completion of the 'checklist' section. Reasons given for not using the *Resource* were cool weather, lack of time, adequate existing health service heat protocols and that staff already knew what to do. Two interviewees had completed the checklist the previous year and saw no reason to do this again.

Perceived usefulness

All interviewees who had used the *Resource* found it useful in some way for supporting the preparation of RACS for hot weather (Table 4).

Discussion

This study has investigated preparations for hot summer weather at a sample of public sector RACS located in non-metropolitan areas of Victoria. Senior staff at the 14 health service campuses who participated in the study were also asked about their use of the *Resource*, and their perceptions of the usefulness of this publication for supporting hot weather preparations in a RACS setting.

The study found that an extensive range of activities had been undertaken to prepare RACS for extreme hot weather before and during the 2010–11 summer, and that almost all of the health

Table 3. Advice offered by interviewees for others preparing for hot weather in a residential aged care setting

Main themes	Key comments	Number of interviewees (n = 14)
Be well prepared and have a heatwave plan	<i>Be well prepared before summer. Have everything ready to go early as you never know what might happen. (Interviewee 2)</i>	9
Have air conditioning that is appropriate for the situation, and have this regularly maintained	<i>Maintenance is the key thing,...if air conditioners don't work then residents, staff and visitors are all vulnerable. It doesn't matter how skilled the staff are, if equipment such as air conditioners break down then everyone is vulnerable. (Interviewee 2)</i> <i>When setting up a new facility don't 'scrimp' at all with air conditioning. (Interviewee 13)</i>	4
Ensure an adequate supply of fluids for residents, visitors and staff	<i>Ensure extra stocks of fluids, and fluid-based foods (e.g. jelly, ice-cream) are always available. (Interviewee 3)</i> <i>...some visitors may have travelled long distances, be elderly themselves, may not have air conditioning in cars, and may not have had a drink. (Interviewee 12)</i>	4
Have a good system of communication	<i>It is important to inform all staff about any [heat] alerts and associated procedures to follow, not just certain staff such as managers. (Interviewee 2)</i>	4
Know the normal health status of residents	<i>Know your residents well. This way you can pick up on any changes in behaviour or appearance that might signal distress'. (Interviewee 7)</i>	3
Act early in the day to keep buildings cool	<i>Remember to close windows, pull down blinds and awnings and turn on air conditioning early. It is easier to keep a cool room cool than to cool down a hot room. (Interviewee 1)</i>	2
Protect residents from direct sunlight	<i>If designing a new facility have plenty of shaded outdoor areas. (Interviewee 13)</i>	2
Be vigilant	<i>Keep 'fresh eyes' to notice situations that could be hazardous, and people that may be at risk. (Interviewee 12)</i>	2
Identify risks specific to your setting and address these in your heatwave plan	<i>It is important that facilities look carefully at their own environment and do what is right for them. (Interviewee 11)</i>	1

Table 4. Perceived usefulness of the Residential Aged Care Services Heatwave Ready Resource

Main themes	Key comments	Number of interviewees (n = 14)
'Checklist' highlighted issues and provide a systematic approach to hot weather preparations	<i>Completing the checklist did raise some issues and led to some alterations being made. (Interviewee 6)</i> <i>[The Resource] helped us prepare for summer in a more timely, orderly fashion. (Interviewee 9)</i>	7
Increased staff awareness	<i>[The Resource] has been good for generating discussion and preventing staff from becoming blasé about the dangers of heat. (Interviewee 7)</i>	5
Source of material for educational publications	<i>[Staff] have used [the section] 'Information for Carers and Families' for pamphlets in the foyer, the community client newsletter, and family newsletter. (Interviewee 12)</i>	5
Informed review of heatwave plans, and confirmation of existing policies	<i>It is very useful as reference material, particularly when reviewing the heatwave policy. (Interviewee 9)</i> <i>It is good for giving us the confidence that we are dealing with the summer heat in the way that is expected of us. (Interviewee 1)</i>	4
Evidence to inform decisions, and support instructions given to staff	<i>Information in the Resource was useful for explaining to other members of the risk assessment team why a reliable power generator of adequate capacity is needed. (Interviewee 2)</i> <i>[The Resource] is good to have as a 'back-up' when talking to staff, [it] gives more weight to instructions. (Interviewee 1)</i>	4
Staff education	<i>The education staff find the Resource useful as the information is easy to translate for teaching purposes. (Interviewee 8)</i>	3

services represented in the study had written heatwave plans in place before the summer season. Challenges to heat preparations mainly concerned the working order and effectiveness of air conditioning, whereas staff awareness and experience of hot weather, and having a written heatwave plan, were seen as important facilitators of heat preparedness. The *Resource* had

been used in some way by almost all interviewees and was reported to have been useful for informing heatwave plans, for increasing staff awareness of the vulnerability of older people to harm from heatwaves, for providing a systematic approach to preparations for hot weather, and as a source of written educational material for use in newsletters and pamphlets.

These findings are in stark contrast to a study conducted before the 2009 Victoria heatwave that investigated awareness, knowledge and practices of Victorian health professionals and care providers regarding minimisation of harm to older people from heatwaves, which found that only 18% of the employing organisations had heatwave plans, and responses to heatwaves were mostly reactive and opportunistic.³² The results of the current study suggest an increased awareness of the impacts of extreme heat on health since the 2009 heatwave. After this heatwave the Victorian Department of Health developed a heatwave plan for Victoria,³³ a heat-health alert system³⁴ and the *Resource*.²⁸ Heatwave-adaptive strategies are essential as projected climate and demographic changes indicate that exposure and sensitivity to this hazard are likely to increase in the future. Not only do climate change projections for Australia indicate an increased frequency and severity of heatwaves,^{6,7} but in addition, the proportion of the Australian population aged over 65 years is projected to reach 24% by 2056, and the number of people aged 85 years and over who live in retirement villages, hostels or nursing homes is expected to more than double by 2031.^{35,36}

Although this study indicates a well-considered approach to heatwave preparedness at this sample of RACS, gaps are evident regarding air conditioning, monitoring of indoor temperatures and protocols to reduce harm to staff from hot weather.

All RACS were reported to have some form of air conditioning, but one-third had cooling in common areas only. Several interviewees discussed problems with air conditioners over the course of the study, including variable temperatures within facilities and delays in repairs. Despite air conditioning being the most frequently discussed challenge to heat preparedness, only two interviewees had monitored indoor temperatures, both in limited areas. Access to air conditioned spaces has been identified as a protective factor for heat-related death during heatwaves.³⁷ Lack of reliable, uniformly effective cooling within a building is a potential hazard for frail, older residents as well as for the staff caring for them. One interviewee explained that the air conditioner thermostat was set to 24°C to avoid over-loading the power supply. A study in Metropolitan Melbourne has identified an overnight minimum temperature of 24°C or greater as a threshold for an increased rate of mortality for people aged over 65 years.³⁸ Future investigations of indoor ambient temperatures within RACS are warranted, with a view to the development of indoor temperature standards.

Only one interviewee discussed a strategy for minimising heat stress for staff. This is an important gap as the workload of RACS staff is likely to increase during extreme heat as the care needs of vulnerable residents increases, and staff engaged in strenuous physical work in hot conditions are at risk of heat-related illness.³⁹ Staff illness when expert and efficient care of vulnerable residents is most needed is a situation to be avoided, and the development of staff support protocols in heatwave situations is essential.

This study is limited by the use of a small convenience sample of public sector RACS senior staff who were interested participants, who may have been more motivated than others to institute preparations for hot weather and use the *Resource*, and who may have felt the need to portray themselves or their workplace in a good light. As senior staff, interviewees may have been more knowledgeable about heatwave planning and preparation, and

their impressions of barriers and facilitators to hot weather preparedness different to those of new, casual or frontline staff. Senior staff may also have had greater access to the *Resource* than did other RACS staff. Interviewees all represented RACS in rural and regional Victoria, restricting the ability to generalise findings to other settings in Victoria, or to other Australian states. Despite these limitations, this study provides insight into preparations for hot summer weather undertaken at public sector RACS, as well as the perceived usefulness of printed educational material and self-administered checklists and as an intervention to minimise harm from heatwaves.

Conclusion

An extensive and well-considered approach to the minimisation of harm from extreme hot weather by a sample of Victorian public sector RACS has been described; having a heatwave plan in conjunction with staff knowledge and experience of the dangers of heat for older people is reported to have facilitated hot weather preparations. Study findings suggest that the *Resource* is a useful planning, education and audit tool for supporting heatwave preparedness.

Competing interests

The authors declare there are no competing interests.

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