Heatwave Response Plan

an annex of the Queensland Health Disaster Plan
COPYRIGHT
The Queensland Government supports and encourages the dissemination and exchange of information. However, copyright protects this document. Queensland Health has no objection to this material being reproduced, made available online or electronically, but only if recognised as the owner of the copyright and this material remains unaltered. Copyright enquiries about this publication should be directed to the Prevention Division, Department of Health, GPO Box 48, Brisbane Qld 4001.

DISCLAIMER
Every effort has been made to ensure that the information contained within these guidelines is accurate and where possible reflects current better practice. However, Queensland Health does not give any warranty or accept any liability in relation to the content of material contained in this guide.
© The State of Queensland (Queensland Health) 2015

Published December 2015
Heatwave Response Plan

Contents

Distribution ....................................................................................................................................... i
Amendments ................................................................................................................................... ii
Version Control ................................................................................................................................ ii
1 Structure and governance ........................................................................................................... 1
  1.1 Purpose .................................................................................................................................. 1
  1.2 Objectives ............................................................................................................................... 1
  1.3 Related Documents .............................................................................................................. 1
2 The Heatwave Context ................................................................................................................ 2
  2.1 National Heatwave Forecasting and Assessment Service .................................................... 2
  2.2 Heatwave Risk and Impact ..................................................................................................... 2
    2.2.1 Likelihood ......................................................................................................................... 2
    2.2.2 Impact (Consequence) ...................................................................................................... 2
3 Basis for Heatwave Arrangements ............................................................................................ 4
  3.1 Monitoring and Assessment .................................................................................................. 4
  3.2 Activation .............................................................................................................................. 4
  3.3 Triggers to activate the plan .................................................................................................. 5
  3.4 Notification ............................................................................................................................... 5
  3.5 Roles and responsibilities ....................................................................................................... 5
4 Prevention and preparedness phase ............................................................................................ 7
  4.1 Prevention .............................................................................................................................. 7
  4.2 Preparedness .......................................................................................................................... 7
    4.2.1 Planning and Arrangements: Summer season preparedness ........................................... 7
    4.2.2 Training and Exercises .................................................................................................... 7
5 Response ..................................................................................................................................... 8
  5.1 Response Strategy .................................................................................................................. 8
  5.2 Coordination .......................................................................................................................... 8
  5.3 Management ........................................................................................................................... 8
    5.3.1 Management intent ........................................................................................................... 8
  5.4 Communication ....................................................................................................................... 9
    5.4.1 Public Messaging .............................................................................................................. 9
6 Recovery .................................................................................................................................... 11
  Appendix 1 – The Heatwave Warning System ............................................................................ 12
  Appendix 3 - Vulnerable Groups and Heatwave ................................................................. 18
  Appendix 4 - Public Messaging in Heatwave ........................................................................... 20
  Abbreviations ............................................................................................................................... 20
  Glossary ...................................................................................................................................... 20
  References ................................................................................................................................... 21
Authority

Under the State Disaster Management Plan 2015, Queensland Health (QH) is the primary agency with responsibility for Heatwaves and maintenance of an effective Hazard Specific Plan.

The Queensland Disaster Management Act 2003 and the Disaster Management and Other Legislation Amendment Act 2010 provide the legislative basis for the plan.

The Chief Health Officer, on behalf of the Director-General, maintains the Heatwave Response Plan.

The 2015 Heatwave Response Plan is hereby approved and recommended for distribution.

December 2015

Distribution

The Heatwave Response Plan is a public facing document that should be made available to:

- Queensland Health (QH)
  - The Department of Health (DoH)
  - All Hospital and Health Services (HHS) via Chief Executives (HHSCE) and Disaster Coordinators
  - Queensland Ambulance Service (QAS).
- Other members of the health sector including but not limited to aged care facilities, private hospitals, primary health and community care providers.
- The State Disaster Coordination Centre (SDCC) and partner agencies in the Queensland Disaster Management Arrangements (QDMA).
- Other Australian jurisdictions.
- The wider community.

The plan will be made available on the internet.
Amendments

Proposed amendments or additions to this plan are to be forwarded to:

Executive Director, Aeromedical Retrieval and Disaster Management Branch
Prevention Division
Department of Health
GPO Box 48
Brisbane Qld 4001

Version Control

This plan will be updated electronically and available on the QH intranet and Internet. The electronic copy is the master copy and, as such is the only copy, which is recognised as being current.

To ensure currency of the Plan holders should insert amendments to the plan as soon as they are received. When an amendment is inserted into the Plan, the amendment should be recorded in the amendment schedule below.

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Entered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Issued (date)</td>
</tr>
</tbody>
</table>

Monitoring and review

This plan shall be reviewed:

- Following the activation of the plan in response to a heatwave event.
- Within one month of any major exercise designed to test the effectiveness of this plan.
- On the introduction of any major structural, organisational or legislative changes that affects QH operations or Bureau of Meteorology (BoM) forecasting or warning systems.
1 Structure and governance

1.1 Purpose

Under the State Disaster Management Plan 2015, Queensland Health (QH) is the primary agency with responsibility for heatwaves.

For the purposes of this plan, the BoM definition of a heatwave will be used:

“Three (3) days or more of high maximum and minimum temperatures that are unusual for that location”.

The purpose of this plan is to outline the arrangements for heatwaves in Queensland and ultimately to reduce the impact of heatwaves on Queensland communities.

The plan is consistent with the principles of the QDMA.

1.2 Objectives

The objectives of this plan are to:

- Outline the context and risk of heatwaves in Queensland.
- Clearly articulate the roles and responsibilities of the health sector and other supporting agencies consistent with the existing QDMA.
- Describe how the notification, assessment and activation of relevant plans will occur.
- Describe heatwave triggers and response activities for QH and other agencies.
- Support a cycle of ongoing evaluation that will continue to improve the capabilities of QH and other agencies to prepare for and respond to heatwaves.

1.3 Related Documents

This plan is an annex of the QH Disaster Plan.

Heatwaves may be local, state-wide or even national. There are also likely to be different levels of heatwave across these different geographic regions and different forecasts at any one time, for different parts of the state.

Local, district and individual agency heatwave plans may be developed to support the operationalisation of this plan - relevant to local needs and risk.
2 The Heatwave Context

2.1 National Heatwave Forecasting and Assessment Service

Heatwaves are calculated using the forecast maximum and minimum temperatures over the next three days, comparing this to actual temperatures over the previous 30 days, and then comparing these same three days to the 'normal' temperatures expected for that location.

The National Heatwave Forecasting and Assessment Service is a BoM product, which operates from the start of November to the end of March, and provides advance notice of unusually hot conditions allowing government, emergency services and communities' time to adopt measures to reduce the impact.

It uses colour coded maps to show the location, or predicted location, of heatwaves over a three day period, while consecutive maps help indicate heatwave conditions persisting for days. There are 2 sets of maps.

- The Heatwave Assessment consists of a panel of two maps across Australia for the previous two three-day periods.
- The Heatwave Forecast consists of a panel of five maps across Australia for the next five three-day periods.

The colour coding system is described in Table 1, while further information regarding interpretation of maps, with examples, is included in Appendix 1.

![Table 1 - Colour Coding System](image)

<table>
<thead>
<tr>
<th>Heatwave Type</th>
<th>Colour Code</th>
<th>Temperature</th>
<th>Community Impact (See 2.4. Risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No heatwave</td>
<td>White</td>
<td>Normal</td>
<td>--------</td>
</tr>
<tr>
<td>Low intensity heatwave</td>
<td>Yellow</td>
<td>Top 10%</td>
<td>Most people have capacity to cope. Increased health risk in vulnerable groups.</td>
</tr>
<tr>
<td>Severe heatwave</td>
<td>Orange</td>
<td>Top 2%</td>
<td>Increased deaths and illness in vulnerable groups (&gt; 65, pregnancy, babies and young children, those with chronic illness).</td>
</tr>
<tr>
<td>Extreme heatwave</td>
<td>Red</td>
<td>Top 1%</td>
<td>May impact infrastructure. Health risk for anyone who does not take precautions to keep cool, even the healthy.</td>
</tr>
</tbody>
</table>

2.2 Heatwave Risk and Impact

2.2.1 Likelihood

Heatwave modelling indicates that Queensland, and Brisbane in particular, is at risk of more frequent heatwaves. Climate projections show that extreme heat events are expected to occur more often and with greater intensity in the future.

2.2.2 Impact (Consequence)

The impacts of heatwaves, both clinical and non-clinical, are described more fully in Appendix two (2) while Appendix three (3) describes vulnerable groups and possible strategies.

Clinical

In the last 200 years, severe and extreme heatwaves have taken more lives than any other...
natural hazard in Australia. Deaths and health problems due to heat increase once the top 10% of temperatures are reached with further increases in temperature increasing morbidity and mortality. Health impacts may include clinical, public health and mental health effects.

**Non Clinical**
As well as clinical effects, a heatwave may cause damage to infrastructure and utilities, as well as leading to increased activity for emergency services, including:

- electricity spikes due to increased air conditioning use, which can create power outages
- roads and highways to buckle, water lines to burst and power transformers to overheat potentially causing electrical fires
- heatwave during a drought can contribute to bushfires and wildfires
- in the past, severe heatwaves have also caused catastrophic crop failures.

**Vulnerable Groups**
Those people especially at risk from heatwaves include the elderly, the very young, Aboriginal and Torres Strait Islander communities, people who work outdoors and those with compromised physical and mental wellbeing. Belonging to more than one at-risk group may significantly increase the risk to that individual of heat illness.

Should the extreme heat impact on critical infrastructure, such as electricity supply, then certain groups also become especially vulnerable including:

- those who rely on electricity to power medical devices in their homes
- those who are reliant on medications, which require refrigeration, such as insulin.

<table>
<thead>
<tr>
<th>Heatwave Type</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low intensity heatwaves</td>
<td>Most people expected to have adequate capacity to cope with this level of heat but begin to see health effects</td>
</tr>
<tr>
<td>Severe heatwaves</td>
<td>Increased morbidity and mortality for vulnerable groups, such as those over 65, pregnant women, babies and young children, and those with chronic illness (e.g. renal disease, ischaemic heart disease).</td>
</tr>
<tr>
<td>Extreme heatwaves:</td>
<td>Will impact normally reliable infrastructure, such as power and transport and are a risk for anyone who does not take precautions to keep cool, even those who are healthy.</td>
</tr>
</tbody>
</table>
3 Basis for Heatwave Arrangements

The different levels of heatwave (low intensity, severe and extreme) with an increasing risk profile enable the generation of tiered arrangements to manage heatwaves with defined activation triggers and escalating response levels.

*Figure 2 – Summary of Heatwave arrangements linked to heatwave levels*

<table>
<thead>
<tr>
<th></th>
<th>No Heatwave</th>
<th>Low Intensity Heatwave</th>
<th>Severe Heatwave</th>
<th>Extreme Heatwave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperatures</td>
<td>Normal</td>
<td>Highest 10%</td>
<td>Highest 2%</td>
<td>Highest 1%</td>
</tr>
<tr>
<td>State Plan Status</td>
<td>Prepared</td>
<td>Alert</td>
<td>Activation considered if widespread, prolonged</td>
<td>Activation considered</td>
</tr>
<tr>
<td>Local / District Plan Status</td>
<td>Prepared</td>
<td>Alert</td>
<td>Activation considered</td>
<td>Activation suggested</td>
</tr>
<tr>
<td>Public Messages</td>
<td>Prepared</td>
<td>Web site, social media</td>
<td>News stories</td>
<td>Media interviews</td>
</tr>
<tr>
<td>Vulnerable groups</td>
<td>Identification</td>
<td>Targeted messages</td>
<td>Welfare checks</td>
<td>Care assistance</td>
</tr>
</tbody>
</table>

3.1 Monitoring and Assessment

All agencies and the community are responsible for maintaining situational awareness of potential heatwaves conditions via the BoM website. Should severe or extreme heatwave conditions, be forecasted by the BoM this information will be included in the SDCC issued daily QEMR.

Should **extreme** heatwave conditions be forecasted to impact:
- large geographical regions and/or highly populated regions and/or
- be expected to last longer than 48 hours.

The BoM will contact the Queensland Health Disaster Management Unit by phone and develop a ‘Weather Outlook Summary’ to be issued from the SDCC.

All HHS as well as all partner agencies will receive this summary from the SDCC.

HHS will also receive notice of QH intentions and advice regarding risk and activation status and will in turn advise Queensland Health of local intentions.

Ongoing liaison with local/district stakeholders should be coordinated via the relevant HHS’ LDMG/DDMG liaison officers.

3.2 Activation

This plan will be considered for activation if there is a widespread, or prolonged severe heatwave; extreme heatwave; significant impacts on infrastructure or at the request of affected HHS, LDCC, DDCC or the SDCC.

Activation of the Heatwave Response Plan cannot occur in isolation. The *Queensland Health Disaster Plan 2015* is automatically activated with activation of this plan. The Chief Health Officer (CHO) may also activate the State Health Emergency Coordination Centre (SHECC) and establish an Incident Management Team (IMT) to assist with response coordination.

**Note:** Local heatwave response plans can be activated without activation of this plan. It is suggested that local plan activation occur for both severe and extreme heatwaves.
3.3 Triggers to activate the plan

This is based on the heatwave forecasts provided by the National Heatwave Service with this information publicly available on the BoM website. Activation decisions need to be made using a standard risk based assessment of likelihood and impact.

- Likelihood is determined by information received from the Heatwave Warning System.
  - Activation should be considered for severe and is suggested for extreme.
- Impact is determined by the size of the area affected by the heatwave; population numbers and vulnerable groups affected and duration of effect.
  - A small, localized extreme heatwave in an unpopulated area would be unlikely to warrant activation.
  - A widespread, prolonged severe heatwave in a heavily populated area would be more likely to result in activation.
  - A widespread, prolonged extreme heatwave in a heavily populated area would see the plan activated.

Local activation may occur without activation of this plan and are made on a similar decision matrix but at a local level.

3.4 Notification

Should this plan be activated the DoH will notify:

- Internal to QH:
  - the Director General and the DoH DDGs
  - all HHS CEs and Disaster Coordinators
  - QAS Commissioner
- External to QH:
  - SDCC Watch Desk by both email and phone call
  - the SDCC will issue advice to all other partner agencies through normal communication channels
  - the community through the DoH Communications strategy in partnership with the SDCC.

QH representatives at district and local level will notify:

- senior HHS staff
- all health facilities and staff within their HHS (if local activation and impact)
- all local healthcare stakeholders such as private hospitals, aged care facilities, Primary Health Network (General Practice)
- LDMG and DDMG.

Note: These representatives are also required to notify DoH and LDMG, and DDMG or any local or district plan activations.

3.5 Roles and responsibilities

The DoH is responsible for:

- Maintaining situational awareness of potential heatwaves conditions via the BoM website.
- Development and maintenance of state heatwave planning arrangements.
- Maintaining business continuity plans for DoH functions, which include sustained/prolonged power outages, loss of mains water supply/cooling systems and potential staffing impact.
Heatwave Response Plan

- Undertaking risk assessments where impacts on utilities are significant and provision of health risk advice to SDCC.
- Identification of vulnerable groups and consideration of these in arrangements.
- Development of messaging while ensuring alignment with BoM as part of a broader communication strategy.
- Sharing of information with HHS, QAS and partner agencies through usual networks and SDCC.
- Support for HHS in the care and safety of staff and patients and the community, including resupply of vaccine.
- Care and safety of patients for functions where the DoH has direct care responsibilities.
- Ensuring the welfare and safety of staff.

**HHS are responsible for:**
- Maintaining situational awareness of potential heatwaves conditions via the BoM website.
- Development and maintenance of local heatwave arrangements.
- Maintaining business continuity plans which include contingencies for sustained/prolonged power outages, loss of mains water supply/cooling systems and potential staffing impact.
- Sharing of information with stakeholder agencies and the community via existing health networks (led by Public Health Units (PHU) in most HHS).
- Liaison with local government, utilities, organisers of local mass events, energy supplies and other relevant stakeholders to address emerging public health risks (led by PHU in most HHS).
- Aligning with DoH and BoM messaging as part of broader communication strategy.
- Helping to identify local vulnerable groups and consideration of these in arrangements.
- Care and safety of patients and consumers (any surge of which would be managed in accordance with existing plans).
- Ensuring the welfare and safety of staff.

**QAS is responsible for:**
- Maintaining situational awareness of potential heatwaves conditions via the BoM website.
- Development and maintenance of heatwave planning arrangements.
- Maintaining business continuity plans, which include sustained/prolonged power outages; loss of mains water supply/cooling systems and potential staffing impact.
- Liaison with organisers of mass events.
- Sharing of information with the community via existing networks.
- Aligning with DoH and BoM messaging as part of broader communication strategy.
- Care and safety of patients (any surge managed in accordance with existing plans).
- Ensuring the welfare and safety of staff.

**Other agencies are responsible for:**
- Maintaining situational awareness of potential heatwaves conditions via the BoM website.
- **Functional Lead Agency status for all emergency support functions remain as described in the State Disaster Management Plan.**

**Note:** Agencies are encouraged to consider specific issues and ensure arrangements are in place to perform these, including consideration of business continuity planning to consider the impact of heatwaves on infrastructure and staffing.
4 Prevention and preparedness phase

4.1 Prevention

Discussions about the management of climate change aside, heatwaves cannot be prevented. However, the impacts of heatwaves can be mitigated. Mitigation focuses on activities that can prevent exposure to the effects of heat-wave. Examples include:

- Design improvements to infrastructure to better allow heat management strategies.
- Prepared communities and response agencies and arrangements in place.
- A clear understanding of hazards, and their interaction with vulnerable elements, which may include reducing exposure to heatwaves e.g. rescheduling events.

4.2 Preparedness

As per the State Disaster Management Plan, preparedness activities include community education and engagement, planning and arrangements, training and education, and exercises.

Community Education and Engagement

QH as the primary agency for heatwave reviews and provides communications relating to the health impacts of heatwaves and works in partnership with whole of government to develop management strategies for both the Queensland community and other government and non-government organisations.

Community education and engagement strategies include:

- The inclusion of heatwave preparedness advice (e.g. self-management of heat stress, recognition of heat illness, food safety etc.) in summer preparedness campaigns.
- Development and provision of targeted information for vulnerable groups, and those who support, or care for people at risk of serious health effects from hot weather.
- The provision of advice sheets for the public, HHS and other agencies with links to these also available on the National Heatwave Service website.

4.2.1 Planning and Arrangements: Summer season preparedness

Heatwave preparedness activities are integrated with summer season preparedness activities. These activities are common across all organisations that are part of the QDMA and include:

- Activation of weather monitoring systems for the summer period and review of previous season monitoring and warning systems.
- Assessment of resource capability for a heatwave response based on potential increase in demand for services.
- Review of business continuity plans in case of interruption to services.

If the seasonal outlook is particularly extreme, Queensland Health may organise a forum for all government and non-government organisations to explore a multi-agency response and ensure currency of all information resources used for preparedness.

4.2.2 Training and Exercises

Training and exercising should be linked to generic emergency preparedness, especially with respect to surge and business continuity.
5 Response

5.1 Response Strategy
The overarching response strategy has five (5) main elements:

1. Reduction of harm to patients and the community, as well as reducing impact on the health system, by a proactive and scalable messaging campaign.
2. Identification of vulnerable groups with scalable strategies in place to support these.
3. Demand management linked to usual surge strategies.
4. Management of public health impacts due to effects on infrastructure.
5. Business continuity planning linked to usual BCP arrangements.

Only the first two (2) are specific to heatwave with scale of response linked to the levels of heatwave as defined by the National Heatwave Service.

5.2 Coordination
QH in consultation and collaboration with the BoM and SDCC will establish briefings, provide consistent information for public messaging and advice for other agencies. This will be done through normal channels through the SDCC.

5.3 Management
The different levels of heatwave (low intensity, severe and extreme) with an increasing risk profile enable the generation of tiered arrangements to manage heatwaves with defined activation triggers and escalating response levels.

5.3.1 Management intent:

- The cornerstones of management of clinical effects consist of rehydration and cooling.
- Most people can manage within their own immediate environment – it is important that people either create (via air-conditioning, use of fans etc.) or move to (e.g. shopping centres, cinemas etc.) a cool environment.

At DoH level activities will focus on:

- Liaison with stakeholders at state level to engage these groups (e.g. Emergency Services, SDCC, St John Queensland, Pharmacy Guild, RACGP, Commonwealth regarding aged care facilities, non-government organisations and partner agencies).
- Ensuring distribution of messaging to vulnerable groups across Queensland through usual health networks and the SDCC.
- Monitoring and providing advice on the public health risks associated with effects on infrastructure.
- Supporting HHS’ by coordinating supply of additional resources, as needed, to provide care.

At HHS level activities will focus on:

- Ensuring distribution of messaging to patients and consumers within HHS through usual health networks and LDMG and DDMGs.
- Liaison with stakeholders in HHS area of operation to engage these groups (e.g. QAS, aged care facilities, private hospitals, primary health care, community health care providers, pharmacies etc.)
- Management of any potential surge of patients in line with all hazard plans and consideration of specific clinical pathways and management plans for high risk groups.
5.4 Communication

The QH communications plan for heatwaves is aligned with the different levels of heatwave so there is a scalable and consistent approach to public communication. A summary of this strategy is included in Appendix 4.

The distribution of alerts and warnings is primarily done through local governments and the SDCC. Each agency/QDMA stakeholder is then responsible for further disseminating these warnings and alerts through their communications networks.

5.4.1 Public Messaging

Five (5) key messages should be consistently delivered to the general public by all agencies:

1. have a plan
2. stay hydrated
3. stay out of the sun
4. keep cool
5. check on and look after others.

The risk of adverse clinical effects from the heat can be minimised by encouraging the population to:

- drink plenty of water and monitor themselves for signs of dehydration (e.g. dark urine)
- minimise physical activity
- check on those at higher risk (see list below)
- check if their home air conditioner works before a heatwave
- go to a public area which has air conditioning if they don’t have access at home
- plan around the heat and avoid being outside between 11 am and 3 pm
- avoid alcoholic, hot and sugary drinks
- take cool showers or baths
- wear light-coloured, loose-fitting clothes made from natural fibres
- cool the house by shading windows and shutting curtains and opening windows at night, if it is safe to do so.
## Heatwave Response Plan

<table>
<thead>
<tr>
<th>Phase</th>
<th>When</th>
<th>What</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention and Preparedness</td>
<td>PRIOR TO SUMMER (No heatwave)</td>
<td>Ensure heatwave plans updated</td>
<td>DoH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure BCP arrangements in place</td>
<td>HHS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check messaging materials/resources (website content, information sheets, posters etc.)</td>
<td>QAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Identification of vulnerable groups and development of strategies to support</td>
<td>DoH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surge strategies developed to manage increased demand (generic plus heatwave specific issues)</td>
<td>HHS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appropriate clinical pathways and management plans for expected increases in mental health hospital admissions due to heatwave.</td>
<td>QAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review capacity of Public Health Units to manage outbreaks</td>
<td>DoH, Prevention Division</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HHS: Public Health Units</td>
</tr>
<tr>
<td>Response</td>
<td>ALERT (Low intensity heat wave)</td>
<td>Ongoing messaging</td>
<td>DoH, Prevention Division, Media and Communication</td>
</tr>
<tr>
<td></td>
<td>ACTIVATION (Severe heat wave)</td>
<td>Active messaging</td>
<td>DoH, Prevention Division, Media and Communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with HHS, PHU’s on activation of local plans</td>
<td>DoH, Prevention Division, Media and Communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with organisers of community events</td>
<td>HHS: Public Health Units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with local government re</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Food businesses</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Water/sewerage/utilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local media messaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACTIVATION (Widespread or prolonged severe heatwave or extreme heatwave, plus)</td>
<td>State-wide media messaging</td>
<td>DoH, Media and Communication</td>
</tr>
<tr>
<td></td>
<td>Loss of power</td>
<td>Liaise with organisations of mass or community events</td>
<td>HHS: Public Health Units</td>
</tr>
<tr>
<td></td>
<td>Other hazard e.g. Fire</td>
<td>Liaise with local government re</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Safe Food Production Queensland (SFPQ), Agriculture and Fisheries</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- SEQ Water (if Brisbane)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Urban Utilities (if Brisbane)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local media messaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss of power</td>
<td>Liaise with other agencies</td>
<td>DoH, Health Protection Branch</td>
</tr>
<tr>
<td></td>
<td>Other hazard e.g. Fire</td>
<td>Re-supply of vaccines (if needed)</td>
<td>DoH, Communicable Diseases Branch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovery</td>
<td>(Widespread or prolonged severe heatwave or extreme heatwave, plus)</td>
<td>Debriefing and post disaster review</td>
<td>DoH, Prevention Division (state plan activation)</td>
</tr>
<tr>
<td></td>
<td>Loss of power</td>
<td></td>
<td>HHS (local activation)</td>
</tr>
<tr>
<td></td>
<td>Other hazard e.g. Fire</td>
<td></td>
<td>QAS</td>
</tr>
</tbody>
</table>
6 Recovery

Recovery and return to business-as-usual will depend on the impact from the heatwave on businesses and departments.

Queensland Health will maintain a health response to areas of the community that continue to be at-risk as the heatwave event abates and will continue to provide advice on treatment of common health effects as a result of the heatwave (e.g. heat stroke, dehydration).

Queensland Health will also encourage stakeholders to consider the continued effects of heat on at-risk patients that may impact on their need for support.

Debriefs and Post Disaster Review

An evaluation of the heatwave response should occur:

- after cessation of the heatwave emergency
- with data collected and analysed on those affected i.e. morbidity/mortality data
- if felt to be required after feedback from other agencies.

Where local heatwave plans have been activated at the HHS level, it is the responsibility of the relevant HHS Chief Executive (HHSCE) (or delegate) to ensure a timely debriefing of all involved agencies, in conjunction with their respective Local Disaster and District Disaster Management Groups. The HHSCE will forward a report to the CHO.

Where the Heatwave Response Plan has been activated at state level, the Prevention Division, in conjunction with the CHO will ensure the debriefing of all participating staff and agencies within a reasonable timeframe following the stand down of the emergency response.

Future Developments

Following each summer period, the Heatwave Service maps will be evaluated for accuracy. The service is expected to be reviewed in conjunction with health and emergency sector stakeholders to consider the relevance and utility of these assessments and forecast maps.
Appendix 1 – The Heatwave Warning System

Understanding Heatwaves

From a meteorological basis, heatwaves are events characterised by the presence of ‘stagnant warm air masses and consecutive nights with high minimum temperatures’\(^2\), and involve a period of unusually or exceptionally hot weather.

Heatwaves are measured relative to the usual weather in the area and relative to normal temperatures for the season. Temperatures that people from a hotter climate consider normal can be termed a heatwave in a cooler area if they are outside the normal climate pattern for that area. The term is applied both to routine weather variations and to extraordinary spells of heat, which may occur only once a century.

Heatwaves are more complex than just the daily maximum temperature. The minimum (or overnight) temperature is extremely important as well. If the minimum remains high then the subsequent maximum will occur earlier in the day and remain near that high temperature for a longer period. A higher minimum temperature also restricts the amount of recovery that can occur, due to less opportunity to discharge heat.

Understanding the Heatwave Warning System

BOM heatwave predictions are based on calculation of an index known as the Excess Heat factor (EHF), which itself is a product of two other indices – the “significance index” and the “acclimatisation index”.

- The “significance index”, generates a number based around the current local daily mean temperature averaged over three days in relation to the local historical 95\(^{th}\) centile daily mean temperature. This gives an indication of how hot the local temperature is compared to normal for that time of year.
- The “acclimatisation index”, compares the same three day averaged mean temperature with the average daily mean temperature over the last 30 days. This introduces an indication of the rate of change in local daily mean temperature over the recent past. Since human beings are capable of acclimatising to higher temperatures over time, the intent of this index is to create greater significance for rapid onset temperature events to which the local population have not had time to acclimatise, and which are, therefore, likely to have greater human health impacts.\(^3\)

Using this calculation takes into account people's ability to adapt to the heat. For example, the same high temperature will be felt differently by residents in Cairns compared to those in Stanthorpe, who are not used to the higher range of temperatures experienced in Cairns.

The BOM heat wave forecast product is then generated by comparing local EHF's to historical centile thresholds of EHF's calculated for the same local area, and defining temperatures as being in “No Heatwave”, “Low-intensity heatwave”, “Severe Heatwave” or “Extreme Heatwave” based on those thresholds.

There are 2 sets of maps as shown in Figures 1 and 2.

- The Heatwave Assessment consists of a panel of two maps across Australia for the previous two three-day periods.
- The Heatwave Forecast consists of a panel of five maps across Australia for the next
Heatwave Response Plan

five three-day periods.

Figure 1 – Example of Assessment Map from National Heatwave Service

Figure 2 – Example of Forecast Map from National Heatwave Service
Available at: http://www.bom.gov.au/australia/heatwave/index.shtml#heatwave-forecasts

Understanding Heatwave Prediction Limitations

The maps provided by the Heatwave Forecast will show a reduced severity level or remove the indication of heatwave before the heatwave actually ends. This occurs because the maps are calculated across today, tomorrow and the next day. If the temperature is lower on the last day(s) then the map will indicate a lower risk despite unusually hot conditions being present for the first day or two. The Heatwave Assessment will show how heatwaves are finishing due to the combination of recent days with the current forecast days.

To find exact temperatures there is still a need to refer to local BoM products for information.
on how hot each day and night will be during the three day period.

**Understanding the impact of heatwaves on health**

Data from Queensland University of Technology suggests that human morbidity and mortality due to heat will increase in the order of 10 per cent once the 90th centile temperature is reached, with further increases in temperature leading to further quantifiable increases in both morbidity and mortality⁴.

As a crude model, if daily maximum temperature is assumed to take a normal distribution around a mean daily maximum temperature, then morbidity and mortality appear to start to rise in a detectable fashion once daily maximum temperature reaches the 90th centile of this normal distribution. The 90th centile temperature is the temperature which 90% of temperatures measured on that day, would be expected to be below, with only 10% of measured temperatures exceeding it. In Figure X, the white shaded area represents 90% of temperatures for that day, whilst the red shaded area represents the remaining 10%. This 10% would represent a ‘low intensity heatwave’. The top 2% and 1% would represent a ‘severe heatwave’ or ‘extreme heatwave’ respectively.

*Figure 3. The 90th Centile Temperature*
Appendix 2 - Effects of a Heatwave

Direct clinical effects of a heatwave

The following list includes the commonplace clinical effects of a heatwave:

- **Hyperthermia**—also known as heat stroke, occurs during periods of sustained high temperature and humidity. Sweating is absent in 84 to 100 percent.
- **Heat rash**—also known as prickly heat—is a maculopapular rash accompanied by acute inflammation and blocked sweat ducts.
- **Heat cramps** are painful, often severe, involuntary spasms of the large muscle groups used in strenuous exercise. They tend to occur after intense exertion, and often develop during heavy exercise while sweating profusely and replenishing fluid loss with non-electrolyte containing water.
- **Heat exhaustion** is considered a precursor of heat stroke. It may resemble heat stroke, with the difference being that neurologic function remains intact. It is marked by excessive dehydration and electrolyte depletion. Symptoms may include headache, nausea, and vomiting, dizziness, tachycardia, malaise and myalgia.

Clinical management of heat-related illness:

- The cornerstones of management consist of rehydration and cooling.
- Most people can be managed within their own immediate environment, but immediate referral to medical care should be considered for distressed patients.
- It is important to create or move to a cool environment.
- Heat loss should be encouraged and supported with urgent cooling without causing shivering.

Public health effects of a heatwave

Other health impacts may be noted on the human population:

- In addition to direct effects on individuals, heatwaves create additional risks to health due to damage to power infrastructure resulting in loss of power.
- Loss of power results in a loss of refrigeration of food increasing risk of food borne illness if not effectively managed. Hot weather also increases the risk of food borne disease due to stresses in food production, particularly for chicken and eggs. Salmonella outbreaks are more common in hot months. These risks can be mitigated through more careful food handling practices.
- Loss of refrigeration can cause damage to certain medicines, for example, insulin, and also vaccines, reducing their efficacy.
- Loss of power can also result in the shutdown of water treatment plants and, depending on the availability of reserves in the system may require the issuing of boil water notices. These risks will be managed by drinking water providers.
- Sewerage pumps may cease to operate resulting in sewage overflows into the environment which may require advice to the community to avoid at risk areas.
Mental health impacts of a heatwave

Mental, behavioural, and cognitive disorders have been shown to be triggered or exacerbated during heat waves, predisposing individuals to heat-related morbidity and mortality.6

**Acute effects – direct mental health impact**

There is a positive association between high ambient temperature and increased hospital admissions for mental and behaviour disorders during heatwaves.

- Specific illnesses that have shown increased hospital admissions during heatwaves include symptomatic mental disorders, dementia, mood (affective) disorders, neurotic, stress-related, and somatoform disorders and disorders of psychological development.6
- Fluctuations in weather have been noted to cause an increase in the incidence of mental stress, depression and suicide. As temperatures rise to extreme, stresses of everyday home, social, or work life are likely to be compounded by lethargy, lack of sleep, and the inability to function normally during oppressively hot conditions.6

**Acute effects – increased vulnerability of those with mental health disorders**

Many medications used in psychiatry increase vulnerability to heat-related morbidity by altering the body’s ability to thermoregulate. Drugs such as antipsychotics, anticholinergics, antidepressants, sedatives, and mood stabilizers that impair sweating and/or increase heat production are used in the treatment of such conditions as dementia, Alzheimer’s disease, psychosis, mood disorders, personality disorders, and anxiety disorders.5

Cognitive awareness of environmental conditions and the ability to undertake adaptive behaviours such as increased fluid intake or wearing appropriate clothing are important coping mechanisms that may be compromised in those with disabling mental illnesses such as Alzheimer’s disease, dementia, senility, psychosis, schizophrenia and developmental disabilities.6

**Longer term effects**

The effects of sustained heat and humidity, accompanied by drought, water restrictions, bushfires and power outages are likely to have marked effects on the mental health of both rural and urban communities, with possible increases in the incidence of episodic or chronic stress, despair and depression, and health-damaging personal behaviors.6

**Non-clinical effects of a heatwave**

As well as clinical effects, a heatwave may cause damage to infrastructure and utilities, as well as leading to increased activity for emergency services, including:

- Heatwaves have a range of economic and planning impacts across a broad range of sectors, including health care, transport, emergency services, energy and agriculture. Impacts to these sectors may also have an effect on responding to people in need.
- Power outages—heatwaves often lead to electricity spikes due to increased air conditioning use, which can create power outages, thereby making it even harder for the population to stay cool. The 2009 south eastern Australia heat wave caused Melbourne to experience major power disruptions which left more than 500,000 people without power as the heatwave damaged transformers and overloaded the power grid.
- Fire—if a heatwave occurs during a drought and dries out vegetation it can contribute
Heatwave Response Plan

to bushfires and wildfires. Heatwaves can also cause roads and highways to buckle, water lines to burst and power transformers to explode, causing fires.

- Excess heat causes psychological stress to a degree, which affects performance and is also associated with an increase in violent crime.
Appendix 3 - Vulnerable Groups and Heatwave

Those people especially at risk include the elderly, the very young, Aboriginal and Torres Strait Islander communities, people who work outdoors and those with compromised physical and mental wellbeing.\(^7\)

Vulnerable groups living in cities are particularly at risk due to the "Urban Heat Island" phenomenon occurs because of a decreased amount of vegetation and increased areas of dark surfaces in urban environments, in addition to the heat produced from vehicles and generators. This affect is generally more prominent during the night than the day. The major impact to people is that it increases the likelihood of extreme high minimum temperatures for a more prolonged time and affects people health by causing heat stress and under very severe conditions, death from the cumulative heatwave effects.\(^7\)

The following societal groups are at substantial risk of increased morbidity and mortality during heatwaves and should be directly targeted by public messaging and education.

- the aged and frail, especially those living alone
- babies and young children
- pregnancy and lactating mothers
- obesity
- people who live in urban areas ("heat islands")
- people who normally live in cool climates (e.g. tourists).
- people who are socially or geographically isolated, including the homeless
- people with physical disabilities that impair their mobility / capacity to self-manage
- people with a cognitive impairment or mental illness that impairs capacity to self-manage
- people working outside, especially involving physical exertion, or sport
- people taking certain types of medications, including some illicit ones
  - allergy medications, such as antihistamines
  - some blood pressure and heart medicine, such as beta blockers / vasoconstrictors
  - anticonvulsants
  - thyroid medications, such as thyroxine
  - diuretics
  - antidepressants and antipsychotics
  - alcohol and illicit drugs (e.g. amphetamines).
- people with chronic diseases such as heart disease, high blood pressure, diabetes, cancer or kidney disease
- acute illness or infections that cause dehydration or fever
- conditions that impair sweating, including skin disorders, congenital impairment of sweating, cystic fibrosis, quadriplegia and scleroderma

Belonging to more than one at-risk group may significantly increase the risk to that individual of heat illness, since several of the risk factors may increase the effect of others.

Should the extreme heat impact on critical infrastructure, such as electricity supply, then certain groups become especially vulnerable including:

- Those who rely on electricity to power medical devices, such as ventilators and dialysis machines in their homes.
- Those who are reliant on medications, which require refrigeration, such as insulin.
### Strategies (Examples only)

#### Community information
- Awareness of predicted heatwave
- Advice on preventive actions (see public messages)
- Targeted messages to high risk groups with specific advice and tools designed to reach these groups (e.g. community newsletters, aged care homes, translations)

#### GP and Pharmacist Engagement
- Ensure consistent advice
- Encourage pre-season review of vulnerable patients

#### Aged Care Facility Liaison
- Ensure consistent advice
- Encourage pre-season review of vulnerable patients
- Ensure strategies in place for local cooling

#### Community Health Liaison
- Ensure consistent advice
- Encourage pre-season review of vulnerable patients
- Consider welfare checks of vulnerable clients

#### Agency / Organisation Liaison
- Ensure consistent advice
- Planning of events (sports, concerts)
- Ensure strategies in place for local cooling for facilities such as prisons.
- Consideration of shopping centres as ‘places of heat refuge’ based on normal behaviours and how to best support this (in conjunction with Council)
- Consideration of other options such as movie theatres, ice rinks etc. (anywhere air conditioned)

#### Council Liaison
- Ensure consistent advice
- Consider WHS opportunities across local industry
- Access to communication strategies through LDMG
- Consideration of vulnerable group register in LDMG
- Consideration of local activities and behaviours that help access to cooler environments (see above re shopping centres, movie theatres)
- Consideration of local transport options in conjunction with these (bus air-conditioning, service schedule etc.)

#### HHS
- Ensure consistent advice
- Pre-season screening of potentially vulnerable patients (Clinics, ED presentations)
- In season advice included for potentially vulnerable patients (Clinics, ED presentations)
- Consider welfare checks of vulnerable clients (e.g. mental health outreach services)
- Engagement with LDMG re vulnerable group register
- Engagement with Council and local organisations to support local behaviours that improve access to cooling
- Ensure BCP arrangements in place to support cool environment in heatwave (generators, priority if grid overload)
- Provision of health spokesperson for activation

#### DoH
- Development and maintenance of community advice and information material
- Provision of spokesperson for state wide activation
- Support for HHS in their activities
- Consideration of state wide strategies based on local behaviours
- Engagement with state and national level groups such as GPs, Pharmacists, Aged care, Government agencies etc.
Appendix 4 - Public Messaging in Heatwave

A 2012 review of the effectiveness of heat warning systems found that the majority of scientific studies identified in a search of major health databases concluded that fewer people died of excessive heat following implementation of a heat warning system, but that, due to the nature of their designs, none were able to establish a causal relationship.

Warnings to the population, if unaccompanied by measures to mitigate adverse impacts, are likely to be less effective. Many countries and jurisdictions have adopted specific measures that are introduced when a heatwave warning is issued, with the intention of increasing awareness of risk and providing temporary measures to safeguard health, especially in vulnerable groups.

These measures include opening of cooling shelters, use of a “buddy” system, and distribution of hydration packs. Mass media messages may also be broadcast to warn the public of the heat impacts and ways to protect themselves and others, as well as availability of facilities to assist in this goal.

Queensland Health will provide guidance to other agencies as to the likely impacts of a heatwave on the morbidity and mortality of the population, as well as advice on preventative strategies and key messages, which should be communicated to the public.

Each department will have standard information and key messages that are developed during the preparedness phase to disseminate as part of their individual heatwave responses. If necessary, some departments may increase availability of their services to meet increased demand. All agencies must work together to ensure a coordinated approach to managing communication and dissemination of consistent messaging to the community and between departments.

Five (5) key messages should be consistently delivered to the general public by all agencies:

1. have a plan
2. stay hydrated
3. stay out of the sun
4. keep cool
5. look after others.

The risk of adverse clinical effects from the heat can be minimised by encouraging the population to:

- drink plenty of water and monitor themselves for signs of dehydration (e.g. dark urine)
- minimise physical activity
- check on those at higher risk (see list below)
- check if their home air conditioner works before a heatwave
- go to a public area which has air conditioning if they don’t have access at home
- plan around the heat and avoid being outside between 11 am and 3 pm
- avoid alcoholic, hot and sugary drinks
- take cool showers or baths
- wear light-coloured, loose-fitting clothes made from natural fibres
- cool the house by shading windows and shutting curtains and opening windows at night, if it is safe to do so.
Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BoM</td>
<td>Bureau of Meteorology</td>
</tr>
<tr>
<td>CAWCR</td>
<td>Centre for Australian Weather and Climate Research</td>
</tr>
<tr>
<td>CHO</td>
<td>Chief Health Officer</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
</tr>
<tr>
<td>DDMG</td>
<td>District Disaster Management Group</td>
</tr>
<tr>
<td>DG</td>
<td>Director-General</td>
</tr>
<tr>
<td>HHS</td>
<td>Hospital and Health Service</td>
</tr>
<tr>
<td>HHSCE</td>
<td>Hospital and Health Service Chief Executive</td>
</tr>
<tr>
<td>IMT</td>
<td>Incident Management Team</td>
</tr>
<tr>
<td>LDMG</td>
<td>Local Disaster Management Group</td>
</tr>
<tr>
<td>RSPCA</td>
<td>Royal Society for the Prevention of Cruelty to Animals</td>
</tr>
<tr>
<td>SDCC</td>
<td>State Disaster Coordination Centre</td>
</tr>
<tr>
<td>SDCG</td>
<td>State Disaster Coordination Group</td>
</tr>
<tr>
<td>SHC</td>
<td>State Health Coordinator</td>
</tr>
<tr>
<td>SHECC</td>
<td>State Health Emergency Coordination Centre</td>
</tr>
<tr>
<td>SRG</td>
<td>State Recovery Group</td>
</tr>
</tbody>
</table>

Glossary

<table>
<thead>
<tr>
<th>Glossary</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bureau of Meteorology</td>
<td>The Bureau of Meteorology is Australia's national weather, climate and water agency.</td>
</tr>
<tr>
<td>Centre for Australian Weather and Climate Research</td>
<td>A partnership between Australia's atmosphere and ocean research agencies: the BoM and CSIRO.</td>
</tr>
<tr>
<td>Forecast area</td>
<td>The Bureau of Meteorology administrative districts which provide localised forecasting for each region of Australia.</td>
</tr>
<tr>
<td>Maximum temperature</td>
<td>The maximum air temperature observed inside a shaded enclosure 1.2 metres above the ground per 24 hour period beginning at 09:00 local time.</td>
</tr>
<tr>
<td>Coordination Centre</td>
<td>A centre established at State, district, or local government level as a centre of communication and coordination during times of disaster operations.</td>
</tr>
<tr>
<td>State Health Coordinator</td>
<td>The person appointed to lead or coordinate a disaster response at the state level.</td>
</tr>
<tr>
<td>Hospital and Health Service Chief Executive</td>
<td>The person appointed to lead or coordinate a disaster response at the hospital and health service level.</td>
</tr>
</tbody>
</table>
References