

# Heatwave Plan for England 2013

An overview of the challenges for primary care arising from heatwaves

July 2013

Considering healthcare plans for a heatwave seems to tempt yet another wet summer. Heatwaves however do happen and warmer summers are predicted to become more frequent with increasing intensity and duration. Their impacts upon patients can be rapid and severe, with the effects being more keenly felt by the most vulnerable, the window of opportunity for primary care to mitigate these effects is relatively short. The Department of Health has over the last few years developed documents to help guide those planning for the health effects of a Heatwave. This responsibility has now passed to a new organisation, Public Health England (PHE)<sup>1</sup>. This document is a précis of those plans relevant to General Practitioners. It identifies the threat a heatwave represents to health, helps identify which groups of patients are most at risk and explores strategies those providing primary care services should consider in order to prevent premature death and morbidity.

## Experiences from Heatwaves

During the summer of 2003 France experienced a sudden and sustained rise in both day and night time temperatures to 10 to 12 °C above the seasonal average across much of the country. The heatwave was attributed with causing nearly 15,000 excess deaths<sup>2</sup>. These deaths were not simply earlier deaths of those who would normally have been expected to die within a period of a few weeks but were a true excess. The effects were most keenly felt within the North of France and Paris, where it is suggested that people were perhaps less acclimatised and adapted to living in a hot climate; and disproportionately affected some of the more vulnerable members of society, such as the elderly, socially isolated and homeless<sup>3</sup>. The heatwave coincided with the annual French summer holidays when the ability of health and social care services to respond was limited.

The UK is not immune to these heatwave effects with only relatively modest elevations in daytime temperatures above normal creating excess deaths. The UK experience of a mini heatwave mirrored the French experience albeit on a much smaller scale, with a sustained excess death rate from all causes in just a few days of elevated temperatures.

In 2003 it was estimated that in England that year there were over 2,000 'excess deaths' over the 10-day heatwave period which lasted from 4–13 August 2003, compared to the previous five years over the same period. In July 2006 a 12 day period of hot weather, was associated with some 680 excess deaths in several regions of the country<sup>1</sup>.

Excess deaths related to heatwave tend to occur within one to two days of the onset of an episode of raised temperatures, and the deaths are most frequently attributed to cardiovascular or respiratory causes. This contrasts with the effects of cold weather on health which are slower in onset and often persist longer<sup>4</sup>. The opportunity for action to reduce this excess death rate once a heatwave becomes established is short,

hence the importance of preparation for and awareness of the possible consequences amongst health care staff and their patients.

## Physiology of Thermoregulation and Heat specific diseases

The body cools itself by four means radiation, convection via water or air across the skin, conduction by a cooler object being in contact with the skin and evaporation of sweat. When the ambient temperature is higher than skin temperature the only effective heat-loss mechanism is sweating. Any factor that reduces the effectiveness of sweating such as dehydration, lack of breeze, tight-fitting clothes or certain medications, can cause the body to overheat. The body's thermoregulation is controlled by the hypothalamus and can be impaired in the elderly and chronically ill, rendering them more vulnerable to overheating. Young children produce more metabolic heat, have a decreased ability to sweat and have core temperatures that rise faster during dehydration. Consequently the above groups are more likely to suffer adverse effects during a heatwave.

Whilst respiratory and cardiovascular diseases are the main causes of excess deaths during heatwaves, there are illnesses specific to hot weather which can affect all.

### Illness specifically related to heat

Heat Syncope	Dizziness and fainting due to a combination of dehydration, vasodilation, cardiovascular disease and certain medications.
Heat Exhaustion	Occurs as a result of water or sodium depletion, resulting in non-specific features of malaise, vomiting, hypotension with circulatory collapse. Core temperature is between 37-40°C. It can be treated by stopping any physical activity, with fluid and electrolyte replacement.
Heat Stroke	Usually following on from a period heat exhaustion with failure of the body's thermoregulatory mechanisms, Symptoms include confusion, disorientation, leading to unconsciousness and seizures. Signs will include a core temperature of over 40°C, and hot dry skin. This is a medical emergency requiring fluid resuscitation and active cooling of the body.

## Planning for primary care

### Identifying those at risk

Experience from other heatwaves has helped identify both diseases whose sufferers are more likely to struggle during heatwaves and those whose social status or location makes them more prone to adverse effects. Often it is a range of factors for example reduced ability to move into a cooler place, reduced sweating due to medication, that combine to produce adverse health effects. The elderly living alone often have many of these risk factors and are consequently at particular risk. It is clearly not practical to give every patient, in a higher risk group, or on medicines likely to alter their response to heat, individual advice in advance of possible need.

#### Predisposing social factors

- Elderly and extreme elderly
- Females
- Infants
- Those with certain chronic diseases
- Those taking medications
- Those confined to bed
- Those living in institutions
- Homelessness
- Socially isolated (mental health problems, autism)
- Those living in densely populated urban environments (Cities are hotter)
- Living on the top floor of a building

Conversely the time between impending heatwave and starting to see excess deaths from a heatwave is a matter of a few days, and may well occur at times when staffing levels are relatively low (for example school summer holidays). Preparation is important and actions need to be both timely and practical. Patient education<sup>1 5</sup> about how to limit the risks of heat, cool homes,

and that medication adaptation might be required could be prepared and circulated. Ideally this could be focused on the isolated elderly and supported by the full primary care team. It may require audits to be carried out to identify the vulnerable and education of the team as to the dangers of heat and opportunities to help and support those at risk. Reminding people that visiting frail family members and or neighbours is as important in a heatwave as it is in a cold spell of weather. In some locations it may be possible to use local groups to support those at risk, with advice and if needed daily contact this should be planned in

advance of a heatwave and actively promoted when one is predicted. Nursing, residential care homes and other institutions should also be preparing for heatwaves and monitoring ambient temperatures and ensuring adequate hydration of patients. They have been given their own guidance to follow, but may welcome support and advice from their Primary care colleagues.

## Preparation

During a heatwave it is important that the primary care team can appropriately assess the risks and symptoms that may be attributable to heat and dehydration, particularly in their contact with vulnerable groups. It may be useful to consider altering medication for the period of heatwave (for example stopping diuretics, or reducing anti-cholinergic drugs) in some individuals. In the event of a prolonged episode of hot weather the body will acclimatise, sweating more readily and becoming more efficient at thermoregulation, this process can take several weeks; caution should be used if medication which alters the body's ability to thermoregulate is initiated during these conditions.

### Medications that affect thermoregulation

Medication	Mechanism
Anti-cholinergics	Can effect central thermoregulation, reduce cognitive alertness and prevent or reduce sweating (many drugs below have anti-cholinergic effects)
Antipsychotics	Can inhibit sweating mechanism, and reduce systolic BP, central thermoregulation, alertness and vasodilatation
Antihistamines	Can inhibit the sweating mechanism, and reduce systolic BP
Anti-parkinsonian agents	Can inhibit the sweating mechanism reduce systolic BP, and cause dizziness and confusion
Antidepressants	Altered sweating, some can decrease centrally induced thermoregulation and cognitive alertness
Anxiolytics and muscle relaxants	Reduce sweating and increase dizziness, decrease cardiac output and therefore reduce cooling by vasodilatation and worsen respiratory symptoms
Anti-adrenergics and beta-blockers	Can prevent dilation of the blood vessels in the skin, reducing the capacity to dissipate heat by convection
Sympathomimetics	Vasodilators, including nitrates and calcium channel blockers, can worsen hypotension in vulnerable patients
Antihypertensives and diuretics	Can lead to dehydration and reduced blood pressure; hyponatraemia is a common side effect and can be worsened by excess fluid intake
Anti epileptics	Can reduce cognitive alertness and increase dizziness
Antiemetics, anti-vertigo , gastrointestinal, and urinary incontinence drugs	Also have anti-cholinergic effects

There are a number of chronic conditions that make their sufferers more prone to adverse effects from heatwave these are summarised below.

### Predisposing medical conditions

Health Condition	Mechanism
Diabetes mellitus and other endocrine disorders	Types 1 and 2 diabetes are associated with impairment in skin blood-flow response, which may play a role in reducing heat dissipation. Sweating responses may also be reduced. Metabolic alterations can occur.
Organic mental disorders, dementias	Reduced awareness of heat-related risks and adaptive behaviours, high dependency level, interaction of many medications with the body's ability to thermoregulate
Substance misuse disorders	Changes in physiological response mechanisms and changes in behaviour due to psychoactive substances and alcohol
Schizophrenia and delusional disorders	High level of dependency, prescribed psychotropic drugs
Neurological diseases, e.g. Parkinson's Disease, and those involving cognitive impairment	Potentially limited awareness and mobility; high level of care dependency, prescribed psychotropic drugs
Cardiovascular diseases (including hypertension, coronary artery disease, heart conduction disorders)	Impairment of thermoregulatory responses and high risk of acute coronary and cerebral thrombosis, changes in blood composition with dehydration (1% of body weight deficit) Changes in renal function may be related to life-threatening cardiac rhythm disturbances in older patients
Respiratory disease, asthma, and COPD	Sudden lowering of blood pressure causing cerebral ischaemia Combination of associated poor air quality (high ozone levels) and difficulty in dissipating excess heat
Diseases of renal system, renal failure, kidney stones	Diminished renal function due to electrolyte and water imbalance consequent to hyperthermia and dehydration, particularly in elderly.

Obesity	Sensory impairment to heat, and/or reduced ratio of body surface area to mass hampering sweat evaporation
Gram negative septicaemia	Increased ambient temperatures and associated dehydration are linked with an increase in bloodstream infections caused by Gram-negative bacteria, particularly <i>Escherichia coli</i> . Risk is greatest in those over 65, emphasising the importance of ensuring adequate fluid intake in older people during periods of raised temperatures to reduce the risk of infection.
Other chronic diseases	Absence of sweat glands in people with scleroderma, high loss of electrolytes through sweating in those with cystic fibrosis

## Response

The Met Office operate a Heat Health watch alert service between 1 June – 15 September which aims to give a few days prediction of abnormally hot weather that is likely to trigger additional health problems. This gives patients and health staff a brief window in which to implement plans. The alert system is used in England to trigger various alert levels within their heatwave plans which recommends what actions should be taken in preparing for and responding to an imminent heatwave. Primary care will receive notification of changes of alert status through NHS England Area teams or locally commissioned arrangements.

### Summary of Heatwave plan levels in England <sup>1</sup>

Heat wave levels	GP Actions
<b>Level 0</b>	Work with partners agencies in developing plans to prepare for and mitigate the impact of heatwaves. Consider identifying high risk patients and how to improve resilience to heatwaves
<b>Level 1</b> <b>Long term planning / summer preparedness</b>	Work with partners and staff to understand implications for Heatwave and where possible minimize risks. Consider staff education, Review business continuity arrangements. Engage with community groups.
<b>Level 2 Alert and Readiness</b> 60% chance of heatwave within 2-3 days	Publicise through leaflets, notice boards and websites. Reinforce message to staff and prepare to implement plans
<b>Level 3 Heatwave Action</b> Heatwave temperatures reached in one or more region of the country	Prepare to respond to additional calls for advice be aware of heat as a contributory factor in any new presentation of illness Mobilise available community / voluntary support
<b>Level 4 Exceptionally Severe Heatwave</b> Heatwave present in many parts of the country requiring nationally coordinated response	Be alert to any national/ regional advice or strategy

## Patient information

A detailed patient information leaflet for patients and carers has been prepared by Public Health England, and it is appropriate to make this available to patients. Practices may wish to adapt their own websites to give basic information to patients and to signpost the PHE advice leaflet<sup>5</sup>

### Coping in a Heatwave

When it gets really hot, if you are taking medication or have long term health conditions it may be necessary to take particular care in order to enjoy the weather and not to suffer adversely from it. The following tips may be worth considering

- Limit strenuous activity to the cool parts of the day, 0600-1100hrs and after 1900hrs
- Make sure that you drink plenty of water passing infrequent quantities of dark urine maybe a sign that you are not drinking enough.
- If your mobility is limited consider preparing bottled water to have nearby you if you have to sit for long parts of the day
- Store medication in a cool place, most medication is OK up to 25°C but above that temperature it is less predictable. Don't leave medication on the window sill
- Try to create a cool room in your house, leave curtains drawn, make use of any breeze and even consider hanging wet towels in the room to aid cooling
- Some medications can alter how your body adapts to heat and may need adjusting if the hot weather is prolonged
- Persistent light headedness on standing can be a sign that your medication might need adjustment and it is worth asking your GP for advice
- Asthma and COPD can be worse in hot weather when poor air quality is more common. Make sure you know how to recognise your breathing is not as good and what to do when you are struggling.
- Changes in behaviour, difficulty in sleeping and increased drowsiness can all suggest you are struggling to adapt to hot weather
- If you are a carer or neighbour of someone who is elderly or frail it is as important to make contact with them to check on their welfare just as one might do in cold weather.
- Similarly if you are the usual carer and are going on holiday it is wise to ensure that there is someone else to provide simple support should it be needed

For further information [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/201037/9545-2901035-TSO-Yourself\\_Accessible.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/201037/9545-2901035-TSO-Yourself_Accessible.pdf)

## Business Continuity Issues

Unlike winter there are fewer business continuity affecting issues associated with hot weather, as infrastructure is less prone to the effects of heat. Room temperatures can be an issue at certain times of the day particularly in older buildings but this can usually be overcome by improved ventilation and/ or re-timing work to cooler parts of the day.

It is worth considering how drugs are stored both by patients and practices, with particular care taken about the storage of drugs within cars where temperatures can be significantly raised. Computers and electronic telephony equipment also do not respond well to heat, it may be necessary to actively cool practice servers with open windows, doors and fans or if possible supply the room where they are housed with air conditioning.

1. Public Health England Heatwave Plan for England 2013, <https://www.gov.uk/government/publications/heatwave-plan-for-england-2013>
2. Le Tertre A, Lefranc A, Eilstein D, Declercq C, Medina S, Blanchard M, et al. Impact of the 2003 heatwave on all-cause mortality in 9 French cities. *Epidemiology* 2006;17(1):75-9.
3. Dhainaut JF, Claessens YE, Ginsburg C, Riou B. Unprecedented heat-related deaths during the 2003 heat wave in Paris: consequences on emergency departments. *Crit Care* 2004;8(1):1-2.
4. Department of Health. Cold Weather Plan for England: Protecting health and reducing harm from severe cold, 2012.
5. Public Health England. Heatwave Looking after yourself and others during hot weather. London, 2010. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/201037/9545-2901035-TSO-Yourself\\_Accessible.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/201037/9545-2901035-TSO-Yourself_Accessible.pdf)