

Evaluation of the Heatwave Plan for England

Final report

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Acronyms

BSA	British Social Attitudes (Survey)
CCC	Committee on Climate Change
CCG	Clinical Commissioning Group
CEO	Chief Executive Officer
CRR	Community Risk Registers
CWP	Cold Weather Plan for England
DHSC	Department of Health and Social Care
EAC	Environmental Audit Committee
EPRR	Emergency Planning Resilience and Response
FG	Focus Group
FLP	Frontline Practitioner
GOR	Government Office Region
GP	General Practitioner
HA	Housing Association
HWP	Heatwave Plan for England
HRA	Health Research Authority
HWBB	Health and Well-Being Board
HWBS	Health and Well-Being Strategy
ICT	Information and Communications Technology
IT	Information Technology
JSNA	Joint Strategic Needs Assessment
LA	Local Authority
LHRP	Local Health Resilience Partnership
LLSI	Limiting Long-Standing Illness
LRF	Local Resilience Forum
LSHTM	London School of Hygiene and Tropical Medicine
NatCen	National Centre for Social Research
NHS	National Health Service
NSWWS	National Severe Weather Warning Service
ONS	Office of National Statistics
PHE	Public Health England
PIRU	Policy Innovation and Evaluation Research Unit
PM	Particulate Matter
RCN	Royal College of Nursing
RR	Risk Registers
SPSS	Statistical Package for the Social Sciences
STP	Sustainable Transformation Plan
WMO	World Meteorological Organisation



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Key findings and recommendations

Evaluation of the Heatwave Plan for England

- The Heatwave Plan for England (HWP) aims to protect health and reduce harm from severe hot weather. It is a good practice guide underpinned by a heat-health watch alert system. The alert system is managed by Public Health England (PHE), who commission the Met Office to provide the forecast for the alerts. In the event of an upcoming period of severe weather where regionally defined temperature thresholds are predicted to be breached, heat-health alerts are cascaded to the Cabinet Office and all health, social care and public services, including NHS providers and local authorities, to enable them to implement their local protection plans.
- This evaluation examined the contribution of the HWP to protecting the health of the population during hot weather by conducting: 1) a time-series analysis to establish the relationship between hot weather and adverse health outcomes; 2) case studies of local implementation of the HWP in five areas in England, along with a national survey of nurses in hospital, community and care home settings; and 3) a survey of the general public to explore whether people protect themselves and others by following the advice set out in the HWP.

Epidemiological relationship between hot weather and health

- The relationship between temperature and mortality, and between temperature and emergency hospital admissions (as indicators of the health impact of hot weather), suggests that hot weather in England is associated with an increase in deaths and emergency hospital admissions.
- There is no evidence that general summertime relationships between temperature and mortality and between temperature and emergency hospital admissions have changed substantially in the years since the introduction of the first HWP in 2004.
- Since the largest number of excess deaths and hospital admissions associated with heat take place outside of heatwave alert periods, this raises questions about the appropriateness of current threshold levels as well as the need to place more emphasis on general preparedness strategies as represented by levels 0 and 1 of the HWP.

Implementation of the Heatwave Plan for England

- Some interviewees noted that there could be sub-regional variation in maximum temperatures within Met Office regions, with some areas (e.g. on the coast) being less likely to experience severe hot weather even when other areas within the same region exceed the alert threshold. This led to some local authorities ignoring regional alerts, and to possibly underestimate current and future risks, as they rarely experienced temperatures that exceeded alert thresholds.
- Local heatwave plans were closely aligned with the national HWP, particularly in the heat-health alert system guidance offered in the Plan. However, heatwaves were often assessed as lower risk than other weather-related hazards (such as floods and cold weather) and were often given a lower priority in planning.



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- Heatwave planning was largely seen as an exercise in emergency preparedness and focused on ‘warning and informing’ through the alert system, rather than as a strategic objective of long-term public health and environmental planning.
 - The role of Clinical Commissioning Groups (CCGs) in planning and implementing local heatwave plans was not clear; in some areas CCGs were reported to be taking a key role in planning and co-ordinating the health response, while in others they were said to be acting in a more supportive role, with NHS England taking the lead.
 - Emergency planners, mainly in local authorities and acute trusts, said that they adopted a ‘wait and see’ approach, employing professional judgment before escalating actions during a heatwave. Some noted that plans may not work as well if a heatwave alert comes over a weekend, when relevant managers may not be at work.
 - Many frontline staff, including nurses surveyed, reported to be unaware of any local heatwave plans, and unfamiliar with the HWP guidance, but most said they knew what to do to protect their patients and clients ahead of and during heatwaves. However, not all the actions stated by frontline staff during the 2017 and 2018 heatwaves were appropriate or in line with HWP guidance, and many reported taking few or none of the recommended HWP actions during an alert.
 - Many frontline nurses surveyed said that they struggled to protect their patients during heatwaves, reporting their organisations to be often ill prepared for severe heat events. Many said that they were working in difficult and challenging conditions: often in old and poorly designed buildings not well adapted for climate change; a lack of funding and resources to implement many HWP actions; and often poor working conditions with inflexible organisational policies.
 - During alert periods, it was reported to be difficult to reach all high-risk groups, especially those who might be ‘below the radar’ of health or social services, such as people with social care needs who do not qualify for means-tested social support, agricultural labourers and homeless people. Managers said that they tended to rely on health information for the general public to reach these groups.
 - General practices may often be well placed to support these high-risk patients, as they tend to have better access to vulnerable groups missing to other NHS providers and local authorities, but their role in the HWP was not clear as they do not have contractual duties for emergency planning, and there are concerns about whether they would have capacity.
 - Unless there was a heat-related ‘major-incident’, few mechanisms were said to be in place to monitor activities during and following a heatwave alert, so managers were not able to formally assess how well their organisations performed during the alert period.



Risk awareness and behaviour of the general public

- Most adults in England do not consider themselves at risk from hot weather, including a majority of those considered to be ‘vulnerable’ (adults with certain health conditions or older adults aged 75 and over). Rather, the general public, especially those aged under 45, tends to hold positive views about hot weather.
- While most of the public recognise the effectiveness of some actions to protect themselves from hot weather (e.g. drinking cool fluids, staying out of the sun between 11am and 3pm), they do not appreciate the effectiveness of other actions (e.g. keeping exposed windows and curtains closed and avoiding alcohol).
- Knowledge of the effectiveness of behaviours was related to the actions people actually took during the June 2017 heatwave. However, this appears to be mitigated by peoples’ perceptions of risk, so that individuals who do not perceive themselves to be at risk will not even take protective actions they know to be effective.
- Younger adults were more likely than older people to report experiencing hot weather related health symptoms during the 2017 summer period. This may be a reflection of their greater under-estimation of the risks of hot weather and reduced likelihood of taking protective behaviours as a result. It may also be that the effects of hot weather on older people (e.g. cardiovascular or lung conditions) are less easily identified as resulting from the heat.
- Despite national and local promotion of heat protection messages during the summer months for many years now, knowledge of some protective behaviours among the general public is still poor (e.g. about closing exposed windows during the day), and the publicity/advice appears not to be reaching some vulnerable groups (e.g. adults who report being in bad health).

Recommendations

- PHE to consider to organise, and possibly rename, the ‘Heatwave Plan’ to a ‘Summer Health Protection Plan’ to acknowledge that preparation is needed to reduce the risk of adverse health effects during temperatures below the current heat-health alert thresholds.
- PHE should ensure that more encouragement is given to local managers and frontline staff to improve their awareness of the HWP and to take stronger action in hot weather, recognising that heat-health harm begins to occur as soon as temperatures rise to average summer levels and well below the levels that trigger alerts.
- PHE to review procedures in the Plan to identify and provide preventive services to vulnerable people who are not routinely in contact with health or social care providers, such as older people who live on their own and transient groups such as agricultural labourers.
- PHE and the Local Government Association to review the capacity and capability of local authorities and other health and social care partner organisations, including those providing voluntary and community services, to implement protective actions



arising from the HWP. This should include considering how primary and community care organisations could work together better to provide guidance, support and protection to vulnerable individuals and groups before and during extreme heat events.

- PHE to review the advice provided to local authorities and health and social care providers on planning for hot weather. This would include providing evidence-based recommendations to hospitals, care homes and similar facilities on air conditioning; improving staff welfare during severe weather events, particularly for those working in areas that are difficult to keep cool; and prioritising HWP awareness through mandatory training for all healthcare staff.
- PHE to revise public health advice/publicity in order to: improve public awareness of the risks of hot weather to health; to enable a realistic self-assessment of risk among different population groups; tailor messages to the information needs and media usage of different population groups, including younger and older adults; and increase knowledge of the effectiveness of those protective behaviours of which many people are unaware (e.g. closing windows and curtains in direct sunlight during the day).



1. Introduction and background

The evidence that the world is warming is now unequivocal. Many countries are experiencing higher summer temperatures and a greater frequency of heatwaves, including the UK. There is consistent evidence that exposure to high temperatures, such as those during a severe heat event, directly increases mortality and morbidity, particularly amongst the most vulnerable groups such as infants and young children, pregnant women, older people and those with chronic conditions such as cardiovascular and respiratory disease (Public Health England, 2015b, Hajat et al., 2010, Kim et al., 2019).

Following the severe heatwave in 2003, which accounted for over 2,000 excess deaths in the UK, and climate change predictions of more frequent and increasingly hotter summers in England, the Government introduced its first Heatwave Plan for England (HWP) in 2004. The aim of the HWP is to protect the population from heat-related harm to health by planning to 'prepare for, alert people to, and prevent, the major avoidable effects on health during periods of severe heat in England' (Public Health England, 2015a p.7). Much like other similar public health schemes adopted in many European countries at the same time, the HWP incorporates a heat-health warning system which triggers short-term protective measures when severe hot weather is forecast. However, whilst similar heat-health warning and adaptive advice systems have been shown to reduce heat-related mortality, research in this area is limited, particularly for those targeting vulnerable groups (Toloo et al., 2013, Lowe et al., 2011).

Since 2004 the HWP has been occasionally updated to take account of new research, and was most recently refreshed in 2018 (Public Health England, 2018b). In 2016, the Department of Health and Social Care (DHSC) commissioned the Policy Innovation & Evaluation Research Unit (PIRU) at the London School of Hygiene & Tropical Medicine (LSHTM) to conduct an independent evaluation of the implementation and potential effects of the HWP. The evaluation was conducted between January 2017 and October 2018.

The evaluation addressed the following three questions:

1. Has the introduction of the HWP in 2004 had any effect in terms of reducing morbidity and mortality?
2. To what extent, if any, has the HWP informed local decisions on management of heat-related health risk and response?
3. Is the general population aware of the risks of heat and overheating buildings, do they change their behaviour in hot weather as a result of hearing heat alerts/advice in line with the HWP, and do they take any actions to prevent potential effects of hot weather (e.g. adapt their homes)?

The evaluation comprised a mixed method study involving four components:

1. A time series analysis of health data linked to hot weather at the level of Government Office Regions as well as the 44 areas covered by the Sustainability and Transformation Plans (STPs), to characterise heat-health relationships and trends over time.
2. A national survey of knowledge, attitudes and behaviour of the general population during heatwaves.
3. Case studies of heatwave planning and implementation in selected local areas in England over a 12-month period.
4. A national survey of nursing staff in hospital, community and care home settings on their awareness of the HWP and actions taken during heat-health alerts.



This report is aimed at a variety of stakeholders including policy makers as well as local planners and implementers of the HWP in the English health and social care system. It presents a broad range of findings over the four strands of work, drawing a number of conclusions and recommendations from these findings.

1.1 The Heatwave Plan for England (HWP)

The HWP presents itself as a good practice guide setting out ‘what should happen before and during periods of severe heat in England. It sets out what preparations both individuals and organisations can make to reduce health risks and includes specific measures to protect at risk-groups’ (Public Health England, 2015a: p.7). The plan sets out actions which should be taken to reduce harm, including a national heat-health alert service as well as heat-health guidance and advice to the general public, local communities and public service providers including local authorities, NHS, social care, voluntary groups and other public agencies. The stated aims of the HWP are ‘to raise public awareness of the dangers of excessive heat to health and to ensure that health, social care and other voluntary and community organisations and wider civic society is prepared and able to deal with a heatwave when it comes so as to protect the most vulnerable’ (Public Health England, 2015a: p7).

There is no universally agreed definition of a heatwave. In an effort to develop a global standard, the World Meteorological Organisation’s Task Team on Definitions of Extreme Weather and Climate Events suggested the following definition:

‘A marked [sic] unusual hot weather (maximum, minimum and daily average) over a region persisting at least two consecutive days during the hot period of the year based on local climatological conditions, with thermal conditions recorded above given thresholds.’ (TT-Dewce, 2016: p10)

On their website the UK Met Office defines a heatwave as ‘an extended period of hot weather relative to the expected conditions of the area at that time of year’ (Met Office, 2018). Temperature thresholds for heatwaves, however, are not the same as thresholds defined to trigger a heat-health alert. Heat-health alerts, limited to England, have been created by the Met Office in conjunction with PHE and targeted primarily at health professionals and emergency planners. This uses threshold maximum daytime and minimum night-time temperatures that vary by region, when the average temperature thresholds set at 30°C by day and 15°C overnight occur for at least two consecutive days (Public Health England, 2015a). These temperature levels were chosen based on the balance between the risk to health and the risk of sending out alerts. They set the point at which services might be expected to ‘ramp up’ their activities in accordance with the severe nature of the weather.

1.2 The heat-health alert system

The heat-health alert service is a core part of the HWP. It operates in England between 1st June and 15th September. The HWP sets out the rationale for introducing a system of hot weather alerts as ‘unlike cold weather the rise in mortality as a result of very warm weather follows very sharply, within one or two days of the temperature rising’ and there is only a short window for effective action once the heatwave starts, so that ‘advanced planning and preparation is essential’ (Public Health England, 2015a: p6). On receiving an alert, responsible authorities are



expected to cascade the alert within their organisations, and to commissioners and providers of health, public health and social care services (Appendix 1). Five alert levels are described in the Plan (Figure 1.1). Specific preventative and protective actions, triggered by regional temperature thresholds issued by the Met Office, are recommended when temperature thresholds are forecast (level 2) and reached (level 3) in local areas (Public Health England, 2015a). Alert levels are colour coded to standard emergency warning systems, from blue (level 0) to red (level 4).

Figure 1.1 Heatwave alert levels

Level 0	Long-term planning – All year
Level 1	Heatwave and Summer preparedness programme – 1 June – 15 September
Level 2	Heatwave is forecast – Alert and readiness – 60% risk of heatwave in the next 2 to 3 days
Level 3	Heatwave Action – temperature reached in one or more Met Office National Severe Weather Warning Service regions
Level 4	Major incident – Emergency response – central government will declare a Level 4 alert in the event of severe or prolonged heatwave affecting sectors other than health

Reproduced from the Heatwave Plan for England (2015) p.14.

Public Health England provides further support during the alerts through monitoring outputs such as information on excess mortality and morbidity. This would include any increase in heat-related illness such as an increase in calls to NHS 111 or GP consultations.

In addition to the heat-health alerts, the HWP provides heat-health information in the form of leaflets, posters, checklists and action cards aimed at the general public; health and social care professionals responsible for supporting vulnerable people; teachers and professionals responsible for children; and those working in care homes. The HWP also links to a separate publication for health and social care professionals that sets out the evidence in support of the heat-health guidance (Public Health England, 2015b).

Heat-health alerts issued in 2017 and 2018

In 2017 a level 2 heat-health alert was issued on June 16th and a level 3 on June (18-20th). The mean average temperature in England was 16 degrees centigrade (Public Health England, 2017). In 2018 level 2 heat-health alerts were issued in June (26-28th), July (9th) and (12-19th) and August (1st). Level 3 heat-health alerts were issued in July (2-8th) and (23-27th) and August (6th) and a record mean average temperature for England was recorded of 17.2 degrees centigrade (Public Health England, 2018c).

1.3 Brief overview of relevant studies

Effects of heat on health

The negative effect of hot weather on the health of the population is well established in England and elsewhere. Previous studies suggest that adverse health effects occur, particularly in those most vulnerable to hot weather such as people aged 75 and over, infants and young children, people with severe physical or mental illnesses, and those with pre-existing medical conditions (Nayak et al., 2018, Thompson et al., 2018, Bassil and Cole, 2010, Green et al., 2010, Wang et al., 2012, Stafoggia



et al., 2006, Arbuthnott and Hajat, 2017). Age risk, especially older age, is likely to be due to a diminished ability to thermoregulate, increased likelihood of co-morbidities or conditions that limit or affect adaptive behaviours during hot weather (such as dementia), or use of medications which affect thermoregulation (Public Health England, 2015b, Arbuthnott and Hajat, 2017). Those working outdoors during summer months, such as agricultural workers, are also identified as high-risk (Spector et al., 2016). Other identified high-risk groups include the homeless and rough sleepers, as these groups are more likely to have poor overall physical and mental health and co-morbidities such as respiratory conditions which are made worse during heatwaves and/or as a result of substance dependencies (e.g. drugs and alcohol) which can increase heat stress. These groups are also viewed as a high-risk of heat morbidity and mortality from other factors such as social isolation and exposure to the environment (Public Health England, 2015b). A recent review found that high ambient temperatures had a range of negative effects on mental health, particularly in relation to increased suicide risk (Thompson et al., 2018).

Awareness of risk and preventive behaviour

Following the 2013 heatwave in the UK, an online survey of 1497 people found that high-risk groups, such as people living in dense urban areas that are susceptible to the 'heat island effect', and those on low incomes, were less likely to take preventive measures during a heatwave than other groups (Khare et al., 2015). A review of the literature investigating public risk perception and behaviour found that, among those people who were aware of an extreme heat episode, few changed their behaviours; a lack of self-perception of being 'vulnerable', and confusion about the right action to take were the main reasons for not changing behaviour (Bassil and Cole, 2010). However, this review explored mostly US, Canadian and other European studies, with only one UK study included. In addition to the Bassil and Cole findings, one author's explanation for the discrepancy between heat-health knowledge and action is that risk is minimal and not life threatening, even among those likely to be more vulnerable to heat (Burchell et al., 2017). It has also been noted that people may confuse the harms from UV radiation with harms from heat, thus underestimating their risk of dehydration or other heat-related risks (Wolf et al., 2010, Burchell et al., 2017). Older people in particular do not perceive themselves at risk from hot weather (Abrahamson et al., 2009, Wolf et al., 2010, Bittner et al., 2014).

Studies also show that preventive behaviours were highly variable (Bassil and Cole, 2010, Wolf et al., 2010, Khare et al., 2015, Toloo et al., 2013, Waldock et al., 2018) and that both physiological and psychological factors have been shown to play a part. For example, Waldock and colleagues found that older people can have reduced perceptual awareness of their thermal environment, meaning that they may not feel uncomfortable enough in a hot environment, and therefore may be less likely to implement cooling behaviours, such as seeking shade or removing excess layers of clothing (Waldock et al., 2018). Another study found that heat protection measures (such as those triggered during heat-health alerts) were not perceived as warnings, but rather as positive news by the general population since they triggered fond memories of long hot summers in the past, and this led to a reduction in protective measures taken by people as they sought to enjoy the hot weather (Lefevre et al., 2015).

There is also some uncertainty about whether heat-health protection methods are effective. A recent systematic review of prevention methods, including heat-health behavioural interventional advice such as those within the HWP, found methodological challenges and inconclusive evidence of effect (Boeckmann and Rohn, 2014).



Implementation and effectiveness of the HWP

Heat-health warning and response systems are in operation in a variety of European countries. Though similar to the HWP there are key differences to allow much comparison (Lowe et al., 2011). There is some evidence to support the effectiveness of these systems in reducing heat related mortality (Toloo et al., 2013), but research in this area is limited.

England has had a heatwave plan in place since 2004 and several studies have looked at how it has been implemented and its effects. Planning and preparing for heatwaves sit within a suite of competing severe weather and other local emergency events, and are often given low priority. A recent small survey of members of Local Resilience Forums (those responsible for emergency planning in local areas) showed that heatwaves were the ‘severe weather event’ they felt least well prepared for (nine out of 17 interviewed), but reasons were not provided (Cox and Crouch, 2017). Another concern is that responsibilities and tasks of stakeholders are not well described in the HWP, leading to potential confusion about local roles (Abrahamson and Raine, 2009).

There are only a few studies examining the views and actions of those implementing the HWP, such as health and social care managers and practitioners. When the HWP was first introduced, health and social care professionals found it useful in preparing for heatwaves, but they were unsure whether the Plan resulted in any actions that would help those most vulnerable to hot temperatures (Johnson and Bickler, 2007). Several recent studies suggested that local implementers tended to give low priority to heatwave planning and were insufficiently familiar with the HWP, particularly frontline health and social care staff (Wistow et al., 2017, Abrahamson and Raine, 2009, Boyson et al., 2014, Gupta R et al., 2016, Woodward, 2014), though one author concluded that frontline hospital staff in some care settings were aware of the dangers of heat and felt able to provide appropriate care during hot weather (Boyson et al., 2014). Another recent study found that some staff in care homes were unaware of the risks heatwaves posed for older residents and that care home managers need to better prepare their homes to deal with the effects of climate change (Gupta R et al., 2016). Another study showed that within hospitals, communication between managers, who had good knowledge of local heatwave planning, and frontline staff, who lacked such knowledge, was an issue during heatwaves (Boyson et al., 2014).

The HWP advises health and social care organisations to be proactive by ensuring that they have systems in place to identify and contact their most vulnerable populations in the event of a heatwave. However, a recent study showed that heat-related health behaviour of frontline staff was reactive rather than anticipatory, the authors concluding that there is a need to share information about vulnerable people more effectively between organisations responsible for implementing the HWP (Wistow et al., 2017). Other studies highlighted difficulties in identifying and reaching vulnerable population groups during heatwaves and the importance of involving local community groups, in addition to voluntary ‘emergency responders’ (e.g. local branches of the Red Cross), in developing and implementing local heatwave plans (Burchell et al., 2017). These findings resonated with the evaluation of the Cold Weather Plan in England (introduced in 2011) that found that vulnerable populations were difficult to identify and community resilience was lacking (Heffernan et al., 2018). The authors of this study also noted that leadership of local cold weather planning was highly variable and that GPs were difficult to engage in cold weather preparedness.



Little is known about the impact of the HWP on long-term preparedness for hot weather and few studies have examined the effects of national government climate change initiatives at local government level (Tompkins et al., 2010). A recent report by the Government's Environmental Audit Committee recommended that the Government should be more proactive to ensure safe and resilient homes and support local authorities to better 'green' their local areas (House of Commons, 2018). Overheating in homes remains a risk for a large number of English households as buildings, particularly newer builds, lack heat resilience (Beizaee et al., 2013, Taylor et al., 2015, Mavrogianni et al., 2014). This is also the case for some care homes whose buildings are less able to cope with climate change and who lack investment strategies to adapt (Gupta R et al., 2016). It is also estimated that 90 percent of UK hospital buildings are prone to overheating (ARCC, 2015). Climate analysts predict that heatwaves are likely to contribute to more deaths in the future in England and, as part of any future plans, there will be an increasing need to adapt existing and new buildings to better withstand heat, whilst reducing carbon emissions through low energy design strategies (Committee on Climate Change, 2014, The Lancet, 2018, Short et al., 2012, ARCC, 2015).

More robust evidence is needed on the role of wider structural and social determinants of adverse outcomes from exposure to hot weather, e.g. the type and state of private housing (Kovats and Bickler, 2012) as well as temperature regulation in hospitals (Carmichael et al., 2012, Short et al., 2012) and care homes.



2. Methods

2.1 Epidemiological relationships between hot weather and health

The first objective of the evaluation of the HWP involved an epidemiological assessment of retrospective data to characterise the nature of the relationships between high temperatures and indicators of health at the levels of Government Office Regions (GOR) and Sustainability and Transformation Plan (STP) areas. Changes in heat-health relationships since the introduction of the HWP are also assessed as well as potential links between annual heat-risk and previous wintertime experience.

Data

The health data consisted of:

- All deaths occurring in England during 1st Jan 1981 – 31st Dec 2015, obtained from the Office for National Statistics.
- All emergency hospital admissions occurring in England during 1st April 1997 – 31st March 2012, obtained from NHS Digital. These data were already available from a previous evaluation of the Cold Weather Plan (Hajat et al., 2016) and a new data application was not made in the interests of time.

Each health outcome was aggregated by date to create a time-series of the daily number of events for each GOR and for each of the 44 STPs. Separate series were also created by age and disease groups.

The exposure data consisted of daily mean, minimum and maximum temperatures for the same time periods. These were recorded by Met Office land surface stations. For each measure, one composite series was created for each region by combining data from stations recording measures on at least 75% of days during the study period and using a previously published imputation method to deal with missing values (Armstrong et al., 2011). On average, 20 stations contributed data to each regional series. A similar approach was used to create composite series for each STP however all stations were included regardless of the amount of missing values in order to maximise available data.

Statistical analysis

Time-series regression analysis was used to characterise the short-term (i.e. day-to-day) associations between temperature and health indicators. For each series of deaths or emergency hospital admissions, slow-changing seasonal patterns in the health counts (unrelated to temperature) and any secular trends were controlled for using splines of time, with seven degrees of freedom per year of data analysed. Spline functions are a series of polynomial curves (usually cubic) joined together to flexibly model patterns in a time series of health data. Indicator terms were used to model any day-of-week effects. The relationship between temperature and health indicators was then assessed graphically, again using spline functions. As effects of high temperatures are mostly immediate, impacts distributed up to two days following exposure are quantified, although longer lags were also assessed. In general, the graphical relationships indicated a gradual increase in the risk of a heat-related health event once daily temperatures increased above certain threshold levels. For quantification purposes, therefore, a linear threshold model was used, whereby there is assumed to be no risk at temperatures below the threshold value, and a linear relationship between temperature and risk of heat-related health event above the threshold. To objectively identify the heat threshold for each region, statistical model diagnostics were compared between models with threshold values fixed at different temperatures. Effects were estimated for just the summer months defined as the months of June to September.



The time-series models were used to (i) compare temperature-health relationships before and after the introduction of the HWP, (ii) explore the alert thresholds currently used in the HWP, and (iii) assess intra-summer variation in heat vulnerability. It was not possible to conduct a direct comparison of mortality impacts on alert days compared to non-alert days or days of similar temperatures before the advent of the HHWS as there were too few days of such extreme temperatures, for example in London there were only two days when our daily maximum temperature series reached the alert threshold value of 32°C. Furthermore, we did not have information on the whole period in which days an actual alert was called by the Met Office based on their forecast values.

For the final epidemiologic component, in order to explore possible links between summertime vulnerability and previous winter burdens, we also quantified heat risk for individual summers and correlated this against the mortality experience of the previous winter. Some studies have observed that a low winter mortality burden may result in a higher than expected mortality burden in the following summer due to the pool of people at risk remaining large (Ha et al., 2011). As both annual summertime and wintertime mortality has been decreasing over time, series were de-trended using spline functions prior to assessment of correlations.

Results are illustrated for London and West Midlands although the patterns were similar in all regions.

2.2 Local implementation of the Heatwave Plan for England: Case studies

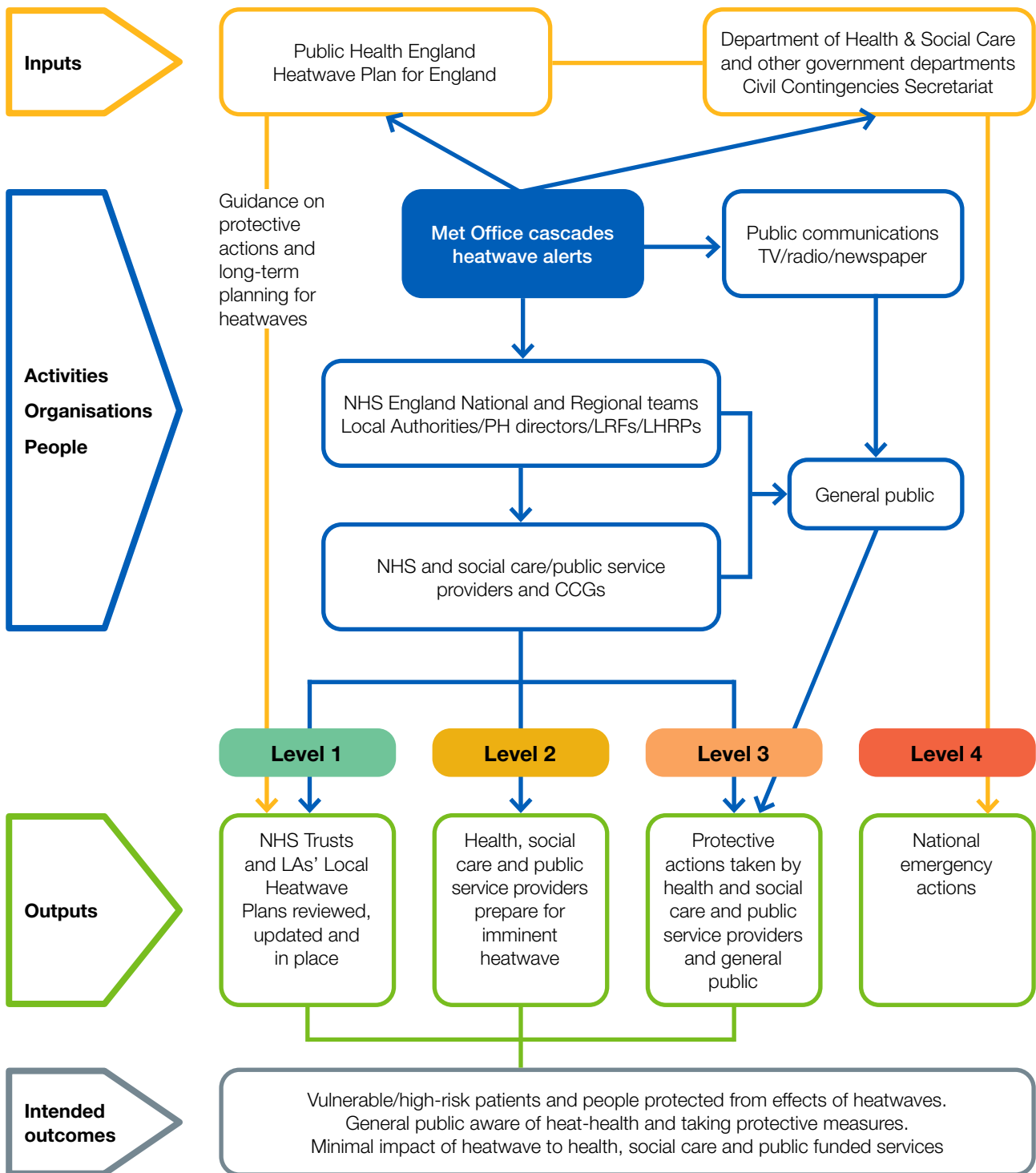
Overview of case study design

A longitudinal multiple case study approach, employing qualitative research methods, was used to investigate how the HWP was implemented in five local areas over a period of one year. The case study design used is well-established in research in many public policy settings, including healthcare (Exworthy et al., 2011, Crowe et al., 2011). It allows critical events, policy development and programme-based service reforms to be studied in detail in their 'real life' context (Yin, 2009). Our case studies focused on how the HWP was interpreted and implemented locally through local plans and subsequent activities, using interviews with managers and frontline staff, the analysis of relevant policy documents and observations of meetings and workshops, enabling in-depth investigation of local processes and activities before, during and after a heatwave.

A logic model (Weiss, 1998) (Figure 2.1) was developed by the team at the early stage of the research, to enable the research team to visually conceptualise the intervention and its processes. This enabled framing of specific evaluative questions by looking at local context, implementation and expected outcomes. The model was based on the current HWP (Public Health England, 2015a). It illustrates the process by identifying the broad activities, outputs and intended outcomes from the HWP.



Figure 2.1 Logic model of the Heatwave Plan for England*



* Note: Level 4 (emergency response) is minimally represented in this model for reasons of simplicity and clarity.



Site selection

Five local authority areas were purposively selected as case study sites to allow for variation in geography and demography. Criteria for selection were derived from the research literature, epidemiological data, and discussions with officials at PHE and the DHSC. This was further refined by reference to further regional data. Sites were selected to include a mix of urban, semi-urban and rural areas and three broad English regions: North, Midlands and South. They also represent differences in exposure to heat and weather-related activity patterns, such as the number of visitors engaging in outdoor recreational activities including summer festivals, and the number of agricultural workers in areas in which agriculture constitutes a significant part of the local economy. Sites also differed in their proportion of older people as a group identified in the HWP as vulnerable to hot weather. One London borough was included as a site, as London has been identified in previous studies as being particularly at risk of heatwaves.

Recruitment of case study sites

The evaluation team contacted the CEO of each local authority selected to ask for their agreement to participate in the evaluation (Appendix 2). Recruitment of sites was supported by a letter of support from PHE (Appendix 3). If they agreed, CEOs were asked to provide the name and contact details of senior staff responsible for heatwave planning in their organisation who would act as the main 'key' contact for the evaluation team.

Identification and recruitment of informants in sites

Those leading on heatwave planning in each local authority, 'key contacts' for the evaluation e.g. directors of public health or emergency planners with a lead on heatwaves or business continuity, were invited to participate in an interview. An information leaflet, detailing the purpose of the study and their involvement (Appendix 4), and a consent form (Appendix 5) were provided along with the study invitation. After providing consent, the key contact agreed to direct the evaluation team to relevant staff within the local authority and in other local organisations involved in heatwave planning, which typically formed Local Health Resilience Partnerships.

We recruited staff involved in planning and managing the response to hot weather, as well as staff working at the frontline with at-risk groups in each site. A participant information sheet (Appendix 4) outlining details of the research and their participation was sent prior to obtaining consent.

Managers were recruited directly via the key contact. Managers then helped to identify and recruit frontline staff either by asking them directly, providing their names to the evaluation team, or by posting recruitment leaflets (Appendix 6). Interested staff responded by contacting a member of the research team for further information by email or telephone. A gift token of £25 was provided to frontline staff to compensate them for their time.

Conducting interviews

Semi-structured interviews were carried out using separate interview schedules for managers and frontline staff to reflect their roles in planning and implementation (Appendix 7). Managers were interviewed in person at their place of work or over the phone. Frontline staff were interviewed over the phone. Interviews lasted between 30 and 80 minutes, were audio recorded with consent and transcribed verbatim.

Following the level 3 alert in June 2017, a short follow-up interview was conducted with the key contact (or a deputy) over the phone, to ask about any action taken after



the alert, efforts to monitor actions and any reflections on the process. In spring 2018, further follow-up interviews were carried out with a sub-sample of staff interviewed in spring 2018 to explore any local learning from the previous heatwave planning cycle and any actions taken in preparation for the 2018 summer.

Documentary data and observations of meetings

The case study analysis also drew on relevant documents, including local strategic and operational documents relating to severe weather or heatwave planning; Community Risk Registers (CRR); Joint Strategic Needs Assessments (JSNA) and Health and Well-Being Strategies (HWBS); local climate change and environmental strategy documents; and any public health guidance relating to heatwaves provided by the local authorities or its partners. Documents were identified through internet searches on relevant websites of the participating local authorities, local NHS organisations and others. In addition, interviewees were asked to point us to any documents that might be relevant to this study. Documents were analysed using the themes identified during the analysis of the interviews.

Across three of the case study sites we observed one Local Resilience Forum planning meeting, one community resilience workshop and visited one general hospital to note measures taken to improve climate resilience.

Analysis

An iterative approach was employed to data collection and analysis throughout the evaluation. Interviews were analysed thematically using the Framework Method for applied policy research (Ritchie and Spencer, 1994). The original research questions, as well as new ideas generated inductively from the data, influenced the process. Members of the research team familiarised themselves with the data by reading transcripts and making notes. Three of the research team independently coded the first few transcripts for a priori and emergent themes. Following discussion, an initial analytical framework of emergent codes and descriptors was agreed and applied to a further set of transcripts. The analytical framework was further refined to incorporate new and refined codes, and a final analytical framework was agreed by the team. The agreed framework was then applied to each transcript using NVivo 11 software and charted within framework matrices for each of the case studies, whereby summarised interview data could be read across codes and cases (participants). Thematic analysis was undertaken by the research team reviewing the summaries within the matrices and making connections between categories and participants. Documentary data were analysed descriptively by searching, listing and summarising content in the documents relating to heat or heatwaves using agreed search terms. NVivo 11 software was used to aid the process. Detailed field notes of meetings and workshops observed were used to provide context to the analysis of interviews.

2.3 Local implementation of the Heatwave Plan for England: National survey of nurses

The views and experiences of frontline staff were obtained through a web survey of nurses working in hospital, community and care home settings carried out in September and October 2018. This was about one year after most of the interviews for the case studies were conducted, and the nurse survey questionnaire asked about the 2018 summer period, during which there were a number of heat-health warnings throughout the country, and was generally much warmer than the 2017 summer covered by the case studies.



An email invitation (Appendix 13) was sent on 14 September 2018 to all nurses identified on the Royal College of Nurses (RCN) membership list identified as working in hospital, community or care home settings in England. Student nurses were excluded, as were those working in academia. The questionnaire was completed online, using the Qualtrics survey platform (www.qualtrics.com/uk).

In all, 2697 completed questionnaires were available for analysis (some returns were excluded due to an insufficient number of questions being completed). The final sample included nurses working in:

- Hospital setting (n=1942)
- Community setting (n=518) which includes community health services, primary care, school services, etc.)
- Care home setting (n=237) which includes nursing and residential care homes.

The questionnaire topics covered: background characteristics of nurse participants and their place of work; nurses' awareness and knowledge of the HWP; actions taken by nurses during heat-health alerts over the 2018 summer period; and how well the nurse participants, and their organisations, are prepared for protecting patients during periods of severe hot weather. The questionnaire is included in Appendix 14.

Analysis

The nurse survey data were 'cleaned' by the PIRU research team and the data were analysed using SPSS v23. The analysis presents survey results by setting (hospital, community, care home) and by nurse role (manager, frontline).

Free text responses to the questions on 'organisations' preparedness for hot weather' and 'any additional points on heatwave planning' were extracted by setting (hospital, community, care home), saved as Word files and uploaded to qualitative software (NVivo 11) for coding and thematic analysis using the Framework Method (Ritchie and Spencer, 1994).

2.4 Public knowledge and behaviour: Survey and focus groups

Survey

A survey of 1878 members of the general public in England (aged 18 and over), living in private residential addresses, was carried out by National Centre for Social Research (NatCen) in August and September 2017. The sample was drawn from members of NatCen's random probability panel, which involves largely web-based surveys, but also includes telephone interviews with panel members who do not have internet access in order to provide coverage of the whole population. Of the 3153 panel members in England invited to participate in the survey, the achieved sample included 1633 web interviews and 245 telephone interviews, giving an overall survey response rate of 60%.

NatCen used a sequential mixed mode design, with panel members first invited (by various methods including email, text and post) to complete the survey questionnaire online. Panel members who had not completed the online questionnaire after two weeks were then contacted by telephone (if phone numbers were available). This ensures that panel members who do not have access to the internet, or who may have literacy or language problems with a written questionnaire, are still able to participate. A £5 gift card was sent as a 'thank you' to those who participated. Fieldwork lasted for one month, from 24 August to 24 September.



Further details of the NatCen probability-based panel can be found in (Jessop C, 2018).

Questionnaire

Draft survey questions were initially specified by the PIRU research team, and these were subsequently modified and refined in discussion with NatCen. The questions covered: attitudes to hot weather; effectiveness of various actions for protecting people from heat; adaptations to home that lend protection from heat; awareness of any hot weather advice or publicity during the summer heatwave in June 2017; actions taken to reduce harm from heat (for themselves or for other vulnerable people they know); and whether they suffered any ill effects from hot weather during that period. The majority of the questions came from previous surveys that looked at the public's views on heat protection messages and measures, and on their changes in behaviour (Public Health England, 2016; Lefevre et. Al., 2015). The questionnaire is included in Appendix 12.

The questions on hot weather and the summer heatwave were part of a survey which included modules of questions on other topics for other NatCen clients.

Non-response and weighting

Since not everyone invited to participate in a survey does so, non-response weighting is used to try to minimise any bias introduced by differential response among population sub-groups (e.g. men versus women, younger versus older age groups, etc.). For surveys using the NatCen panel, non-response can occur at three stages: firstly, for the survey which is used to recruit the panel (i.e. the British Social Attitudes Survey (BSA), which involves a face-to-face interview with a probability sample selected throughout Great Britain); secondly, refusal to join the panel at the end of the BSA interview; and thirdly, non-response for particular panel surveys.

NatCen calculates a weight to account for non-response at each of the three stages, with the final weight being the product of these three weights. Logistic regression models are used to derive the probabilities of response of each panel member, and the weight is computed to be the inverse of the probabilities of response. The weight adjusts for non-response using a number of variables such as region, household type, education level, internet access and social class. Further details about the weighting and survey methods for this specific survey are available in a Technical Report written by NatCen, which can be obtained from the PIRU research team.

Table 2.1 shows how the estimated profile of the population (column a) compares with the weighted survey sample (column b) (at the time of panel recruitment in 2015/16) for several key socio-demographic variables. It also shows the profile of the achieved panel sample (column c) at the time of data collection for the current survey (summer 2017). While columns (b) and (c) are similar, the latter is updated for people who may have moved from one region to another, changed their type of job or household, etc.



Table 2.1 Socio-demographics: population estimates compared with weighted survey estimates at time of panel recruitment, and profile of weighted sample at time of interview (summer 2017)

	(a) Population estimate – England (BSA) %	(b) Sample profile at time of panel recruitment (after weighting) %	(c) Sample profile at time of survey (after weighting) %
Gender			
Male	48	48	48
Female	52	52	52
Age			
18-24	11	12	9
25-34	17	17	17
35-44	17	17	17
45-54	18	18	17
55-64	14	15	16
65+	22	20	22
Region			
North East	5	5	5
North West	13	13	13
Yorkshire & The Humber	10	10	10
East Midlands	9	9	8
West Midlands	10	10	10
East of England	11	11	11
London	16	15	15
South East	16	16	16
South West	10	11	11
Social grade			
Managerial & professional	38	39	41
Intermediate	12	14	14
Small employers & own account workers	9	7	8
Lower supervisory & technical	8	8	8
Semi-routine & routine	28	27	29
Household type			
Single person household	17	16	17
Lone parent	4	4	4
2 adults (no children)	36	36	35
2 adults (with children)	21	21	23
3+ adults (no children)	15	15	16
3+ adults (with children)	7	7	6



Table 2.1 Continued

	(a) Population estimate – England (BSA) %	(b) Sample profile at time of panel recruitment (after weighting) %	(c) Sample profile at time of survey (after weighting) %
Economic activity			
Full time education	5	4	4
Paid work	57	58	54
Unemployed	5	5	5
Retired	23	21	20
Other	11	11	17
Tenure			
Owned/being bought	64	64	63
Rented (LA)	10	8	9
Rented (HA/Trust/New Town)	7	8	6
Rented (Other)	18	18	17
Other	1	1	3

Analysis

The survey data were ‘cleaned’ by NatCen and provided to the research team as an SPSS dataset. Data analysis was carried out by PIRU researchers using SPSS v23.

The analysis presents survey results by socio-demographic variables including: gender, age group, ethnic group, Government Office Region (GOR), highest educational qualification, household type, urban or rural residence, longstanding disability and self-reported general health.

Results are also provided for a number of ‘vulnerable’ groups, including (unweighted bases are shown in brackets):

- Individuals aged 75 years and over (75+) (143)
- Individuals aged 75+ who live alone (69)
- Individuals aged 18-74 with a limiting longstanding illness (18-74 with LLSI) (260)
- Individuals aged 18-74 with self-reports of bad/very bad health (18-74 with bad health) (135)

While young children are also recognised as another at-risk group, since the survey did not collect data on the age of children living in participants’ households, it was not possible to identify participants who were looking after young children.

Focus groups

Four focus groups about how people coped in hot weather were carried out in three different geographical regions and towns in England: two in central London; one in the South East; and one in the Midlands. Participants were purposively selected to include those identified potentially as most at risk during heatwaves: largely older people, particularly those over age 75 and living on their own, including those with health conditions likely to be made worse by heat (Public Health England, 2015a: p14). Participants were recruited through national and local voluntary organisations supporting people from this group, one being a national charity organising monthly tea parties



for older people (over age 75) living on their own; others were recruited through local community luncheon clubs for older people. Table 2.2 presents the characteristics of the focus groups.

Table 2.2 Characteristics of focus groups

Focus Group	Area	How recruited	Date held	Attendees			
				Male	Female	Age range	Total
1	South East	National charity organising monthly tea party	Dec 2017	1	4	5 > 75	5
2	Midlands	National charity organising monthly tea party	April 2018	1	5	6 > 75	6
3	London	Local luncheon club (church)	May 2018	2	4	6 > 75	6
4	London	Local luncheon club (community)	May 2018	1	7	7 > 75 1 65-74	8
Total				5	20		25

Recruitment

National charity: The charity was approached by one of the researchers by telephone and email to seek their agreement to help with recruitment. The charity was selected as it organises monthly tea parties in regions across England for small groups of older people aged 75+ who are dealing with loneliness and social isolation. Volunteers for the charity offered to ‘host’ the tea party in their own homes, as well as helping with transporting guests. Once the charity had agreed to help, information about the research including the recruitment leaflet (Appendix 8) was sent to the head office and disseminated regionally. Two of the charity’s area organisers agreed to help with recruitment. The organisers’ communicated our request (via the recruitment leaflet) to their hosts and guests verbally and by email. Those interested were invited to request further information about the evaluation and the focus group in the form of a participant information sheet (Appendix 9). Once a group had agreed to participate (initial consent was required from the host as well as the guests), a date was set to hold the focus group during a tea party and the focus group was convened during the event. In both focus groups, all participants were living independently and some were familiar with others in the group as they had met during previous tea parties.

Luncheon clubs: Three established luncheon clubs for older people were approached by one of the researchers by telephone and email with details about the research, requesting help with recruitment. Luncheon club organisers agreeing to help (two) were provided with further information including a recruitment poster. One focus group was convened in a luncheon club run by a local church which participants attended typically on a weekly basis. The manager of the luncheon club was approached by the researcher to see if any members would like to participate in the focus group. A poster and an information sheet about the research was distributed to the members two weeks prior to the focus group being held. Information about the focus group was publicised in the club centre on their notice board. The researcher attended a week before the planned focus group date to meet with interested members and answer any questions they might have. Information sheets and consent forms were distributed (Appendices 9 and 10).

All participants were provided with a gift token of £25 to compensate them for their time.



Process

On the day of the focus group, the facilitator (researcher) provided a copy of the information sheet (enlarged for accessibility) and explained the process face-to-face, restating assurances of anonymity and confidentiality. The group had an opportunity to ask any questions before providing their full written consent. The interview was recorded only with consent from all group members, which was given in all cases. The aims and conduct of the focus group were agreed and people were asked to introduce themselves for the record. The facilitator used a topic guide (Appendix 11) to frame the discussion with probes and prompts as necessary. The topics included general opinion and attitudes to heat and hot weather, the participant's own and other's heat-health behaviour, including any identified risks and coping strategies. Participants were provided with a selection of current health promotion leaflets/posters such as the HWP's 'Beat the Heat' campaign and Age UK's guidance on Staying Cool in a Heatwave (Public Health England, 2018a, Age UK, 2017).

Analysis

Interviews were audio recorded and transcribed verbatim by the researcher/facilitator. A reflective diary was kept, and detailed observational notes were written-up immediately following each focus group. A thematic framework approach to analysing the data was used (Richie & Spencer 1994), whereby themes were developed from the research questions as well as from the transcript. Familiarisation with the data was undertaken by the researcher personally transcribing the recorded data in tandem with field notes and observational data. Transcripts were read and re-read a number of times and then coded thematically, mapped on a chart and interpreted. IT software to enable the process (NVivo11) was used.

2.5 Patient and public involvement

Three lay Research Advisors were recruited via PIRU's collaboration with the Quality and Outcomes of Person-centred Care Research Unit (QORU), another DHSC funded Policy Research Unit (PRU) which has a Public Involvement Implementation Group that supports and provides public involvement in research projects across the two PRUs. This Group has recruited a pool of 20-30 Research Advisors who can be called upon to provide input into particular projects.

A briefing note was circulated to the Group. Key tasks were to advise on the design and quality of fieldwork documents and to comment on reports and papers as a result of the evaluation and other dissemination activities. Documents were sent to the Advisors electronically for comment/feedback at various points in the study, such as in the development stage of interview and focus group topic guides and questionnaires, and in draft sections of reports. Their feedback enabled the research team to further refine and improve the documentation for participants (Appendices 4, 5, 6, 8, 9 and 10), interview questions, focus group topic guides (Appendices 7, 11 and 12) and the draft chapter on public attitudes, awareness and behaviour related to hot weather (Chapter 5).

2.6 Ethical approval

Health Research Authority approval to conduct the research was given on 27th March 2017. The London School of Hygiene and Tropical Medicine's Research Ethics Committee gave the study a favourable opinion on 21st March 2007 (Ref 12004-1).



3. Epidemiological relationships between hot weather and health

Lead author:
Shakoor Hajat

3.1 Comparison of temperature-health relationships before and after introduction of the HWP

Temperatures have risen during the study period. For example, in London the average daily summertime maximum temperature was 18.0°C between 1981-1989, 18.6°C between 1990-1999, 19.4°C between 2000-2009 and 20.0°C between 2010-2015; in the West Midlands over the same time periods it was 16.0°C, 16.4°C, 17.3°C and 18.1°C respectively.

Figures 3.1 and 3.2 show the seasonally-adjusted regional relationships between year-round daily mean temperature and daily mortality and between year-round daily mean temperature and daily emergency hospital admissions respectively. In each graph, the centre line represents the estimated temperature-health relationship, and the lines either side are 95% confidence limits. For mortality, the relationships are shown separately for the 12 years before and 12 years after the HWP was introduced in 2004. For the shorter emergency hospital admissions series, relationships were considered separately for the 6 years before 2003 and 9 years after. The extreme summer of 2003 was excluded from comparisons as relationships could have been heavily influenced by this unusual year. With both health outcomes, the graphs show very little change in the relationship in any of the regions since the plan has been in operation. In interaction models, there was no significant difference in the heat effect (steepness of the slope) between the two time-periods.



Figure 3.1 Adjusted relationship between mean temperature and relative risk of all-cause mortality by region

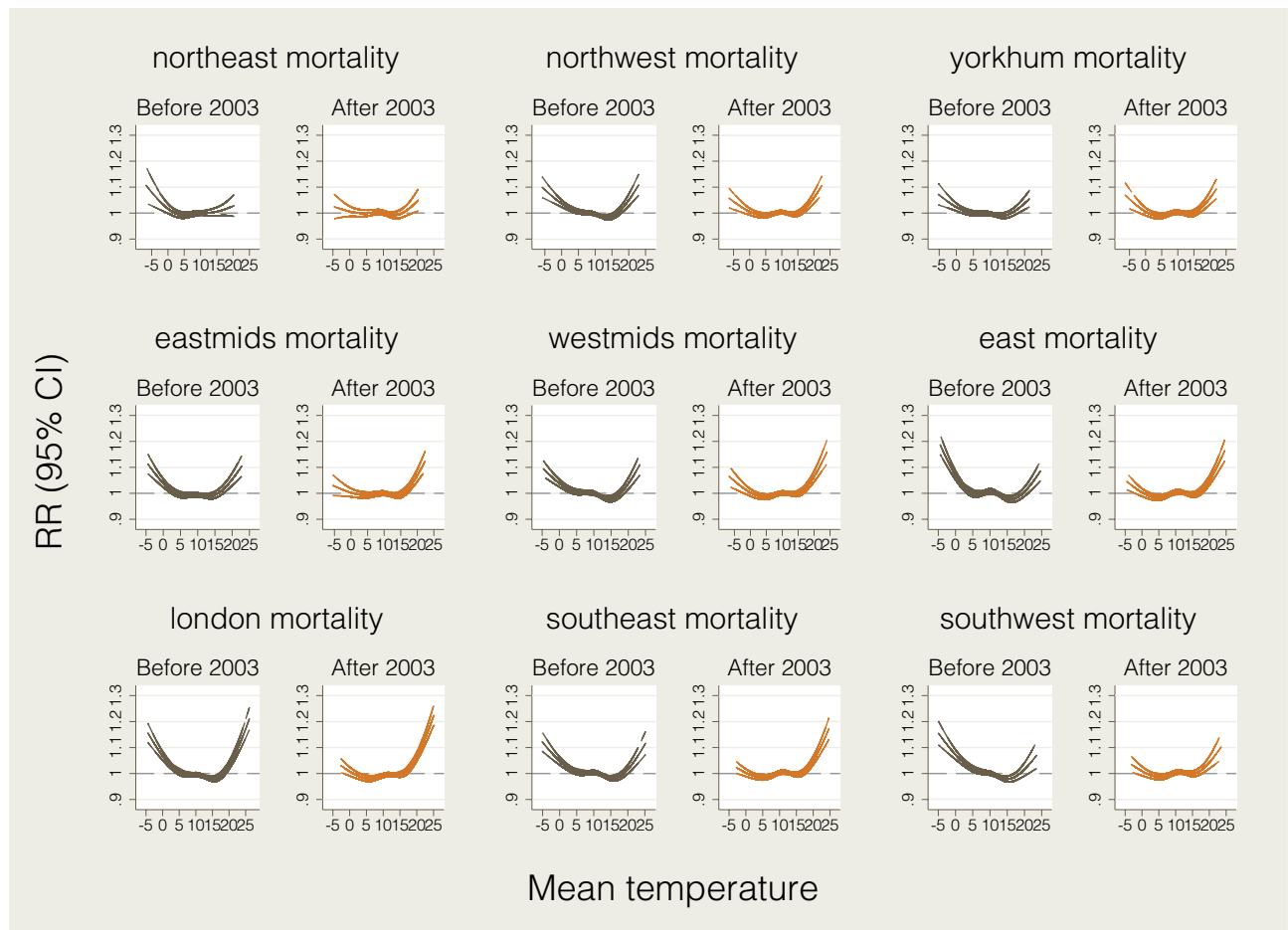
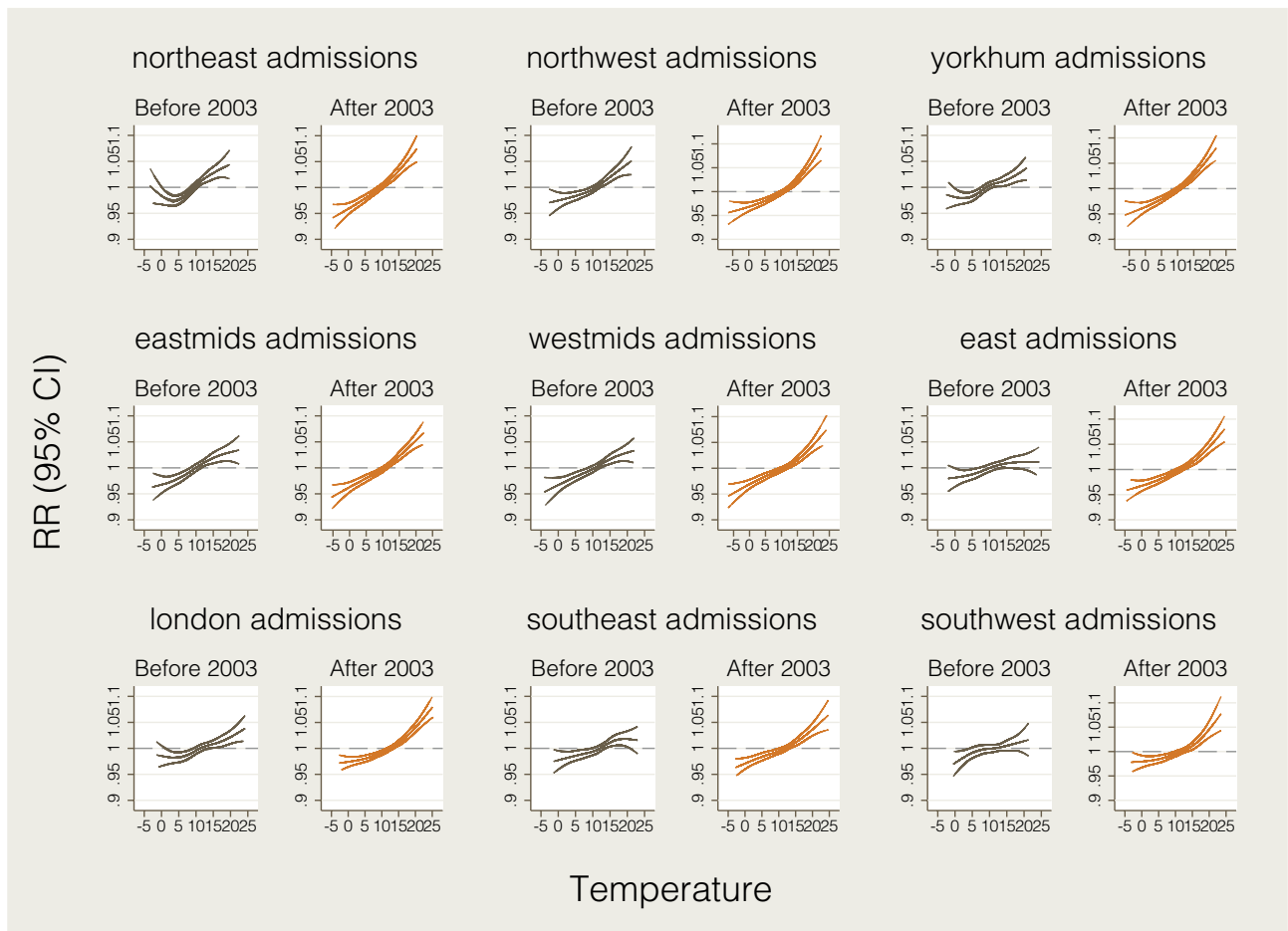




Figure 3.2 Adjusted relationship between mean temperature and relative risk of all-cause emergency admissions by region





3.2 Exploration of alert thresholds used in the HWP

Figures 3.3 and 3.4 show the temperature-mortality relationships again for London (3.3) and the West Midlands (3.4), but this time for daily maximum temperature rather than daily mean temperature, and also restricted to just the summer months. The histogram shows the distribution of temperature for each region. The lower graphs combine the relative risk of death at each temperature with the frequency with which each temperature occurs (histogram) to provide an estimate of the attributable fraction of heat-related deaths associated with each temperature value. The vertical dashed line indicates the alert threshold value currently used in the HHWS based on maximum temperature. In London, the heat threshold was estimated to be at 24°C, i.e. the value of maximum temperature at which the risk of death begins to increase (relative risk greater than 1). In the West Midlands, the threshold is estimated at 23°C. Heat-attributable days are represented by all days above the identified epidemiological thresholds; i.e. 24°C in London and 23°C in the West Midlands. Consequently, if all deaths above these values represent 100% of the total heat-related mortality burden, then it becomes apparent that by far the greatest fraction of deaths attributable to high temperatures occurs on days below the alert thresholds. Given the relative infrequency of temperatures at which an alert is currently triggered, only a small fraction of heat-related deaths occur on alert days – less than 10% in the case of London and the West Midlands, and a similar pattern is seen in all other regions also (not shown).

Figure 3.3 Adjusted temperature-mortality relationship in London and heat-attributable fractions

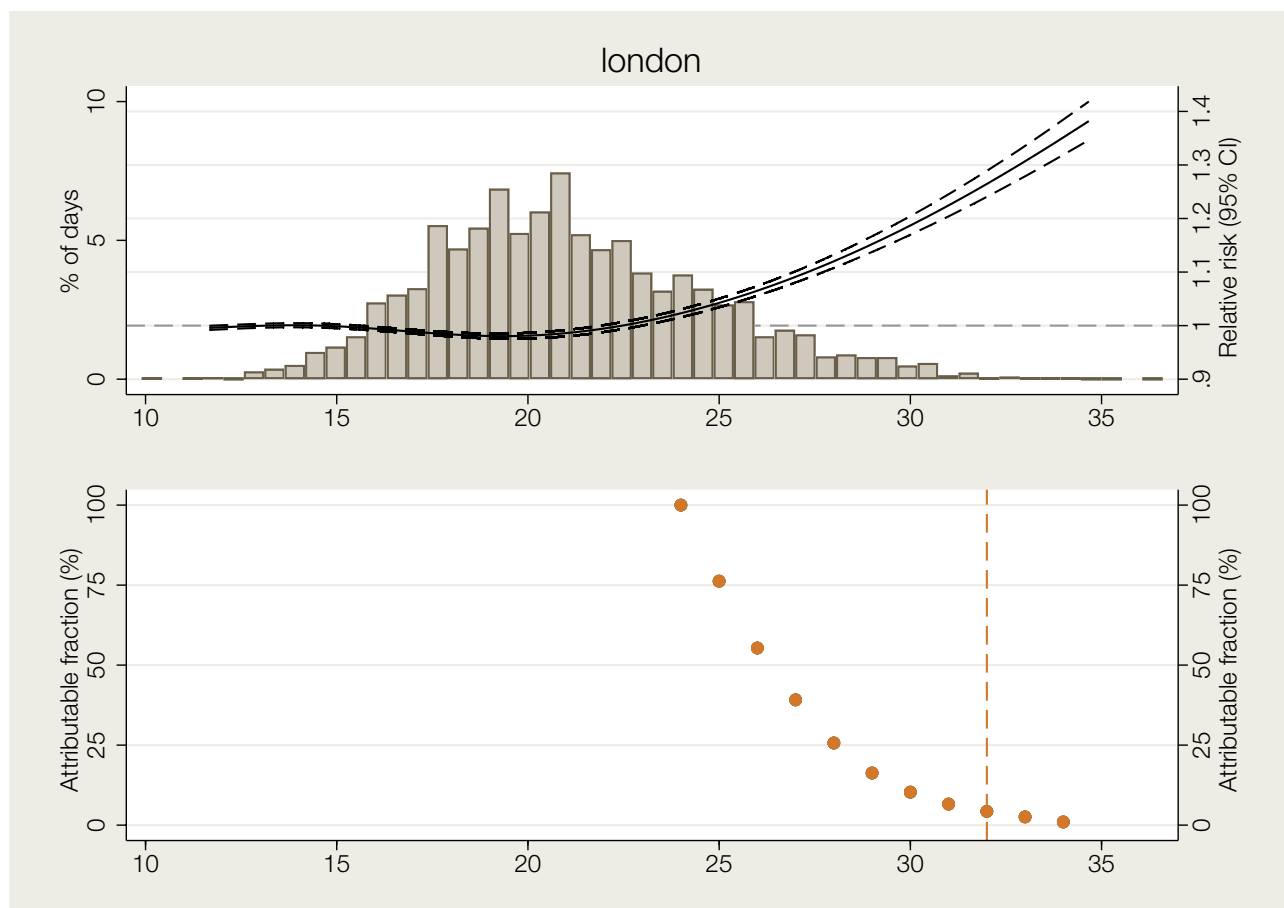
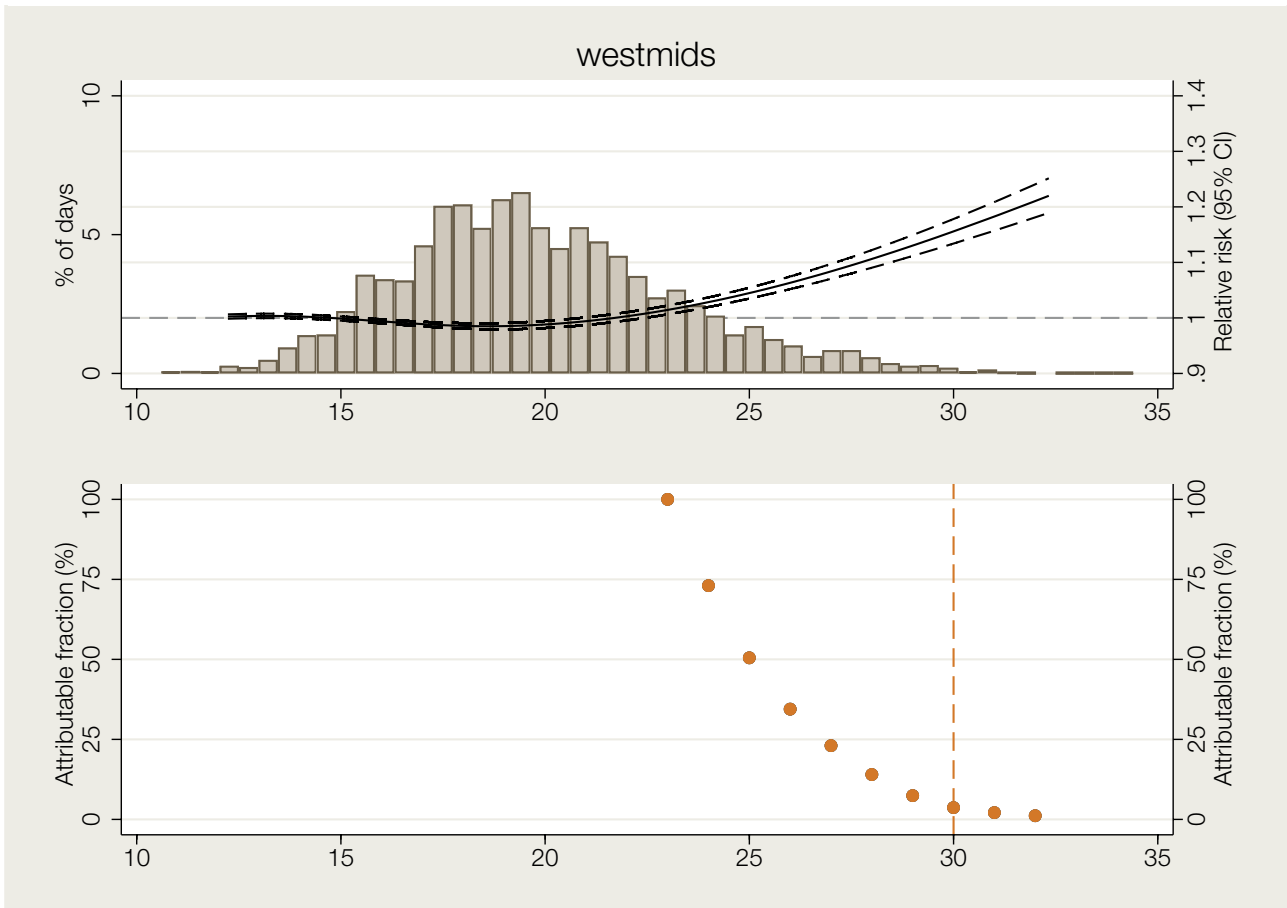




Figure 3.4 Adjusted temperature-mortality relationship in the West Midlands and heat-attributable fractions



3.3 Intra-summer variation in heat vulnerability

Current heat alert thresholds are less likely to be activated early in the summer when temperatures are generally milder. Since population vulnerability to heat risk tends to be higher in early summer compared with later (even if absolute temperatures are lower) (Hajat et al., 2002), the alert system may currently be missing important days in early summer when mortality impacts are likely to be high. Furthermore, substantial heat impacts may also occur on days before the HWP comes into operation each June – as was the case during the unusually warm period during April 2018.

To explore this, we estimated mortality impacts on days that would be considered to be unusually hot (for a given time of the year) but not so hot that the alert is triggered, and therefore acute health protection measures are not instigated. A hot day for this analysis is defined as any day in June-September when the maximum temperature was above the 95th percentile for each month. Days before June were not considered as there were no unusually hot days in April or May during our study period. There may be relatively high temperatures on days when alerts are not called, for example, mid-July in London in 2003 (Figure 3.5) and in the West Midlands in 1995 (Figure 3.6), with resulting increases in mortality. Excess mortality was calculated based on comparing observed mortality levels with expected levels. The expected



levels (baseline deaths in Figures 3.5 and 3.6) are derived by averaging mortality on the same calendar day in proximate years (two years before and two years after).

Figure 3.5 Observed and expected daily mortality in London in summer 2003

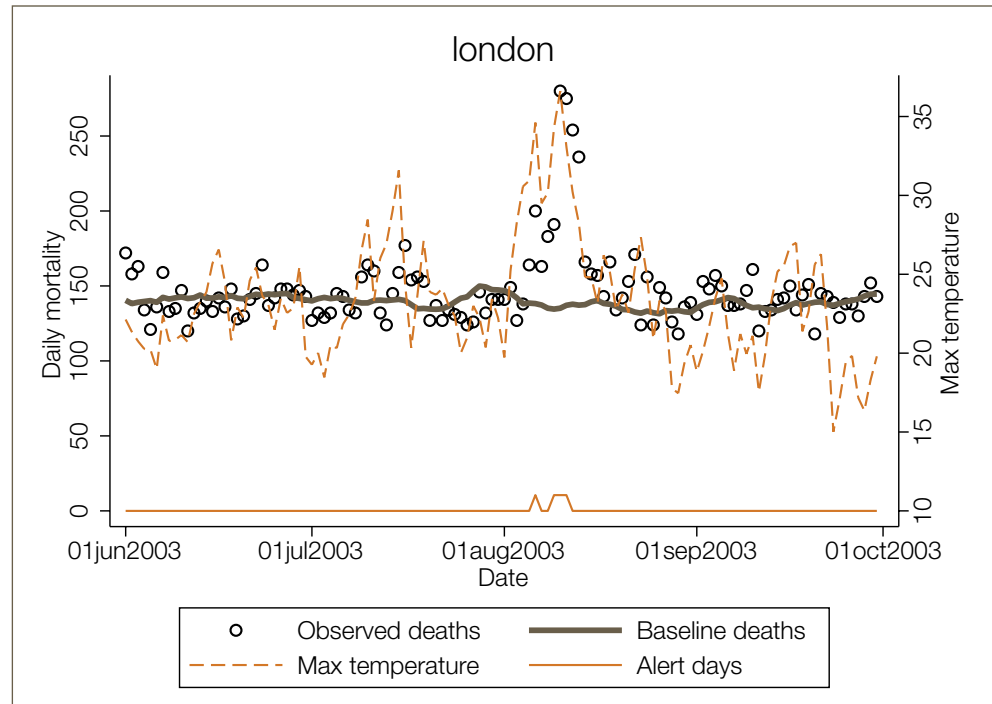
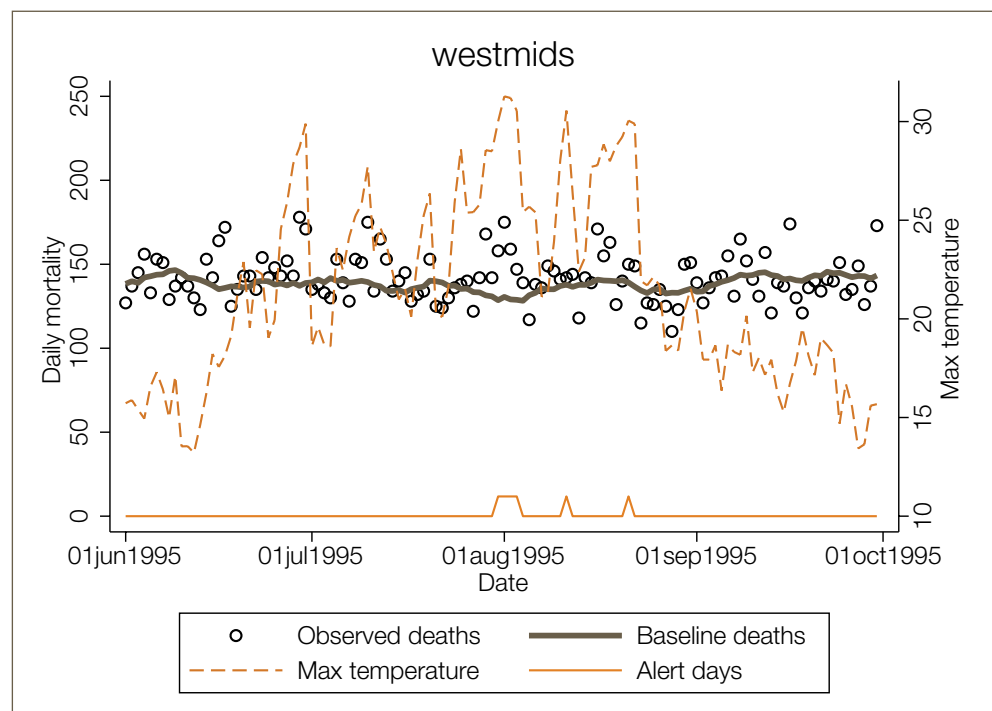


Figure 3.6 Observed and expected daily mortality in the West Midlands in summer 1995





Tables 3.1 and 3.2 list the top 20 hot-days in London and the West Midlands with the highest percentage increases in mortality and whether or not they would have been issued as alert days based on current HWP thresholds. There are considerable excesses on non-alert days. Although not evident from the tables, heatwaves in the most recent years have generally not been associated with large mortality excesses (Green et al., 2016).

Table 3.1 Top 20 hot-days with highest percentage excess mortality in London

	Date	Max temp °C	Observed mortality	Expected mortality	Excess mortality	Excess as %	Alert
1	10aug2003	36.6	280	135.1	144.9	107.2	Yes
2	11aug2003	33.1	275	137.1	137.9	100.6	Yes
3	12aug2003	30.2	254	137.8	116.2	84.3	No
4	13aug2003	28.3	236	137.2	98.8	72.0	No
5	17jul1983	27.5	251	176.4	74.6	42.3	No
6	16jul1983	32.1	249	176.4	72.6	41.2	Yes
7	03aug1995	30.4	224	153.3	70.8	46.2	No
8	03aug1990	35.0	228	165.4	62.6	37.9	Yes
9	06aug2003	34.6	200	138.3	61.8	44.7	Yes
10	24jul1989	28.9	233	171.9	61.1	35.5	No
11	24jun2005	27.0	197	136.0	61.0	44.9	No
12	15aug1981	25.6	226	168.4	57.6	34.2	No
13	07jun1996	30.3	218	160.5	57.5	35.9	No
14	09aug2003	34.3	191	134.6	56.4	41.9	Yes
15	15jul1983	31.3	231	175.1	55.9	32.0	No
16	31jul1995	31.6	212	156.4	55.6	35.6	No
17	28jul1981	26.0	240	185.9	54.1	29.1	No
18	30jul2002	24.9	199	148.7	50.3	33.9	No
19	04aug1990	33.9	214	165.0	49.0	29.7	Yes
20	08aug2003	30.2	183	135.1	47.9	35.4	No



Table 3.2 Top 20 hot-days with highest percentage excess mortality in the West Midlands

	Date	Max temp °C	Observed mortality	Expected mortality	Excess mortality	Excess as %	Alert
1	03aug1990	34.4	202	135.0	67.0	49.6	Yes
2	29jul2002	27.4	186	135.8	50.3	37.0	No
3	15sep1983	16.1	180	134.2	45.8	34.2	No
4	27aug1988	18.8	178	133.2	44.8	33.7	No
5	01aug1995	31.3	175	130.6	44.4	34.0	Yes
6	13jul1983	29.8	178	134.0	44.0	32.8	No
7	10jun1990	19.3	187	143.9	43.1	29.9	No
8	07sep2005	22.4	172	129.1	42.9	33.3	No
9	21jun1994	17.2	179	137.3	41.8	30.4	No
10	23jul1996	24.6	179	138.1	40.9	29.6	No
11	29jun1995	28.7	178	137.1	40.9	29.8	No
12	16jun1986	26.1	180	139.4	40.6	29.1	No
13	10aug2003	26.6	173	132.6	40.4	30.5	No
14	29aug1986	15.3	174	134.4	39.6	29.4	No
15	09jul1997	26.1	178	138.4	39.6	28.6	No
16	30jun2002	18.6	170	131.3	38.8	29.5	No
17	17jul1983	25.6	171	132.4	38.6	29.2	No
18	04sep2006	21.4	164	126.2	37.8	29.9	No
19	12jun2015	21.4	163	125.4	37.6	30.0	No
20	20jul2006	28.3	168	131.3	36.8	28.0	No

3.4 Exploration of links between summertime vulnerability and previous winter burdens

The purpose of this analysis was to determine if annual summertime health burdens are associated with mortality burdens in the previous winter. Therefore the units of analysis now are individual years rather than days. Summers were defined as months June to September and winters as December to March. Figure 3.7 shows the average number of daily deaths each summer and average summertime temperatures in London, and Figure 3.8 shows average wintertime deaths and temperatures in London. Unsurprisingly, these show a general trend of reduced mortality over time in both the summer and winter seasons, and rising temperatures.



Figure 3.7 Annual summertime mortality and temperature

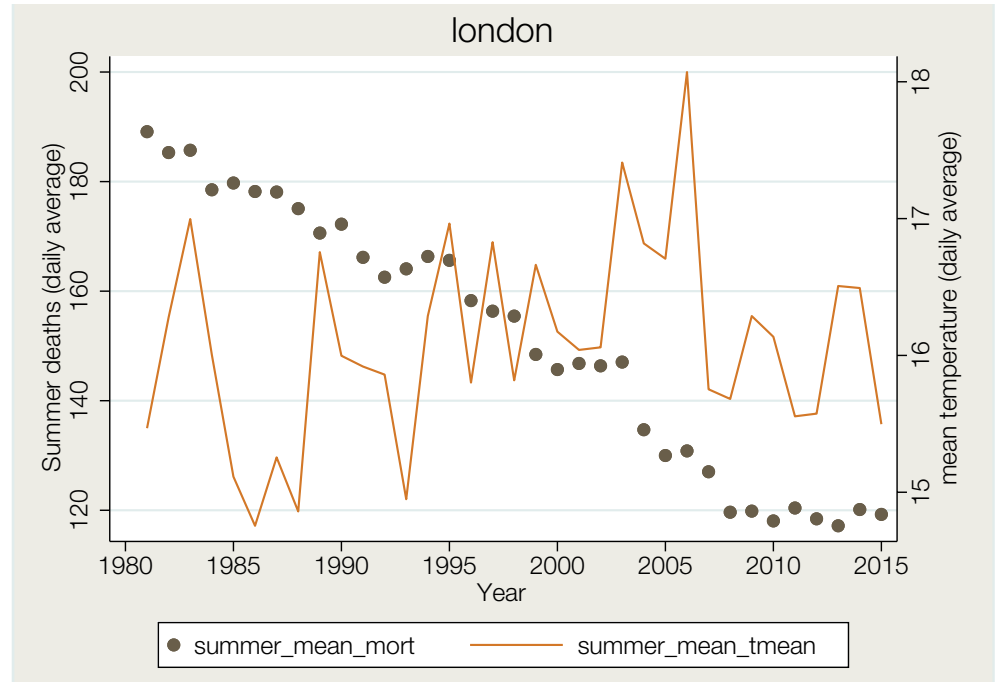
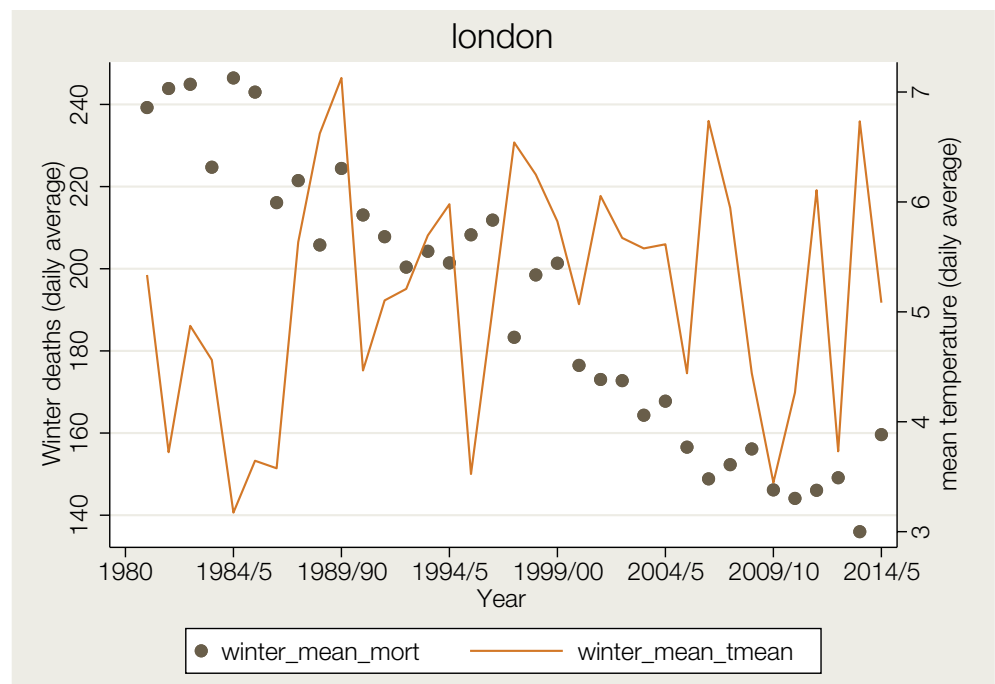


Figure 3.8 Annual wintertime mortality and temperature



The series were therefore de-trended, and then annual heat risk was correlated against previous annual winter mortality levels. The hypothesis is that heat-risk is greater in summers following a winter with low mortality. However, this is not suggested by Figures 3.9 and 3.10 where we would expect to see a negative correlation under the hypothesis, but



instead the relationships are largely flat. In the case of London, there is a non-significant increase in heat risk associated with high mortality winters rather than a decrease.

Figure 3.9 Annual relative risk of heat-related death against previous winter mortality levels in London

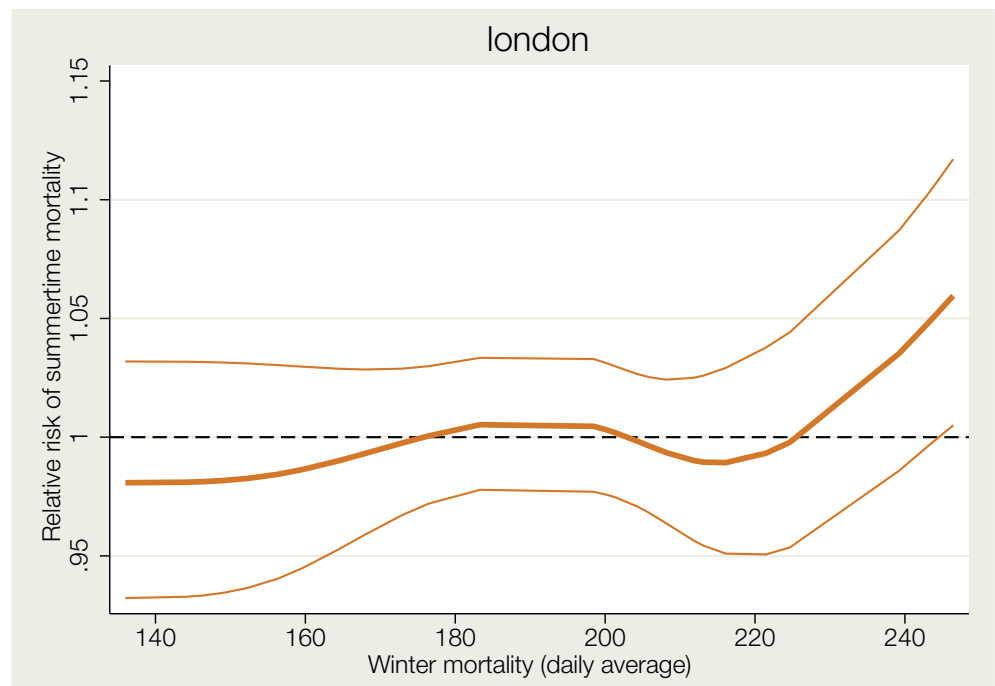
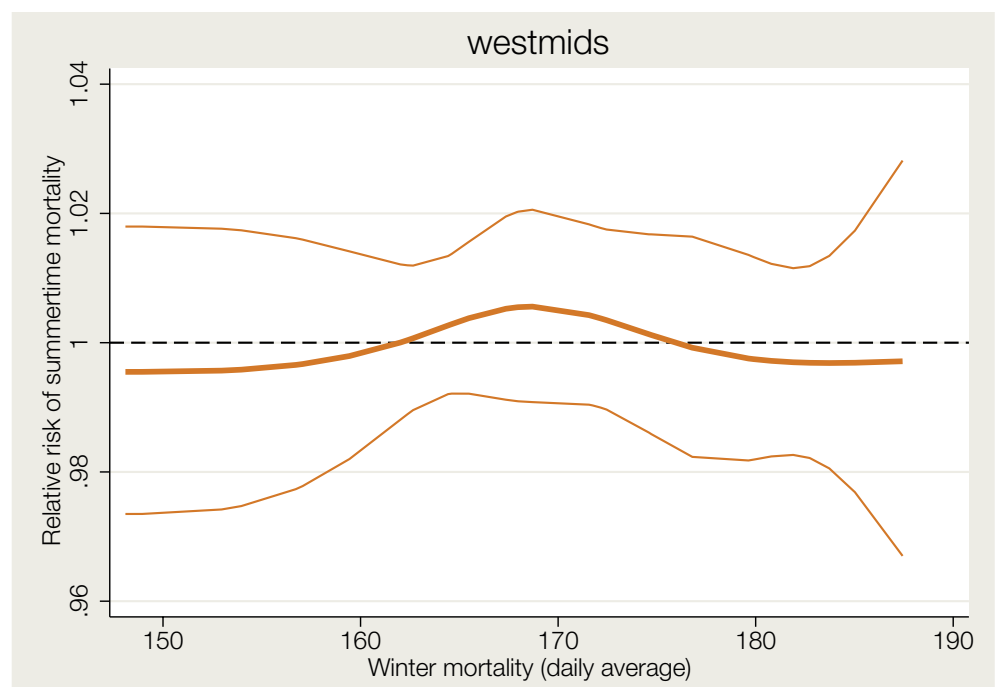


Figure 3.10 Annual relative risk of heat-related death against previous winter mortality levels in the West Midlands





To quantify possible trends, the percentage increase in heat-related mortality was estimated in seven year bands ranging from the seven winters with the highest average mortality (Band 1) (after de-trending) to the seven years with the lowest (Band 5) (Tables 3.3 and 3.4). Under the hypothesis, we would expect the risk of heat-related mortality to be progressively higher with lower mortality winters, but this is not the case.

Table 3.3 Heat risk in 7 year bands of high to low winter mortality in London

	Percent change in mortality per 1C increase in temperature	95% confidence interval	
Band 1 Highest winter mortality	2.96	1.56	4.37
Band 2	3.00	1.91	4.10
Band 3	3.65	2.55	4.76
Band 4	1.95	0.45	3.45
Band 5 Lowest winter mortality	1.86	0.74	3.00

Table 3.4 Heat risk in 7 year bands of high to low winter mortality in the West Midlands

	Percent change in mortality per 1C increase in temperature	95% confidence interval	
Band 1 Highest winter mortality	1.82	0.99	2.67
Band 2	2.00	1.01	3.00
Band 3	0.72	-0.13	1.57
Band 4	2.16	1.27	3.06
Band 5 Lowest winter mortality	0.80	-0.52	2.13



Variation in heat risk by STP

Figure 3.11 shows the temperature-mortality relationship by STP areas for the years 2007-15. Table 3.5 estimates the percentage change in risk of heat death for every 1°C increase in temperature above the 93rd percentile of the temperature distribution specific to each STP. The 93rd percentile was the best fitting threshold across all of the STPs. Significantly elevated heat risk was apparent in many of the STPs. Ranking of the relative risks shows that the STP with the greatest heat-risk was in Hampshire & the Isle of Wight. STPs in London were also associated with high heat risk. There was relatively high spatial variation in heat risk across England (Figure 3.12).

In assessment of heat risk in 3-year bands (2007-09, 2010-12, 2013-15 – results not shown), we observed that risk has increased substantially in many of the STPs, in particular, in Lincolnshire where the relative risk went from 0.97 (95% CI 0.93, 1.01) in 2007-09 to 1.03 (0.99, 1.06) in 2010-12, to 1.05 (1.00, 1.09) in 2013-15. In the most recent period, the risk in Lincolnshire was ranked second highest, behind Surrey Heartlands. The greatest reductions in heat risk over time have been observed in Staffordshire, Birmingham and Solihull, and Cornwall & the Isles of Scilly.

Figure 3.11 Adjusted temperature-mortality relationship by STP, 2007-2015

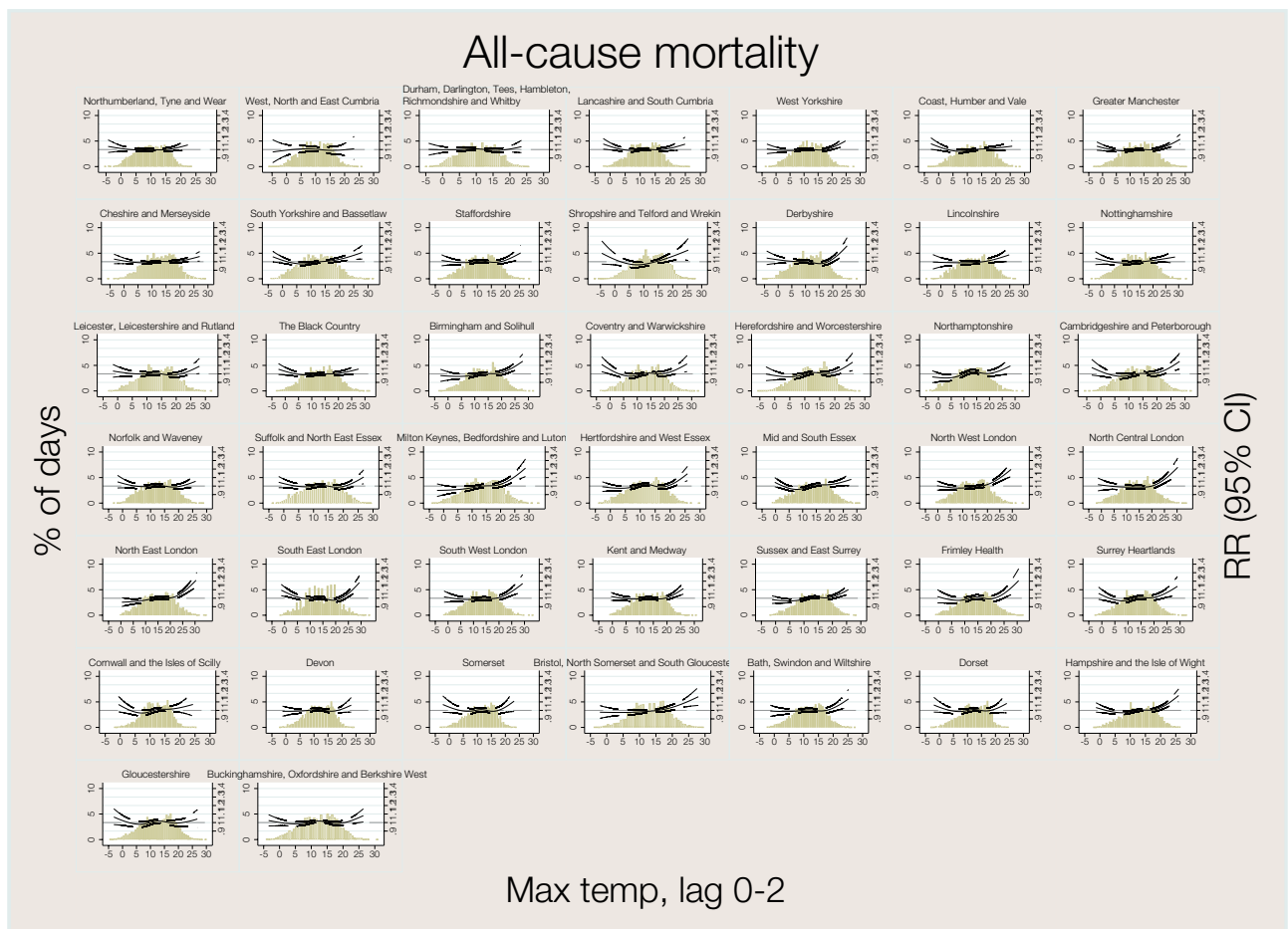




Table 3.5 Relative risk of heat-related death per 1°C increase above the 93rd percentile of the temperature distribution within each STP

Relative risk per 1°C increase	Lower 95% confidence limit	Upper 95% confidence limit	P-value	Temperature value at 93rd percentile	STP name	Ranking
3.12	1.83	4.43	0	20.3	Hampshire and the Isle of Wight	1
3.05	1.78	4.34	0	22.9	North West London	2
3.04	1.64	4.45	0	23.3	North Central London	3
3.02	1.41	4.66	0	22.6	Milton Keynes, Bedfordshire and Luton	4
2.96	1.39	4.55	0	19.3	Derbyshire	5
2.89	1.62	4.18	0	24	North East London	6
2.82	1.21	4.46	.001	21.4	Suffolk and North East Essex	7
2.78	1.51	4.07	0	23	South East London	8
2.75	1.30	4.23	0	21	Bristol, North Somerset and South Gloucestershire	9
2.71	1.20	4.25	0	19.9	Hertfordshire and West Essex	10
2.67	0.41	4.98	.021	19.6	Shropshire and Telford and Wrekin	11
2.38	0.80	3.99	.003	22	Surrey Heartlands	12
2.30	0.87	3.75	.002	22.3	South West London	13
2.21	0.83	3.59	.002	20.9	Kent and Medway	14
2.11	0.47	3.78	.012	22.3	Cambridgeshire and Peterborough	15
2.05	0.39	3.74	.015	23.1	Frimley Health	16
2.04	0.66	3.43	.004	21.9	Birmingham and Solihull	17
1.99	-0.19	4.20	.074	18.5	Dorset	18
1.95	0.16	3.78	.033	18.1	Devon	19
1.95	0.74	3.18	.002	20.7	Sussex and East Surrey	20
1.80	0.76	2.86	.001	18.8	West Yorkshire	21
1.71	-0.40	3.86	.112	20.2	Lincolnshire	22
1.71	-0.20	3.66	.08	20.2	Herefordshire and Worcestershire	23
1.65	0.80	2.51	0	21.2	Greater Manchester	24
1.65	-0.04	3.37	.056	19	Bath, Swindon and Wiltshire	25
1.62	0.16	3.09	.03	21.7	Coventry and Warwickshire	26
1.47	-0.08	3.05	.063	21.9	Leicester, Leicestershire and Rutland	27
1.46	-0.10	3.06	.067	20.6	Norfolk and Waveney	28
1.43	-0.99	3.91	.248	17.7	Somerset	29
1.37	-0.31	3.08	.111	22	Northamptonshire	30
1.27	-0.18	2.74	.087	19.3	Staffordshire	31
1.17	0.02	2.33	.046	20.8	South Yorkshire and Bassetlaw	32
1.13	-0.21	2.49	.098	20.3	Buckinghamshire, Oxfordshire and Berkshire West	33
0.95	-0.57	2.50	.222	18	Durham, Darlington, Tees, Hambleton, Richmondshire & Whitby	34

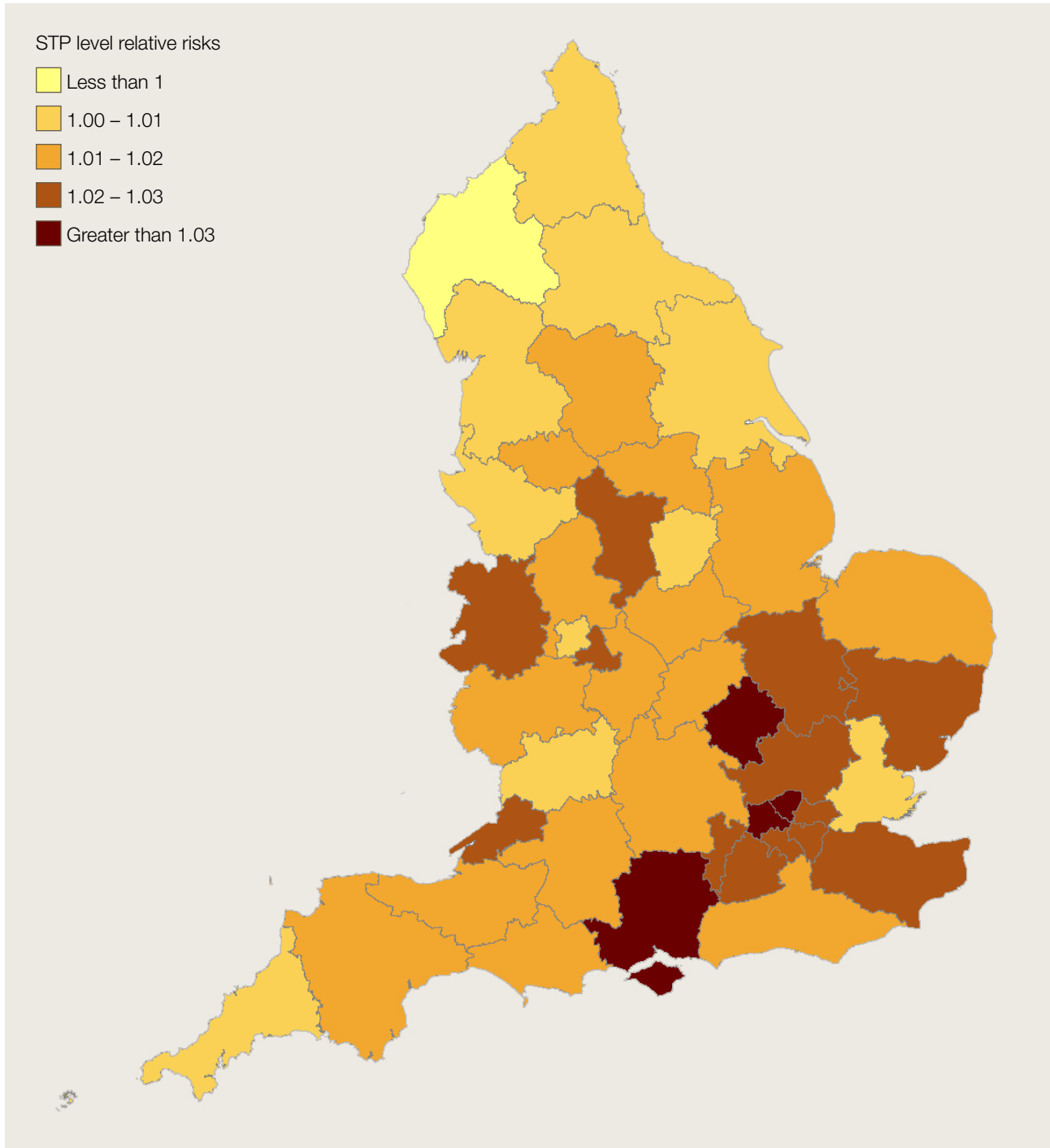


Table 3.5 Continued

Relative Risk per 1°C increase	Lower 95% confidence limit	Upper 95% confidence limit	P-value	Temperature value at 93rd percentile	STP name	Ranking
0.93	0.32	2.20	.147	21.8	The Black Country	35
0.90	0.00	1.82	.05	20.5	Cheshire and Merseyside	36
0.85	-0.69	2.42	.281	22.5	Mid and South Essex	37
0.84	-1.36	3.09	.456	17.9	Cornwall and the Isles of Scilly	38
0.81	-0.32	1.97	.162	18	Lancashire and South Cumbria	39
0.72	-0.78	2.25	.348	20.6	Coast, Humber and Vale	40
0.45	-0.97	1.89	.539	22.3	Nottinghamshire	41
0.38	-1.50	2.31	.692	20.7	Gloucestershire	42
0.37	-1.19	1.96	.641	17	Northumberland, Tyne and Wear	43
-1.29	-4.43	1.95	.43	17	West, North and East Cumbria	44



Figure 3.12 Spatial variation in heat risk by STP





3.5 Limitations

In ecological studies of this nature, while it is inevitable that temperature data from monitoring stations are used to represent exposure, this may not truly reflect exposures at a personal level, especially among mobile populations. In addition, given that analyses were undertaken at relatively large spatial scales, we did not control for air pollutants which may act as possible confounders, especially ozone and PM10 (particulate matter of diameter less than 10 micro meters). Also, although our mortality data were relatively up-to-date, the most recent years of hospital admissions data were not available. Using the most recent years of data would provide the best evidence of current associations.

3.6 Conclusions

Based on epidemiological evidence, there has been very little change in temperature-health risk functions in the years since the HWP has been operational. Conversely, recent (relatively mild) heatwave events have generally not been associated with large excesses in mortality. This may be due to specific measures taken during alert periods and better awareness among the general population. However, even if the HWP has been effective to some extent in reducing health impacts during extreme hot-days, evidence suggests that the HWP does not adequately address the larger number of moderately hot days where the biggest health burdens lie.



4. Local planning and implementation of the heatwave plan

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4.1 Findings from case studies of local implementation

4.1.1 Introduction

Information about how the HWP was being implemented locally was collected in five local authorities in four regions: London, the North West, the East Midlands and the South East. We planned interviews ahead of and during the summer to capture both planning and responding to hot weather. Fieldwork was carried out from April 2017 to July 2018, with most interviews taking place during June to September 2017.

4.1.2 Organisational structure of emergency planning

As required by the Civil Contingency Act 2004, responsibilities for emergency planning and response are shared by organisations and agencies that, in partnership, form the Local Resilience Forum (LRF). LRFs are organised geographically in England and Wales by police force areas and there are currently 38 LRFs in England. LRFs include representatives from local public services including the emergency services, the NHS, local authorities and the Environment Agency. The function of the LRFs are to plan for local incidents and emergencies by identifying potential risks and producing emergency plans to either prevent or mitigate the impact of incidents on their local communities. Alongside the LRF, health bodies work together through recently established Local Health Resilience Partnerships (LHRPs). The LHRP has responsibility for emergency preparedness, resilience and response across the local health sector by providing a 'strategic forum for local organisations to facilitate health sector preparedness and planning for emergencies at LRF level' (Department of Health, 2012: p5), ensuring that the health system is prepared for sharp increases in demand, such as those occurring as a result of a heatwave. The LHRP footprint maps to the 38 LRFs and comprises Emergency Planning Resilience and Response (EPRR) leads from local NHS Trusts; local authorities including adult social services; the regional ambulance service; Clinical Commissioning Group(s) (CCG) and representation from NHS England, and is normally co-chaired by the regional representative of NHS England and the local authority director of public health. Where more than one director of public health is represented (some LRFs partner with more than one senior tier or unitary authority and therefore more than one public health directorate), the councils agree among themselves who will co-chair the LHRP.

Whilst hospitals and other NHS facilities are required to meet the NHS core standards for emergency preparedness, resilience and response, there is no such provision for care homes (House of Commons, 2018).

4.1.3 Description of case studies

Case study sites were purposively selected to include a range of geography and demography, including a mix of urban, rural and regions of the country to account for temperature variation. Local authorities were also recruited to cover a range of potential heat-health risks, such as those attracting a high number of tourists, those engaging in outdoor recreational activities, those with the potential for large numbers engaged in outdoor activities (such as agriculture) and those with high numbers of older people. One London borough was also selected as London has been identified in the literature as a particular risk to health during heat waves.

A summary of the characteristics of the case study sites is in Table 4.1



Table 4.1 Description of case study sites

Site ID	Type of LA	Region	Population approx. (000)	% over 65	Geography and climate	Number and types of health provider and commissioning organisations
A	County	North West	500 < 600 Low density	20 to <25%	High rainfall Cool climate	2+ NHS Acute Trusts 1 NHS Community and MH Trust 1 CCG 50<100 GP Practices
B	Unitary	South East	100 < 200 Higher average age	25%+	Coastal Moderate climate	1 NHS Acute MH Community Trust 1 CCG <50 GP Practices
C	County	South East	600 < 700 Largely affluent with some high density areas	20 to <25%	Coastal Rural flood risk areas	2+ NHS Acute Trusts 1 NHS MH/LD Trust 1 NHS Community Trust 2+ CCGs 150<200 GP Practices
D	County	Midlands	700 < 800 Low density with higher density of older people living in rural areas	20 to <25%	Agricultural/ rural High rainfall with flood risk areas	1 NHS Acute Trust 1 NHS MH Trust 1 NHS Community Trust 2+ CCGs 50<100 GP Practices
E	London Borough	London	200 < 300	<15%	High traffic and air pollution	2+ NHS Acute Trusts 1 MH Trust 1 Community Trust 2+ CCGs 50<100 GP practices

Case study site A

A is a large county situated in the North West region of England. It is predominately rural, having only two major urban districts, and a total population of between 500 – 600,000 people. A has a tiered system of local government comprising county, boroughs or districts, parish and town councils. It is one of the less densely inhabited counties with a higher than England average population of over 65s. Due to its largely wet climate, A is not particularly prone to hot weather, with flooding typically seen as a higher environmental and public health risk. The community’s healthcare needs are supported by 2+ NHS Acute Trusts, one NHS Community and Mental Health Trust, and one CCG. Ambulance services are provided by the Regional Ambulance Trust.

Planning for hot weather: The LRF leads on emergency planning, producing an emergency plan, which describes the generic response to incidents and emergencies, the roles of agencies involved and how the response is planned and co-ordinated. Within this framework, individual organisations develop their own operational plans, including those related to hot weather. In A, the local public health team lead for health protection, situated within the local authority, prepares a local adaption of the HWP, incorporating public health messages and specifying appropriate actions for health and social care staff



and organisations for each of the alert system levels. NHS Trusts also develop their own operational plans, which again follow the structure of the national alert system and identify responsibilities of their senior and middle management. For one NHS Trust, their operational plan is contained within a severe weather framework, incorporating plans and actions for cold weather as well as heatwaves. The regional branch of NHS England also participates in the planning process playing a ‘positive assurance’ role towards local NHS organisations, hence making sure that plans are properly prepared.

Case study site B

Site B is a small county situated in the south coast of England and home to 100- 200,000 people. B is governed by a unitary authority (i.e. consisting of one tier of local authority). The average age of the population is higher than that for England, with over a quarter of the population aged 65 years and older. The area enjoys a coastal climate and temperatures tend to be moderate, with summer temperatures rarely exceeding 25°C. The area attracts a large number of tourists each year, mostly during the summer months. Acute, mental health, community and ambulance services are provided by one integrated NHS Trust. The site has one CCG and a small number (under 50) of GP practices.

Planning for hot weather: Although B has its own LRF, overarching planning for periods of hot weather is undertaken mostly by the local authority, led by the public health team (through a dedicated public health officer) and the plan is held by the local authority’s emergency management team. The local heatwave plan is based on the HWP and largely involves cascading heatwave alerts to provider organisations. It also includes some longer-term strategic planning, including adjustments of the local environment. The local heatwave plan is shared with provider organisations in health and social care, including voluntary organisations, such as Age UK. Currently, there is no mention of heatwave preparedness within public health strategies, such as those produced by the local Health and Well-Being Board. The local authority has limited control over whether the guidance set out in their own plan is implemented by providers. B also has a separate plan for large events such as festivals, where risks are assessed separately and compliance from stakeholders is assured through specific legislation.

Case study site C

Site C is a geographically large, comparatively affluent county, with pockets of high population density, located in the southeast of England. A tiered system of local government exists for a large part of the county, comprising county, borough, district and parish councils. C has an older age profile than the national average. C experiences some of the highest temperatures in England. Healthcare in C is provided by a small number of NHS Acute Trusts, one NHS Mental Health and Learning Disability Trust, one NHS Community Health Services Trust, several CCGs, and between 150-200 GP practices.

Planning for hot weather: The work of the LRF is supported by the C Resilience Team, largely consisting of local authority staff, as well as a small number of emergency services (fire and police) and business management support staff, funded by the LRF’s category 1 responders. Although there is no ‘LRF’ badged heatwave or severe weather plan for C, the local authority has developed a multi-agency major emergency plan: a generic plan for major emergencies which LRF partner organisations and agencies follow. The plan includes incidents deriving from heatwaves, alongside other emergencies, listing core responsibilities of county and district councils in warning and informing during alert periods and identifying vulnerable people. Heatwave planning is also incorporated within the local authority’s system resilience plan where actions are identified to manage pressures in the health and social care systems during severe hot and cold weather. The CCG responsible



for emergency planning has developed an overarching heatwave plan for local NHS providers, with each provider having its own operational plan within this framework. LRF organisations and agencies currently follow national guidance, as in the HWP, and have aligned their own operational and business continuity plans to this.

In relation to the wider aspects of health and long-term planning, there was limited evidence, but plans were in place to strengthen heatwave planning within the local environment strategy, which currently only refers to extreme cold weather. Also, the local authority (public health and environment) published a chapter on sustainability, which included planning for climate resilience, within its latest Joint Strategic Needs Assessment (JSNA).

Case study site D

Site D is a large and sparsely populated county in the Midlands with a large percentage of its population living in rural areas. The population of over 65s is higher than the national average, a large proportion of whom live in rural areas. The county is dominated by agriculture, which provides employment to a large number of agricultural workers including seasonal migrants. The local government in D is shared between the county council, district councils, parish and town councils. The county has a temperate maritime climate with typically warm rather than hot summers, and a high-risk of flooding. Healthcare is provided by one NHS Acute, one NHS Mental Health and one NHS Community Health Services Trust, several CCGs and between 50 to 100 GP practices.

Planning for hot weather: The LRF is responsible for strategic planning for emergencies and has put in place a 'LRF badged' severe weather multi-agency plan which includes local planning for incidents deriving from severe hot and cold weather. The plan is closely aligned with the HWP and identifies the NHS as the lead responder for heatwaves, and the local authority for cold weather. At the local authority level there is very little done for long-term or year-round planning for heatwaves, though the authority is working to develop the environmental aspects of the Health and Well-Being Strategy document, where heatwaves are planned to be included alongside floods and other environmental risks. As with the other case study sites, NHS providers have their own operational and business continuity plans for heatwaves, and the emergency planning lead within the Acute Trust has produced an overarching heatwave plan across all Trust sites, a localised version of the HWP. The CCG stated that they would not normally be involved during alert periods, as responses to heatwaves normally take place at single agency or provider level, but would become more involved if the situation deteriorated, for instance, if one of the providers judged it could not cope.

Case study site E

E is an inner-city London borough. Most of the borough is residential and the population density is high. As an inner-city borough, E has a large number of tourists and commuters, with high traffic and accompanying inner-city pollution levels. E has a lower than national average of over 65s (similar to surrounding boroughs in inner London). The impact of the urban heat island effect arising from built up areas emitting and retaining heat, amplifying night time temperatures in the summer, is high. Healthcare in the borough is commissioned by more than one CCG, and provided by several NHS Acute Trusts, one NHS Mental Health Trust and one NHS Community Health Services Trust.

Planning for hot weather: Emergency planning and resilience is organised in London in a tiered system. The regional London Resilience Forum develops an overarching emergency plan, including plans for extreme weather, which are localised by each borough. Boroughs come together to plan for emergencies through sub-regional



resilience fora. The borough level resilience forum includes all emergency services (London-region wide), the local borough health organisations and the local authority, and has oversight of all plans. NHS England (London region) takes the lead on emergency planning on a regional basis at level 2 alerts and above.

The local authority public health function is organised in cooperation with a neighbouring borough. At present, the local authority has no heatwave plan in place, but is working with the local authority public health team to develop an overarching plan for severe weather, localised but based on the HWP, to be delivered across the area. Currently, information received annually from the HWP team at Public health England is distilled (e.g. locally interpreted) by the emergency planning lead in the local authority and cascaded to the relevant services and provider organisations as set out in the HWP. As with the other case study sites, NHS providers (Trusts) have their own operational and business continuity plans in place, which are reviewed and updated annually.

4.1.4 Data

We carried out 59 semi-structured interviews with 51 health and social care staff across all sites, of whom 34 were involved in strategic or operational planning and delivery of the heatwave plan in their local areas, and 17 were staff working with patients and other potentially vulnerable people in health and social care. Table 4.2 provides numbers of professional staff per organisation and Table 4.3 provides a breakdown of the numbers, organisations and roles of interviewees in each case study site. Findings from interviews with all professional staff are reported here.

This section also draws on other data. This comprises documents collected in each case study site, including key emergency planning and public health documents, such as Community Risk Registers; JSNAs and Health and Well-Being Strategies; local strategic and operational documents relating to severe weather or heatwaves; and local climate change and environmental strategy documents. We observed one LRF meeting and one community resilience workshop, in two separate sites, and visited a recently built acute hospital in a third site to note the measures taken to improve climate resilience. Additional interviews to gather background and supporting information were carried out with two academic researchers who had recently completed studies relating to the planning for, and communicating the risks of, heatwaves within London. Further detail on methods is included in Chapter 2.

Table 4.2 Number of interviews per organisation

	Managers/leads	Operational/frontline	Total
Local Authority	25	3	28
Acute Trust	6	3	9
Community Healthcare Trust	5	5	10
CCG	4	0	4
Care Homes	0	5	5
Primary Care	0	1	1
NHS England	2	0	2
Total	42	17	59



Table 4.3 Number of interviews per site (organisation and role)

Site	Number of interviews/site	Number of staff interviewed/site*	Description/role of interviewee
A	9	8	<p>LA: Health protection leads, specialists, quality assurance and governance managers, managers and leads for social services</p> <p>NHS: Acute and Community Healthcare Trusts (leads on resilience, emergency planning), NHS England (regional lead on EPRR)</p>
B	9	7	<p>LA: Leads on public health, emergency planning and heatwave planning</p> <p>NHS: Emergency planner (across NHS and LA) and CCG emergency manager lead</p> <p>Care homes: Care home managers</p>
C	18	17	<p>LA: Managers responsible for heatwave planning (public health), communications manager, managers for business continuity, emergency planning and social services), frontline staff – senior practitioners for adult social care, community support worker</p> <p>NHS: Acute Trusts COO and leads for emergency planning, emergency resilience; frontline staff (elderly care) Community Healthcare Trusts; leads on emergency planning, resilience officer, operational managers; CCG manager for performance and delivery</p> <p>Care homes: Managers of private and LA owned care homes</p>
D	12	10	<p>LA: Emergency planning leads (public health and social services), emergency planning and business continuity manager (community resilience), programme manager (PH wider determinants), PH consultant</p> <p>NHS: Acute Trust manager – emergency planning; Community Healthcare Trust manager – emergency planning; frontline and operational staff (clinical lead for community hospital, district nurse, assistant practitioner for community care (social worker) and CCG emergency planning manager)</p>
E	11	9	<p>LA: Emergency planning manager (social care and public health), Public Health manager</p> <p>NHS: Acute Trust emergency planning manager, Community Healthcare Trust resilience manager, frontline/operational – resilience manager and domiciliary manager; CCG emergency planning manager; General Practitioner</p>
Total	59	51	

* Some interviewed more than once.



4.1.5 Findings

Case study sites were compared having identified several cross-cutting themes. Methods of analysis are explained in Chapter 2. The themes are: risk and risk perception; knowledge and perceived usefulness of the HWP; year-round planning and the wider aspects of public health; the alert system and local response to alerts; monitoring and feedback; and challenges to local implementation of the HWP.

4.1.6 Risk and risk perception

Emergency planners, senior managers and strategists in all five case study sites were asked to comment on their perceived risk of heatwaves within their geographical areas or organisations. All interviewees, including those working at the frontline of health and social care services, were asked to identify people most at risk of harm from severe heat and how those identified were protected during periods of hot weather.

As stipulated by the Civil Contingencies Act (2004), all LRFs are required to carry out assessments of the risk of hazards occurring in their areas and publish them in Community Risk Registers. These are, frequently, presented as a risk matrix (as illustrated in the National Risk Register (Cabinet Office, 2017) in which the level of severity is displayed against likelihood of the event taking place. As can be observed in Figure 4.1, heatwaves are rated as high-risk in three of the sites (C, D and E) and medium in Site A. One site, B, did not use a risk matrix, but presented the risk of a heatwave as the fourth of nine identified ‘top risks’. All sites, apart from E, classified risks from other natural hazards, such as flooding, severe weather, storms, gales and low temperatures, as higher than heatwaves, both in terms of their likelihood and impact. E assessed heatwaves as having a higher likelihood of occurrence than storms, gales and low temperatures, but similar in impact, and, therefore, rated heatwaves as an overall high-risk.

Figure 4.1 Matrix of heatwave risk sites

		Ratings					
		1	2	3	4	5	
Relative impact	Catastrophic	5	High	Very high	Very high	Very high	Very high
	Significant	4	Medium	High	Very high	Very high	Very high
	Moderate	3	Low	A	D	C and E	High
	Minor	2	Low	Medium	Medium	Medium	Medium
	Limited	1	Low	Low	Low	Low	Low
Key to risk level		1	2	3	4	5	
		Low	Medium-low	Medium	Medium-high	High	
		Relative likelihood					
		Low	Medium-low	Medium	Medium-high	High	

Risk of heatwaves happening in geographical areas

As can be seen from the matrix above, the assessment of heatwaves occurring in local areas ranged from medium-low to medium-high. Across all sites, heatwaves were viewed as likely to be both infrequent and short-lived and seen has potentially having less impact in their local areas than other natural hazards, such as flooding and cold weather, and therefore given lower priority on their agenda for emergency preparation.



Managers and planners in one site where the overall risk was rated as medium, said that they were committed to planning for hot weather, but did not feel that the local climate posed much of a risk as the threshold temperature for a heatwave was unlikely to be breached, or if it was, it would not be for a prolonged period:

'It isn't one of our Community Risk Register main issues, because given where we live and that, we don't really see a lot of good weather and we get a heck of a lot of rain. If we do get hot weather, our threshold is 30 degrees, isn't it? And it's very unlikely, really, that we hit 30 degrees, and certainly it's always in a short, sharp burst. It's not 'up there' on our risk register.' (Manager, Site A).

A manager in Site B observed that, although they were in an area that received more frequent bouts of hot weather, any impact was likely to be minor as the climate was moderate and there was no excess of built-up areas and dense housing, reducing the risk of harm to health. Even in sites that rated their risk as high, prolonged spells of severe hot weather affecting their local areas were seen as unlikely, as indicated in comments such as *'I'll believe it when I see it'* and *'it's England, you know, if it's warm, it's going to last for a day and a half and that will be the end of summer'*. Nevertheless, planning and preparation for heatwaves was considered important by all sites, largely due to an acceptance of climate change and the increased risk this poses to the population's health and well-being in the future:

'Well I think recent history tells us that actually some areas, some parts of Europe, have had extremely hot weather. So yes, it is a risk. But I think everyone's conscious that with this changing climate, there is the potential for it to be on the increase. I think people are certainly sighted on it.' (Manager, Site B)

Risk of heatwaves to individuals and groups

Managers and frontline staff in all sites agreed that those most vulnerable to the heat, even short spells, were older people, particularly those over 75 years and living on their own. This accorded with information provided within the HWP. Frontline practitioners working with these groups emphasised that those with limited cognitive function, for example, people diagnosed with dementia, and those with limited mobility had the greatest risk and therefore required the highest level of support during this time. This risk was further exacerbated by the difficulty of identifying and reaching people most in need of support during heatwaves, particularly those who lived unsupported in their own homes, and not all providers felt they had the capacity to respond to their needs, particularly at short notice during a sudden hot spell. The importance of getting health messages to this group at the appropriate time and using suitable media was stressed by some providers:

'There is a shortage of home care and home care support locally for caring for people in their home environments, so there's a lot of vulnerable people out there. And I don't think we've caught up with technology, the message of warning, informing and getting to those vulnerable groups. Without stereotyping everybody, the vast majority of older people are not using computers and they're not using smartphones. So we've still got, I think, a group of people that [...] for getting the information to them will be depending on the traditional system, will be the mailing, mailshot through the door, or dependant on your radio and television for getting that message across.' (Manager Site A)

Many, though not all, of those providing services and support to patients and clients said that they assessed heat-health risk through individual risk assessments.



Community health services staff in particular reported that they were regularly updating and sharing lists of patients they had assessed as most vulnerable to heat-related risks so that they might be prioritised for contact and visits during any spell of severe hot weather. Although one care home manager said that the home carried out a heat-health risk assessment for all its residents, this did not appear to be the case from interviews with the other four care home managers interviewed for the study. Several managers in NHS Acute Trusts and care homes stated that they considered all their patients and clients as equally at-risk during periods of hot weather and would therefore not consider it appropriate to prioritise during this time.

'But everybody in the hospital is an 'at-risk'... I suppose [prioritising patient risk during heatwaves] is meant much more for in the community, because somebody's in the hospital he's an at-risk individual.... otherwise he wouldn't be in hospital.' (Acute Trust manager, Site D).

Risk of heatwaves for buildings and the immediate environment

Interviewees in several sites suggested that risks varied according to the environment occupied by those most vulnerable to heat-related health problems, as hospital buildings and residential or nursing homes provided variable levels of resilience to severe hot weather (i.e. their ability to maintain optimum temperatures during heatwaves). A visit to a recently built NHS Acute Trust in site C revealed a range of measures incorporated into the building to ensure the building was able to withstand excesses of heat or cold. This included insulation, natural (passive) ventilation with operable windows, solar shading devices, and mechanical ventilation systems to help the building remain comfortable for patients and staff even without electronic cooling systems such as air conditioning units. However, this hospital was the exception rather than the rule, and many providers spoke about delivering health and social care services in old surroundings that were difficult to ventilate and keep cool during periods of hot weather.

There was also concern expressed by both managers and frontline health and social care staff that not everyone might be aware of the dangers of heat as they observed the public still taking risks with their health by not taking protective measures during hot spells. Managers spoke about specific groups identified, for example, rough sleepers, alcohol and substance abusers, who may lack the capacity and resources to protect themselves, as well as those employed largely outside in summer months such as agricultural workers, particularly those who are moved around frequently by 'gang masters', and who may not have either access to public health messages, or the ability to respond appropriately. Other groups considered to be a potential risk were tourists and holiday makers, including those attending large outdoor festivals during the summer. Managers said that they used a variety of methods to communicate public health messages to these groups, including general and targeted public health messages through local media, as well as providing heat-health information to local community groups supporting vulnerable people, and to commissioned community services, such as substance misuse services. One site had a separate plan for large events such as festivals, where risks are assessed separately and compliance from stakeholders is assured through legislation specific to the council and to these type of events.

Risks to business continuity and services were also acknowledged. In one site, a 2015 report on monitoring the impact of severe weather on public services, showed that a recent heatwave had been costlier than all other severe weather events in the area in the same year, comprising three separate storms, due to loss of staff days and the costs of additional welfare support provided. Most local NHS Trusts and other organisations providing and commissioning services, were mitigating potential impact



of heatwaves through risk assessments and plans for business continuity as part of their organisational heatwave or severe weather operational plans. However, one emergency planning manager in an NHS Acute Trust said that he found it difficult to convey the risk at Trust meetings due to the infrequent number and short duration of heatwaves. He said that he would point out that a heatwave *'could be costly to the Trust'*, for example, the impact severe heat might have on the Trust's IT systems.

4.1.7 Knowledge and perceived usefulness of the heatwave plan and alert system

All senior and emergency planning managers interviewed in all sites appeared to have a good understanding of the HWP and its heat-health alert system; however, opinions on its usefulness varied. Among the positives was general agreement that the HWP provided appropriate guidance, particularly in relation to the emergency response part of the plan. It was seen as comprehensive, inclusive of both health and social care services, and simple to follow. Participants noted that the risks from hot weather were explained clearly and the alert system was seen as fitting with local emergency systems and processes, which operated with a 0-4 risk alert approach. All respondents said that they had based the operational plans and activities of their organisation on the HWP, to ensure compatibility, and documents analysed for this study revealed reasonable alignment between local and national plans.

However, some noted that the HWP needed to be refreshed and that annual updates should be made available earlier in the year. The HWP was normally released shortly before the start of the summer alert period. Common planning practice in most of the sites was to wait for the next HWP to be released in May before reviewing and updating their local plans. Some managers expressed disappointment that there had been little change to the HWP in recent years; the Plan has remained much the same since 2012 and, consequently, no new messages had been derived to be distributed locally. Some feared that this could reduce the impact of the Plan. However, others argued that this continuity made emergency planning easier, especially for those charged with cascading information to health and social care organisations.

Some hospital managers questioned the rationale for having an alert system for heatwaves, as responses to hot weather were often seen as obvious, and they argued that staff in their organisations would know what to do without there being a HWP:

'Why do we need to have a plan for a heatwave, if I'm honest? You know, it's hot, its hot, So, I don't get why we have to have these alerts sent out to us then, oh, we're up to level 3, as if we don't know we're up to level 3...we don't need a national plan just to do stuff, we just do it anyway.' (Acute Trust manager, Site C)

Not all of those working at the frontline were aware of the existence of the HWP and, among those who were, there were some differences of opinion about its usefulness. One manager of a care home said, *'I don't think it's really telling you anything that common sense doesn't tell you'*, and a nurse working in a ward for elderly clients in an Acute Trust said that preventive actions during hot weather would be considered a normal part of routine nursing practice, not something that would need to be planned for separately. However, most respondents said that they welcomed the alert system.

'I think it just gives a guideline really, for those, maybe, people who are not quite sure of what to do, but like I was saying, there is quite a lot of common sense involved in it as well. I think most people are aware of what to do if we have a heatwave.' (Social Care manager, Site A)



4.1.8 The alert system and response

All health and social care staff interviewed, including managers and frontline staff, were asked about how heat-health alerts were received within their organisation and what actions, if any, were taken locally during alert levels 0 – 3.

Level 0: year-round planning

The HWP describes Level 0 planning as ‘year-round long-term planning, so that longer term actions (such as those linked to spatial planning and housing) are taken to reduce the harm to health of severe heat when it occurs’ (Public Health England, 2015a: p13). Suggested actions, for both commissioners and providers of health and social care, as well as community groups and individuals, are listed in the HWP. For healthcare commissioners and local authorities, these include suggestions such as joint partner working to incorporate heatwave planning into local public health planning and strategy documents, such as Joint Strategic Needs Assessments (JSNAs) and Health and Well Being Strategies (HWBSs). For health and social care providers, these include examples such as developing systems to identify high-risk groups; making local environmental improvements to ensure patients and clients are protected during heatwaves; as well as preparing business continuity plans in both hospitals and care homes to cover the event of a heatwave. Long-term planning for community groups include developing community emergency plans to support those identified as most vulnerable in the event of a heatwave; and for individuals, making environmental improvements to ensure homes are more resilient to the effects of heat.

There was little year-round planning for heatwaves reported from managers of health and social care and local authority public health departments across all sites, and where these did exist, they were largely limited to being prepared for emergencies, and preparing public health messages to be sent out during alert periods. The wider aspect of ‘reducing the impact of climate change and ensuring maximum adaptation to reduce harm from heatwaves’ (Public Health England, 2015a: p13) were given little or no attention in sites. Most local public health risk assessments and plans, such as JSNAs and HWBSs, did not include preparation for, or the development of, mitigations against any impact from heatwaves. Only one site had included a chapter on sustainability in its JSNA, which referred to the local authority’s commitment to develop climate resilience by including a ‘sustainable needs assessment’ within their JSNA which would, alongside their environment strategy, address some of the impacts of wider aspects of climate change in the local area. However, at the time of writing this had not been developed. A public health lead for wider determinants of health in another site noted that his organisation intended to develop such plans while revising the JSNA. He recommended that the JSNA should identify any vulnerability of the organisation to hot weather. In this site, the ‘Climate Just’ tool was intended to be used to map local area vulnerability, i.e. showing where ‘extreme events such as floods and heatwaves were likely to have the biggest impacts because of the characteristics of people and communities’ (Climate Just, 2014-2017).

For healthcare managers, as for local authorities, level 0 was frequently viewed as ‘business as usual’ as local plans were often generic. Managers in some CCGs reported regularly carrying out emergency exercises as part of long-term emergency planning, although these were often for other emergency incidents, such as flu pandemics, and not those related specifically to heatwaves.

NHS provider organisations appeared to be more active in year-round planning. Managers responsible for emergency planning in Acute and Community Health Services



Trusts stated that they used the time before and after the summer alert period to review and update their operational plans to prepare for hot weather. This included assessing surge capacity, i.e. the ability to provide health and medical care during a sudden increase in numbers of patients during a prolonged heatwave; carrying out emergency ‘heatwave related’ exercises for clinical staff; ensuring buildings were suitable for hot weather by carrying out any necessary repairs and reviewing issues flagged by maintenance teams, such as identified hot areas; and mitigating effects by making adaptations such as installing heat resistant glass where possible. However, a manager in one Acute Trust noted that funding for such improvements was often limited so that only the most urgent changes were made to ensure health and safety compliance.

Those interviewed in provider organisations also spoke about using this time to ensure lists of vulnerable people were updated and accessible, particularly for those providers responsible for clients in the community. One manager in a Community Trust told us that they used an electronic community patient management system (CIC) to identify those most vulnerable to periods of hot weather. Another Community Trust emergency planner said that it reviewed its operational plan for heatwaves in January, working year-round with families and carers of ‘at risk’ people to ensure they were aware of health-risks during hot weather. Prioritising patients for risk was not viewed as necessary in Acute Trusts, according to managers and frontline staff interviewed in two of the Trusts, as all patients would be identified as vulnerable or ‘high-risk’ from severe heat:

‘...they’re [patients] all really quite vulnerable. I get the odd one that isn’t but that’s very rare. So, we would treat them all as if they are vulnerable.’ (Acute Trust frontline practitioner, Site E)

‘...because if somebody’s in the hospital he’s a high-risk individual, otherwise he wouldn’t be in hospital.’ (Acute Trust manager, Site D).

No care home manager interviewed for this study reported any long-term planning for hot weather, apart from one who mentioned having an awning fitted in the observatory to shield residents from excessive sun exposure.

Level 1: Summer preparation

Level 1 is described in the HWP as being prepared for the summer period. Here, suggested actions for commissioners of health and social care as well as local authority public health directors include, but are not limited to, activities such as: working together with partner organisations to ensure ‘vulnerable and marginalised groups are appropriately supported’ that local institutional establishments (such as schools, prisons) are aware of national heatwave guidance, and that care homes and hospitals are aware of and engaged in preparing for heatwaves. For health and social care providers, key activities during this period include identification of individuals most likely to be at risk during heatwaves and making any necessary plans of actions for those identified, as well as raising awareness of heat-health to clients and carers using the public health messages in the national plan. Care homes and hospitals are guided to ensure business continuity plans are in place and that any cool areas are identified (Public Health England, 2015a).

The first alert for summer preparedness comes out on 1st June and remains in place throughout the summer season until 15th September, unless the level of alert is escalated in response to forecasts of local threshold temperatures being breached. On receiving notification of alert level 1 from the Met Office and PHE, health and social care managers and emergency planners interviewed said that they followed



the HWP communications flowchart. Emergency planning leads in local authorities and NHS/CCGs notified all commissioned health, social care and public services about the HWP and heat-health alert service, providing links to the latest version of the HWP and guidance. Managers in local authorities and CCGs viewed their role in responding to a level 1 alert as primarily to ensure that health and social care providers were aware of their roles and responsibilities as set out in the HWP. Information was typically sent by email and frequently included a web link to the HWP and other guidance on the GOV.UK website. Some emergency planners shortened messages to increase the odds that they were read by busy managers. Managers in provider organisations then cascaded information to service teams and other key personnel, as identified in any local operational plans for heatwave preparedness, if applicable. In provider organisations where there was no formal local 'organisational level' plan for heatwaves, such as in some care homes, managers said that they followed the national guidance.

Level 2: Heatwave forecast – alert and readiness

Level 2 alerts are triggered by the Met Office when there is at least a 60% chance that temperatures will exceed a threshold (i.e. a prolonged spell of hot temperatures likely to cause harm within the next two to three days). The HWP states the importance of being ready to take swift action at this time as 'death rates rise soon after temperature increases, with many deaths occurring in the first two days' (Public Health England, 2015a: p14). This alert is intended to generate specific actions to be carried out by both commissioners and providers of health and social care, as guided in the HWP. Managers with specific responsibility for emergency responses for the local NHS and local authority (public health and social services) are guided to cascade the alert and provide heatwave guidance to those providing health, social care and public services, as well as 'warning and informing' the public, i.e. alerting the general population to the danger of hot weather and how best to protect themselves, through various media messages. Health and social care providers would be expected to implement their own local plans and protective/preparatory actions, such as professional staff checking arrangements for high-risk patients or clients are in place and, where necessary, prioritised (such as arranging visits or phone calls); local environmental checks being made including checking indoor temperatures; and that alerts and local heatwave plans and actions are communicated to staff. For individuals and the community, this involves such actions as looking out for vulnerable neighbours and checking weather reports and ambient room temperatures.

During the study period, a level 2 alert was issued on the 16th June 2017 to all case study sites. Health and social care managers, emergency planners, and frontline staff were asked to report how they had responded to the alert. Managers in all but one case study site said that they had implemented their plans and level 2 actions.

Local authority managers in public health departments stated that they issued public health messages as planned, many using local television and radio, websites and social media. There was some duplication of messages and lots of re-sharing, but this was justified by some as 'reinforcing' the message.

All local authority managers interviewed in four of the five sites involved said that they cascaded the alerts to their service providers and teams as in their plans. In site A, although an alert had been issued by the Met Office in the region, emergency planners did not expect severe hot weather to affect the area, so the alert was not cascaded.

Some preparatory actions were illustrated. For example, in one local authority, a social services team manager reported that, in line with the local plan, they contacted care



management teams and care agencies to make assessments of those most at risk, to consider whether checks or visits needed to be made and how these should be prioritised.

CCG emergency planners said that they cascaded the alert message to their NHS providers, with NHS England alerting primary care providers directly. One CCG manager spoke about activating actions from triggers in their surge plan, such as ensuring air conditioners were allocated to identified areas.

Managers from both NHS and social care providers stated in interviews that they followed their local plans. Those interviewed in Acute and Community Health Services Trusts stated that they ensured that operational staff were assigned roles and responsibilities, some by the emergency planner circulating HWP adapted level 2 action cards; these involved actions such as checking that thermometers were installed and working, making sure patient areas were cool and that water was available and accessible. For some working in Community Health Services Trusts, this involved cascading alerts to all community service managers so that they could ensure community nurses were prioritising those patients most vulnerable to the heat.

We interviewed a few practitioners working directly with patients and clients in health and social care organisations and many, though not all, told us that they carried out actions compatible with the HWP, even in the absence of a local operational plan. How alerts were communicated and accessed by those working at the frontline varied by organisation; some said that they received these alerts from their manager during routine daily team briefings or through a written notice on their staff notice board, others received these electronically through email alerts (e-alerts), texts or daily communication briefings. Some reported not seeing or hearing any formal guidance or advice but, as healthcare practitioners, *'would know what to do'* in the event of a heatwave.

Provider actions in preparation for the heatwave also varied, with some managers reporting tailoring their response to their local situation. For example, a NHS Community Health Services Trust planner said that decisions about contacting people were left to the discretion of individual professionals such as district nurses who would be expected to know the people most vulnerable to heat and would assess risk. Others said that they took more of a team approach to identifying and prioritising patients who might need to be contacted during this time, so preparation involved ensuring that lists of potentially vulnerable people were up to date and available to community teams.

Care home managers interviewed said that they carried out a range of routine activities in response to the alert. These included ensuring any cooling equipment, such as fans, were functioning, that cooling foods and liquids were available in sufficient quantity, such as ice cream and water, as well as stocks of sun creams and sun hats. They noted that rooms were checked for functional thermometers. Some frontline staff in acute hospitals said that they took similar activities at level 2, largely checking the availability and function of cooling equipment (fans) and that windows could be shaded if required, but others said that they did not take any preparatory actions at all.

Level 3: Heatwave action

A level 3 heat-health alert is triggered when the threshold 'temperature is reached in one or more Met Office National Severe Weather Warning Service (NSWWS) Regions' (Public Health England, 2015a: p14). Local temperature thresholds are regionally set maximum day and night temperatures, and these vary according to region. For example, in the London NSWWS region, the threshold maximum day temperature



is set at 32°C and night is 18°C, whilst in the North East NSWWS region it is set at 28°C and 15°C, respectively.

The HWP suggests that local areas take specific actions targeted at high-risk groups. These include local authorities and health commissioners issuing public media alerts and taking other actions such as mobilising community and voluntary support. Health and social care providers should be activating their local organisational plans to maintain business continuity, including possible surges in demand. Local plans should include, for those working in hospitals and care homes, actions to ensure client safety by close monitoring of health and hydration and making regular environmental checks, such as taking ambient room temperatures. For professional staff working in community settings, the HWP suggests specific actions such as contacting high-risk people and providing advice on health protective measures during this period. The level 3 alert should also be a trigger for community groups to activate their community emergency plans, which would likely include making a check on those who are known to be at risk during heatwaves, and the public should be following key public health messages.

A hot weather level 3 alert was issued from Saturday 18th to Tuesday 21st June 2017 in most regions in England, apart from the region of case study site A. In an attempt to get rapid feedback following a level 3 alert, short catch-up interviews were conducted with key contacts for heatwave planning in each of the regions reaching the threshold shortly after the level 3 alerts were issued. Other interviewees, both managers and staff working at the front-line in health and social care organisations, were asked to comment on actions taken during this specific alert period. The alerts were managed in each site as a single-agency response, i.e. each organisation managed risk internally through in-house actions.

Health and social care commissioners: Local authority and CCG managers reported that the alert was cascaded to their respective health, social care and public service providers, and public health messages and guidance, as suggested in the national Plan, were communicated through their usual channels. Managers reported that health and social care providers were reminded to implement the appropriate level 3 actions as per their organisation's operational plans and, in some cases, specific guidance was provided to some services. For example, one social care manager spoke about advising domiciliary service providers to remind carers to have an appropriate discussion with service users and families about taking health protection measures if needed, and that social services care management teams consider and make assessments about whether they might need to make a check of those most at risk during this period. Searches of internet communication revealed that local authorities and CCGs were advising the public to contact NHS 111 and their GPs rather than attending hospital if feeling unwell during this time. A CCG manager said that this was done to avoid hospital Trust surges in patient demand. Another CCG manager reported monitoring the system for any increases in demand, by contacting NHS Trusts. S/he also said that s/he identified areas where extra air conditioners could be placed if hospital Trusts needed them.

Care homes: All care home managers interviewed said that they carried out several activities in response to a level 3 alert; the focus for all was on maintaining hydration and controlling temperatures in the care home. Managers stated that curtains were closed, and fans were used if needed. Cool areas, where residents could be moved, were reported to be available (and used during this period) in only one of the care homes, a local authority owned home which had a small number of residents. Care



home managers spoke about ensuring clients were protected from sun with the use of sun cream and hats and changing activities to those more suited to hot weather (e.g. a cooking activity was changed to making smoothies). Some said that they either changed or cancelled outside activities to avoid the hottest parts of the day. Most said they monitored indoor temperatures and provided ice creams, fluids and cool foods such as jellies during this time.

Community services: During heatwaves, identifying and protecting patients perceived to be most at risk was reported to be a key focus for action by managers and practitioners interviewed in NHS Community Health Services Trusts, and a variety of different local approaches and actions were described by interviewees, reporting that they prioritised visits during this period where possible, or that they used other means to ensure high-risk individuals were contacted if they lacked capacity to organise an extra visit themselves. Many thought that direct contact by healthcare staff through home visits was important during this time. For example, one district nurse stated that she made an ‘environmental check’ for those she identified as most vulnerable during this period, such as frail older people who may not have external contacts or regular paid or informal carers visiting. This involved closing windows and doors and ensuring sufficient amounts of liquids, suitable clothing and ventilation were available as, she noted, some people often have very little awareness of the dangers of heat:

‘Because certainly when we ring to have discussions with [patients] about do they still want to go outside, for instance, to do some activity when the temperature is increasing? And you know, there’s very limited awareness. Even this year I was out to see a patient and she wanted to be pushed in her wheelchair in the extreme heat, I think it was at 2 o’clock in the afternoon when the heatwave starts, and having to have a very difficult conversation with her about how I felt that was unsafe.’ (Community Healthcare Trust frontline practitioner, Site E)

In one Community Health Services Trust, a community nurse said that she visited high-risk patients in their homes even if they did not have a visit scheduled during the heatwave and provided specific protective advice on care plans for other domiciliary carers visiting, such as *‘ensure patient is hydrated, check room temperature and ventilation’*. However, a manager in another Community Health Service Trust noted that there was insufficient capacity to contact all their high-risk patients during this time and therefore had advised social care providers to contact a GP if they were concerned.

NHS Acute Trusts: In the participating Acute Trusts, managers and frontline staff in some areas reported that it was busier than normal during the alert period, although one noted that admissions had been the same. Demand tended to be higher in the evening, especially from people admitted for respiratory problems, such as asthma. Controlling the environment was a problem for some hospitals but less so for others: some had air conditioning or modern systems of ventilation and cooling, while others relied on electronic fans to cool the area. Staff reported having ensured that patients received sufficient liquids, providing regular fresh water (with one noting that these were filled via the ward’s water cooler during this time) and monitoring fluid balance, and people were reminded to drink. One nurse reported that patients had complained about feeling hot, tired and having more headaches than usual, but felt that there was little else they could have done other than ensure *‘they’re drinking a lot of fluids and they all had fans blowing’* (Acute Trust nurse manager Site E).



Those interviewed in community hospitals reported that ward rounds were carried out more frequently during this time to ensure patients were comfortable and provided with fresh water. In addition, they said that they ensured that the surrounding environment remained cool by closing and shading windows and turning off unnecessary lighting. In one of the community hospitals, a nurse described some patients temporarily moved to a cooler area of the hospital, an air-conditioned palliative care suite, during this time. Cooler uniforms, such as theatre scrubs, were reported to be made available for staff in one of the hospitals.

Primary care: Only one general practitioner was interviewed for the study, who did not remember receiving any alerts.

4.1.9 Reflections on the recent heatwave response

As stated previously, short catch-up interviews were conducted with key contacts in each of the four sites receiving a level 3 alert in June 2017. Managers in these sites considered their response action to be, in the main, measured and proportionate to the perceived risk, employing professional judgement where indicated, as suggested in the HWP. Interviewees in two of the sites reported not having taken any or much action during the alert, or had revised their planned actions, noting that, in this case, the hot weather was likely to be brief in duration, and the alert had taken place over the weekend with little ‘run up’ time to make much preparation. For example, plans to organise a LRF partner teleconference (as a stated action for a level 3 alert within the local LRF severe weather plan) was delayed until the upcoming Monday when threshold temperatures were predicted to be breached. This was then judged as no longer necessary as temperatures were expected to quickly cool again, making any consideration of co-ordinating an integrated multi-agency response to the alert unnecessary. Nevertheless, standard level 3 actions such as forwarding heatwave alert information to all providers with advice on ensuring that vulnerable people are protected was carried out. The emergency planner added that had the heatwave been longer they would have escalated to an LRF partner teleconference. They were reconsidering the wording in the local plan:

‘I suppose the only additional thing that we thought of, looking at our heatwave plan, what it does say is at level 3 you must have a partner teleconference, and what we have decided to do as a result of that is to change that to say ‘consider’ [having a partner teleconference]. Because I think there needs to be an element of professional judgement in there as well, because yes, it was a very hot day on the Monday. But what we did need to do was to temper that with the fact that the temperature was due to cool overnight and it was to be a significantly cooler day on the Tuesday, and that has happened.’
(Local Authority manager, Site D)

Catch up interviews carried out with public health managers in two sites reported plans to provide an interview to a local radio station to inform the local public about hot weather preparedness. In both cases they could not be organised quickly enough:

‘At one point we were going to conduct a radio interview with our deputy director of Public Health. However, it was probably at that point that the heat was waning, so decided not to do that in the end, so perhaps we were a little bit slow on that. But I think it was just a decision on who should do it, whether it should have been an elected member or what....So I think that is something that we all learnt for next time, to perhaps mobilise that quicker.’
(Local Authority manager, Site B)



One manager said that plans were now in place to record a range of bespoke interviews that could be accessed quickly following an alert.

Taking a conservative ‘wait and see’ approach to any increase in level of action taken, such as considering a multi-agency response, was common among all of the managers interviewed, with all stating that organisations were implementing their own ‘in house’ actions during the heatwave. One Acute Trust manager felt, however, that this may not have been the best approach. This interviewee reported the Trust had had very high A&E attendances, largely cardiac and respiratory conditions – ‘*well over 700 in one day*’ (the norm for the time of year was mentioned to be around 500) – and higher than average admissions, with ambulance services reporting that they were not always able to get to priority calls within the target times. This manager noted that normally the Trust would have called a ‘whole systems call’, whereby an organisation, such as an Acute Trust, if it judges that it cannot manage alone, will make a call to the director or executive on-call for health emergencies to organise a multi-agency conference call to review the situation and make plans to resolve it, which may include involving other local agencies. In emergency planning terms, this is known as ‘escalation’. However, this did not happen as the Trust had judged that the hot weather would end earlier than it did. The emergency planning manager said that, on reflection, the Trust should not have waited and should have escalated earlier (as stated in the local plan). In this area the heatwave lasted longer, around five days, than in the other case study sites:

‘...yes, and that was a shock to everybody. And I think the impact was about day three; whereas if that happens again and the predictions that come down saying the weather is likely to be..., we would take much more notice of that. We would be contacting... we’d put on a whole system call, like you do in the middle of winter because we have a way of escalating to whole system call, and we didn’t, at all.... But had that whole system call been enacted, because we just kept on thinking the next day it would cool, the next day it would cool.’ (Acute Trust manager, Site C)

Not all followed HWP guidance to keeping buildings cooler during a heatwave. For example, one care home manager, reflecting on actions taken during the last heatwave, admitted to opening windows to help cool the building, but found this to be of little use:

‘...I think when it’s really hot, the building’s hot anyway, and if you open the windows, it gets worse if there’s no breeze. I think we definitely have more admissions [to hospital].’ (Care Home manager, Site C)

4.1.10 Monitoring and feedback

Although interviewees stated that their organisations had managed well during the alert period, the appropriateness of the response tended not to be assessed. There were few formal mechanisms in place to monitor the activities that took place following the alert, and the alert had not resulted in any emergency incidents, triggering the plan for an emergency response, as, one manager in site C noted, ‘*flaws are only seen if plans are activated*’. Managers in one site found monitoring ‘*actions that did not result in an emergency*’ particularly frustrating, with respondents from the local authority and CCG conceding that there were few tools available to collect feedback. Where data were collected, these were frequently informal and one-way, such as data collected on information and advice being sent out, rather than



actual actions taking place. As described by a local authority emergency planning manager:

'I suppose what we've got is that audit trail to say we've sent it out. What we haven't got is any audit to come back to say, 'and was that ever received?' No, we haven't got that. No.' (Local Authority manager, Site D)

Some of the emergency planners and business continuity leads in local authorities managed to get some feedback following the heatwave, by either catch-up meetings or email requests for any issues arising from the heatwave, though again this was largely unidirectional and confirmatory, with adults' and children's services validating that alerts had been cascaded to all care homes and domiciliary care organisations and that the process went as planned, with no incidents or issues reported. In one site, a local authority manager said that it monitored care homes' observance of heatwave actions, reporting good compliance from both service users and staff and identifying few obstacles or barriers. Other local authorities stated that, though they did not monitor formally, they might have discussions with providers during business continuity meetings. One local authority manager expressed some concern about the limited feedback the local authority care management teams had received from social care providers, such as care agencies, particularly about whether there were any reported ill effects from the heatwave by those receiving care. Systems for reporting issues were not standardised in the local authority and therefore he suggested that carers were more likely to contact the person's GP rather than the social care management team, if they were concerned about a person's health. Contacting the GP is also the stated advice provided for individuals and carers in the HWP. However, this means that the local social services department is unaware of any problems generated by the heat, according to the local authority manager interviewed, as feedback would help inform future advice:

'I particularly want to check with the various care providers how helpful it is to be told about [the heatwave alert and guidance] and how effectively they can get their carers to actually check those things, and how effectively they get the information back and do something with it.' (Local Authority manager, Site E)

A few of the CCG managers interviewed said that they remained in contact with their providers during alerts, monitoring surge and offering support where indicated and required. This was validated by some of the interviewees though not all. Some managers in (mostly acute) provider organisations said that the only monitoring carried out by the CCG was a check to ensure that everyone was cascading the Met Office heat-health briefing, and a cross-check with providers that staff were in receipt of these. However, some Trusts said that they were in frequent (largely daily) contact with their CCG, often about capacity issues, so feedback on coping during severe weather formed part of that conversation. However, a small number of managers in Acute Trusts reported that the CCG did not monitor or follow up on how things had gone during the heatwave, with one suggesting that *'a call to ask us how we are doing'* would have been nice.

According to one senior manager in a local authority (Site B), the commissioning department would take note of any incidents reported in care homes of people becoming dehydrated or injured due to hot weather as part of existing risk assessments and reporting mechanisms. However, the interviewee was not sure whether this would provide a suitable mechanism for implementation monitoring as it only focused on severe problems, e.g. those leading to declared 'incidents'. A care



home manager noted that responses to hot weather were not discussed during the annual quality assurance interview with the local authority or with the Care Quality Commission (CQC).

4.1.11 Issues and challenges to implementing local heatwave plans

Interviewees identified various challenges relating to implementing their local heatwave plans. These are presented under two broad headings: (1) ensuring a protective environment, which relates mainly to specific concerns related to the local health and social care built environment; and (2) implementing protective measures, which is further subdivided into four categories: triggers for alerts; the role of the CCG; protecting vulnerable groups; and training in emergency planning.

Ensuring a protective environment

As discussed earlier, emergency planners in NHS Trusts reported year-round planning to make any necessary adaptations to their buildings to help mitigate any effects of the heat and ensure a safe environment for both staff and patients. Many said that they were operating in old, Victorian buildings without air conditioning, with some only able to supply individual fans and shade. This presented several challenges to remaining cool in heatwaves. As one emergency planner in a local authority stated, *'hospital buildings get very hot, you are not going to knock it down and build a new one that is better designed to sustain heatwaves – can't see social services buying a lot of air con units'* (Local Authority manager, Site D). There was also concern expressed by some about whether staff and carers had sufficient knowledge about how best to maintain a safe environment in hot weather. For example a nurse working in a community hospital said that not everyone (including staff and visitors) was aware of actions to keep the environment cool and were opening windows even though the temperature was hotter outside than in. Those interviewed from NHS Community Health Services Trusts said that they often operated within many premises they had limited control over. For example, one of the Trusts included in the evaluation provided services in over 200 premises, managed by a third-party organisation responsible for ensuring that the buildings were safe and resilient to heat. The emergency planning manager said that he was therefore reliant on the Trust's own staff reporting any issues relating to safety, including overheated buildings. One care home manager said that its buildings were originally built for a different clientele, those who had lower levels of need and therefore presented less of a risk from severe heat. This had now changed as most people entering residential care have higher care needs and were less able to take protective measures for themselves:

'And these care homes were built in the days when people went into residential care, they could walk in, they could make a cup of tea, they could do all that, but our service users now, they're much more vulnerable and complex than that. None of our buildings have got air conditioning or anything, you know, like that. So there is an issue there that would worry me if we did have a heatwave.'
(Local Authority manager, Site A)

There was a range of views about the wisdom and affordability of introducing (more) air conditioning in hospitals. Interviewees working at the frontline in hospitals said that they often struggled with issues of excess heat on their wards, saying that it was, at times, *'a battle to keep the temperature down'*, and they would have liked to have had air conditioning units on all wards but were told that this was not possible *'because of infection control'*. In another Acute Trust, the emergency trust manager reported that some windows in the hospital were safety windows which could not be



opened, so they were reliant on electronic fans to cool the wards. This interviewee said that, although it was accepted that old buildings stayed hot for much longer, it was felt to be too much of an expense to install cooling systems as heatwaves are infrequent and short-lived. Another manager at an Acute Trust asked for a national steer on the provision of air conditioning in hospitals (e.g. 'at least 10% of hospital areas should be cooled with air con'), this would, he said, strengthen the argument for the Trust to prioritise procurement of cooling systems.

Even outside the summer alert period, challenges to cool some hospitals and care homes were observed. For example, a nurse in an Acute Trust spoke about radiators being controlled centrally and timed to come on and off during different months. When the weather got warm (as it did in April 2017), the radiators were unable to be turned off and it was 'uncomfortably hot'.

It was also noted that actions taken to improve the capacity in old buildings often related to the risk of any prolonged period of sustained hot weather happening locally. For example, in one case study site in which hot weather was assessed as a low risk, Victorian buildings were noted for remaining comfortable in hot weather, being '*often very cool and cold*', because they tended to have small windows and thick walls. In contrast, in a higher risk case study site, more likely to have long periods of hot weather, old buildings were viewed as problematic, particularly in prolonged hot spells, as managers noted that when they did heat up they retained the heat for longer ('*like saunas*'). Actions, such as procuring air conditioning units to prevent buildings heating up, therefore, relied on knowing the length of any upcoming heatwave, as well as knowing in detail about the heat resistant properties of particular older buildings.

Implementing protective measures

Triggers for alerts: There was some concern that the temperature thresholds that trigger alerts were not sufficiently specific to account for regional or geographic differences in climate. This was mainly noted by managers in northern and coastal areas, e.g. sites A and B, where temperatures tended to be lower than in the rest of the Met Office regions of which they were part. In these sites, managers explained that there was often an expectation that alerts for the broader region would not apply to them, and, based on more specific local forecasts, often concluded that the procedures included in the local heatwave plan should not be activated in their case. At the same time, there was awareness that some patients could struggle to cope with heat, despite the thresholds for heatwaves not being reached, especially when sustained spells of warmer weather would occur. This led some NHS Acute and Community Health Services Trusts to take preventative heat-health measures regardless of an alert having been issued, as illustrated by one emergency planning manager in an Acute Trust:

'...we didn't get an alert for it because it wasn't June, but...three or four weeks ago we had really hot weather, didn't we? And I made sure everybody then were 'on top of it...we don't need a heatwave plan to tell us what to do, we do it anyway.' (Acute Trust manager, Site D)

The role of CCGs: The need to better clarify the role of CCGs in implementing the local heatwave plan was expressed by some managers, as information and guidance provided in the HWP was limited. This related mostly to the levels of support that CCGs should offer to providers during active phases of the local plan, such as during level 3 alerts, rather than their role in informing providers about the alerts and their respective responsibilities.



Structures for communicating alerts are clearly set out in the HWP: CCGs are grouped with NHS England as commissioners of healthcare and their role is stated as to ‘work collaboratively to ensure that, between them, they have a cascade mechanism for heatwave alerts to all providers of NHS commissioned care’ (Public Health England, 2015a: p17). The HWP also recommends that CCGs should, along with LRFs, ‘seek assurance that organisations and key stakeholders are taking appropriate actions in light of the heatwave alert messages’ (Public Health England, 2015a: p39). For emergency planning and response, NHS England’s regional offices, as category 1 responders, would normally be expected to take the lead in the health response, with support from their local CCGs, which, as designated category 2 responders, have a lesser, more supportive role to their NHS England colleagues, as well as other category 1 responders, such as NHS providers. A few CCG managers said that they planned as a category 1 responder, in line with their responsibilities and duty of care within NHS England EPRR core standards, even though they were categorised by the Civil Contingency Act as category 2 responders.

Interviews carried out with emergency planning managers in CCGs as well as NHS Trusts revealed some differences in actions and activities, particularly up to and during level 3 alerts. Some interviewees said CCGs were taking a key role in the local health response, being proactive and providing support in the form of maintaining contact with their commissioned providers throughout the alerts and monitoring surge. Other interviewees reported that the CCG only became involved if the situation became stressed and actions needed to be escalated as there ‘*was not much more they could do*’. A few provider managers did say that they would have liked more communication from their CCGs during the heatwave action period, particularly as heatwaves were normally actioned at the single-agency level, with each organisation implementing its own operational business continuity plans. One suggested that there could be a debrief with the CCG at the end, as normally only formal debriefs occur after declared incidents, which heatwaves seldom reach. This would, as the manager commented, enable providers to better reflect on how they coped and to review their operational plans. Another manager from an Acute Trust mentioned that it would be helpful if intelligence from outside organisations could be shared, such as whether GPs were seeing more people during this time, and others spoke about a general need for better ways of communicating data between organisations, including data on vulnerable populations. A manager from a CCG said that the CCG shared information between agencies (including NHS providers) using an online, real-time early warning system, largely to better manage capacity and escalation, but only winter emergency plans were shared at the time, so they were unable to review system gaps during heatwaves.

Protecting vulnerable groups: Implementing protective measures for those identified as most vulnerable during periods of severe hot weather is a key aim of heatwave planning. However, identifying, contacting and monitoring those most at risk was not always easy, according to those interviewed for this evaluation. Those considered to be most protected were individuals already known to local health and social care authorities through receiving services either in hospitals, care homes or in the community, as health and social care professionals would be able to directly implement protective actions, such as those listed in national and local plans. However, hidden communities of potentially high-risk individuals, including older people, existed, and interviewees also spoke about the difficulties reaching some of those known to be at-risk, but, due to capacity issues, could not be contacted or monitored during a heatwave, particularly one that was short-lived. Interviewees said that they often had to rely on a strategy of issuing public health protective messages to reach these groups. There was also little clarity about the role of GPs in these situations.



As mentioned earlier, all those interviewed agreed that those identified as most at risk were older people, particularly those aged over 75, living in their own homes without regular contact with social services, particularly if they had health conditions that could be exacerbated by high temperatures. Older people residing in hospitals or nursing and care homes were considered less of a risk, as they were more likely to be supported than those living on their own. Those receiving health or social care services within their own homes were also perceived as being less at risk as they would be receiving visits and support from providers during the heatwave, although it was noted that this would often depend on whether scheduled home visits coincided with alert periods, as not all providers had the capacity to contact and monitor the well-being of all their service recipients, especially if the heatwave was short. Seasonal agricultural labourers and travellers were also identified as a ‘hidden community’ whose needs could potentially be overlooked by social services.

One social services manager in a local authority was particularly concerned about recent increases in the threshold for eligibility for social services financial support (people may have to demonstrate a higher level of need to receive local authority support), meaning that social services are likely to be in contact with a declining proportion of people in high-risk groups. Also, it was a concern for some that, due to new commissioning arrangements, not all social care providers could be adequately monitored, as, in some cases, the local authority was no longer commissioning care directly. For example, some social care recipients may have chosen to employ their own carer using a direct payment, rather than receiving care from a care provider commissioned by the local authority, thus limiting the ability of the local authority social services department to get any heat-health messages to them and receive feedback on how they were coping with hot weather.

Some of those interviewed said that general practice staff might be better placed than social services to support vulnerable people as they would be likely to have better access to vulnerable groups, since a large proportion of people in at risk groups were likely to be in contact with general practice. However, the responsibility of the GP to fill this gap is not altogether clear as explained in the next section.

4.1.12 The role of general practice

Contractual responsibilities within the Emergency Preparedness Resilience and Response Framework only apply to statutory providers of NHS services, not GP practices, which have their own contracts. Current GP practice contracts do not make any reference to emergency preparedness or business continuity planning. Also, because of the changes in the commissioning responsibilities for primary care, NHS England has no direct responsibility to monitor any plans or actions GPs might be making for heatwaves, including those taken to ensure business continuity.

CCG managers interviewed said that they cascaded alerts to their GP practices, in line with the HWP’s flowchart, and noted that since many practices had their own business continuity plans in place, it would be likely that GPs would be making provision for additional calls to their surgery during an alert. There was no evidence, however, that GPs were engaged in any other actions for prioritising and implementing any protective measures to support their most high-risk patients or sharing data on their high-risk patients with other organisations or agencies during heatwaves.

It was generally agreed, by managers interviewed in CCGs and local authorities, that it would be unreasonable to expect GP practices to contact all their at-risk patients themselves and that this could probably be shared among agencies, especially



during more severe or prolonged heatwaves. The challenge was how to share data, particularly as one local authority manager said that GPs were seen to be protective of their information. One of the sites is currently working on a plan for locally sharing health and social care data on those identified to be at risk from environmental and other emergencies as part of its LRF, including data from GP practices. In addition to obtaining information from GPs, other issues emerging about sharing information on vulnerable populations are fluctuating groups: whereas community care have more shifting populations, mental health and social services have more stable groups who are likely to be receiving services for a while, making it easier to share.

4.1.13 Training in emergency planning and response

Interviewees in health organisations recalled limited exercises in heatwave responses in recent years, either collectively (as part of an LRF or CCG led exercise) or at organisational level. Some said that this was not too much of an issue as they would be carrying out other emergency exercises that would be relevant to heatwave incidents, such as those causing ‘a lack of water, or high numbers of casualties due to a weather event’ (CCG manager, site C), and the response would be the same. Managers said that their organisations were prioritising the types of emergency exercises to the level of local risk as well as likely interest, so as to get good participation. For example, one site was training and preparing for terrorist threats, so hot weather was not a priority in comparison.

Getting good engagement was hampered by factors such as the fact that emergency planning is not a mandatory requirement for staff working in hospitals. One emergency planner said that his hospital teams always needed training, particularly those new to the Trust.

Added to this, local operational plans relied on having sufficient emergency trained staff, and with staff leaving or moving departments, it was not always clear who was meant to be cascading information. This interviewee expressed some frustration in building capacity due to low attendance at training sessions and suggested that there is a need for ‘*more sticks*’, as emergency planning should be a key part of any health practitioner’s role. Several interviewees suggested having emergency planning, including heatwaves, as core staff training, such as fire and infection control.

4.2 Findings from the national survey of nurses

Of the 2697 nurses completing the survey, 1942 worked in a hospital, 518 worked in community or primary care settings, and 237 in residential or nursing care homes. The majority of nurses worked in the NHS (85%), with the rest working for private or charitable organisations (15%).

Hospital nurses include those working largely in multi-disciplinary teams, providing clinical care and treatment to patients of all ages in a variety of settings and specialist units. As such hospital nurses, at all levels and roles, would be engaging directly with a high number of those identified in the HWP as being ‘high-risk’ or vulnerable during severe hot weather, e.g. older people, those with chronic and severe illnesses, and the very young. In addition to knowing how to recognise and treat symptoms of heat induced illnesses, hospital nurses would need to have a good working knowledge of how to best protect their most vulnerable patients during severe heat periods, including how to aid cooling on wards and other patient heavy areas.



Nurses in community care settings include those working in schools, prisons, primary care and other community services. Many of these are district and community nurses working for a community healthcare trust who provide care to patients in their own homes. This includes patients requiring a short episode of nursing care and support (e.g. following a hospital discharge) as well as those requiring care for long-term conditions. Primary care and community health services nurses are often the main point of contact for the older, isolated and house bound patients, so their knowledge and implementation of the HWP can be critical for protecting vulnerable patients during periods of severe hot weather.

Nurses working in a care home setting include those working in nursing homes, where residents often require complex nursing interventions, and those specialising in dementia care. These are largely privately run. Given the high level of client need, as with other care settings, the requirement for nurses to be aware of the latest HWP guidance, including specific guidance provided for care homes, is important.

The aim of the survey was to collect data from nurses, especially those working on the frontline, in order to gain a perspective on the level of awareness and knowledge of the HWP among staff who deal directly with patients, especially those vulnerable to severe hot weather. The RCN membership list, however, does not identify only frontline nursing staff and our sample of nurses included 346 nurse managers alongside 2324 frontline nurses (and 27 nurses classified as 'other').

The analysis of the survey results in this section compares responses between nurses from the three settings (hospital, community, care home), as well as between nurse role (manager, frontline).

4.2.1 Characteristics of nurses and their current roles

Table 4.4 shows the characteristics of the nurses who participated in the web survey. The majority (88%) were female and half (49%) were aged 50+. About three in four (73%) had over 10 years work experience and nearly all held a professional qualification (94%). In terms of their current roles, 86% were frontline, and 13% said they were managers, with twice as many participants in care homes saying they were managers (25%). About seven in ten nurse participants worked in a hospital setting (72%), two in ten worked in a community setting (19%) and one in ten in a care home setting (9%). The majority of nurses worked in the NHS (85%), except for those working in care homes, where only 3% worked in the NHS and 81% worked for a private organisation and 12% for a charitable/social enterprise organisation. Three in five (59%) nurses said they specialised in services that involved groups vulnerable to hot weather (e.g. older people), but this proportion was much higher among nurses working in community (73%) or care home (97%) settings.



Table 4.4 Characteristics of nurses and their current roles

	All %	Setting			Nurse role	
		Hospital %	Community %	Care home %	Manager %	Frontline %
Gender						
Female	88	88	87	90	85	88
Male	11	11	12	9	14	10
Neither/refused	1	1	1	1	1	1
Age group						
<30	9	11	4	6	2	10
30-39	16	18	14	6	9	17
40-49	25	26	26	20	33	24
50-59	39	36	45	45	45	38
60+	11	9	11	24	10	11
Nurse role						
Manager	13	11	15	25	x	x
Frontline	86	88	84	74	x	x
Other	1	1	1	1	x	x
Setting						
Hospital	72	x	x	x	60	74
Community	19	x	x	x	23	19
Care home	9	x	x	x	17	8
Organisation						
NHS	85	94	84	3	73	86
Private	12	5	6	81	19	10
Charity/social enterprise	3	1	7	12	6	3
Local authority/other	1	0	3	3	1	1
Hours worked						
Full time (30+)	78	78	76	73	92	76
Part time (<30)	22	22	24	27	8	24
Health professions qualification						
Yes	94	95	92	98	98	94
No	6	5	8	2	2	6
Region						
Northern	5	4	5	4	5	4
North West	12	12	10	13	10	12
Yorkshire & the Humber	9	9	9	12	11	9
East Midlands	9	9	7	9	6	9
West Midlands	10	10	11	14	8	11
East of England	8	8	9	6	10	8
London	12	12	13	5	16	11
South East	19	18	20	20	18	20
South West	16	16	16	16	15	16



Table 4.4 Continued

	Setting				Nurse role	
	All %	Hospital %	Community %	Care home %	Manager %	Frontline %
Area type						
Inner city	22	25	16	9	22	22
Other urban	31	33	31	19	28	32
Suburban	36	35	33	49	39	35
Rural	11	7	20	23	11	11
Specialisms						
Diabetes	16	12	26	23	14	16
Cardiovascular/respiratory	22	23	21	18	15	23
Dementia	21	17	23	58	23	21
Mental health	15	13	24	11	15	15
Learning disabilities	7	5	13	11	6	8
Paediatrics	9	9	10	0	7	9
Older people	32	25	42	73	33	32
None of these	41	50	27	3	45	41
Percentage of patients aged 75 or over						
>75%	27	19	32	75	28	26
50-75%	24	26	20	11	23	24
50%	18	22	10	3	17	18
<50%	15	17	15	6	10	16
None	13	12	19	6	11	13
Don't work directly with patients	2	2	3	–	11	1
Can't say	2	2	1	-	0	2
Years in current profession						
<1	2	3	1	2	0	3
1, <2	3	4	4	1	1	4
2, <5	9	10	7	8	3	10
5, <10	12	12	11	10	6	13
10+	73	72	77	80	90	71

Bases: All = 2697; Hospital = 1942; Community = 518; Care home = 237; Manager = 346; Frontline = 2324.
 Bases are for 'setting' and 'nurse role', and may differ for the other variables.

It is difficult to determine how representative the participants in our nurse survey are of the population of nurses eligible for the survey. The best available evidence comes from the 'employment survey' carried out by the RCN of its members in 2017 (Marangozov et al., 2017) although the coverage of the surveys was not an exact match (e.g. the RCN survey covered all of the UK, it included nurses who were on maternity or sick leave, and nurses working in all settings, not just those included in our survey on the HWP). Despite these differences, the nurses responding to our survey were a close match to nurse participants in the RCN Employment Survey 2017 in terms of gender (88% female in both surveys) and their regional distribution



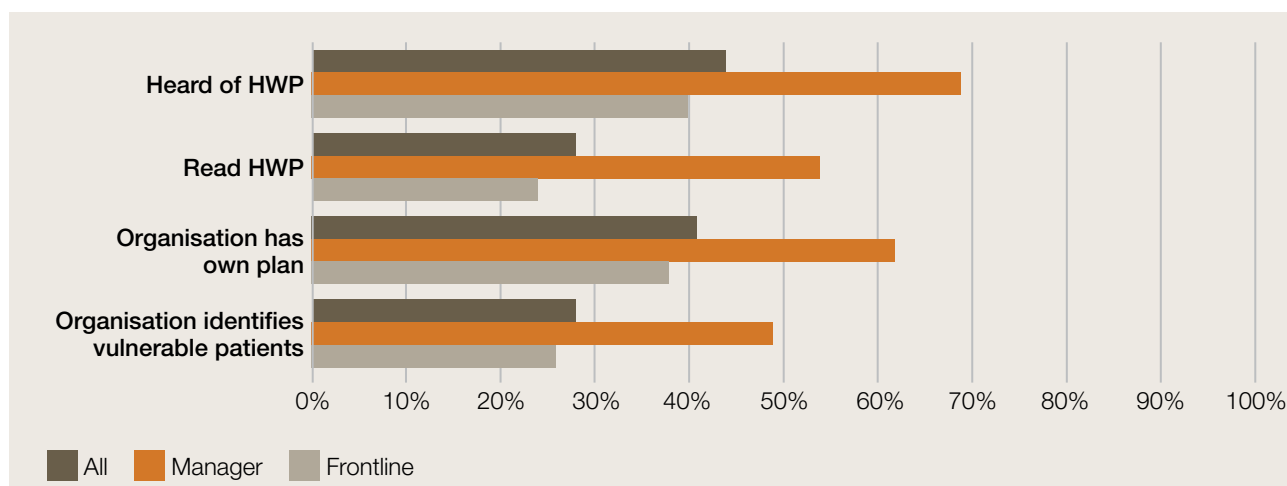
in England (although our survey slightly over-represents nurses in the southern part of the country, with 55% working in the southern regions compared with 50% in the RCN Employment Survey). It also appears that nurse participants in our sample are more likely to be aged 50+ than those in the RCN Employment Survey (but exact comparisons are difficult, since different age categorisations were used in the two surveys).

4.2.2 Awareness of the HWP

Overall, fewer than half (44%) of nurses said they had heard of the HWP, and only around one in four (28%) had read any of it (Figure 4.2). These proportions were much higher for managers compared with frontline nurses: 69% and 40% respectively had heard of the HWP, and 54% and 24% had read any of it. Nurses in care homes, and to a lesser extent in community settings, were more likely than those in hospital settings to have heard of the HWP (64%, 50% and 40% respectively) (Figure 4.3). A majority of those who had heard of the HWP said it had been used by their own organisation to help it plan for spells of hot weather (64%), with nurse managers more likely to be aware of this (76%) (data not included in the figures).

Managers were also much more likely than frontline nurses to say their organisation had its own written plan to deal with spells of hot weather (62% compared with 38%), and to identify patients who may be vulnerable to hot weather (e.g. by keeping a list or having a system to identify at-risk patients (49% compared with 26%). Frontline nurses were most likely to answer ‘don’t know’ to these questions (47% and 42% respectively). Nurses in care homes were the most likely to say their organisation had a written plan (55%) and to identify at-risk patients (58%), while nurses in hospitals were the most likely to answer ‘don’t know’ to these questions (49% and 45%). (The surprisingly low proportion of nurses who say their organisation identifies at-risk patients may be explained by the fact that this is often not considered to be necessary because e.g. all residents in a nursing home could be considered vulnerable, as could all hospital inpatients.)

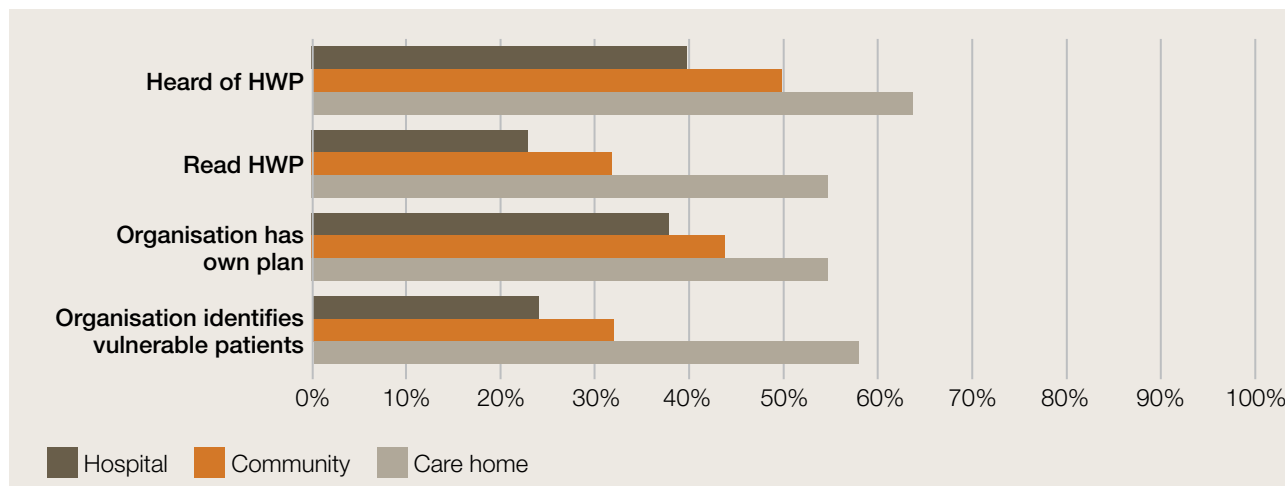
Figure 4.2 Awareness of the HWP and local preparedness for hot weather, by nurse role



Bases: All = 2697; Manager = 346; Frontline = 2324. Bases are for ‘heard of HWP’, and may differ for the other variables.



Figure 4.3 Awareness of the HWP and local preparedness for hot weather, by setting



Bases: Hospital = 1942; Community = 518; Care home = 237. Bases are for 'heard of HWP', and may differ for the other variables.

4.2.3 Awareness of heat-health alerts in summer 2018

There were a number of level 2 and level 3 heat-health alerts during the 2018 summer period in all areas of England (except for the North East region). Nurses were asked if they recalled hearing a hot weather alert in their area between June and September, and nearly all said they did (92%), with most of the rest saying they could not recall (7%) (only 2% said there was no alert). Although nearly four in five nurses in the North East region incorrectly said there was a hot weather alert in their area, they were twice as likely as nurses in other regions to say there was no alert (4%) or that they could not recall (17%).

Those who had recalled an alert that summer were asked how they were personally made aware of the alert at work. Overall, the most common response was by email, either from their manager, a global email to all staff, or directly from the Met Office (73%); the next most common answers were hearing weather reports (46%), verbal communication from a manager (30%), and informal communication with colleagues (20%). Nurses in care homes were more likely than nurses in the other settings to have been told verbally by a manager (50% compared with the average of 30%), and less likely to be informed via email (50% compared with the average of 73%). On the other hand, nearly all nurse managers were informed by email (96% compared with 69% for frontline nurses).

4.2.4 Actions taken during heat-health alerts

Nurses were given the dates of the most recent level 2 and level 3 heat-health alerts in their area and asked which, if any, protective actions/activities (included in a list) they had personally taken. The listed actions were drawn from Figure 3.2 in the HWP which specified actions to be taken by 'providers' in all health and social care settings e.g. hospital, community, care homes, (Public Health England, 2015a p 22). The list of actions shown to respondents varied according to their work setting (community versus hospital/care home) and current role (managers versus frontline). Nurses who said they worked with children in a community setting were shown several additional actions that were listed in the HWP for a level 3 alert. Nurses could also write in other activities



taken aside from those shown. These were examined by the research team and either recoded to one of the activities included in the list or given a new code (some of which are included in Tables 4.7 and 4.8). (When writing in these other activities, nurses may have simply reported actions they had taken during hot weather, rather than specifically during the period of a level 2, or a level 3, heat-health alert.)

4.2.5 Actions taken during heat-health alerts by managers in all settings

Table 4.5 shows the actions nurse managers reported taking during the most recent level heat-health alerts in their area. Overall, two-thirds said they communicated the alerts to staff (66%), half said they ensured staff were aware of their responsibilities in the local heatwave plan (52%), two in five reported ensuring there was sufficient staffing/resources to cope with any potential needs (41%), and one in five implemented business continuity for a level 2 alert (18%), increasing to 28% for a level 3 alert. Given that our sample included more ‘middle’ than ‘senior’ managers, it is perhaps not surprising that most of the actions targeted at managers in the HWP were carried out by fewer than half of our nurse manager participants. Participants in care homes were much more likely than those in hospital and community settings to mention these actions (aside from business continuity).

Table 4.5 Managerial actions taken during level 2 and level 3 heat-health alerts in summer 2018

Base: Managers only – all settings	Setting			All managers %
	Hospital %	Community %	Care home %	
Level 2 alert actions				
Communicate alerts to other staff	59	70	87	66
Ensure other staff are aware of responsibilities	48	44	73	52
Ensure sufficient staffing	36	35	65	41
Implement business continuity	15	25	19	18
Level 3 alert actions				
Implement business continuity	27	n.a.	30	28

Base (Level 2): Managers only: Hospital = 180; Community = 63; Care home = 52; All = 295

Base (Level 3): Managers only: Hospital = 171; Care home = 47; All = 218

4.2.6 Actions taken during heat-health alerts by nurses in community setting

Table 4.6 shows the actions taken by all nurses working in a community setting. Most commonly, nurses in community settings said they would ensure patients and their carers had appropriate information on how to protect themselves from heat (level 2 alert – 51%; level 3 alert – 53%). This was followed by checking indoor room temperatures if visiting patients (level 2 alert – 31%; level 3 alert – 38%), and checking that high-risk patients have contact arrangements in place (level 2 alert – 16%) or contacting high-risk patients (level 3 alert – 18%). Nurses who reported working with children were shown an additional three items on the list of actions for a level 3 alert. Two of these were reported by half of nurses: protecting children from the heat (such as providing water, sunscreen, hats) (42%), and maintaining an appropriate environment (such as shading, ventilation) (58%). A large number of nurses wrote in other answers, most commonly that they provided patients with fans or with water.



While the percentage is low (4% for a level 2 alert), this is likely due to the fact the response had to be written in (and it is also worth noting that this is not a level 2 alert action specified in the HWP for nurses in community settings). Overall, one in five participants said they took no actions (level 2 alert – 19%; level 3 alert – 19%), with frontline staff more likely than managers to say they took no actions (for managers, this also includes actions shown in Table 4.6).

Table 4.6 Actions taken by all staff in community care settings during level 2 and level 3 heat-health alerts in summer 2018 by nurse role

<i>Base:</i> <i>Community setting only – all staff</i>	Community setting %	Nurse role	
		Manager %	Frontline %
Level 2 alert actions			
Check high-risk patients have contact arrangements in place	16	22	15
Ensure patients know how to protect themselves	51	52	51
Check room temperature	31	25	32
Communicate/advise staff ¹	1	–	1
Provide patients with fans, water, etc ¹	4	6	4
Change patient medication ¹	0	–	1
Change patient appointments ¹	1	–	1
No actions	19	5	22
Unclear answer	0	–	1
Can't recall	7	6	7
Level 3 alert actions			
Contact high-risk patients	18	20	18
Ensure patients know how to protect themselves	53	54	53
Advise carers to contact GP with concerns	38	42	36
Communicate/advise staff ¹	2	8	0
Provide patients with fans, water, etc ¹	3	2	3
Change patient medication ¹	1	–	1
Change patient appointments ¹	1	–	1
Protect children from heat ²	42	a	43
Maintain appropriate environment ²	58	a	57
Close school/nursery ²	3	a	3
No actions	19	14	20
Unclear answer	1	–	1
Can't recall	8	8	8

Base (Level 2): Community setting only: All = 407; Manager = 63; Frontline = 340

Base (Level 3): Community setting only: All = 392; Manager = 59; Frontline = 329

¹ Response written in by nurse

² Additional actions for staff working with children only: Base: All = 38; Frontline = 30.

a Base too small to provide results



4.2.7 Actions taken during heat-health alerts by nurses in hospital and care home settings

Table 4.7 shows the actions taken by all nurses working in hospital and care home settings. The lists of actions for both alert levels in the HWP for these settings was longer than for community settings. For a level 2 alert, most commonly, nurses in these settings said they would: ensure sufficient cold water was available (hospital – 65%; care home – 88%); check the indoor temperature (hospital – 46%; care home – 70%); review and prioritise high-risk patients (hospital – 36%; care home – 67%); and ensure there are cool areas below 26 degrees Celsius (hospital – 20%; care home – 53%). It is notable that the percentage of nurses reporting each of these actions is generally much higher in care home than in hospital settings. A large number of nurses in these settings also wrote in other answers, most commonly that they would keep the environment cool (such as by closing blinds and providing fans), although the actual percentage writing this in is relatively low in comparison with the answers shown on screen; the percentage would likely be higher if this response was included in the list shown.

For a level 3 alert, the most commonly reported actions were: turning off unnecessary lighting or electrical equipment (hospital – 61%; care home – 69%); reducing the internal temperature through shading (hospital – 46%; care home – 70%); opening windows at night (hospital – 41%; care home – 70%); and checking the indoor temperature (hospital – 35%; care home – 61%). As for the level 2 alert, nurses in care home settings were much more likely to mention these actions than those in hospital settings. (It should be noted that these actions are not necessarily possible in all settings, for example, due to lights working on motion sensors, or windows in many modern buildings that cannot be opened.)

The proportion of nurses in these settings reporting that they took no actions was lower than for community nurses (for level 2 alert, hospital – 12%; care home – 2%; compared with community – 19%). Frontline staff were more likely than managers to report taking no actions (12% and 6% respectively for level 2 alert).



Table 4.7 Actions taken by all staff in hospital and care home settings during level 2 and level 3 heat-health alerts in summer 2018, by setting and nurse role

<i>Base:</i> <i>Hospital and care home – all staff</i>	Setting		Nurse role	
	Hospital %	Care home %	Manager %	Frontline %
Level 2 alert actions				
Check indoor temperature	46	70	58	47
Record where patients spend most time	11	39	22	13
Ensure cool areas	20	53	35	22
Prioritise high-risk patients	36	67	46	39
Ensure cold water, etc.	65	88	68	67
Reschedule activities	8	26	18	9
Change/maintain environment (close blinds, provide fans etc.) ¹	7	5	5	7
Provide patients with water, IV fluids, etc. ¹	0	2	1	1
Report heat-related issues upwards ¹	1	–	0	1
Monitor patients ¹	1	0	–	1
No actions	12	2	6	12
Unclear answer	1	1	1	1
Can't recall	6	2	5	6
Level 3 alert actions				
Check indoor temperature	35	61	51	36
Reduce internal temperature through shading	46	70	58	47
Turn off lighting, etc.	61	69	70	71
Open windows at night	41	70	46	43
Ensure discharge planning takes home conditions into account	7	11	15	6
Change/maintain environment (close blinds, provide fans etc.) ¹	5	8	5	6
Provide patients with water, IV fluids, etc. ¹	0	1	0	0
Report heat-related issues upwards ¹	0	1	–	0
Monitor patients ¹	0	–	–	0
Provide fluids ¹	2	3	1	2
No actions	12	4	9	12
Unclear answer	0	–	–	0
Can't recall	7	4	7	7

Base (Level 2): Hospital = 1608; Care home = 203; Manager = 232; Frontline = 1565

Base (Level 3): Hospital = 1577; Care home = 198; Manager = 218; Frontline = 1545

¹ Response written in by nurse



4.2.8 Actions taken during heat-health alerts by nurses specialising in services that involve groups vulnerable to hot weather

As shown in Table 4.8, a high percentage of our nurse participants said that they specialised in services that involved groups vulnerable to hot weather: 73% of nurses in community settings, 50% in hospital settings and 97% in care home settings. (Of course, just because a nurse does not specialise working with these groups, some – perhaps most – of their patients are still likely to be a member of a group that is vulnerable to hot weather.)

Tables 4.8 and 4.9 show that nurses who specialised in these services were more likely than those who did not to mention carrying out all the actions for level 2 and level 3 alerts (only the most common actions are shown in Tables 4.9 and 4.10). The differences were larger for nurses working in community settings than for those working in hospital/care home settings. About one in three nurses in community settings who did not specialise carried out none of the actions in the list they were shown; this is more than twice as high as non-specialist nurses in hospital/care home settings (15% of whom did none of the actions at a level 2 alert).

Table 4.8 Actions taken by all staff in community care settings during level 2 and level 3 heat-health alerts in summer 2018 by whether specialise in services that involve groups vulnerable to hot weather

	Specialise in services that involve vulnerable groups	
	Yes %	No %
<i>Base:</i>		
<i>Community setting only – all staff</i>		
Level 2 alert actions		
Check high-risk patients have contact arrangements in place	19	7
Ensure patients know how to protect themselves	55	39
Check room temperature	35	21
No actions	14	34
Level 3 alert actions		
Contact high-risk patients	22	8
Ensure patients know how to protect themselves	55	45
Advise carers to contact GP with concerns	42	25
No actions	15	33

Base (Level 2): Yes = 299; No = 106

Base (Level 3): Yes = 289; No = 101



Table 4.9 Actions taken by all staff in hospital and care home settings during level 2 and level 3 heat-health alerts in summer 2018, by whether specialise in services that involve groups vulnerable to hot weather

	Specialise in services that involve vulnerable groups	
	Yes %	No %
Base:		
Hospital/care home settings – all staff		
Level 2 alert actions		
Check indoor temperature	51	46
Record where patients spend most time	17	10
Ensure cool areas	28	19
Prioritise high-risk patients	45	32
Ensure cold water, etc.	72	61
Reschedule activities	14	5
No actions	8	15
Level 3 alert actions		
Check indoor temperature	40	36
Reduce internal temperature through shading	50	47
Turn off lighting, etc.	63	61
Open windows at night	51	35
Ensure discharge planning takes home conditions into account	9	5
No actions	10	14

Base (Level 2): Yes = 1016; No = 794

Base (Level 3): Yes = 1002; No = 772

4.2.9 Medication review and workload during spells of hot weather in summer 2018

Nurses were asked whether they or their colleagues carried out any medication reviews of vulnerable patients during spells of hot weather, as recommended in the HWP, over the (2018) summer. As Table 4.10 shows, overall, only one in five nurses were aware that any medication reviews of vulnerable patients were carried out during the summer (22%), although participants in care homes were nearly twice as likely to be aware of these reviews (41%).

All nurses were asked whether their workload during spells of severe hot weather increased or decreased compared with a typical working day. Over half said their workload increased a lot (26%) or a little (29%), a third said it did not change (31%), and only 3% said it decreased (with 10% unable to say). There was little difference between settings or nurse role, except that nurses in care homes were more likely to report an increase in workload (72%).



Table 4.10 Whether medication reviews for vulnerable patients were carried out, and nurse workload, during hot weather spells in summer 2018, by setting and nurse role

	Setting				Nurse role	
	All %	Hospital %	Community %	Care home %	Manager %	Frontline %
Medication review carried out during summer 2018						
Yes	22	17	31	41	33	21
No	56	58	55	41	48	57
Can't recall/don't know	22	25	14	17	19	22
Workload during hot weather in summer 2018						
Increased a lot	26	26	18	39	21	27
Increased a little	29	28	31	33	34	28
Did not change	31	32	35	20	35	31
Decreased a little	3	3	4	1	2	3
Decreased a lot	0	0	0	-	-	0
Can't say	10	11	12	7	8	11

Base: Medication review: All = 2558; Hospital = 1850; Community = 483; Care home = 225; Manager = 320; Frontline = 2214

Base: Workload: All = 2553; Hospital = 1844; Community = 483; Care home = 226; Manager = 318; Frontline = 2211

4.2.10 Overall preparation for dealing with vulnerable patients during hot weather

Finally, nurses were asked for their views about their, and their organisations, preparation for dealing with vulnerable patients during hot weather. The four questions were:

- In your view, how important is a patient/client's vulnerability to hot weather for setting your priorities?
- How confident would you say you are in recognising patients/clients with heat-related illnesses?
- How confident would you say you are in taking appropriate actions to protect patients/clients during periods of severe hot weather?
- Overall, how well do you think your organisation/practice/service was prepared for dealing with at-risk patients/clients during periods of severe hot weather this [i.e. 2018] summer?

As Figure 4.4 shows, nearly all nurses said a patient's vulnerability to hot weather was very (66%) or fairly (27%) important in setting their priorities. The only notable difference by setting was that nurses in care homes were much more likely than average to say this was very important (92%).

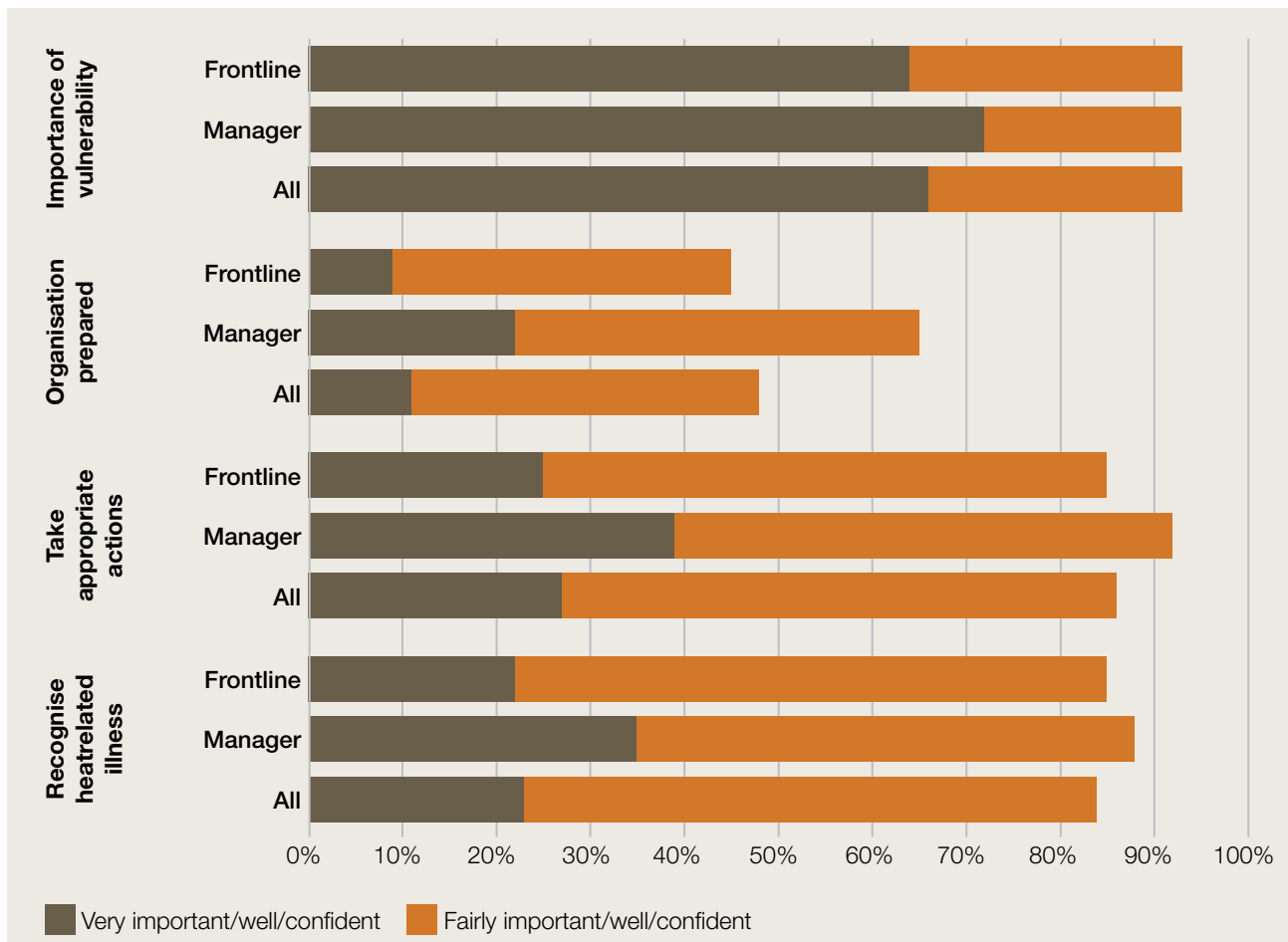
Overall, nurses were confident that they could recognise patients with heat-related conditions (23% very, and 61% fairly, confident), and that they could take appropriate actions to protect patients during hot weather (27% very, and 59% fairly, confident). However it is surprising that only a minority of hospital and community nurses said that they were very confident in these actions (Figure 4.5). Nurses working in care homes were again much more likely than average to feel very confident about recognising heat-related illness (49%) and in taking appropriate actions (59%).



Nurse managers were more likely than frontline nurses to feel very confident in these respects (Figure 4.4). However, there was still a significant minority of nurses who did not feel confident either in recognising heat-related illness (12%) or in taking appropriate actions (12%); these were most likely to be found among nurses working in hospitals (14%) (data not included in the figures).

Overall, views about how well their organisation was prepared for dealing with vulnerable patients during hot weather was fairly evenly divided between nurses saying it was well prepared (48%) and those saying it was not well prepared (42%). Nurse managers were more likely than frontline nurses to say their organisation was well prepared (65% and 46% respectively). Nurses in care home settings were the most likely to say their organisation was well prepared (72%), followed by those in community settings (55%), with hospital nurses the least likely to say this (44%). (These differences between settings remained when managers were excluded from the analysis, although they were slightly less marked.) (Figure 4.5). Nurses were also asked why they thought their organisation was/was not well prepared for dealing with vulnerable patients during hot weather. This is explored in the next section which looks at responses to this, and another, open-ended question.

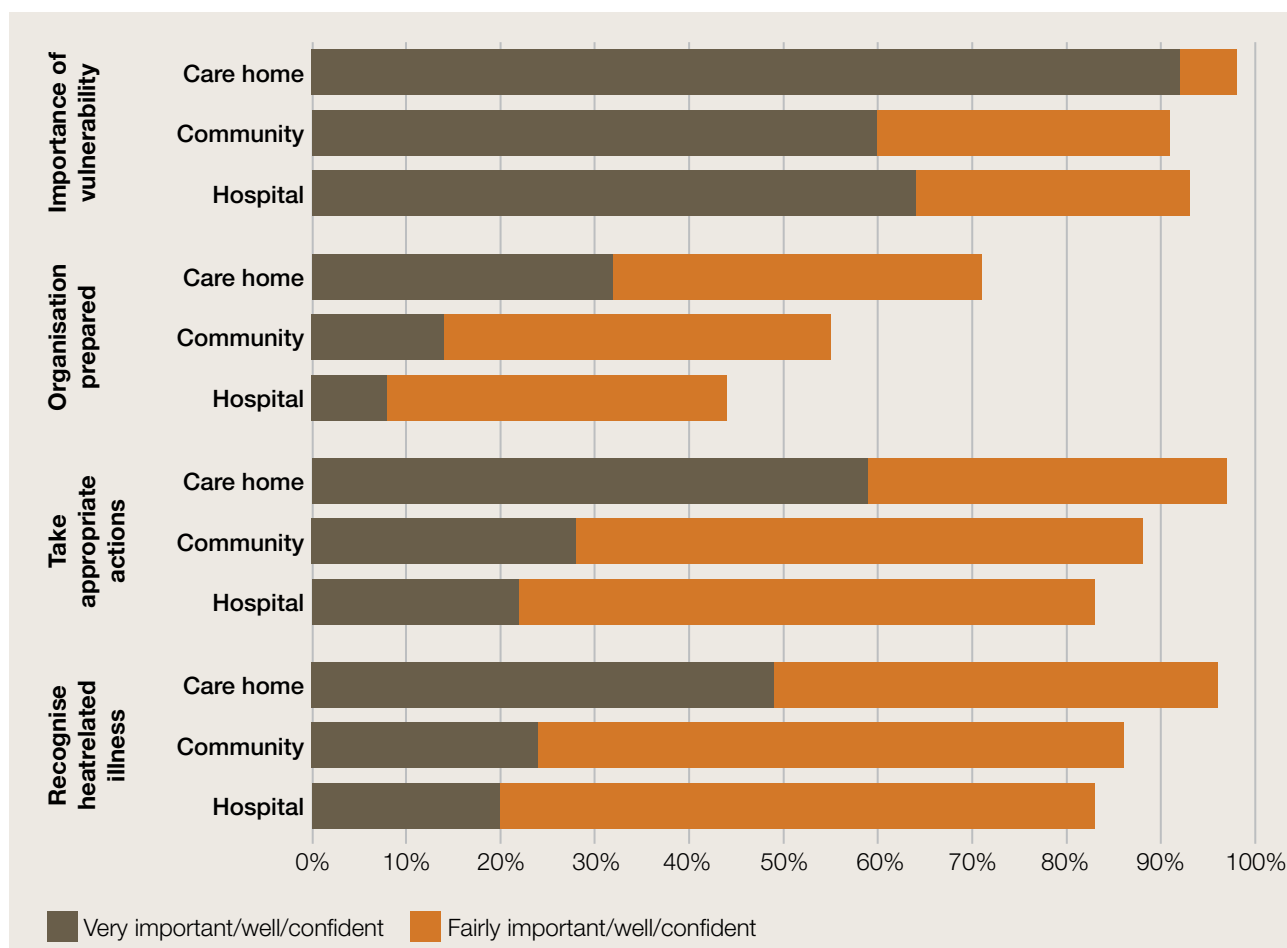
Figure 4.4 Nurses’ views on their/their organisation’s preparation for dealing with vulnerable patients during hot weather, by nurse role



Bases: All = 2696; Manager = 346; Frontline = 2323. Bases are for 'patient's vulnerability', and may differ for the other variables.



Figure 4.5 Nurses’ views on their/their organisation’s preparation for dealing with vulnerable patients during hot weather, by setting



Bases: Hospital = 1941; Community = 518; Care home = 237. Bases are for 'patient's vulnerability', and may differ for the other variables.

4.2.11 Findings from analysis of free text responses in nurse survey

The nurse survey included two questions where nurses could write in free text responses: firstly, how well respondents thought that their organisation was prepared for dealing with high-risk patients during the [2018] periods of severe hot weather (1696 free text responses, 57% of all responses); and secondly, a final question asking them to write in any further comments they would care to make about the national HWP or planning for hot weather in their organisation (751 free text responses, 28% of all responses). The high volume and richness of the responses to both questions lend themselves to analysis using qualitative methods, the results of which are described below.

Key points were highlighted using an initial search of most frequently occurring words. As Figure 4.6 illustrates, for responses relating to how nurses thought their organisation was prepared for dealing with at-risk patients during periods of hot weather, topics relating to staff were most often cited, specifically relating to organisational support and working conditions, followed by those relating to patients, then methods of cooling the environment, such as air conditioning and electric fans. Similar results were found for the question relating to further comments on the HWP.



to beat down on them'. During heatwaves, indoor areas were quoted as often being 'over 25 degrees', with some respondents reporting 'over 30 degrees' and 'stifling' for both patients and staff. Maintaining adequate ventilation in these buildings, such as by opening windows, was often constrained by other factors. Windows were repeatedly described as either not opening or 'opening only a crack' either because of 'infection control' or for 'patient safety'. Adhering to the HWP's guidance to protect patients was a challenge for some, as illustrated by the following comment from a nurse working in a hospital trust:

'Despite [the HWP's] advice given about how to mitigate the risk, it was not physically possible to carry out these strategies due to the environment and build quality of the area. No air conditioning, nowhere shady, no light switches in the rooms as they are motion sensor only, and therefore continuously on while rooms occupied, and in an area where the sun shone in through the windows for most of the day...' (Hospital based nurse)

Availability and suitability of cooling equipment and resources

Alongside operating in old and poorly designed buildings, a large number of respondents described limited or inadequate resources to mitigate against the effects of severe hot weather. Most cited a lack of, or limited, air conditioning, even in hospital areas without windows, as permanent fixed air conditioning was said to be only available mainly to specialised hospital clinical areas such as Theatres or ITU. Several respondents spoke about their trusts and care homes supplying portable air conditioning units during a particular hot period, but there was a mixed response as to their usefulness and effect, with some stating that these did not make much difference to the temperature as they were either weak or faulty, or too few in number to make a difference (they were often hired by organisations at a cost of around £1,000 per week per unit), while others suggested that they added to patient risk as they often leaked water. One hospital nurse described them as contributing to an electrical overload and subsequent power failure 'which put patients at huge risk'. There was also concern, perhaps also related to cost, that trusts were taking too long getting portable air conditioning units in place, they were often hired or bought late, at the end of the period of hot weather. There were very few comments from those with functioning installed air conditioning, which would indicate little issue with keeping cool during severe heat, though some did say that theirs did not work very well during the heat and some were unable to alter the settings.

Electric portable fans were described by most as their main method of 'cooling' or making comfortable their patient's surrounding environment during hot weather. Many of these comments related to their availability, 'there are never enough fans', or utility, 'they just blew about the already hot air' so were ineffective. Fans appeared to be in short supply, according to the majority of comments received, with cost to the organisation often cited as a reason, and some nurses even said that they were either using patient charity funds or their own money to buy them. Some trusts had policies whereby patients were asked to bring in their own fans as there were not enough to supply them individually. However, often this was of little help as '[hospital] policy states that fans brought in by relatives must be tested by an electrician first, this is not something that happens instantly, it takes days'. By the time the fan was PAT tested, the heatwave was either over or diminishing. Many said that they obtained their stock of extra fans by patients leaving their own fans for other patients to use when they were discharged. Others were concerned about the need for numerous fans during this time and, in addition to overloading the electrical supply, the increased risk of injury this posed for patients. A few said that they were unable to use fans due to infection control.



As well as mechanical methods, nurses commented on other measures used to help cool patients during hot periods. These included shading windows exposed to the sun and providing patients and staff with cool fluids and ice. Some said that they were able to provide ice lollies, ice, cold water fountains and bottled water to keep in fridges to use for patients and staff. Most spoke about the lack of these, particularly those working in hospital settings. A large number of nurses responding to the survey said that they did not have ice machines, water coolers, access to freezers or little refrigerator space, and therefore found it difficult to keep water cold. Some said that they relied on patients' relatives to bring in ice. One hospital nurse spoke of one of their patient's spending over £100 on ice during their stay as they had to buy it from their hospital café, who were selling ice at £1 per bag.

Regulations, such as those relating to health and safety or infection control, were mentioned as a reason for not being able to employ some cooling measures. These included the use of fans and mechanical air conditioning units for infection control in some specialised clinical areas, and restricting the opening of windows for health and safety reasons. Some mentioned the use of ice being banned in their departments, again for infection control.

Funding

In all settings, finances, in addition to health and safety regulations and infection control, were provided as one of the main reasons for not being able to follow all protective measures as suggested in the HWP. Comments on the lack of funding were more frequently made from those working in hospital settings, where many said that that often there wasn't the money or resources to make changes in all clinical areas, such as installing sufficient blinds to block out the sun, or to provide enough cooling equipment, despite these being frequently requested by staff. In many cases, nurses were mentioning their hospital trust withdrawing freezers and ice as it '*cost them too much*' to provide. Numerous comments related to budget and spending restrictions, with some nurses saying that they had to resort to charitable fundraising for equipment, or paying for them out of their own pockets.

References were made about organisations wasting money by having to hire expensive portable air conditioning units when old broken units could have been fixed if the organisation had been more forward thinking. Some rationalised this, commenting that heatwaves were so infrequent that it did not make economic sense to invest in '*air conditioned units anywhere other than theatres and the labs*'.

Community staff said that there was no additional funding or staff to be able to check on vulnerable patients during this time.

4.2.13 Staff support

Workload and conditions during hot weather

As mentioned earlier, the word 'staff' was the most referenced word by far by those completing the free text questions in the survey. This related to all settings, but was much more prevalent by those working in hospital trusts, and related mainly to concerns about staff working conditions during hot weather.

In hospitals, those working with functioning air conditioning and sufficient fans and ventilation said that they coped '*as well as they could*' during the heatwave, though noting the high service demand and increased workload during that time as they generally had more admissions in the heat. However, the vast majority of comments



were from those who experienced difficulties working during this period. Conditions varied in description, from *'uncomfortable working'* to *'unbearable'* with a few reporting both nurses and patients *'collapsing'* due to the heat. Temperatures on wards were reported to be in excess of 30 degrees Celsius in some areas, and many said that they struggled to keep their patients, themselves and their working areas cool.

A variety of reasons were provided, mentioned previously, including poorly designed buildings with inadequate ventilation, a lack of or ineffective cooling equipment, regulatory restrictions and access or availability of other measures to mitigate against the effect of heat. Some suggested that this was because their organisation was slow to respond and not prepared enough for when the hot weather hit, so did not have portable air conditioning units, extra fans or sufficient shading in place. Strategies such as cancelling operations or closing bays that were too hot were employed by some to relieve the pressure on staff.

However, a key concern, reflected by a large number of those responding, was related to the lack of care some organisations were providing for their staff during this time. This included, for some, an inflexible uniform policy where staff were required to continue to carry out their duties in *'thick winter uniforms'* during heatwaves, with one nurse stating that *'we were told we would not be paid if we came onto the ward wearing scrub [theatre] tops'*. Some nurses said that their employers did relax their uniform policy, allowing either theatre scrubs or the wearing of long shorts instead of uniform trousers, or allowing no tights with dress uniform, and others said that they had a lightweight summer uniform, but these appeared to be in the minority. One said their trust change its uniform policy, but it was not communicated very well and came rather late in the day:

'The chief executive put out a message on the trust net (which most nurses cannot get to see due to workload) but she [chief executive] did state to wear no tights with dresses, and we could wear navy long shorts in the hot period. This was after a month of hot weather had passed.' (Hospital nurse)

However the majority of respondents stated that their organisations were insisting on full uniform in clinical settings, including *'black tights for those wearing dresses'*. This led to some frontline staff feeling undervalued by their management:

'Our ward was very hot with lots of south facing windows. Our uniform is very thick, we asked to go into scrubs to remain cool but were refused. Saw management of matron, service manager and head of nursing in sandals and summer dresses [while] we were physically working hard in the heat in thick tunics and trousers with socks and heavy shoes.' (Hospital nurse)

Staff maintaining their own hydration was also a concern for some. Several hospital nurses commented on their organisations banning them bringing their own water into clinical areas or allowing them to drink at the nurses' station during their shifts, due to *'infection control'*, and not providing them with sufficient breaks to rest and rehydrate during the hot weather.

Nurses working in the community described similar conditions and concerns to those working in hospitals, i.e. increased workloads, unacceptable working environments with very hot clinic rooms and offices. Many reported having to provide their own fans. Some reported their cars overheating due to no air conditioning and no summer uniform policy. A similar concern about a lack of staff care was expressed. Staff shortages and sickness rates were noted to be high during this time (linked to



working in the heat) and were said by some to be impacting on patient visit times, and there was a lack of resources to cope with the increased workload which placed a strain on emergency appointments.

There were fewer responses about staff conditions from those working in care homes but again, there were similar issues to hospital and community settings with nurses stating that residents were well cared for but staff less so, as care homes were generally short staffed and overloaded with little time provided to rehydrate, as illustrated by this nurse working in a care home: *'there is lack of recognition to the needs of the staff at times. We need to look after staff too, to enable them to look after our clients/patients/residents'*.

4.2.14 Planning, management and communication

Planning for heatwaves was commented on by nurses working in all settings, including how their organisation was locally planning and preparing for hot weather and whether they were able to implement the guidance provided in the HWP. There was variation between the settings. In care homes, there was a variable response from nurses working in this setting; while some said that they had their own local plans and policies in place, others said that there were none, that they were not prepared for heatwaves, no actions were taken even when temperatures reached 30 degrees Celsius. One nurse said that their organisation was *'oblivious of the HWP and of planning ahead, heeding advice and implementation'*. Those working in community settings said that planning was important but not a priority, and some said that they were working in areas that lacked plans and protocols for a heatwave. However, several mentioned that the HWP alert provided enough notice to prepare and put minimum measures in place to protect the vulnerable. Hospital nurses suggested that there was no robust internal planning, and much was last minute and reactive, largely responding to alerts, hiring of air conditioning units etc. and that many organisations were therefore unprepared for hot weather, were often *'surprised it is hot'* and actions were taken either *'on the day or a couple of days before [a heatwave]'*. Some suggested that this lack of forward thinking caused issues and created a high demand on already stretched resources. Heatwaves were said to be low priority and winter plans were prioritised.

How nurses experienced the management of heatwaves within their organisations varied within and between settings. For those working in care homes there was a mixed response, as some said that they monitored the event well, while others reported a lack of, or poor, communication during this time. For example, one nurse said that managers were undermining their professional judgement and allowing care staff to overrule decisions:

'They [care staff] are given roles [by managers] and don't take into account experience or knowledge of nursing staff – [care staff] decide on room temperature i.e. needs to be high as residents are sitting.' (Care home nurse)

Nurses also said that planning (both locally within the organisation and in the HWP) lacked recognition of the needs of staff.

Community nurses responded variably to heatwave management issues. Many responded negatively, suggesting that their management did not prioritise hot weather or that managers were not acting proactively. There was, for some, little or no communication or reminders about actions to take during hot weather, or information



made available for staff to distribute to patients or carers during this time. Several suggested that their concerns about staff working conditions were ignored, such as those about inappropriate uniforms or water not being made available. Others were more positive, commenting that their senior management team were taking the initiative, providing good communication during heatwave alerts, ordering and providing cooler uniforms and allowing scrubs, though for some this was after the event.

Responses from those working in hospitals were similar to those in community settings, some reporting good practice, heat-health alerts were well communicated and local policies and procedures were in place, such as posting public warnings in hospital corridors and stairwells, and discussing plans and actions at the morning ward meetings, with managers monitoring the situation and providing support where required. Others said that there was little or poor planning and communication, with many stating that they were not aware of any local plans or protocols for hot weather or did not receive management visits to wards or departments to assess the situation. Staff concerns, such as those about hot uniforms, storage of medications, or working conditions, were said to not be taken on board by some managers, or only taken lightly; comments such as *'poor communication from managers'* and *'management not concerned with temperature inside the hospital'* or *'management not listening'* were frequent, as illustrated by this hospital nurse working at the frontline *'there was not much support from my organisation, we were left to our own devices'*.

4.2.15 Knowledge and usefulness of HPW

A number of survey respondents, from all healthcare settings, expressed concern about their lack of knowledge of the HWP and its guidance and advice on how to protect patients and residents, suggesting that some, particularly junior, staff and those not familiar with fluid assessment and co-morbidities, may not be heat-health aware and therefore the HWP should be mandatory training for staff at all grades. In community settings, some staff said that their trusts provided good regular training and staff meetings about recognising heat-health risks, symptoms and actions to take, while others indicated that there was not enough teaching to frontline staff on heat-related problems and staff may not fully understand the need for increased fluids. The advice provided in the HWP about identifying, prioritising and contacting those most vulnerable during heat-health alerts, proved trying for some working in the community, as this was perceived likely to be *'an unattainable suggestion'* as they would probably not have the resources to literally carry out the actions suggested, as one community nurse noted *'I read the advice once but found it frustrating, particularly the suggestion of phone/checking the 150 patients (potentially) on our caseload.'* Several hospital staff commented that it was not their lack of knowledge of how to protect, as they would know what to do, it was more an inability to assist patients due to restraints in the workplace. Some suggested that the focus of the HWP should be on general public media awareness, and not reliant on healthcare professionals and services to provide heat-health guidance and monitoring.

There were, however, many positive comments about the HWP and its heat-health guidance. Those working in care homes said that they thought that the HWP worked well in their organisations, and the heat-health alerts were useful for planning the day for their residents.



4.3 Summary of local implementation

Planning and prioritising for heatwaves locally

The local implementation case studies showed that local operational plans for heatwaves existed in all the NHS provider organisations where interviews took place, some in partnership with their local CCGs.

In assessing risk, heatwaves were frequently assessed as of potentially lower likely adverse impact than other weather-related hazards (such as floods and cold weather) and were often given a lower priority in emergency planning. The view among many of those interviewed was that heatwaves were both infrequent and short-lived in their areas, and, therefore, unlikely to be much of a problem as potential impacts on health would be manageable within their local health and social care systems. However, all considered planning and preparation to be important, largely because of an acceptance of the existence of climate change.

Managers felt that the HWP was a useful document to support local planning, particularly the heat-health alert system guidance offered, and all said that they had aligned their local plans to the national guidance. However, some felt that the HWP needed to be refreshed, as there had been little change in recent years and it risked losing its impact as a result.

Heatwave planning was largely seen as an exercise in emergency preparedness rather than part of long-term public health and environmental planning. Apart from several NHS trusts including resilience within their business continuity plans, there was little evidence of local long-term strategic planning. However, some local authority managers said that they were in the process of revising and updating their three or five year public health plans to include severe weather (including heatwaves).

Knowledge and awareness of HWP and related actions

Interviews carried out in the case studies revealed that few frontline staff were aware of any national or local heatwave plans prior to being interviewed, though most of those working in healthcare said that they would know what to do to protect their patients and clients ahead of and during heatwaves as this was part of normal healthcare practice.

These findings were echoed in the results of the national nurse survey. A relatively low proportion of nurses working in England had heard of the HWP, and only one in four said that they had read any of it. This was especially the case for nurses working in hospitals, whereas nurses in care homes were much more likely to have heard of and read the HWP. Nurse managers were also more likely than frontline nurses to be familiar with the HWP.

Similarly, except for nurses working in care homes, most nurses in hospital or community settings did not know if the organisation they worked for had its own plan setting out actions to take during spells of hot weather, or said it did not have such a plan.

Despite this, the vast majority of nurses in all settings stated that they felt 'fairly' or 'very confident', both in recognising patients who might be suffering from heat-related illness, and in taking appropriate actions to protect patients during spells of hot weather.



Actions taken during heat-health alerts

Case study interviewees reported that actions taken during alert periods followed guidance in the HWP as local plans were closely aligned, though some plans included responses to level 3 alerts that were adapted to the local situation, such as decisions about whether, and, if so, how, and when to contact their ‘vulnerable’ people. Frontline staff, particularly those working in hospitals and care homes described actions taken as ‘common sense’.

The 2017 heatwave was relatively short-lived in all case study sites, and in one site the temperature did not reach the threshold so no actions were taken. Some managers felt that the temperature thresholds that triggered alerts were not sufficiently specific to account for regional and sub-regional differences in climate. The level 3 alert response was, according to the emergency planners interviewed, implemented at ‘single-agency’ level, meaning that individual health and social care organisations were responding separately with their own in-house actions to ensure business continuity. There were no declared emergency incidents across the case study sites in 2017, and managers reported that they had coped well, though a few healthcare providers reported being busier than normal or encountering some stresses within their healthcare systems.

The nurse survey showed that nearly all nurses reported that they had been aware of the heat-health alerts issued during the summer of 2018 (which had more prolonged spells of hot weather than the 2017 summer). Most said that they were made aware of the alerts at work via email.

Most nurse managers said that they communicated alerts to other staff and ensured staff were aware of their responsibilities. Managers in care home settings were the most likely to say that they had undertaken these actions.

Most nurses in care homes reported that they carried out the actions specified in the HWP, such as checking indoor temperatures, ensuring a sufficient supply of cold water, etc.

However not all the actions taken by staff were appropriate or in line with HWP guidance, e.g. opening windows in hot weather, which was found both in the case studies and survey data.

Whilst hospital nurses surveyed said that they were ensuring the availability of supplies of cold water, and turning off unnecessary lighting, they were not typically carrying out the other activities specified in the HWP for level 2 and level 3 alerts (such as ensuring cool areas and rescheduling activities). Some were reporting ‘level 3’ actions taken at level 2 (though this might be explained by nurses conflating level 3 and level 2 responses and reporting all actions taken during hot weather).

Community nurses surveyed were even less likely than hospital nurses to be taking the actions specified in the HWP, with one in five saying that they took none of the actions listed in the HWP. About half of community nurses said that they ensured patients knew how to protect themselves, but fewer than one in five reported that they had contacted vulnerable patients during a level 3 alert.

Moreover, for all nurses surveyed, only one in five (one in three nurse managers) were aware of any medication reviews being carried out for vulnerable patients. Similar findings existed for those interviewed in the case studies.



Issues and challenges

Although case study interviewees said that their organisations had managed well during heat-health alerts, the appropriateness of the response was rarely assessed as there were few mechanisms in place to monitor activities during and following the alert, and the alert had not resulted in any emergency incidents, which would trigger a formal review.

The role of CCGs in planning and implementing local heatwave plans was not always clear. Some CCG staff reported that their CCG was taking a key role in planning and co-ordinating the health response, in others they said that they were acting in a more supportive role, with NHS England taking the lead.

A conservative ‘wait and see’ approach to escalating actions during a heat-health alert appeared to be adopted by most managers; they considered their response actions to be, in the main, measured and proportionate to the perceived local risk, employing professional judgement where indicated. Some managers noted that plans did not function as well as they might if the alert period coincided with a weekend, when most managers and emergency planners were not at work.

Capacity to reach all high-risk members of the population was identified by some interviewees as a significant issue, especially the ability to identify ‘hidden’ populations, i.e. those with needs but not necessarily on the ‘radar’ of health or social services, such as: people with social care needs not qualifying for social support; seasonal agricultural labourers and transient populations; and other groups such as some homeless people, and alcohol and drug users. Many managers relied on general public health information to reach these groups, though a few public health managers communicated specific targeted messages via public media, and some linked with community groups (through their community resilience programmes) as well as relying on commissioned services supporting local vulnerable populations to relay heat-health guidance and advice and take protective actions where indicated.

While it was recognised that general practices might be among the best placed organisations to support high-risk patients, as they would likely have better access to vulnerable groups than other NHS providers and local authorities, their role in the HWP was not altogether clear as they did not have contractual duties for EPRR, as other NHS statutory providers did, and were not assessed against EPRR standards. Some emergency planning managers in local authority social care departments were working to develop a shared database of identified local vulnerable people, including data held by general practices.

The nurse survey data showed a relatively high proportion of nurses, almost half of those in hospital settings, who said that their own organisation was not well prepared for dealing with vulnerable patients in hot weather. Difficulties and challenges on implementing protective actions, both structural and organisational, were highlighted.

Most nursing staff said that they were doing the best they could to protect patients and themselves in often quite difficult conditions, partly due to old and poorly designed buildings, not easy to adapt to a changing climate. Methods for ventilating and cooling patient and staff environments were reported as being limited, insufficient or absent in some areas, and staff said that they struggled to ensure that they and their patients remained safe and hydrated.



Nurses stated that this was made more difficult by health and safety regulations and infection control requirements. They also reported that their employers often imposed unrealistic and inflexible policies, such as requiring staff wear full uniform in clinical areas during hot periods, not allowing extra breaks or flexible (short) shifts during very hot periods, and restricting staff drinking water during shifts.

While some participants reported that their organisation was proactive and had local plans and procedures in place, in line with guidance provided in the HWP, others said that their workplaces were ill prepared for heatwaves, reacting only when the heat-health alerts were triggered, and that this led to delays in taking appropriate actions, such as hiring and setting up cooling equipment.

Many said that they were unaware of any internal heatwave plans or protocols and were not familiar with the HWP guidance, suggesting that all grades should have mandatory HWP training.

Those that either were, or became aware of, the HWP as part of the survey, were largely positive about the Plan's aims and objectives, although some suggested that it was unrealistic in parts, such as where it suggested that community providers prioritise and contact all their vulnerable patients during heat-health alerts.

4.4 Limitations

The bulk of the interviews to investigate the implementation of the HWP in local authority areas was conducted in 2017, which was characterised by a relatively mild summer. Only one level 3 alert was issued, in June, and this period of very hot weather was relatively short. It was also only possible to analyse a small number of case studies due to the time and funding constraints of this project. It was not always easy to recruit staff for interviews, particularly in some sites, and we hypothesised that this reluctance might to some extent reflect the degree of priority and attention given to heatwave planning in these locales. It was particularly difficult to recruit managers of care homes and GPs.

The nurse survey was carried out following the much warmer summer in 2018. The results may, therefore, not be wholly representative of nurses' usual summer practice though if summers become warmer, 2018 may become more like a normal summer. Also, nurses in warmer parts of the country may have been more motivated to respond to the survey due to the hotter summer conditions they had faced, so we cannot be certain that this represents the views and experiences of all nurses, although comparisons between nurse settings (e.g. hospital versus community) and roles are instructive.



5. Findings: public attitudes, awareness and behaviour related to hot weather

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5.1 Public attitudes to hot weather

In England, with its temperate climate, people generally feel positive about warm summer days, as summers can often be cool and wet. These positive feelings often extend even to hot weather, with many residents spending their holidays in much warmer climates, such as Greece, southern France, Italy and Spain. When individuals feel positive about an experience such as hot weather, they may be less likely to take protective measures despite the risk posed by the heat. An earlier survey looking at UK residents’ views on hot weather and their behaviours during the 2013 heatwave showed that people who felt positive about hot weather were less inclined to take protective measures (Lefevre et al., 2015).

In order to gauge attitudes towards hot weather in the current study, the survey asked whether participants agreed or disagreed with five statements (three of them from Lefevre et al 2015):

- I love hot weather.
- Spending time in the sun is good for me.
- Hot weather is a risk to my health.
- Hot weather is a risk to the health of someone I know.
- One good thing about climate change will be hotter summers in England.

The response categories were: strongly agree; agree; neither agree nor disagree; disagree; strongly disagree. Table 5.1 shows the distribution for the five statements across the full sample. For three of the five statements – ‘love hot weather’, ‘spending time in sun is good’ and ‘hot weather is risk to my health’ – there are stronger positive than negative feelings, with the largest difference for the statement ‘spending time in sun is good’ (with 67% expressing positive feelings and only 16% negative feelings). The other two statements – ‘good that climate change will bring hotter summers’ and ‘hot weather is risk to someone I know’ – showed somewhat more negative than positive feelings and also generated a lot of ‘neither agree nor disagree’ responses. The attitudes towards the ‘climate change’ statement is likely explained by the overwhelming messages in the media over the potentially harmful effects of climate change. It is more difficult to explain the attitudes towards the ‘risk to someone else’ statement as we don’t know how widely or narrowly participants interpreted the ‘someone I know’, e.g. whether it included only their immediate family (children, partners, elderly parents) or whether some participants included elderly neighbours or children living next door.

Table 5.1 Attitudes towards five statements about hot weather

Row %		Strongly agree	Agree	Neither	Disagree	Strongly disagree	Bases (unweighted)
I love hot weather	%	16.4	41.3	20.7	16.2	5.3	1876
Spending time in the sun is good for me	%	13.8	52.9	16.9	11.5	5.0	1878
Hot weather is a risk to my health	%	4.8	26.4	29.6	31.2	8.0	1874
Hot weather is a risk to the health of someone I know	%	8.9	32.2	29.1	24.3	5.5	1869
One good thing about climate change will be hotter summers in England	%	3.0	21.8	30.6	29.6	15.0	1867



The percentage who strongly agree/agree for various demographic groups are shown in Table 5.2. There were a number of differences in attitudes according to demographic and socio- demographic characteristics of participants. While there were no gender differences, there were large differences by age, with younger participants generally expressing more positive attitudes towards hot weather; the only exception was the ‘climate change’ statement which older participants (particularly those aged 75+) were more likely to endorse. Level of education was also associated with attitudes, and in an unexpected direction for two of the statements: compared to those with no qualifications, participants with higher levels of education were more likely to agree that ‘spending time in the sun is good’ and to disagree that ‘hot weather is a risk to own health’. However, those with no qualifications were much more likely to agree with the ‘climate change’ statement. There were differences in attitudes according to the region the participants lived in, but the differences varied by each statement, so it is difficult to generalise by region. Participants in the North West generally had quite positive attitudes (except for the ‘climate change’ statement), while those in the East of England appeared to be the least positive overall. Finally, participants living in households with children expressed more positive views than those living in households without children.

Table 5.2 Positive attitudes towards hot weather by socio-demographics

% strongly agree/ agree	I love hot weather	Spending time in the sun is good for me	Hot weather is a risk to my health*	Hot weather is a risk to the health of someone I know*	One good thing about climate change will be hotter summers in England	Bases** (unweighted)
	%	%	%	%	%	
All	57.7	66.7	39.2	29.8	24.8	1876
Gender						
Male	57.6	68.4	38.2	27.4	26.6	822
Female	57.8	65.1	40.3	32.0	23.2	1054
Age group						
18-24	63.5	68.3	47.9	37.3	21.2	57
25-34	62.0	72.1	46.9	30.2	25.5	186
35-44	64.2	74.1	40.9	33.2	22.4	328
45-54	58.2	70.7	37.4	28.5	18.4	394
55-64	55.0	58.6	32.0	24.5	22.0	385
65-74	48.3	59.3	33.4	29.3	28.0	380
75+	48.7	58.8	39.3	27.0	47.2	142
Ethnic group						
White	56.9	66.9	37.6	29.3	24.1	1749
Black	49.4	56.0	37.6	41.4	27.9	33
Asian	64.8	66.2	43.3	30.3	26.0	62
Mixed/Other	56.9	66.9	47.2	30.4	24.1	32



Table 5.2 Continued

	I love hot weather	Spending time in the sun is good for me	Hot weather is a risk to my health*	Hot weather is a risk to the health of someone I know*	One good thing about climate change will be hotter summers in England	Bases** (unweighted)
	%	%	%	%	%	
Region						
North East	49.9	60.8	34.6	26.4	16.8	91
North West	68.1	71.5	38.1	33.4	18.0	254
Yorkshire & the Humber	56.4	65.1	42.5	35.4	30.6	178
East Midlands	62.0	72.0	37.8	31.9	23.2	202
West Midlands	55.6	58.8	34.3	28.9	24.5	186
East of England	51.5	59.9	31.2	29.6	27.3	224
London	52.2	67.1	45.4	28.4	27.0	185
South East	59.9	68.9	42.5	30.4	29.6	341
South West	58.8	71.1	40.5	22.1	20.2	215
Urban/rural						
Urban	57.7	66.2	39.5	29.9	25.0	1450
Rural	57.6	68.9	37.9	29.3	24.0	426
Highest educational qualification						
Degree or higher	57.3	70.2	45.6	32.9	17.6	741
A level or equivalent	60.5	74.6	39.2	28.7	23.6	404
Other below A level	60.8	66.4	39.5	31.4	28.8	383
Other qualifications	45.4	51.6	27.3	22.1	25.4	145
None	56.4	55.1	31.0	26.1	36.7	201
Household type						
Single person	55.2	58.7	34.4	28.5	29.8	443
Lone parent	51.6	64.6	45.4	37.4	36.3	84
2 adults, no children	57.5	64.4	39.9	27.8	24.6	681
2 adults, 1+ children	65.7	71.1	41.8	34.1	23.2	400
3 adults, no children	57.6	68.5	39.7	28.4	22.2	175
3 adults, 1+ children	61.2	78.8	40.0	28.3	20.3	79
Disability						
Yes – affects daily life	48.9	60.1	29.1	23.2	29.3	291
Yes – not affect	51.8	62.1	35.8	29.0	24.9	367
None	61.2	69.3	42.5	31.6	23.8	1216
General health						
Very good	67.8	73.4	44.9	34.2	23.8	361
Good	60.0	71.1	43.9	33.0	24.4	883
Fair	49.5	57.3	29.3	22.3	25.6	483
Bad/very bad	48.1	55.6	32.0	26.0	26.8	149

* % disagree/strongly disagree

** Bases vary slightly for each statement, and are shown for 'I love hot weather'.



Whether or not individuals perceive their health to be at risk of hot weather is likely to influence their behaviour during heatwaves. Figure 5.1 shows that individuals within the vulnerable groups we defined (see page 15) generally do not consider their own health to be at risk from hot weather. Fewer than half (41.8%) of participants aged 75+ see themselves at risk of hot weather (with one in five (18.8%) saying that they did not know). As Figure 5.2 shows, women aged 75+ were much more likely than men in this age group to recognise the risk of hot weather to their health (52.7% and 33.1% respectively). Among 18-74 year olds, only half of those with a LLSI or those in bad health said their health was at risk (46.2% and 50.8% respectively). Participants aged 75+, especially those living alone, were more likely to agree with the statement 'I love hot weather' than to agree that they are at risk. This was not the case for adults 18-74 with a LLSI or in bad health (Figure 5.1).

Figure 5.1 Attitudes to hot weather for vulnerable groups: % strongly agree/agree

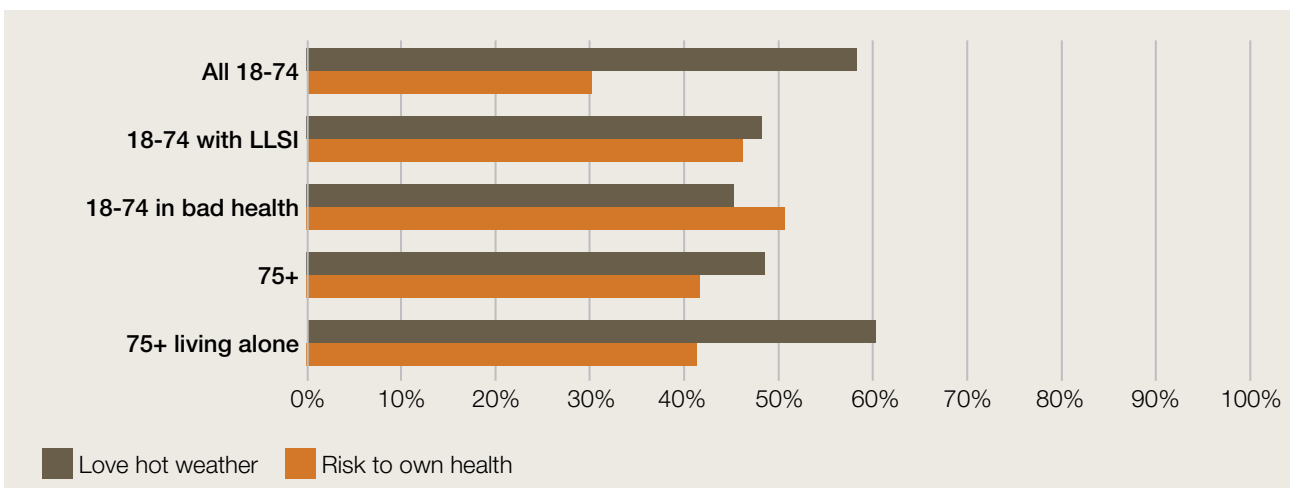
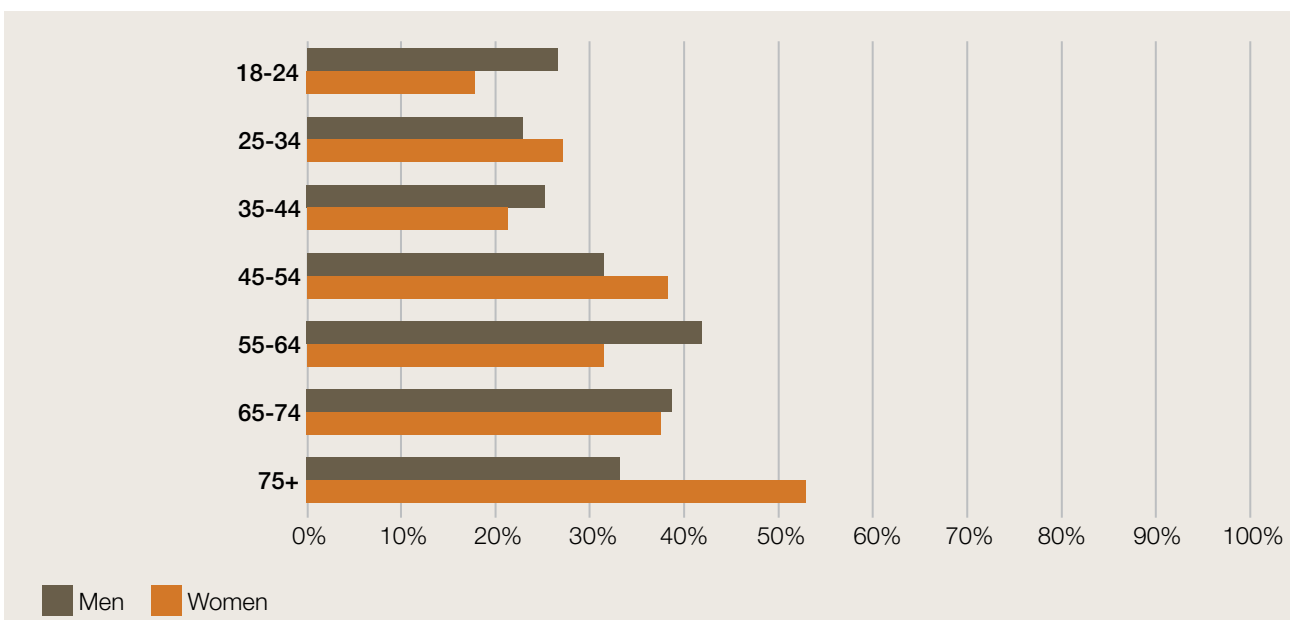


Figure 5.2 Whether hot weather is risk to own health by age group within gender: % strongly agree/agree





This attitude toward risk was also found in the focus groups, where few participants felt they were personally at risk during periods of very hot weather. Though many identified the old and very young as particularly at risk, they did not perceive themselves to be in this category, even though most of those interviewed were aged 75+ and living on their own. It was *'really old people'* who were more at risk, and, according to one participant, aged 80, *'we're not really old'* (FG2 P1). Though probably said with some irony, agreement with this sentiment was observed in all the focus groups. Others qualified their responses, suggesting that physical and mental health were more important factors for risk, not age. The groups commonly did not feel they were specifically at risk from periods of extreme hot weather as most felt they had a good general knowledge of the risks compared to others in their age group, and that they took protective measures when necessary. It was, for some, something that they *'did not really have to think about'*.

However, this does not mean participants expressed positive attitudes about very hot weather. There was general agreement among participants in all the focus groups that *'too hot'* was any temperature over 26°C or 27°C (80°F), though a few said over 23°C (75°F). Participants were particularly negative about the high levels of humidity that appeared to frequently accompany spells of hot weather in England, rather than the temperature itself. However, most said that it was not a problem for them as they considered heatwaves (agreed as a period of very hot weather lasting for a long period) as a seldom occurrence in England, with many suggesting that the last real heatwave to have taken place in England was in 1976. Most agreed that the weather was more changeable nowadays:

'The thing is that the weather we get over here, it's not continuous, you might get one good day or two days...whereas in some countries they get a nice full week of it. Our weather can change so many times in a day.' (FG4 P1)

Nonetheless, there were conflicting opinions expressed about how much the weather is changing, with most participants agreeing that, in the past it was *'hotter then'*, despite having a shared understanding that climate is changing and accepting that it is more dangerous now. The perception was that the danger of climate change was not necessarily in rising temperatures in England, but in the stripping of the ozone layer which offered some protection from the UV rays of the sun. For most, discussion of heat risk was couched in the narrative that hot weather increased people's risk of sunburn and skin cancer rather than increasing other risks to health, such as overheating, heat stress and heat exhaustion; older people and babies therefore were felt to be more at risk as they had *'thin skin'* so needed to protect themselves by either keeping out of the sun or covering up, using sunscreen and wearing hats.



5.2 Awareness of health advice and publicity about hot weather

All regions in England experienced a level 3 heat-health alert from 17-21 June 2017. Nearly all (95.4%) survey participants said they were in England on some or all of those days.

Those who were in the country during some or all of the June heatwave were asked if they were aware of any hot weather-related health advice and publicity during that period. Those who were aware, were also asked whether they thought the advice or publicity was useful. Heat protection messages are often aimed at vulnerable groups, but are also relevant to all members of the population who can experience adverse effects in hot weather (e.g. due to outdoor physical activity) (Caspersen et al., 2000). The results for vulnerable groups are shown in Table 5.3 and for other socio-demographic groups in Table 5.4. Just over half of participants said they were aware of hot weather-related advice or publicity during the June heatwave and, of those who had heard the advice/publicity, the vast majority said what they heard was very or fairly useful. While one vulnerable group – participants aged 75+ – were much more likely to have heard the advice/publicity (64.1%), another vulnerable group – participants aged 18-74 in bad health – were much less likely to have heard it (only 38.3%).

There are not many differences by these other socio-demographic characteristics, and where there are it appears that health advice/publicity during heatwaves is largely reaching the right sorts of people. For example, the advice/publicity was more likely to be heard by participants living in the warmest parts of the country (the South East), where a slightly higher than average proportion had heard the advice. The one group where health advice does not appear to be getting through is among households with children, as these household types were the least likely to have heard the advice (although, as already mentioned, we do not know the age of the children living in these households).

Table 5.3 Whether heard health advice or publicity during June 2017 heatwave, and whether advice was useful for vulnerable groups

Row %		Not heard health advice	Heard health advice	Heard advice and found it:	
				Useful	Not useful
All	%	48.9	51.1	42.5	8.5
Aged 18-74	%	50.1	49.9	41.6	8.4
Aged 75+	%	35.9	64.1	54.2	9.8
Aged 75+ and living alone	%	45.1	54.9	45.2	9.7
Aged 18-74 no LLSI	%	50.4	49.6	41.2	8.4
Aged 18-74 with LLSI	%	48.2	51.8	44.0	7.9
Aged 18-74 in good/fair health	%	48.9	51.1	42.7	8.4
Aged 18-74 in bad health	%	61.7	38.3	30.8	7.5



Table 5.4 Whether heard health advice or publicity during June 2017 heatwave, and whether advice was useful, by socio-demographics

Row %		Not heard health advice	Heard health advice	Heard advice and found it:		Bases (unweighted)
				Useful	Not useful	
All	%	48.9	51.1	42.5	8.5	1786
Gender						
Male	%	48.7	51.3	40.7	10.6	784
Female	%	49.2	50.8	44.2	6.6	1002
Age group						
18-24	%	56.0	44.0	35.2	8.8	53
25-34	%	56.4	43.6	32.2	11.4	176
35-44	%	54.2	45.8	38.6	7.3	318
45-54	%	53.0	47.0	39.7	7.2	387
55-64	%	44.9	55.1	48.4	6.7	361
65-74	%	35.7	64.3	55.3	9.0	353
75+	%	35.9	64.1	54.2	9.8	135
Ethnic group						
White	%	49.5	50.5	42.1	8.4	1670
Black	%	47.4	52.6	49.3	3.3	32
Asian	%	40.1	59.9	46.7	13.3	56
Mixed/Other	%	a	a	a	a	28
Region						
North East	%	62.0	38.0	33.0	4.9	90
North West	%	54.6	45.4	35.8	9.6	244
Yorkshire & The Humber	%	48.9	51.1	46.0	5.1	172
East Midlands	%	51.8	48.2	38.7	9.5	190
West Midlands	%	48.1	51.9	38.7	13.2	174
East of England	%	49.4	50.6	44.2	6.4	218
London	%	45.1	54.9	44.4	10.6	178
South East	%	42.4	57.6	48.3	9.4	320
South West	%	49.0	51.0	45.5	5.5	200
Urban/rural						
Urban	%	48.8	51.2	42.6	8.6	1377
Rural	%	49.7	50.3	42.1	8.2	409
Highest educational qualification						
Degree or higher	%	51.2	48.8	35.6	13.2	708
A level or equivalent	%	48.4	51.6	46.9	4.8	386
Other below A level	%	46.3	53.7	46.0	7.7	359
Other qualifications	%	47.3	52.7	50.6	2.1	141
None	%	49.6	50.4	41.8	8.6	191



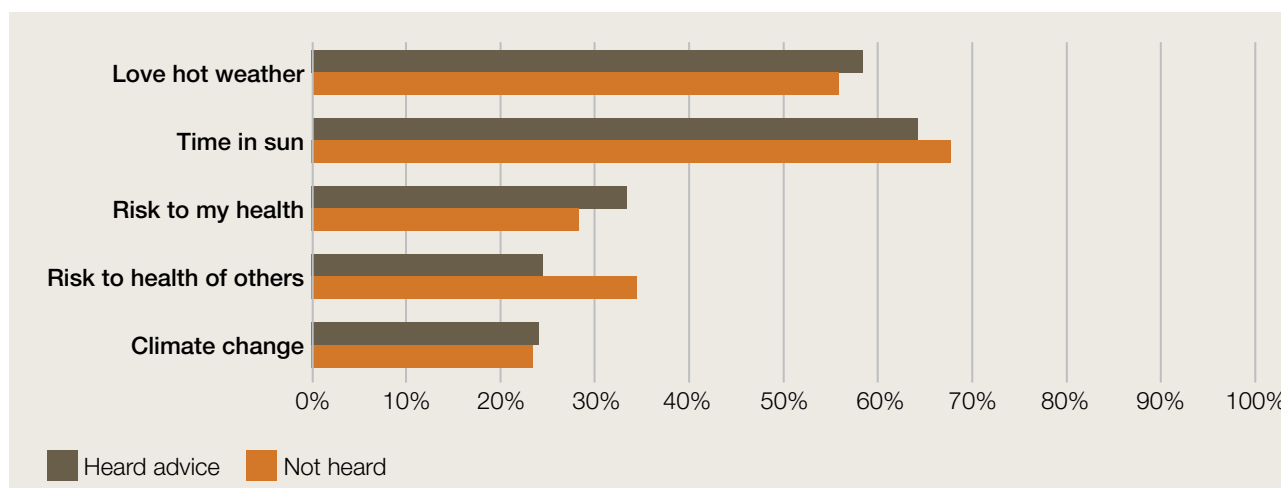
Table 5.4 Continued

Row %		Not heard health advice	Heard health advice	Heard advice and found it:		Bases (unweighted)	
				Useful	Not useful		
Household type							
	Single person	%	48.4	51.6	42.8	8.8	423
	Lone parent	%	57.2	42.8	42.8	–	83
	2 adults, no children	%	43.9	56.1	47.1	9.0	634
	2 adults, 1+ children	%	57.6	42.4	34.2	8.2	387
	3 adults, no children	%	41.7	58.3	48.1	10.2	168
	3 adults, 1+ children	%	62.5	37.5	32.8	4.8	77
Disability							
	Yes – affects daily life	%	49.4	50.6	42.5	8.1	280
	Yes – not affect	%	42.9	57.1	46.6	10.5	352
	None	%	50.3	49.7	41.5	8.1	1153
General health							
	Very good	%	47.8	52.2	44.8	8.1	338
	Good	%	50.0	50.0	41.8	8.2	838
	Fair	%	44.3	55.7	46.1	9.6	463
	Bad/very bad	%	59.1	40.9	33.2	7.7	147

Figure 5.3 shows that there was no association between participants hearing health advice/publicity about hot weather and their views towards hot weather. Since the aim of such advice/publicity is to warn people of the risks of hot weather, it would appear that such advice/publicity does not seem to be having a significant impact in this respect. In fact, previous research has found that hearing such advice was associated with more positive feelings towards hot weather (Lefevre et al., 2015), but this relationship was not found in our survey. However, as a cross-sectional survey, it is not possible to assume any causal relationships between hearing advice about hot weather and participants’ attitudes, since we do not know what other influences there have been on people’s attitudes or for how long they have held such attitudes.



Figure 5.3 Attitudes towards hot weather, by whether or not heard health advice/publicity: % strongly agree/agree



Although the focus groups were held quite a few months after the summer of 2017, participants were asked to reflect on their recollection of hot weather in England during that summer and they were also prompted to think about the specific level 3 heat-health alert in June that year. They were asked about whether they remembered receiving any alerts, publicity or advice about how to best protect themselves against the heat, and for their opinion on any advice or publicity received. Leaflets and guidance documents produced by the NHS, PHE and Age UK (Public Health England, 2018a, Age UK, 2017) were circulated later in the session to gauge their awareness and thoughts on how useful this information is.

Few participants had specifically remembered the June 2017 heatwave, and those that did, did not consider it to be a 'heatwave'. According to all those interviewed, heatwaves were generally thought to be hot weather that lasted a long period, though opinion on what was constituted 'long' varied between one and several weeks. Still, there was agreement among most participants that there were some very hot days in the summer of 2017, but that they didn't last long; *'we haven't really had a summer'* was a common response.

Only a small number of participants remembered seeing or hearing any specific warnings or advice about heat-health on television, radio or in doctors' surgeries during the hot weather. One participant thought that they remembered seeing *'something saying drink more water'* (FG1 P4), though nothing else. Most agreed that they normally became aware of impending hot weather through listening to or watching national or local weather reports on the radio or television, where information is aimed at the general population, communicating specifics on temperature and climate. Another conceded that information and advice may have been available in their GP's surgery noticeboard, but that people rarely read these, stating that *'half the time you sit down and read a magazine before you actually go in'* (FG1 P5). Specific advice and guidance, as described in the Age UK leaflet, was felt by a few as lacking as they felt that some people, like themselves, may benefit from this.

Another concern was expressed about how health protection information was, and could be, accessed during heatwaves. Although most participants said that they had reasonably good access to IT and knowledge of websites for information about the



dangers of hot weather to health (e.g. NHS 111), they felt that many of their peers lacked this form of access either because of cost or reluctance to engage. One expressed the view that reliance on ICT to provide health promoting and protecting messages actively excludes older people who largely rely on television and radio:

‘Sometimes on television you’d get, at the end of a programme, “and if you want to get further information log on to our website” and the times I’ve said to [my husband] ‘how many people haven’t got computers’ – they might want to see what this is all about but they, they’re not online.’ (FG1 P5)

‘...then they give you a telephone number you can’t take down because you haven’t got a pen in your hand, you know – it’s all these sort of things against... well it’s against the elderly.’ (FG2 P4)

5.3 Knowledge of effective actions/behaviours for heat protection

Individuals are more likely to take action during hot weather if they perceive the protective behaviours as effective. Previous research has shown that many people, including those at risk of hot weather-related illness, do not think taking such behaviours is effective or necessary (Abrahamson et al., 2009). Also, as mentioned previously, given the relative infrequency of hot weather in England, residents often welcome and seek out hot weather, e.g. by doing outdoor activities on warm days, or by travelling to countries known for warm weather for holidays (even during their hottest periods). We therefore examined the extent to which participants in our survey perceived heat protection behaviours as effective. Specifically, we asked how effective they thought nine different actions/behaviours were for protecting them from summer heat:

- Staying out of the sun between 11 am and 3pm
- Drinking cool fluids
- Covering up your skin with clothing or using a hat
- Limiting strenuous physical activity to the cooler parts of the day
- Using an electric fan
- Keeping curtains closed on windows exposed to direct sunlight during the day
- Keeping windows closed that are exposed to direct sunlight during the day
- Opening windows at night or in the cooler parts of the day
- Avoiding alcohol

The response categories were: completely effective, very effective, somewhat effective, slightly effective; not at all effective. Eight of the nine measures (the exception being ‘covering skin with clothing’), using the same or similar wording, were asked in a previous survey (Lefevre et al., 2015), and all are included as guidance in the HWP.

The responses to each action/behaviour are shown in Table 5.5. Overall, five of the nine actions were recognised as effective by around two in three participants or more: ‘drinking cool fluids’ (72.6%); ‘covering skin’ (66.5%); ‘staying out of sun’ (66.2%); ‘limiting activity’ (64.2%) and ‘opening windows at night’ (63.2%). Two other measures were recognised as effective by half of participants: ‘keeping curtains closed on exposed windows’ (47.7%); and ‘avoiding alcohol’ (45.3%). ‘Using an electric fan’ was only thought effective by two in five (38.0%) participants, and ‘closing exposed windows’ by only one in five (20.2%).



Table 5.5 Whether actions/behaviours are effective as protection from hot weather

<i>Row %</i>		Completely effective	Very effective	Somewhat effective	Slightly effective	Not at all effective	Bases (unweighted)
Staying out of the sun between 11am and 3pm	%	17.7	48.5	22.9	6.6	4.3	1878
Drinking cool fluids	%	22.5	50.1	19.5	6.4	1.5	1878
Covering up your skin with clothing or using a hat	%	16.5	50.0	23.5	6.2	3.7	1875
Limiting strenuous physical activity to the cooler parts of the day	%	14.4	49.8	24.1	9.6	2.1	1876
Using an electric fan	%	8.6	29.4	37.7	18.6	5.6	1877
Keeping curtains closed on windows exposed to direct sunlight during the day	%	10.0	37.7	33.8	12.8	5.7	1878
Keeping windows closed that are exposed to direct sunlight during the day	%	3.2	17.0	24.8	18.1	36.9	1873
Opening windows at night or in the cooler parts of the day	%	16.0	47.2	27.9	7.3	1.6	1876
Avoiding alcohol	%	11.1	34.1	29.5	14.3	10.9	1862

For the most part, vulnerable groups expressed similar views on effectiveness to the population in general (Table 5.6). Participants aged 75+ were somewhat less likely to say that ‘drinking cool fluids’ was effective (60.8% compared with 73.6% of ages 18-74), but the former were more likely than the latter to say ‘keeping curtains closed on exposed windows’ was effective (60.5% compared with 46.5%). The effectiveness of using an electric fan was more often reported by participants aged 18-74 with a LLSI (52.3%) or in bad health (50.3%) compared with all those aged 18-74 (38.0%). But among ages 18-74, those in bad health were less likely to report as effective ‘staying out of the sun’ (54.0% compared with 66.2% of all aged 18-74) and ‘opening windows at night’ (52.8% and 63.2% respectively).



Table 5.6 Whether actions/behaviours are effective as protection from hot weather for vulnerable groups

% completely/ very effective	Staying out of sun between 11-3	Drinking cool fluids	Covering up your skin with clothing	Limit physical activity to cool parts of day	Use electric fan	Keep curtains closed on exposed windows	Keeping exposed windows closed	Opening windows at night	Avoid alcohol
	%	%	%	%	%	%	%	%	%
All	66.2	72.6	66.5	64.2	38.0	47.7	20.2	63.2	45.3
Aged 18-74	65.7	73.6	66.3	64.1	38.4	46.5	19.5	63.0	45.6
Aged 75+	71.2	60.8	67.6	64.8	34.0	60.5	27.0	65.1	41.2
Aged 75+ and living alone	75.1	68.4	70.3	75.2	33.9	47.8	34.1	63.5	44.1
Aged 18-74 no LLSI	66.7	74.1	65.9	64.2	35.8	47.7	19.7	63.7	45.5
Aged 18-74 with LLSI	60.5	70.7	68.5	63.3	52.3	39.8	18.0	58.8	45.9
Aged 18-74 in good/fair health	66.9	73.3	67.0	64.6	37.2	46.4	19.9	63.9	45.6
Aged 18-74 in bad health	54.0	76.3	58.9	58.9	50.3	48.2	15.7	52.8	44.6

There were some differences in perception by socio-demographic groups, particularly by age (Table 5.7). In general, it was younger age groups, and especially the 18-24 group, who were least likely to identify these actions as effective. This was most notable for 'staying out of sun 11-3' (39.8% among 18-24 year olds compared with 66.2% on average); 'limiting physical activity' (40.9% compared with 64.2%); and 'keeping curtains closed' (21.9% compared with 47.7%). The oldest age group of 75+ was the most likely to identify as effective four of the nine items ('staying out of sun'; 'keeping curtains closed'; 'keeping windows closed'; and 'opening windows at night').

There were also large differences by ethnic group; for example, White participants were much more likely than Black participants to identify as effective 'staying out of sun' (67.2% and 27.3% respectively), 'drinking fluids' (73.6% and 43.5%) and 'limiting physical activity' (66.0% and 49.9%).

Regional differences were also apparent, which generally reflect England's geography; for example, 'staying out of the sun 11-3' was much more likely to be mentioned by participants in the South West (75.4%) or South East (70.4%) than in the North East (45.3%). Six of the nine statements were most often mentioned by participants in southern parts of the country (including the East of England, London, South East and South West).



Table 5.7 Whether actions/behaviours are effective as protection from hot weather, by socio-demographics

% completely/ very effective	Staying out of sun between 11-3	Drinking cool fluids	Covering up your skin with clothing	Limit physical activity to cool parts of day	Use electric fan	Keep curtains closed on exposed windows	Keeping exposed windows closed	Opening windows at night	Avoid alcohol	Bases* (unweighted)
	%	%	%	%	%	%	%	%	%	
All	66.2	72.6	66.5	64.2	38.0	47.7	20.2	63.2	45.3	1878
Gender										
Male	63.7	69.6	65.5	64.3	35.1	49.2	21.4	60.9	46.5	923
Female	68.5	75.4	67.4	64.2	40.7	46.3	19.0	65.2	44.1	1055
Age group										
18-24	39.8	78.1	50.0	40.9	39.8	21.9	21.2	62.5	34.5	57
25-34	70.4	74.0	60.0	63.0	39.9	45.0	17.9	59.6	49.4	186
35-44	69.5	80.3	69.9	68.2	41.1	49.6	16.6	62.8	54.3	328
45-54	66.8	69.7	67.2	69.1	36.4	51.9	18.2	62.6	45.2	394
55-64	68.5	74.2	74.7	67.5	37.6	49.7	21.3	65.5	47.5	386
65-74	68.0	65.9	69.4	65.7	35.3	50.6	23.4	65.0	35.7	380
75+	71.2	60.8	67.6	64.8	34.0	60.5	27.0	65.1	41.2	143
Ethnic group										
White	67.2	73.6	68.6	66.0	37.6	48.2	19.6	62.6	44.2	1751
Black	27.3	43.5	56.9	49.9	36.7	45.6	20.3	70.7	56.8	33
Asian	66.6	75.2	48.3	47.2	43.4	39.0	22.0	66.9	54.6	62
Mixed/Other	76.3	63.8	60.6	74.0	38.5	58.7	34.5	61.8	39.4	32
Region										
North East	45.3	73.3	61.0	51.8	42.4	37.1	8.2	54.9	39.9	91
North West	63.5	72.7	65.7	62.4	37.1	47.4	24.0	54.1	43.5	255
Yorkshire & The Humber	67.7	66.8	59.1	59.0	39.3	31.2	15.7	51.5	33.6	178
East Midlands	61.9	79.0	68.3	67.7	38.0	49.2	20.1	60.4	46.0	203
West Midlands	72.9	74.8	73.2	59.8	38.0	51.3	21.5	63.3	54.5	186
East of England	61.4	72.9	51.7	61.8	47.4	51.7	20.1	71.1	41.0	224
London	64.7	67.9	67.1	66.1	40.0	50.5	24.0	67.4	51.1	185
South East	70.4	74.4	66.6	68.4	30.8	54.5	20.0	69.3	45.3	341
South West	75.4	74.0	65.1	72.2	34.3	45.5	18.6	67.6	47.6	215
Urban/rural										
Urban	65.6	72.6	65.7	63.3	38.4	46.5	19.9	62.4	45.8	1452
Rural	68.9	72.6	69.7	68.6	36.1	53.1	21.2	66.5	42.7	426
Highest educational qualification										
Degree or higher	69.1	72.7	69.1	66.9	33.3	49.3	20.2	64.4	42.6	742
A level or equivalent	65.5	76.8	64.8	63.9	35.0	45.2	20.3	65.6	48.9	404
Other below A level	63.9	71.4	65.0	66.0	42.9	47.8	15.5	60.9	44.1	383
Other qualifications	64.7	64.3	62.3	55.0	42.2	46.3	20.6	58.5	44.1	146
None	64.9	72.1	67.8	61.1	43.8	48.6	26.3	62.3	47.9	201



Table 5.7 Continued

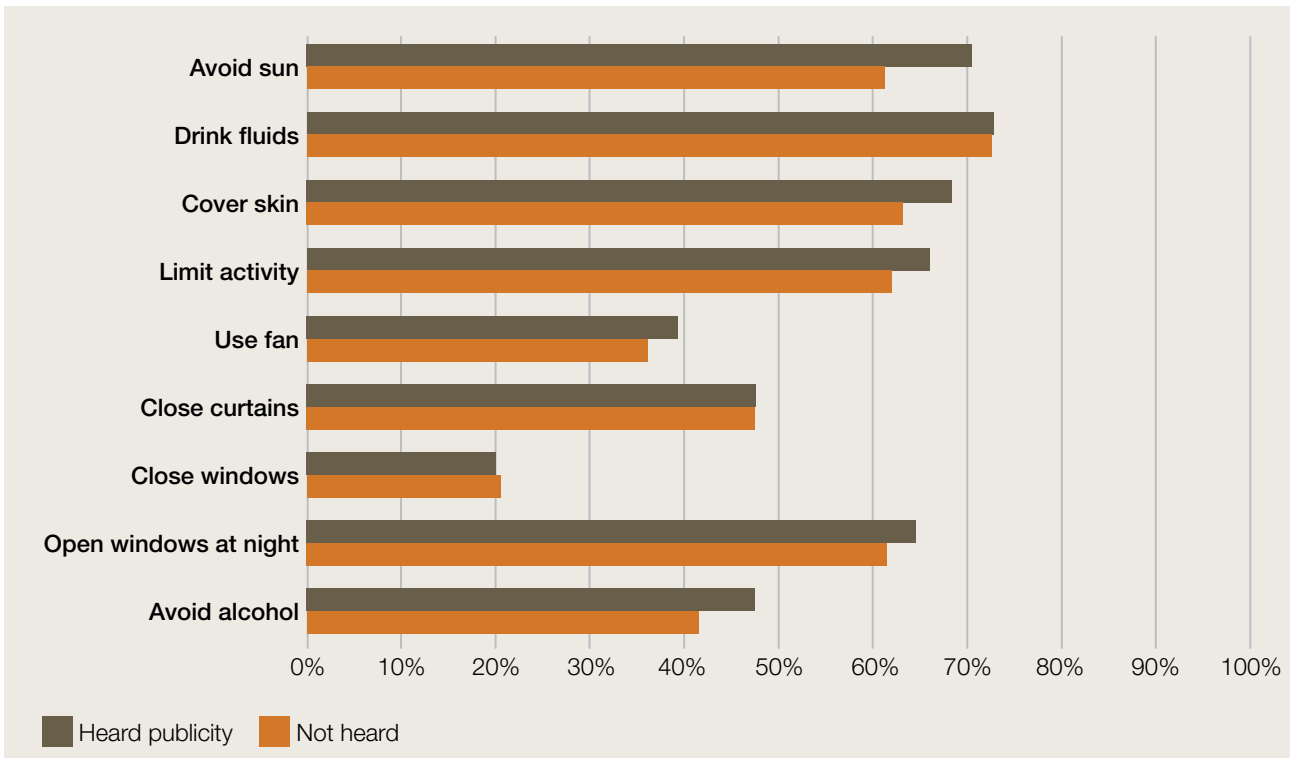
% completely/ very effective	Staying out of sun between 11-3	Drinking cool fluids	Covering up your skin with clothing	Limit physical activity to cool parts of day	Use electric fan	Keep curtains closed on exposed windows	Keeping exposed windows closed	Opening windows at night	Avoid alcohol	Bases* (unweighted)
	%	%	%	%	%	%	%	%	%	
Household type										
Single person	67.3	63.0	68.3	67.8	38.2	50.5	25.3	64.1	47.4	445
Lone parent	49.0	74.2	50.0	55.6	38.4	26.4	8.3	53.7	37.4	84
2 adults, no children	71.4	70.5	69.2	67.1	33.8	52.2	20.9	60.9	43.3	681
2 adults, 1+ children	66.5	78.8	68.5	61.5	42.0	50.2	18.3	64.8	47.1	400
3 adults, no children	60.7	76.3	62.4	60.7	42.9	38.3	18.9	68.4	45.0	175
3 adults, 1+ children	58.2	75.3	59.3	62.2	29.7	36.1	18.5	56.8	51.1	79
Disability										
Yes – affects daily life	61.1	68.2	66.6	62.5	51.1	42.7	19.5	57.1	44.2	292
Yes – not affect	66.2	65.1	68.0	64.2	36.2	50.0	20.6	61.2	39.8	367
None	67.3	75.5	66.0	64.6	35.4	48.3	20.1	65.0	46.9	1217
General health										
Very good	69.0	79.7	74.3	72.0	36.1	59.2	24.1	71.7	47.4	362
Good	68.1	71.0	68.4	64.1	35.2	46.1	20.3	63.1	44.2	884
Fair	64.8	69.7	60.4	60.5	40.0	41.6	17.4	61.0	46.0	483
Bad/very bad	53.8	74.5	57.5	59.7	50.9	49.5	19.0	51.3	44.1	149

* Bases are for 'Staying out of the sun', but are similar for the other actions/behaviours.

Figure 5.4 shows that those who reported that they had heard health advice about hot weather during the June 2017 heatwave were more likely than those who had not heard such advice to find several of the behaviours effective (e.g. 'staying out of the sun 11-3', 'covering skin' and 'avoiding alcohol'), but none of the differences were very large for any of the behaviours.



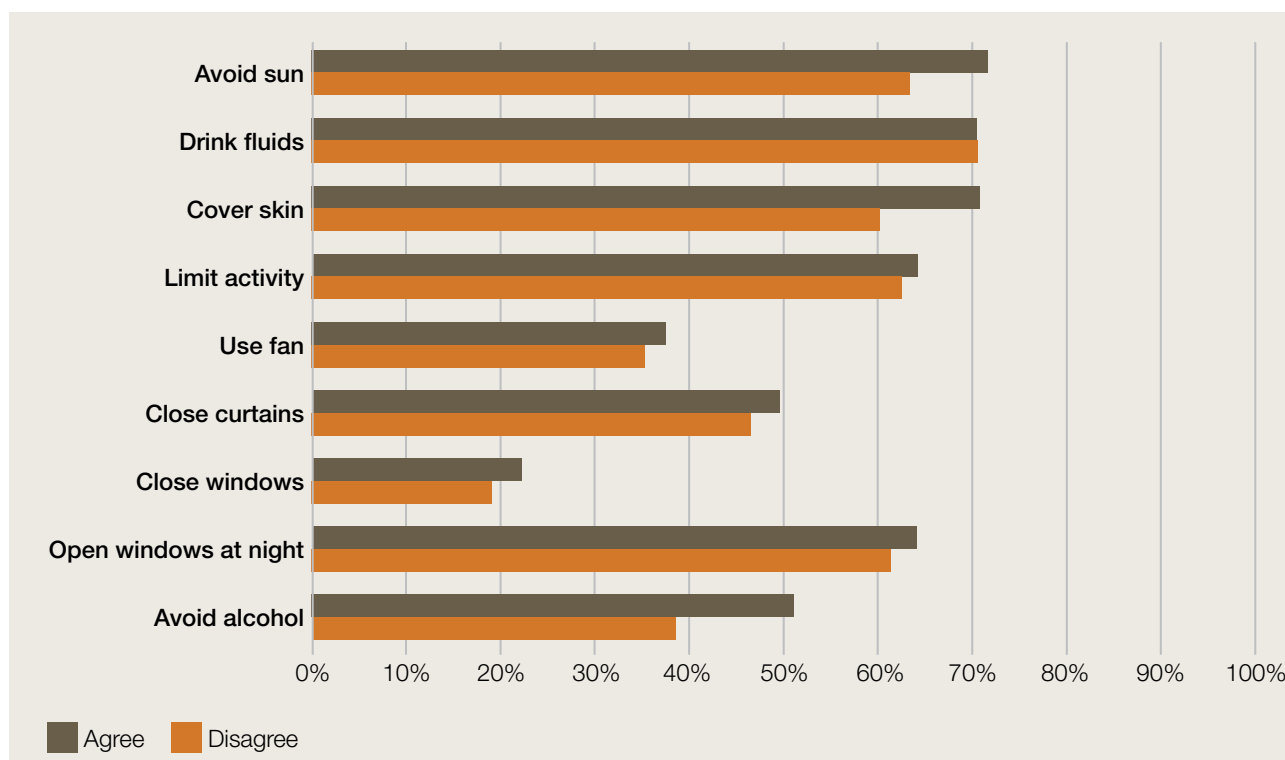
Figure 5.4 Whether actions/behaviours are effective as protection from hot weather, by whether heard health advice/publicity: % completely/very effective



We examined whether participants' attitudes towards hot weather influenced their views on the effectiveness of these actions, and found no relationship. Figure 5.5 shows that those who disagree with the attitude question 'hot weather is a risk to my health' have similar views on the effectiveness of most of these behaviours as those who agree with this question. The only exceptions are 'covering skin' and 'avoiding alcohol' where those who agree that hot weather is a risk to their health are more likely to view these two actions as effective than those who disagree.



Figure 5.5 Whether actions/behaviours are effective as protection from hot weather, by whether agree/disagree that ‘hot weather is risk to my health’



5.4 Actions during the 2017 heatwave

Changed behaviour as a result of hearing publicity

As already noted, all parts of England experienced a level 3 heat-health alert in mid-June 2017, and 95.4% of survey participants were in England during that time. As reported above, just over half (51.1%) of those participants said they had heard health advice/publicity about hot weather during the June heatwave. This sub-group was then asked whether they had changed their behaviour as a result of this advice/publicity.

As can be seen in Table 5.8, just over two in five (42.9%) of participants who had heard hot weather-related health advice in June 2017 changed their behaviour as a result of hearing the advice, with the majority saying they did not change their behaviour (57.1%). Since only half of participants had heard the advice, this means that, overall, about one in five (21.5%) participants reported that they had changed their behaviour as a result of health advice/publicity during the 2017 June heatwave.

The figures from this survey are very similar to the results from a survey undertaken after the July/August 2013 heatwave, where 53% of participants were aware of heat-related health advice, and 23% reported that they had changed their behaviour as a result of this advice (Public Health England, 2016).

Changing behaviour as a result of hearing advice did not appear to be any more common for vulnerable groups than for the population in general. The only difference was for those aged 18-74 with a LLSI, as 54.4% of this group said they had changed their behaviour, which was significantly higher than average.



Table 5.8 Whether changed behaviour as a result of hearing advice for vulnerable groups

<i>Base: Heard advice</i>			
<i>Row %</i>		Changed behaviour	Did not change behaviour
All	%	42.9	57.2
Aged 18-74	%	43.1	56.9
Aged 75+	%	41.9	58.1
Aged 75+ and living alone	%	43.3	56.7
Aged 18-74 no LLSI	%	40.9	59.1
Aged 18-74 with LLSI	%	54.4	45.6
Aged 18-74 in good/fair health	%	43.0	44.3
Aged 18-74 in bad health	%	44.3	55.7

There were very few differences according to other socio-demographic characteristics of participants: those living in London (59.0%) and those living in households with 3+ adults without children (58.9%) were more likely than average to change their behaviour, while those aged 35-44 were less likely to (Table 5.9).

Table 5.9 Whether changed behaviour as a result of hearing advice, by socio-demographics

<i>Base: Heard advice</i>				
<i>Row %</i>		Changed behaviour	Did not change behaviour	<i>Bases (unweighted)</i>
All	%	42.9	57.1	934
Gender				
Male	%	40.9	59.1	416
Female	%	44.8	55.2	518
Age group				
18-24	%	a	a	22
25-34	%	39.7	60.3	78
35-44	%	33.8	66.2	140
45-54	%	45.1	54.9	179
55-64	%	47.6	52.4	201
65-74	%	42.6	57.4	227
75+	%	41.9	58.1	85
Region				
North East	%	45.1	54.9	35
North West	%	37.3	62.7	115
Yorkshire & The Humber	%	41.8	58.2	81
East Midlands	%	35.7	64.3	95
West Midlands	%	40.6	59.4	94
East of England	%	40.9	59.1	110
London	%	59.0	41.0	107
South East	%	36.7	63.3	190
South West	%	44.6	55.4	107



Table 5.9 Continued

<i>Base: Heard advice</i>		Changed behaviour	Did not change behaviour	Bases (unweighted)
Row	%			
Urban/rural				
Urban	%	44.7	55.3	720
Rural	%	34.6	65.4	214
Highest educational qualification				
Degree or higher	%	34.9	65.1	353
A level or equivalent	%	40.6	59.4	212
Other below A level	%	49.8	50.2	199
Other qualifications	%	44.0	56.0	71
None	%	52.9	47.1	98
Household type				
Single person	%	44.7	55.3	232
Lone parent	%	42.5	57.5	35
2 adults, no children	%	38.9	61.1	364
2 adults, 1+ children	%	31.3	68.7	158
3 adults, no children	%	58.9	41.1	103
3 adults, 1+ children	%	54.5	45.5	32
Disability				
Yes – affects daily life	%	52.9	47.1	155
Yes – not affect	%	35.2	64.8	186
None	%	42.7	57.3	593
General health				
Very good	%	36.3	63.7	183
Good	%	43.7	56.3	436
Fair	%	46.4	53.6	242
Bad/very bad	%	40.8	59.2	73

a = Omitted due to small base.

Behaviours taken to protect self and others

Participants in the country during the June 2017 heatwave were also asked whether they took any of the following actions to reduce harm to their own health from the heat, or to reduce harm to potentially vulnerable others, such as the very young, older people or people with a longstanding illness. The actions included:

- (Ensured they) Stayed out of the sun between 11am and 3pm
- (Ensured they had cool fluids to drink) Drank cool fluids
- (Ensured they) Stayed in the shade
- Covered up (their) your skin with clothing or a hat
- Limited strenuous physical activity to the cooler parts of the day
- Used an electric fan
- Kept curtains closed on windows exposed to direct sunlight during the day
- Kept windows closed that are exposed to direct sunlight during the day
- Opened windows at night or in the cooler parts of the day
- Avoided (providing) alcohol
- Sought professional health advice



The response categories to these eleven actions were: never; rarely; occasionally; often; always. Full responses to each behaviour are shown in Table 5.10, while Figure 5.6 shows the percentages saying the action was ‘always’ or ‘often’ done for protecting themselves and vulnerable others.

Virtually all participants reported undertaking at least one of the eleven activities to protect themselves during the June heatwave (with only one participant in the survey saying they did none of these activities). Participants were less likely to report protecting others, but over four in five (81.1%) of those who were in the country during the heatwave reported at least one activity taken to protect others.

When looking at whether these behaviours were ever taken, participants were more likely to report all these behaviours for protecting themselves than for protecting others, aside from seeking professional health advice, which was higher for protecting (vulnerable) others (25.7% compared with only 13.3% seeking advice for themselves). The actions that were least likely to be taken at all, both for protecting themselves and others, included: using an electric fan (31.2% saying they never used one; 38.1% saying they did not use a fan to protect others); closing windows exposed to sunlight during the day (25.3% and 36.5% respectively); and closing curtains on windows exposed to direct sunlight (18.0% and 31.6% respectively).

A survey among the general population was carried out by ONS following the July 2013 level 3 alert. The survey included identical questions for eight of the 11 behaviours. Nearly all of these protective actions were more likely to be taken in 2017 than they were in 2013, and none were less likely in 2017, for protecting both self and others (Public Health England, 2016 see Figure 6).



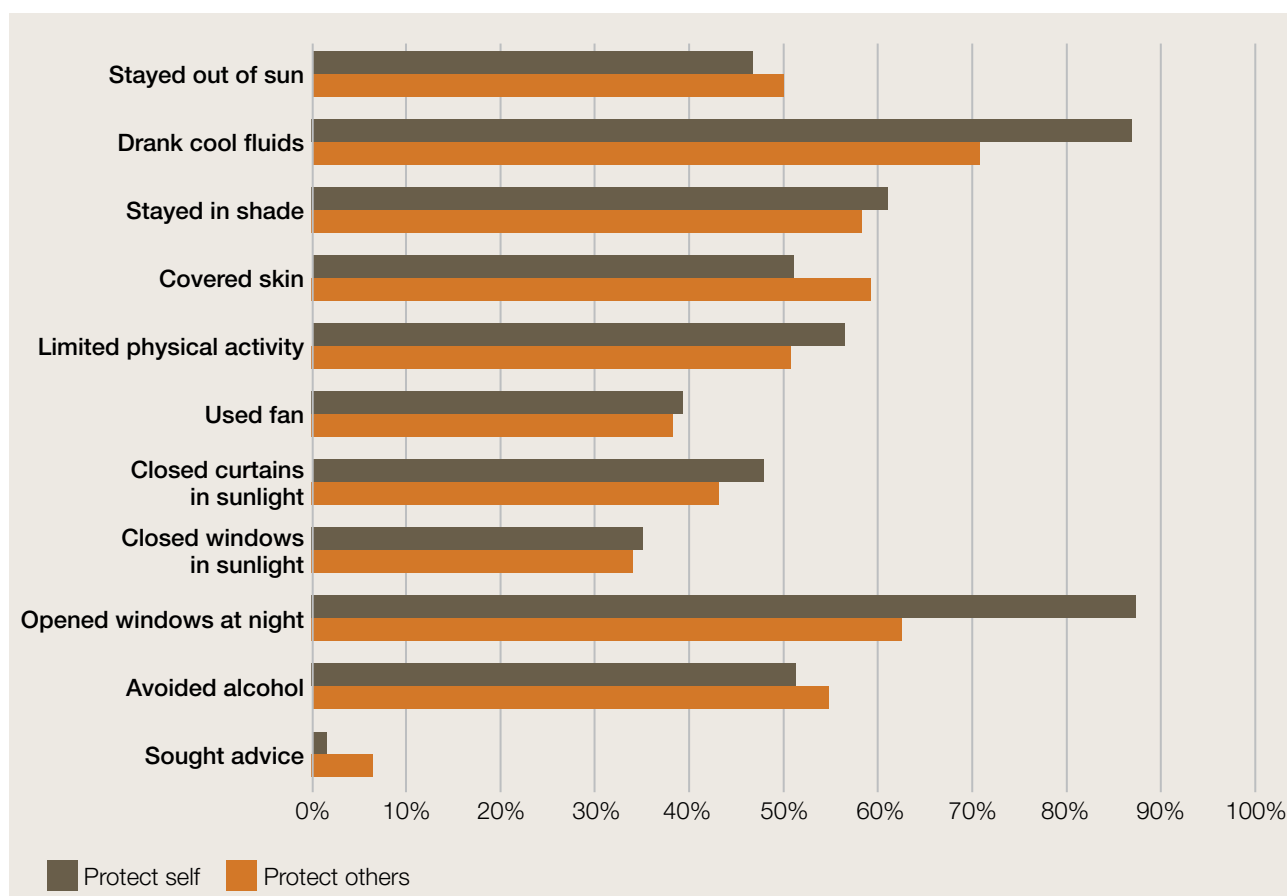
Table 5.10 Behaviours taken to protect from heat a) yourself and b) vulnerable others

Row %		Never	Rarely	Occasionally	Often	Always	Bases* (unweighted)
a) Protect yourself							
Stayed out of the sun	%	7.3	12.4	33.7	34.5	12.1	1788
Drank cool fluids	%	0.5	1.0	11.2	46.6	40.7	1791
Stayed in the shade	%	3.2	6.7	29.0	47.1	13.9	1790
Covered up skin	%	8.3	12.0	28.7	33.9	17.1	1789
Limited physical activity	%	6.4	11.1	26.2	36.0	20.3	1788
Used electric fan	%	31.2	7.9	21.5	21.3	18.0	1791
Closed curtains on windows in direct sunlight	%	18.0	10.5	23.7	28.2	19.6	1788
Closed windows exposed to direct sunlight	%	25.3	18.6	21.1	21.6	13.4	1788
Opened windows at night	%	1.9	2.2	8.8	28.8	58.3	1791
Avoided alcohol	%	10.0	14.3	24.5	21.1	30.1	1788
Sought professional advice	%	86.7	7.4	4.1	1.0	0.7	1790
b) Protect vulnerable others							
Ensured they stayed out of the sun	%	25.0	5.5	19.5	29.4	20.5	1764
Ensured they had cool fluids	%	20.5	1.6	6.7	26.0	45.2	1764
Ensured they stayed in the shade	%	22.2	4.2	15.3	34.1	24.2	1762
Covered up their skin	%	24.1	4.2	12.7	27.4	31.7	1761
Limited physical activity	%	24.9	6.5	17.9	27.3	23.4	1760
Used electric fan	%	38.1	6.6	17.1	22.2	15.9	1765
Closed curtains on windows in direct sunlight	%	31.6	7.6	17.7	23.8	19.3	1765
Closed windows exposed to direct sunlight	%	36.5	11.1	18.4	20.6	13.4	1761
Opened windows at night	%	24.0	3.8	9.8	26.0	36.3	1764
Avoided providing alcohol	%	29.4	5.2	10.7	13.3	41.4	1756
Sought professional advice	%	74.3	10.4	8.8	3.3	3.2	1764



When looking at the frequency of behaviours taken ‘always’ or ‘often’, there were few differences between protecting oneself and protecting others (Figure 5.6). Seven of the activities were done ‘always’ or ‘often’ by around half or more of participants to protect their own health, including: ‘drinking cool fluids’ (88%); ‘opening windows at night’ (87%); ‘staying in the shade’ (61%); ‘limiting physical activity’ (56%); ‘covering up their skin’ (51%); ‘closing curtains on windows in direct sunlight’ (48%); ‘staying out of the sun between 11am and 3pm’ (47%).

Figure 5.6 Behaviours ‘always’ or ‘often’ taken to protect self and vulnerable others



Overall, vulnerable groups were not any more likely to take these behaviours to protect themselves than the population in general, aside from those aged 75+ (Table 5.11). Participants aged 75+ were more likely than average to say they ‘stayed out of the sun’ (59.2%), ‘stayed in the shade’ (71.2%), ‘covered their skin’ (65.0%), ‘limited their physical activity’ (71.8%), ‘closed windows in the sun’ (52.4%) and ‘avoided alcohol’ (62.8%). However, the 75+ living alone were less likely than average to ‘drink cool fluids’ (72.3%), ‘use an electric fan’ (23.8%) and ‘open windows at night’ (65.9%).



Table 5.11 Behaviours ‘always’ or ‘often’ taken to protect self for vulnerable groups

% always/ often	Staying out of sun %	Drinking cool fluids %	Stay in shade %	Cover skin %	Limit activity %	Use fan %	Close curtains in sun %	Close windows in sun %	Open windows at night %	Avoid alcohol %	Seek advice %
All	46.6	87.2	61.0	51.0	56.3	39.3	47.8	35.0	87.1	51.2	1.7
Aged 18-74	45.6	87.9	60.2	49.8	55.0	40.0	47.1	33.4	87.9	50.2	1.6
Aged 75+	59.2	80.6	71.2	65.0	71.8	31.0	55.3	52.4	78.4	62.8	2.8
Aged 75+ and living alone	63.4	72.3	71.4	55.5	71.1	23.8	44.3	52.8	65.9	57.0	6.0
Aged 18-74 no LLSI	45.6	88.7	58.3	49.8	54.6	39.1	46.6	34.0	88.3	48.2	1.4
Aged 18-74 with LLSI	50.8	83.2	70.5	49.4	57.7	44.8	49.7	30.2	85.1	61.2	3.0
Aged 18-74 in good/fair health	45.0	88.4	59.0	49.7	54.4	38.4	46.6	33.1	88.3	48.3	1.5
Aged 18-74 in bad health	51.3	82.8	71.3	50.2	60.8	55.5	52.2	37.2	83.0	69.1	2.7

The older people included in the focus groups reported behaviours similar to those in the survey. When asked what actions they took during the hot weather the previous summer, participants reported that they tried to avoid going out of their house/flat during the hottest part of the day, or, if they had to, by walking or sitting in the shade when possible, as well as seeking out cool areas such as shopping centres and shops with air-conditioning. All participants said that they wore appropriate clothing (largely loose light-coloured cotton) and hats/sun lotion when going out. Several said that they carried water with them when they went out, one commenting: *‘twenty years ago you never thought about walking around with a water bottle and now everyone’s doing it’* (FG3 P3). Participants said that they mostly moved to cool areas of their houses or gardens when at home and opened doors or windows to *‘create a breeze’*. Only a few said that they closed windows and drew curtains on sun-facing windows and a small number used electric fans to help cool their homes. Maintaining hydration was viewed as important by everyone, although this was something that many participants felt they were not always good at doing.

When asked to review their actions against key measures such as those in the leaflet ‘Beat the Heat: staying safe in hot weather’ (Public Health England, 2018a), there was agreement that they were aware of, and carried out, most of the actions suggested in the leaflet. They were thought to be sensible: *‘Its common sense this [Beat the Heat guidance] is, from what I have read of it, I think it’s just common sense – you would automatically do these things’* (FG2 P5). However, some were unaware about the guidance on shading windows or about medications (even though a few mentioned that they were prescribed some of the medications listed) and some did not follow all suggestions (e.g. opening windows at night) due to concerns of personal or pet safety and security.



Though most agreed that maintaining hydration was important, several said they could be better at this and there was some discussion about how best to do this. Several participants said that they *'did not like drinking water'* and *'probably did not drink enough'* when it was hot or, a common response, *'did not often feel thirsty'*. One said that drinking water is *'tasteless and boring'* (FG1 P1) and asked *'why did it have to be water?'* (as in the guidance) and *'how much was enough?'* There appeared little knowledge or understanding among participants about this point. One surprise, commented on by many focus group participants, was around the advice on reducing caffeinated drinks, including tea. Some participants were not aware that tea was included as a caffeinated drink as they had believed that tea was good to drink in hot weather *'...if you drink tea in a hot climate it's supposed to lower your temperature...'* (FG4 P1); many participants reported continuing to drink tea during the hot spell, and some said that they increased their intake.

A few focus group participants said they were not always able to take appropriate behaviours, such as opening and closing windows, due to their strength or physical disabilities:

'If my son's about he comes in and flings things open, but he has to shut them before he goes because I can't, I've no strength in my arms – and sometimes it gets hot.' (FG2 P6)

'Sometimes when my daughter comes and she opens the window wide and then I think – where's she gone? I'm not going to be able to close that.' (FG2 P2)

And the following from one person who visited a 'vulnerable person' during the hot weather herself:

'...she was housebound – she went from her bed to her chair – she couldn't get up, she couldn't walk – when I went round there she asked me to open the window but as I left she wanted me to shut the window – although she lived upstairs in a maisonette she still wanted the windows shut [background – she was worried about security] – I found a fan and I had it there in case she wanted it but when I went the following week it was still in the same position [not near her] – so I don't really know how she was coping with the heat.' (FG1 P3)

When asked how their peers acted in relation to the health risks of hot weather, they provided a variety of responses. These largely pertained to some peers lacking knowledge through not getting heat-health messages in a timely way, or through other factors such as an inability to self-care due to illness or disability and therefore having to rely on others for protection during extreme heat events.

There was a common belief among focus group participants that some people were reluctant to take certain health protective measures, such as opening windows during hot nights, because of a fear of intruders. Most participants, with the exception of those that lived above the ground floor in apartment blocks, shared this fear and kept their windows closed during warm nights, although a few were able to take alternative measures such as moving to a cooler part of the dwelling, or using an electric fan all night to help cool the room. Living in flats might also mean not having access to a suitable 'protective' environment, such as a garden to help keep cool:

'...we have the advantage of having gardens where we can open doors and go and sit in the cool, but what about the elderly people who live in flats?' (FG1 P2)



Another possible constraint on taking appropriate protective measures was related to cost. Participants felt that some older people, especially those living on their own, might be deterred by the cost of using electric fans during spells of hot weather and might therefore endure sleeping in overheated rooms with windows closed for security. One participant felt that there was some inequity between government allowances for extreme temperatures, as older people received allowances for cold weather but nothing for warm summer months – *‘they [the government] only think of heating and keeping warm, they don’t think of the electricity to keep cool’* (FG1 P4) – and it was generally agreed that it is easier to heat up a home than to cool one down. The group also spoke about the potential deterrent of the cost of using good (high strength) sun protection – a few spoke about older people having *‘thinner skin’* and therefore needing high factor sunscreen *‘...the good stuff is really expensive – and for elderly people on a budget that might be a deterrent, you know?’* (FG1 P3), and another pointed out that the cost of telephone information helplines could deter people seeking advice on health, as some information lines charged at a premium rate.

When relating their knowledge and behaviour with others, there was broad consensus that some people are very lax in taking health protective measures, despite being more aware of the dangers. This included mothers who take risks with their babies:

‘It makes me cringe when I see these babies lying in their prams all exposed with arms all bare, legs all bare – nothing on their heads, not even a little umbrella – and the sun beating down ... and I can’t believe it when it’s advertised time and time again.’ (FG1 P3)

Table 5.12 shows some significant differences for the various demographic groups. For example, young people (ages 18-24) were much less likely than average to take six of the actions, but were the most likely to ‘use a fan’ (54.3%). Some of the differences between age groups were very large: for example, only 34.3% of ages 18-24 said they would ‘cover their skin’ compared with 65.0% of ages 75+; the figures for ‘limiting physical activity’ were 38.4% and 71.8% respectively for these two age groups. In terms of ethnicity, Asian participants were less likely to take five of the actions, but were more likely to ‘use a fan’ and to ‘avoid alcohol’ (perhaps because some Asian groups are normally less likely to consume alcohol). There was also considerable regional variation, with participants living in the north of the country being the least likely to take a number of the actions.



Table 5.12 Behaviours ‘always’ or ‘often’ taken to protect self by socio-demographics

% <i>always/often</i>	Staying out of sun	Drinking cool fluids	Stay in shade	Cover skin	Limit activity	Use fan	Close curtains in sun	Close windows in sun	Open windows at night	Avoid alcohol	Seek advice
	%	%	%	%	%	%	%	%	%	%	%
All	46.6	87.2	61.0	51.0	56.3	39.3	47.8	35.0	87.1	51.2	1.7
Gender											
Male	38.3	83.9	53.6	50.1	49.1	35.9	46.2	33.0	84.2	42.4	1.1
Female	54.3	90.3	67.9	51.9	63.0	42.5	49.2	36.8	89.9	59.4	2.2
Age group											
18-24	27.3	85.9	46.4	34.3	38.4	54.3	26.1	23.8	87.0	35.6	–
25-34	37.0	93.4	56.6	47.6	48.4	46.2	39.0	27.6	84.5	53.9	2.1
35-44	46.8	92.0	60.2	42.3	56.0	37.3	53.9	31.2	85.6	52.1	0.9
45-54	45.3	86.2	55.2	47.3	54.5	35.9	50.8	33.7	91.0	48.6	0.6
55-64	52.7	87.5	68.2	57.9	58.5	35.8	50.9	41.5	90.9	52.8	2.5
65-74	58.5	80.0	70.7	65.7	69.6	36.2	53.7	40.1	87.7	52.4	3.3
75+	59.2	80.6	71.2	65.0	71.8	31.0	55.3	52.4	78.4	62.8	2.8
Ethnic group											
White	46.8	87.9	60.3	52.7	57.7	38.2	48.9	35.3	87.8	49.5	1.6
Black	39.6	91.3	73.1	39.4	47.7	39.3	63.2	44.5	70.3	70.5	4.8
Asian	41.2	74.7	59.6	36.1	41.1	52.9	27.5	32.0	86.4	62.7	1.7
Mixed/Other	68.7	97.2	76.3	48.9	63.8	35.9	53.0	20.0	85.3	51.9	–
Region											
North East	45.3	73.3	61.0	51.8	42.4	37.1	8.2	54.9	39.9	–	91
North West	41.9	83.2	56.1	47.0	51.6	25.3	39.0	31.2	75.7	43.2	3.9
Yorkshire & The Humber	46.4	91.6	59.5	52.7	63.6	42.0	49.3	41.1	91.4	59.3	–
East Midlands	47.0	90.4	54.5	50.4	55.5	50.0	46.6	32.1	90.0	56.4	2.7
West Midlands	46.0	89.6	57.3	51.6	57.2	46.9	45.8	33.8	89.3	54.2	1.3
East of England	47.3	85.5	62.7	50.7	51.8	42.2	52.7	34.3	87.3	55.2	1.2
London	45.2	84.7	69.6	49.7	60.3	49.9	46.8	38.4	83.5	53.4	1.6
South East	49.6	87.0	59.6	51.6	53.6	38.9	57.5	37.1	91.4	43.9	1.9
South West	53.1	91.6	63.8	58.9	63.8	24.6	48.0	34.5	93.6	52.0	0.5
Urban/rural											
Urban	46.3	87.4	62.0	50.8	55.7	41.1	47.7	35.4	87.1	51.8	1.0
Rural	48.0	86.4	56.7	51.9	58.8	31.4	48.2	33.0	87.2	48.6	0.9
Highest educational qualification											
Degree or higher	47.5	88.0	63.6	54.5	59.7	32.4	49.1	35.9	90.2	45.4	0.9
A level or equivalent	41.0	88.9	56.6	44.5	50.5	45.2	44.1	33.1	88.6	47.2	1.1
Other below A level	43.3	87.0	56.5	47.4	56.0	41.4	47.7	30.7	84.1	54.1	2.7
Other qualifications	46.2	89.0	69.1	58.7	52.0	47.1	51.0	40.5	85.3	60.2	2.4
None	58.6	82.3	64.3	54.3	60.7	38.5	48.7	39.1	83.2	61.2	2.7



Table 5.12 Continued

% always/ often	Staying out of sun %	Drinking cool fluids %	Stay in shade %	Cover skin %	Limit activity %	Use fan %	Close curtains in sun %	Close windows in sun %	Open windows at night %	Avoid alcohol %	Seek advice %
Household type											
Single adult	53.7	80.9	66.3	53.5	58.6	30.0	50.1	42.1	81.1	49.0	4.2
Lone parent	39.1	96.0	58.5	36.3	49.1	46.7	60.1	46.4	89.7	60.5	3.4
2 adults, no children	50.4	86.1	65.2	56.3	60.9	35.7	52.9	39.7	88.6	49.5	0.8
2 adults, 1+ children	43.6	93.8	57.2	49.2	54.0	40.1	49.8	28.7	86.7	55.9	1.8
3 adults, no children	41.6	84.3	55.5	50.7	52.5	50.5	36.5	29.7	87.4	47.8	1.2
3 adults, 1+ children	39.8	90.4	57.4	35.3	53.3	46.2	29.7	21.5	92.5	49.1	–
Disability											
Yes – affects daily life	52.0	82.4	71.2	50.4	59.7	43.3	49.3	32.0	82.5	61.7	3.6
Yes – not affect	45.5	86.0	63.5	58.0	59.3	39.1	49.4	38.6	89.4	52.4	1.5
General health											
Very good	42.7	90.9	53.3	53.0	52.6	30.4	50.2	32.1	88.7	40.7	1.0
Good	44.4	88.3	58.8	51.6	56.3	38.0	45.1	33.6	88.2	47.3	1.0
Fair	51.5	84.4	66.8	49.2	57.4	43.0	49.4	37.7	86.4	59.2	2.9
Bad/very bad	51.4	82.7	70.8	49.1	60.6	53.0	51.9	39.8	80.7	69.1	3.5

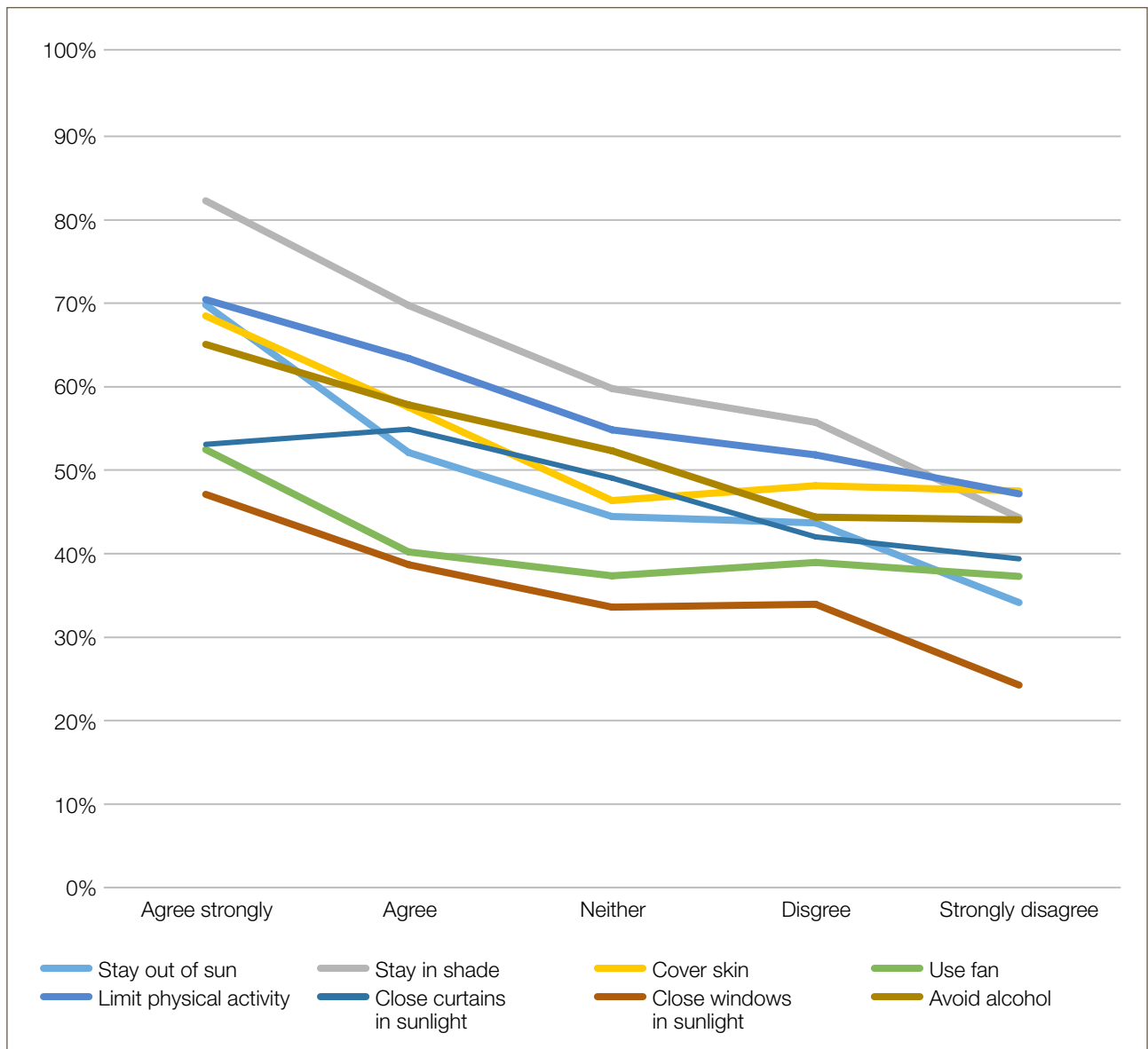
Bases are similar to those in Table 5.7.

Association of protective behaviours taken and attitudes towards hot weather

Previously, we observed that participants’ attitudes towards the risk to their own health due to hot weather did not influence their views on whether or not these actions were effective in protecting them from hot weather (see Figure 5.5). However, as Figure 5.7 shows, attitudes towards the risk to own health had a significant influence on whether or not these actions were taken by participants during the June 2017 heat wave. Eight of the 11 actions showed significant differences, with the strongest association found for the action ‘staying in the shade’, which was taken by 82.3% of those who ‘strongly agree’ that hot weather is a risk to their own health, but only by 44.3% of those who ‘strongly disagree’. (Two of the actions – ‘drink fluids’ and ‘open windows at night’ – were not associated with this attitude statement, while a third (‘seek advice’) was too rare to include in the analysis. Similar associations were found for these actions with the attitude statements ‘I love hot weather’ and ‘time in the sun is good for me’.



Figure 5.7 Behaviours ‘always’ or ‘often’ taken to protect self by whether agree or disagree that ‘hot weather is a risk to self’

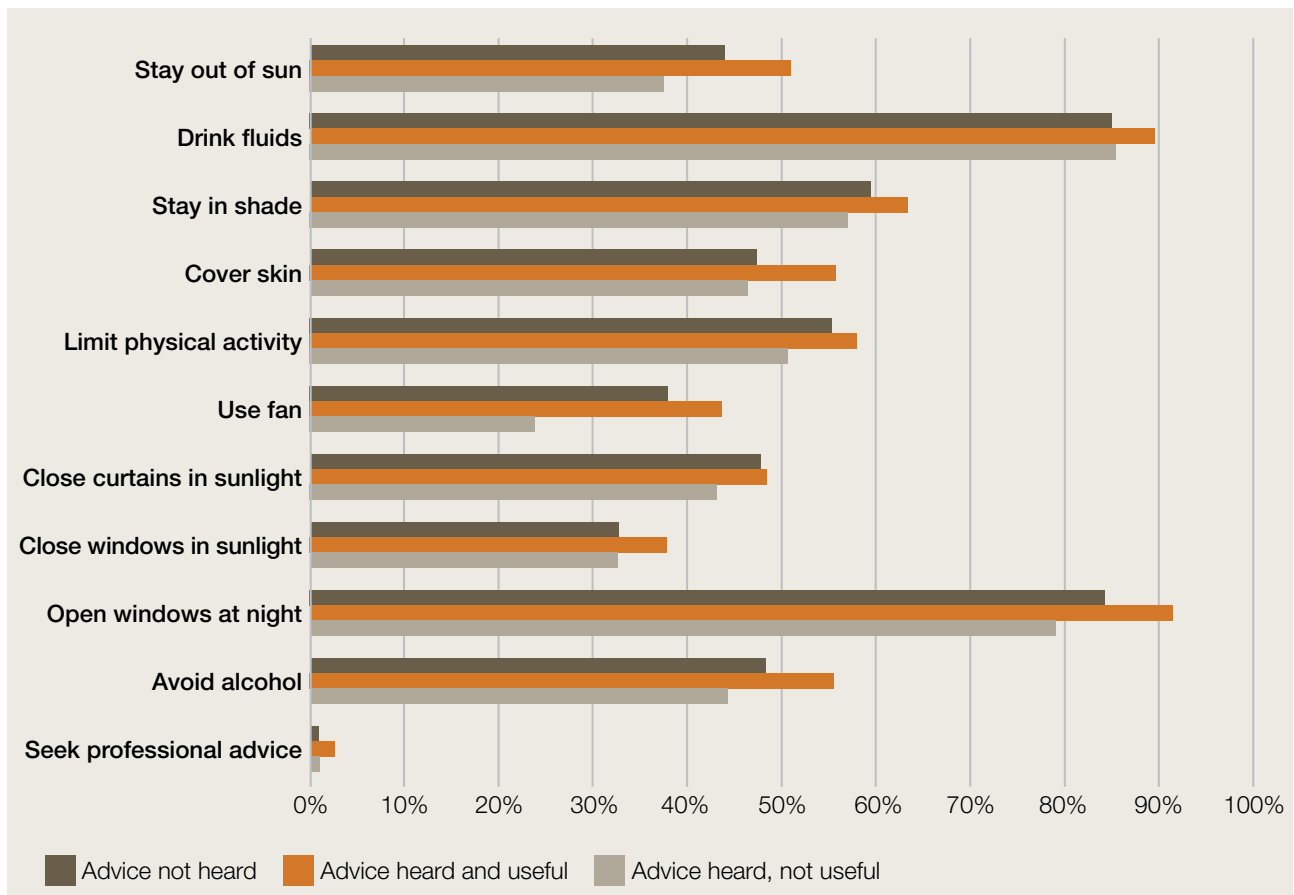


Association of protective behaviours taken and whether heard publicity

As noted already, only about one in five participants changed their behaviour as a result of hearing health advice during the June 2017 heatwave. Figure 5.8 shows the percentages of participants who took these 11 actions depending on whether or not they reported having heard the publicity/advice, and on whether they had found the advice useful. Participants who had heard the advice and found it useful were the most likely to take all of the protective actions asked about, while those who had not heard the publicity/advice were the next most likely to take these actions. Participants who had heard the publicity/advice but said it was not useful were the least likely to take these actions.



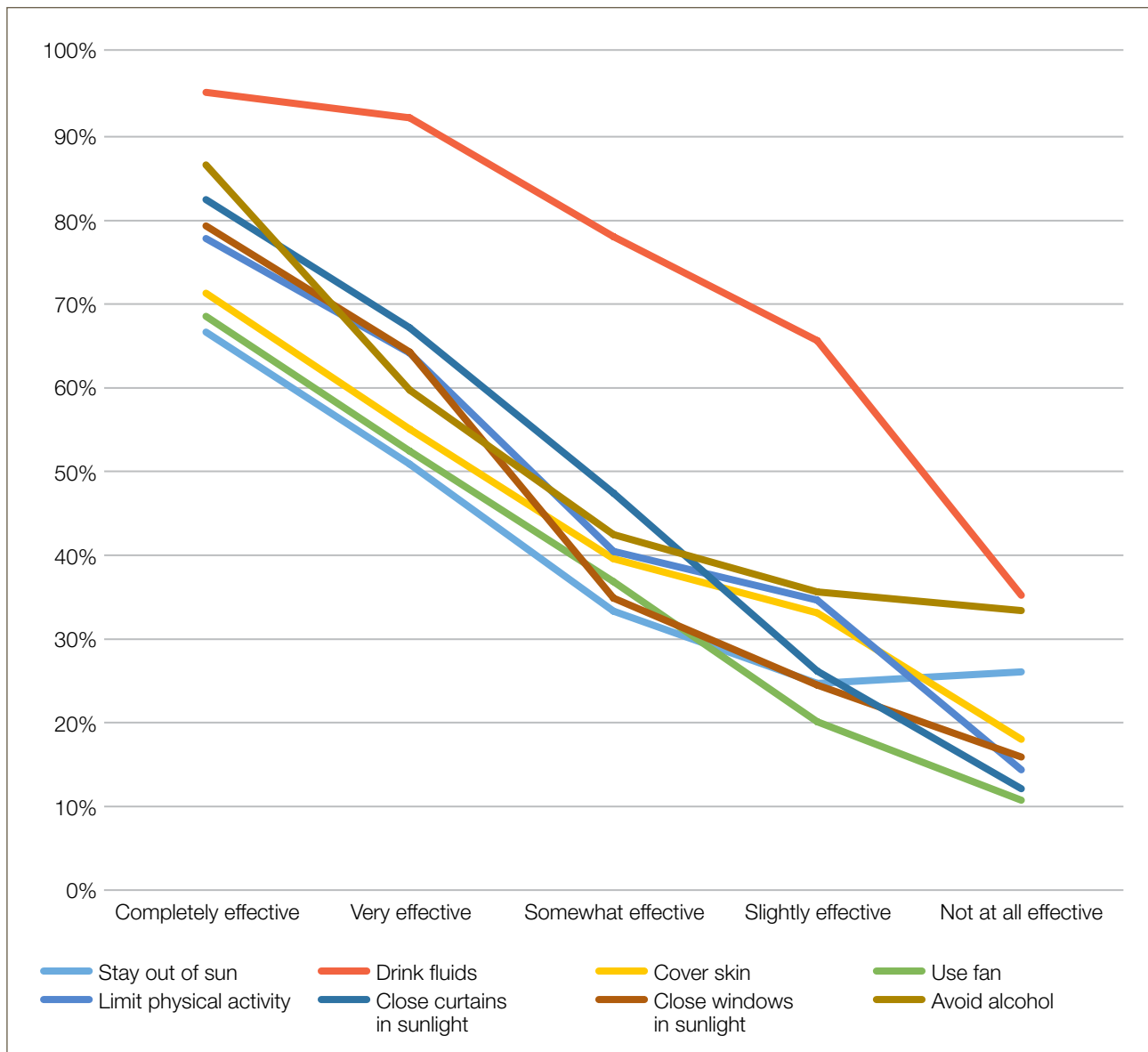
Figure 5.8 Behaviours ‘always’ or ‘often’ taken to protect self from heat by whether heard hot weather-related health advice/publicity and whether they considered the advice useful



On the other hand, Figure 5.9 shows a very marked association between participants’ perceptions of the extent to which actions are perceived to be effective as protection from summer heat and whether they took the action during the June 2017 heatwave. Aside from ‘keeping the window open at night’ (which is not included in Figure 5.9), the difference in likelihood of taking a particular action was strongly associated with the perceived effectiveness of that action, with differences between ‘completely effective’ and ‘not at all effective’ ranging from 40 to 70 percentage points. The largest difference, for example, was found for ‘closing windows in sunlight’: among participants who said it was ‘completely effective’, 82.1% said they did this ‘always’ or ‘often’ during the June 2017 heatwave, compared with only 12.1% of those who viewed it as ‘not effective’.



Figure 5.9 Behaviours ‘always’ or ‘often’ taken to protect self from heat by perceptions of effectiveness as protection from hot weather



Protecting vulnerable others

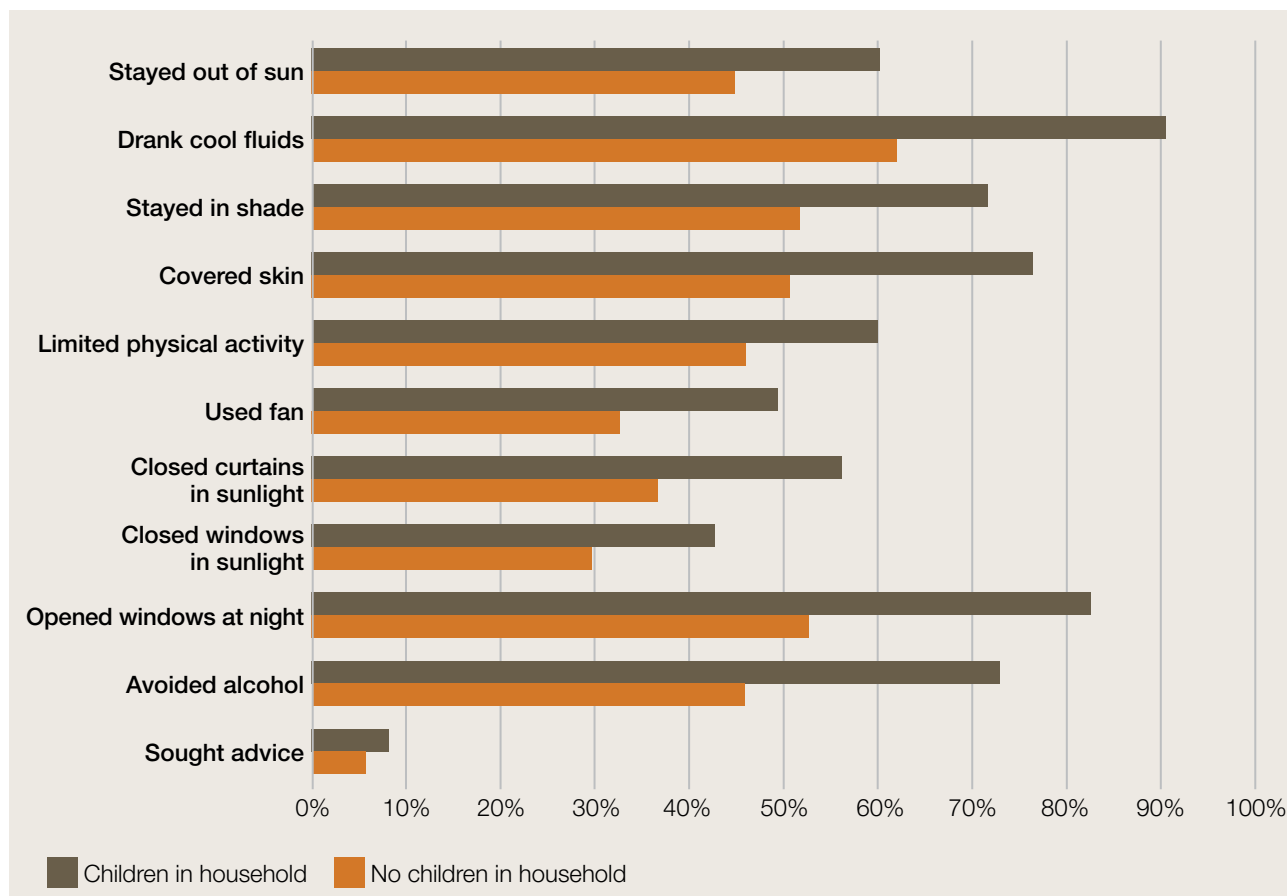
As already mentioned, participants were more likely to take actions during the June 2017 heatwave to protect themselves than they were to protect others. In fact, there was only one participant in the survey who reported ‘never’ to all 10 actions/behaviours (leaving out ‘seeking professional advice’ because it was relatively uncommon) for protecting themselves. By contrast, 17.4% of participants said ‘never’ to all 10 of the actions for protecting others. Men were a bit more likely than women to take no action (20.6% and 14.4% respectively). By far the biggest difference, however, was whether or not there were children living in the participant’s household: whereas 23.8% of participants living in households with no children aged under 18 said they took no actions to protect others, this applied to only 3.3% of participants living in households with children aged under 18.



Since we do not know whether our participants lived with, or were responsible for, young children or vulnerable adults, it is not possible to examine the extent to which they undertook actions to protect others for those whom they may have had such responsibilities. The best we can do is compare participants living in households with children (without knowing the exact age of the child or the relationship of the child to the participant) with those living in households with no children (31% of households contained one or more children aged under 18, and 69% of households had no children).

Participants living in households with children were significantly more likely to take 10 of the 11 behaviours to protect others ('sought advice' being the exception) than those in households without children (Figure 5.10). It is interesting, however, that this does not seem to have carried over into taking behaviours that protect themselves; as we saw earlier (Table 5.12), participants living in households with children were not any more likely to undertake any of the behaviours to *protect themselves* than those in households with no children.

Figure 5.10 Behaviours 'always' or 'often' taken to protect others from heat by whether or not children in household





Contacts by professionals

All participants aged 65+, or those under 65 with a LLSI, who were in England during the June 2017 level 3 heat-health alert were asked whether any of the following people contacted them during the heatwave to check how they were:

- GP or other doctor
- Nurse or other NHS staff
- Local authority/social services
- Neighbour/friend/family member
- Member of a voluntary organisation
- Someone else

Three in four (75.1%) of this group of participants who were aged 65+, or had a LLSI, were not contacted by anyone to check how they were during the heatwave (Table 5.13). Among those who were, the vast majority were contacted informally by neighbours, friends or family members. Only a small minority were contacted by health or social services, a voluntary organisation or someone else (the last group consists of three participants mentioning their carer and one saying they were contacted by their boss). There were few differences by socio-demographic characteristics, although the vulnerable group of participants who are aged 75+ were the most likely to have had contact with someone (44.7%), although as for the under 75s, most contacts were with neighbours/friends/family (38.0%). Participants aged 35-44 were significantly more likely than average to report being contacted by a GP (21.4%), but the reason for this is unclear, and the base size for this group is quite small (n=40) so this result should be treated with caution. One other notable difference was the high level of contacts reported in the North East by neighbours/friends/family (50.2%), although this too is on a small base (n=36).

Among all participants aged 65+, or with a LLSI, only just over one in twenty (5.9%) said they were contacted by a health or social care professional (the first three groups in the list above) during the June 2017 heatwave. The likelihood of being contacted by a professional at this time was twice as high for participants aged 75+ (12.9%).

Table 5.13 Contacts during June 2017 heatwave, by socio-demographics

<i>Base: All aged 65+ or 18-64 with long-term condition</i>	GP/doctor	Nurse/NHS	Local authority/social services	Neighbour/friend/family	Voluntary organisation	Someone else	No-one	Bases (unweighted)
	%	%	%	%	%	%	%	%
All	4.3	2.0	0.8	21.1	0.6	1.2	75.1	669
Gender								
Male	2.5	3.1	1.4	18.0	1.1	1.2	77.7	295
Female	5.9	0.9	0.2	24.0	0.1	1.3	72.6	374
Age group								
18-24	a	a	a	a	a	a	a	5
25-34	a	a	a	a	a	a	a	23
35-44	21.4	11.5	1.1	21.8	-	-	67.8	40
45-54	1.6	-	-	18.0	-	-	80.4	47
55-64	3.7	3.0	-	8.1	-	-	88.3	62
65-74	0.9	0.7	-	17.2	0.2	1.0	80.3	355
75+	7.2	2.6	3.1	38.0	2.1	3.4	55.3	136


Table 5.13 Continued

<i>Base: All aged 65+ or 18-64 with long-term condition</i>	GP/ doctor %	Nurse/ NHS %	Local authority/ social services %	Neighbour/ friend/ family %	Voluntary organisation %	Someone else %	No-one social %	Bases (unweighted) %
Region								
North East	8.7	7.3	–	50.2	–	–	41.1	36
North West	4.3	2.2	4.5	18.6	3.2	4.7	73.0	94
Yorkshire & The Humber	12.7	–	0.5	18.3	–	4.4	77.3	65
East Midlands	6.5	2.4	–	18.2	–	–	78.2	67
West Midlands	–	–	–	15.6	–	–	84.4	71
East of England	–	1.9	–	25.4	–	0.6	72.9	82
London	3.3	1.4	0.6	18.4	1.1	–	80.8	57
South East	4.5	2.2	–	24.0	–	0.5	71.9	126
South West	1.0	3.9	1.4	15.7	0.7	–	78.3	71
Urban/rural								
Urban	4.5	1.0	1.0	21.8	0.7	1.5	75.1	519
Rural	3.2	6.4	–	17.7	–	–	74.7	150
Highest educational qualification								
Degree or higher	3.7	2.2	0.3	10.7	0.9	1.8	84.0	203
A level or equivalent	–	3.5	–	14.7	–	–	81.8	129
Other below A level	2.4	1.2	0.3	22.2	0.4	1.4	75.2	137
Other qualifications	11.3	–	–	44.8	–	–	54.6	74
None	5.3	2.4	2.5	22.4	1.1	1.9	72.5	126
Household type								
Single adult	–	0.9	2.5	27.5	1.2	3.0	68.4	245
Lone parent	a	a	a	a	a	a	a	5
2 adults, no children	4.6	2.0	0.1	19.9	0.2	0.8	77.1	309
2 adults, 1+ children	7.7	–	–	22.6	–	–	77.4	42
3 adults, no children	9.9	6.0	–	10.2	1.2	–	81.3	44
3 adults, 1+ children	a	a	a	a	a	a	a	10
Disability								
Yes – affects daily life	6.0	2.8	1.2	18.4	0.8	1.3	77.0	280
Yes – not affect	6.2	2.3	–	27.7	0.6	2.8	67.1	158
None	–	0.5	0.8	20.5	0.2	–	78.0	231
General health								
Very good	–	–	2.4	9.4	–	–	86.1	75
Good	2.2	1.6	0.4	19.0	–	1.2	77.8	269
Fair	6.0	3.1	–	27.5	0.5	0.6	68.3	218
Bad/very bad	7.8	2.2	2.1	21.0	2.2	3.1	74.5	107

a = Omitted due to small base.



In the focus groups, most participants said that they had regular contact with other people, such as family members, though there was little memory of them being contacted specifically because of the heat (except for one participant who said her neighbour popped by during the heatwave). When asked about whether they had received calls or specific visits from any of health or social care services during the hot weather, the response was largely in the negative. All but one of the group did not remember receiving any call or other communication from either health or social services during the summer of 2017, despite there being a level 3 alert in their area, and the participants being in the 'high-risk category', e.g. over 75 and living on their own, including several with disabilities or health conditions that could be made worse by the heat. The person who did receive a call during the hot spell said that it was from her asthma support service, asking if she was ok and if her medication was working as the pollen and air pollution levels were particularly high that day.

Some participants wore 'alarm' pendants to alert designated people if they needed help, but said they were normally only used in an emergency, such as if they had a fall, and they were not needed during the hot weather. A few lived in warden controlled accommodation, but none of them said they received any visits from their warden during this time: *'...you'd think they'd check but they don't, well my warden doesn't anyway'* (FG1 P5). However, the appropriateness of receiving support in the form of monitoring calls or visits from health or social care professionals was questioned by some participants. Questions were mainly related to participants' self-perception of risk – *'I think if people are bed-bound then yes, especially if they live on their own – then maybe – the days when you have a nurse come and help you get up are long gone.'* (FG1 P6) – but there was concern about the burden this would place on the health service coupled with a generally low expectation of support from public services – *'They haven't got the money to do this ... costs would be astronomical'* (FG3 P4). There was also suspicion and concerns about personal security: *'...because if someone [telephoned and] said to me are you keeping cool or whatever, I would want to know what they are selling'* (FG1 P4) and *'...you've got to be very careful these days'* (FG1 P5).

Others said that they would welcome more support up to and during heatwaves as, although they understood and generally followed public health guidance, they were often forgetful and agreed that they needed a reminder to change their behaviour during key periods. This was felt to be more important when living alone. One of the group said that her local gym was very good at reminding people to drink *'to get it into their heads'* (FG1 P2). Another participant, reflecting on drinking water more during these times, said: *'I don't even think that it's something we do consciously – unfortunately as we get older we get more forgetful and things don't come automatically to us, you know, it has to be suggested to you – "have you had a drink or would you like one?" or whatever'* (FG2P3). And another said: *'I wish I didn't [get into bad habits of not drinking] but there's no cure – unless someone nags me all the time'* (FG3 P2). There was agreement that this would be best done verbally *'as its happening, when it's happening'* (FG1 P1), using media most acceptable to older people, such as radio or TV. Short TV or radio advertisements were favoured, probably around the time of the weather report, with messages such as *'It's going to be a heatwave tomorrow – do [this], do [that]'* (FG1 P2).

5.5 Protecting the home from hot weather

Preparing one's home inside and out can help reduce the degree of overheating during periods of hot weather. For example, white external walls can reflect heat, (the right type of) roof/loft and cavity wall insulation can reduce overheating during hot



weather, as can external shutters on south facing windows (Porritt et al., 2012). We asked participants whether their home had any of the following characteristics which can offer protection during hot summers:

- Roof or loft insulation
- Cavity wall insulation
- A ceiling fan in any room
- Shaded areas outside the home (such as awnings or trees)
- External shutters on any windows
- White external walls

They were also asked whether they were able to keep their main living space at home, and their bedroom, cool during hot weather. This can be particularly important for vulnerable (especially older) people who are often home during the hottest parts of the day (Porritt et al., 2012).

As shown in Table 5.14, overall, roof insulation was the most common home characteristic, mentioned by three in four (75.5%) participants, followed by cavity wall insulation and having shaded areas outside, mentioned by half of participants (52.4% and 49.6% respectively). None of the other characteristics were very common. It is encouraging that a considerable majority of participants felt that they could keep their main living space (84.9%) and bedroom (72.3%) cool during hot weather.

Table 5.14 Home characteristics for vulnerable groups

	Roof/loft insulation	Cavity wall insulation	Ceiling fan	Shaded areas outside	External shutters	White external walls	None of these	Keep living space cool	Keep bedroom cool
	%	%	%	%	%	%	%	%	%
All	75.5	52.4	10.6	49.6	3.4	19.5	7.8	84.9	72.3
Aged 18-74	74.7	51.5	10.3	48.8	3.4	19.6	8.2	84.3	71.2
Aged 75+	85.8	63.9	14.8	59.0	3.4	18.5	2.9	91.7	86.2
Aged 75+ and living alone	84.4	69.1	12.1	56.3	5.0	31.6	6.3	96.7	87.8
Aged 18-74 no LLSI	76.7	51.5	10.9	50.8	3.1	19.0	7.3	85.7	71.7
Aged 18-74 with LLSI	64.2	51.7	7.1	37.9	5.2	22.6	13.3	76.5	68.5
Aged 18-74 in good/fair health	76.2	51.0	10.5	50.0	3.4	19.6	8.0	85.6	72.4
Aged 18-74 in bad health	60.0	56.3	8.4	36.5	3.0	18.8	10.2	71.2	59.3

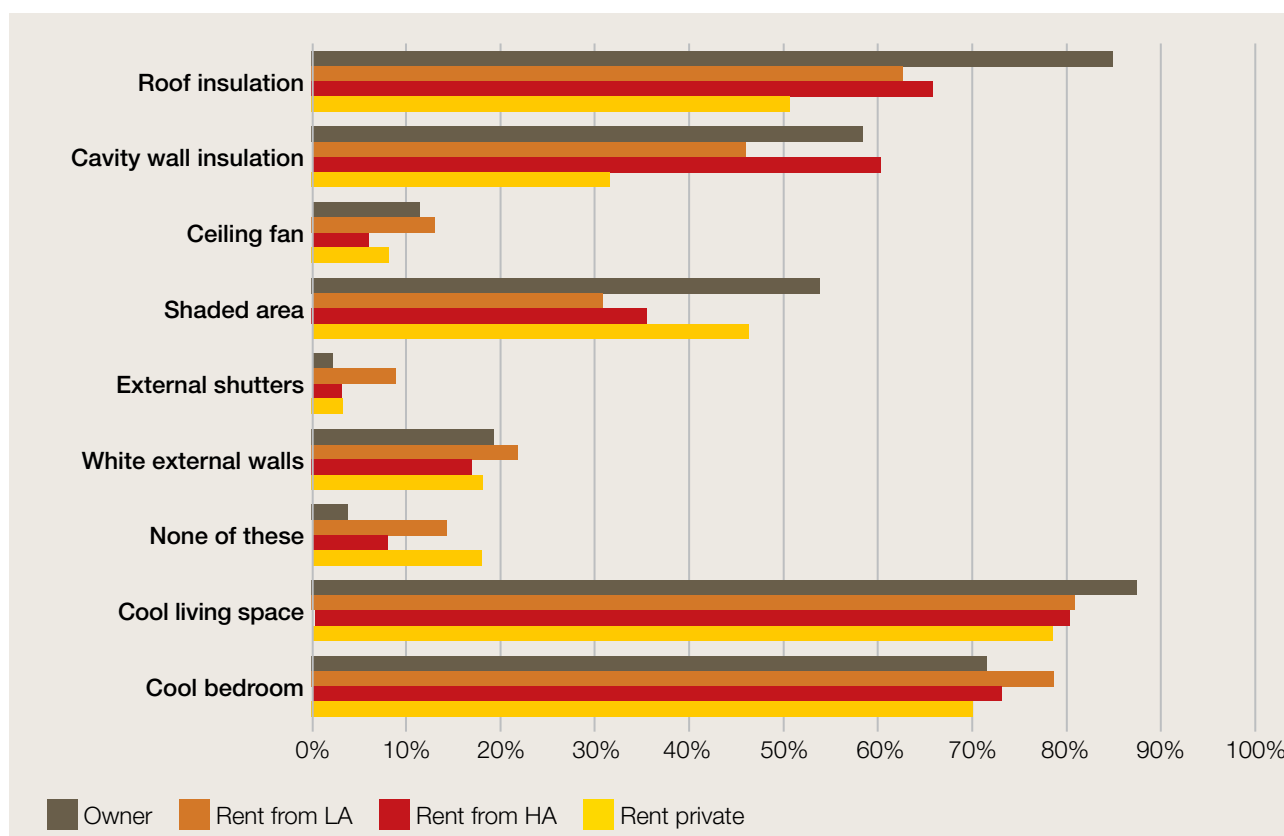
Looking at these housing characteristics among vulnerable groups (Table 5.14), there is a different picture according to age. Participants aged 75+ were more likely than average to have several of these characteristics, such as roof/loft and cavity wall insulation; they were also more likely to say that could keep their bedroom cool in hot weather. However, those aged 18-74 with a LLSI or in bad health were less likely to have roof/loft insulation and a shaded outside area, and they were also less likely to say they could keep their living space or bedroom cool in hot weather.



Some of these differences in home characteristics are explained by differences in tenure, as participants aged 75+ were more likely to be home owners and less likely to be private renters, while those aged 18-74 with LLSI or in bad health were much less likely to be a home owner and much more likely to rent from a local authority (LA) or housing association (HA). And there were significant differences in home characteristics by tenure, as shown in Figure 5.11.

Participants who owned their own home were the most likely to have at least one of the home characteristics asked about, and were the most likely to have roof/loft insulation, a shaded area outside and, along with those renting from a housing association, cavity wall insulation. Those renting privately were the least likely to have any of these items (18.1% had none) and were much less likely to report having roof/loft or cavity wall insulation. (Of course, this could be partly due to a lower awareness among renters about the characteristics of their dwelling.)

Figure 5.11 Home characteristics, by tenure



There were also variations by other socio-demographic variables. Although this didn't apply to all the home characteristics, for many of them, older participants were the most likely to report having them, and younger participants, especially those in the 25-44 age range, were the least likely (Figure 5.12); for example, 85.8% of those aged 75+ reported having roof/loft insulation compared with only 60.8% of those aged 25-34, which is largely a reflection of their tenure, with younger people much more likely to be private renters.



Among the older participants in the focus groups, most said that they were able to keep their homes relatively cool during the summer months, and several said that they had cool parts of their home where they were able move to if they felt hot. Participants discussed the importance of adequate insulation to protect their homes, but most said that they felt their homes did not get too hot during the summer, particularly as periods of very hot weather did not last long.

Figure 5.12 Home characteristics, by age group

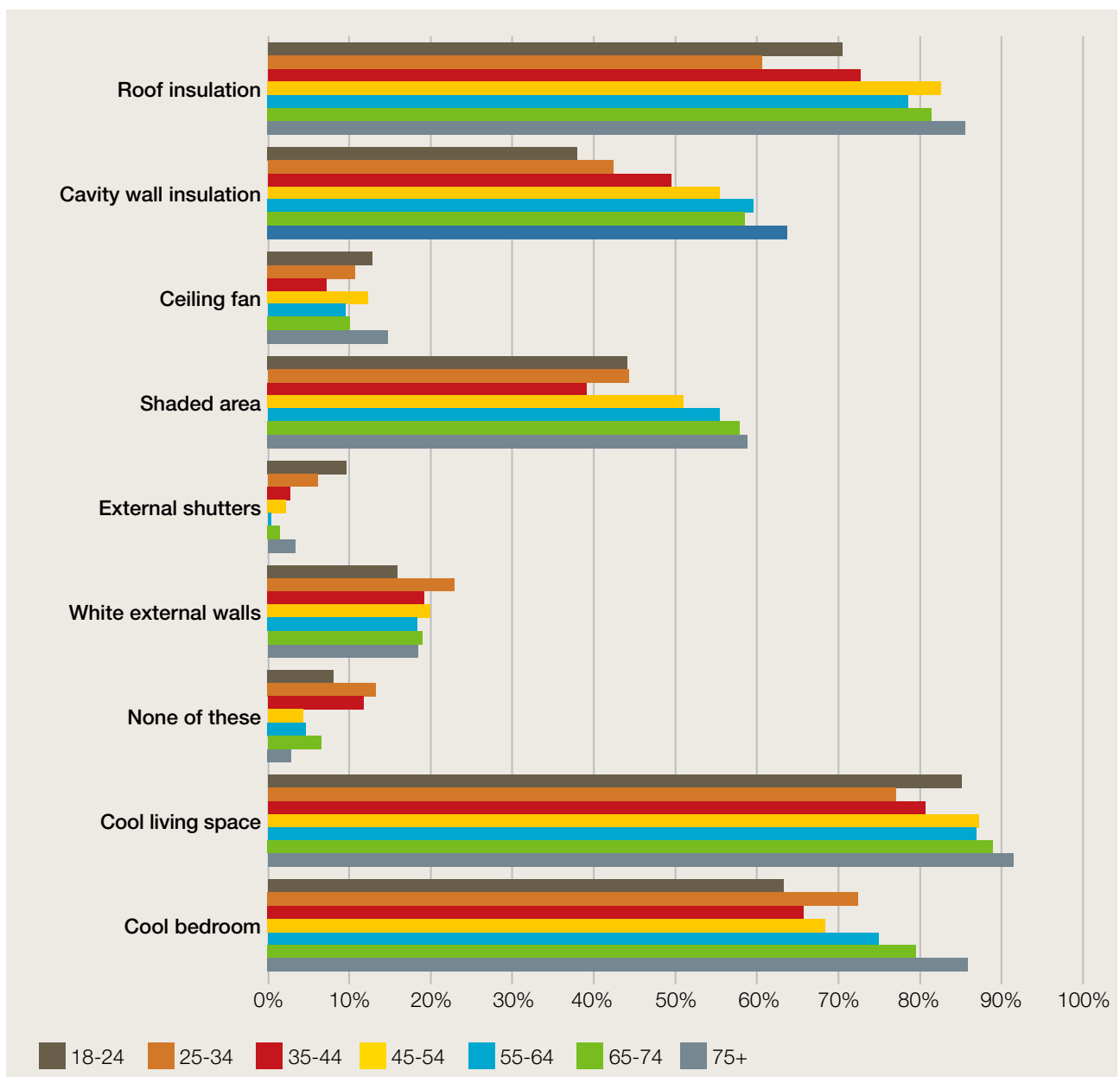




Table 5.15 shows there were also differences by other socio-demographic variables, such as ethnicity, with Black participants much more likely than White participants to say they had none of these six characteristics (27.2% and 6.4% respectively). Asian participants were by far the most likely to have external shutters (19.4% compared with the average of 3.4%). There were also some stark differences by region: for example, only 54.8% of participants in London reported having roof/loft insulation compared with 88.9% of those in the North East.

Table 5.15 Home characteristics, by socio-demographics

	Roof/loft insulation	Cavity wall insulation	Ceiling fan	Shaded areas outside	External shutters	White external walls	None of these	Keep living space cool	Keep bedroom cool	Bases (unweighed)
	%	%	%	%	%	%	%	%	%	%
All	75.5	52.4	10.6	49.6	3.4	19.5	7.8	84.9	72.3	1878
Age group										
18-24	70.7	38.1	12.9	44.3	9.7	16.0	8.1	85.4	63.4	57
25-34	60.8	42.5	10.7	44.4	6.2	23.0	13.3	77.3	72.6	186
35-44	72.9	49.6	7.3	39.2	2.8	19.3	11.8	80.9	66.0	328
45-54	82.8	55.6	12.3	51.1	2.3	20.0	4.3	87.5	68.6	394
55-64	78.8	59.8	9.6	55.6	0.4	18.4	4.7	87.1	75.1	386
65-74	81.7	58.7	10.1	58.1	1.5	19.0	6.6	89.2	79.8	380
75+	85.8	63.9	14.8	59.0	3.4	18.5	2.9	91.7	86.2	143
Ethnic group										
White	78.6	54.4	10.4	51.5	2.0	18.8	6.4	84.7	71.2	1751
Black	47.1	38.2	11.8	36.6	-	45.3	27.2	85.1	92.1	33
Asian	58.3	39.9	10.7	35.5	19.4	20.2	14.3	86.2	76.1	62
Mixed/Other	54.3	39.0	17.6	43.4	8.1	8.5	14.4	88.3	76.0	32
Region										
North East	88.9	73.2	12.9	49.3	3.5	31.8	3.7	94.9	87.4	91
North West	80.4	54.5	7.3	43.0	1.1	14.4	7.8	85.7	68.7	255
Yorkshire & The Humber	72.2	53.3	7.3	52.8	4.1	12.7	11.7	80.5	69.5	178
East Midlands	77.6	51.2	14.2	52.7	0.8	11.7	4.5	82.1	63.9	203
West Midlands	85.7	63.8	16.9	50.8	2.8	18.9	4.7	82.5	74.2	186
East of England	72.4	55.3	9.1	46.9	1.3	21.1	4.9	90.3	74.8	224
London	54.8	31.8	9.1	46.2	7.4	22.6	16.9	78.2	71.9	185
South East	79.0	55.0	15.3	54.0	4.2	19.6	3.3	86.2	70.7	341
South West	82.8	52.2	5.0	52.3	3.3	27.1	9.0	89.7	78.3	215
Urban/rural										
Urban	72.6	50.5	11.5	47.2	3.6	19.7	9.1	84.0	73.5	1352
Rural	88.7	61.3	6.7	60.1	2.5	18.6	2.0	89.0	67.1	426
Highest educational qualification										
Degree or higher	74.9	50.4	10.1	54.6	4.2	21.8	9.3	86.2	73.0	742
A level or equivalent	76.6	53.3	11.6	54.2	4.3	18.1	5.8	88.3	71.3	404
Other below A level	78.3	52.4	10.5	40.0	2.6	15.2	7.1	79.3	68.1	383
Other qualifications	77.5	55.0	11.8	53.3	3.2	25.2	9.3	82.0	77.3	146
None	70.3	54.7	10.0	43.2	1.4	19.7	7.7	86.6	76.1	201



Table 5.15 Continued

	Roof/loft insulation	Cavity wall insulation	Ceiling fan	Shaded areas outside	External shutters	White external walls	None of these	Keep living space cool	Keep bedroom cool	Bases (unweighed)
	%	%	%	%	%	%	%	%	%	%
Household type										
Single adult	66.7	51.8	8.9	40.6	3.2	23.0	12.0	87.1	78.0	445
Lone parent	54.9	35.2	0.9	21.8	0.8	19.2	25.5	80.0	74.1	84
2 adults, no children	79.9	55.2	11.1	56.1	0.9	17.9	5.6	86.9	74.6	681
2 adults, 1+ children	77.3	55.7	10.6	50.2	4.8	16.6	6.1	86.9	69.4	400
3 adults, no children	73.7	40.9	14.1	51.0	5.6	23.6	8.9	84.3	69.9	175
3 adults, 1+ children	89.0	64.2	11.6	50.6	8.9	20.5	2.2	83.4	66.4	79
Disability										
Yes – affects daily life	64.1	51.4	8.0	40.0	5.3	22.2	12.8	77.6	70.0	292
Yes – not affect	81.2	57.5	10.7	53.8	1.0	14.7	6.1	87.5	74.9	367
None	76.8	51.4	11.2	50.8	3.6	20.0	7.1	85.9	72.2	1217
General health										
Very good	78.5	55.8	10.8	56.0	2.9	19.2	6.1	92.5	77.3	362
Good	77.6	47.6	10.8	52.7	4.0	20.3	7.9	85.4	74.9	884
Fair	74.5	57.0	10.9	44.1	2.4	18.0	8.0	82.6	68.0	483
Bad/very bad	61.1	57.7	8.3	36.0	3.8	20.1	10.5	73.4	61.4	149

5.6 Health effects of hot weather

Participants were asked whether, at any time during summer 2017 (not just during the June heatwave), they had experienced any of the following health symptoms/conditions as a result of hot weather or heat:

- Dehydration/intense thirst
- Sunburn
- Heat rash/red and dry skin
- Headaches
- Dizziness
- Nausea or vomiting
- Muscle weakness or cramps
- A high temperature
- Irritability
- A need to contact a GP or NHS 111, call an ambulance or go to hospital or A&E
- Other condition
- (No health symptoms/conditions)

Just over half (52.9%) of participants said they had experienced one or more of these health conditions as a result of hot weather in summer 2017. Most of these participants tended to experience more than one condition, with headaches (25.7%), irritability (21.4%), dehydration/intense thirst (20.2%) and sunburn (18.1%) being the most common. However, the health problems tended not to be severe enough to



require medical treatment, as only 1.4% of participants had had to contact the health services as a result of hot weather. Still, at the population level, 1.4% of all adults living in England translates into a considerable number of people requiring medical attention as a result of hot weather. With an adult population (aged 16+) of approximately 47,000,000, this equates to over 600,000 extra contacts with health services.

A number of other conditions were mentioned by participants including: fatigue/exhaustion/lethargy (15 participants); breathing problems, including asthma (10); problems sleeping (8); extreme sweating (4); and various other problems mentioned by only one or two participants. In the focus groups, participants mainly said they often found it difficult to sleep at night during hot periods, often because they did not open their windows at night (often for security reasons) or use fans at night (often for reasons of cost).

Table 5.16 shows these symptoms for our vulnerable groups. Whereas participants aged 75+ were less likely to report any of these symptoms, those aged 18-74 with a LLSI or in bad health were more likely to report having at least one of these symptoms (about two in three reported at least one symptom). In particular, they were more likely to report dizziness, cramps, irritability and, for those in bad health only, headaches and heat rash.

Table 5.16 Hot weather related health symptoms in summer 2017 for vulnerable groups

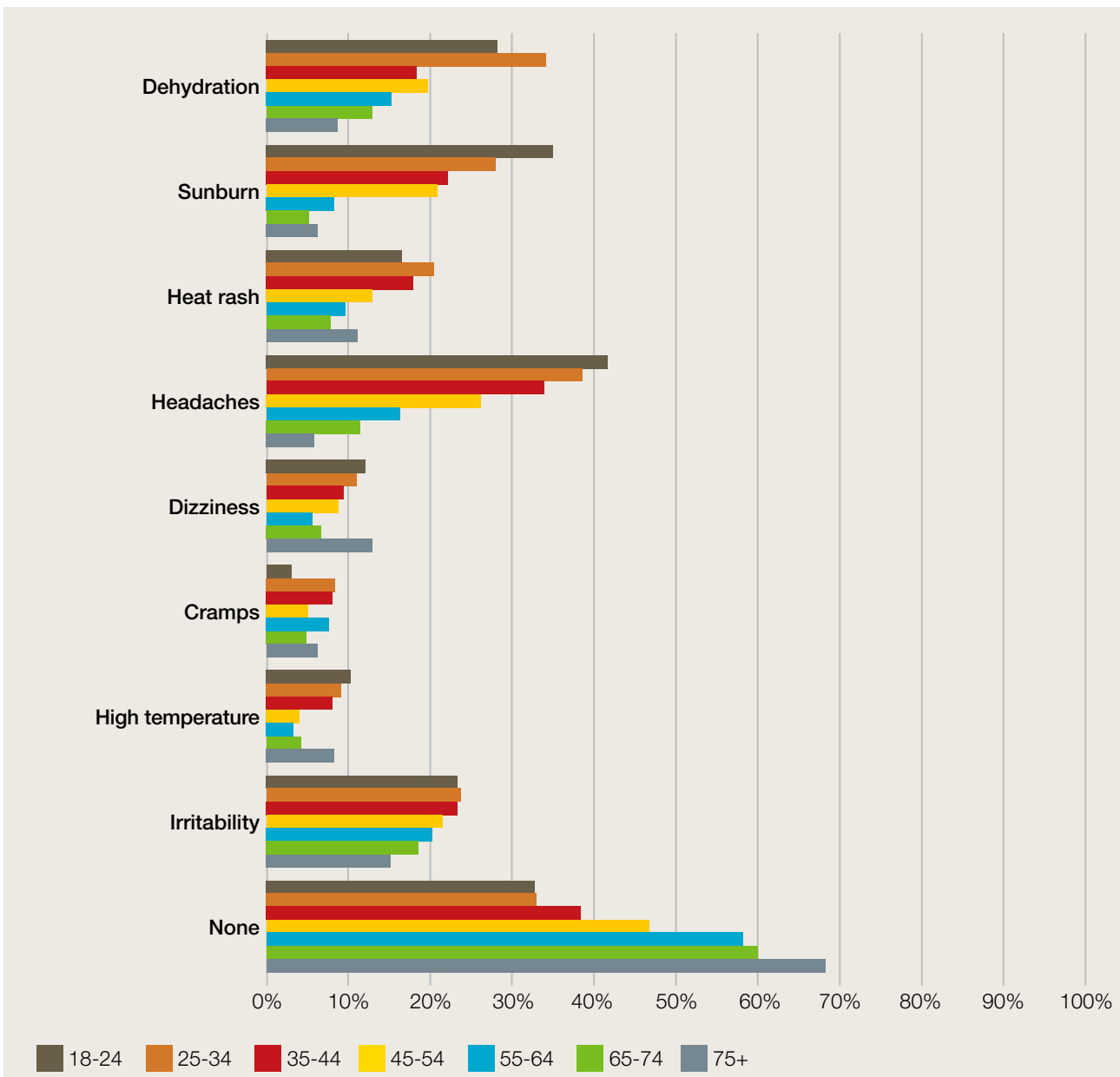
	Dehydration %	Sunburn %	Heat rash %	Headaches %	Dizziness %	Nausea %	Cramps %	High temperature %	Irritability %	Contact NHS %	None %
All	20.2	18.1	14.0	25.7	9.2	2.9	6.5	6.4	21.4	1.4	47.1
Aged 18-74	21.1	19.2	14.3	27.5	8.8	2.6	6.5	6.3	21.8	0.9	45.3
Aged 75+	8.7	6.3	11.1	5.9	12.9	6.1	6.2	8.3	15.2	6.7	68.3
Aged 75+ and living alone	20.8	–	7.2	7.1	8.6	–	13.5	4.7	14.0	1.0	60.8
Aged 18-74 no LLSI	20.0	18.9	13.0	27.3	6.8	2.1	4.2	5.8	19.1	0.8	46.8
Aged 18-74 with LLSI	27.8	20.7	21.2	28.5	19.7	5.4	19.0	8.8	37.0	1.2	37.1
Aged 18-74 in good/fair health	20.5	19.0	13.2	26.5	7.0	2.3	5.1	5.8	20.5	0.8	46.6
Aged 18-74 in bad health	27.2	21.6	25.8	38.2	27.4	5.8	21.2	11.7	34.9	2.1	32.4

The significantly lower reporting of these symptoms by participants aged 75+ seems unexpected, given that older participants are more likely to have a LLSI and to be in worse health. However, as Figure 5.13 shows, for eight of the symptoms (plus none), there was an inverse relationship with age, with the youngest participants most likely to report one or more symptoms (67.2% for the 18-24 age group), while the oldest participants were the least likely to report any (only 31.7% of those aged 75+ reported one or more symptoms). Younger participants were more likely than average to report dehydration, sunburn and headaches. Participants aged 75+ were, however, the most likely to report contacting the NHS: 6.7% did, compared with the average of 1.4%. Of course, it is important to keep in mind that these are self-reports and are not clinically



diagnosed symptoms due to hot weather. However, it is perhaps not all that surprising that young people suffered more effects from hot weather given that they were much less likely to take action to protect themselves from the heat, as previously shown in Table 5.12: i.e. during the June 2017 heatwave, younger participants were much less likely to stay out of the sun between 11am and 3pm, to stay in the shade, to limit physical activity, to close curtains on windows in sunlight, and to avoid alcohol. This relationship between symptoms and protective actions taken is examined further below.

Figure 5.13 Hot weather related health symptoms in summer 2017, by age group





The clear association with participants’ general health, as shown in Figure 5.14, is as expected. The likelihood of reporting one or more symptoms was much higher for participants in bad health than for those in very good health (64.7% compared with 36.6%). Participants in bad health were much more likely to report symptoms of dehydration, headaches, dizziness and irritability.

Figure 5.14 Hot weather-related health symptoms in summer 2017, by self-reported general health

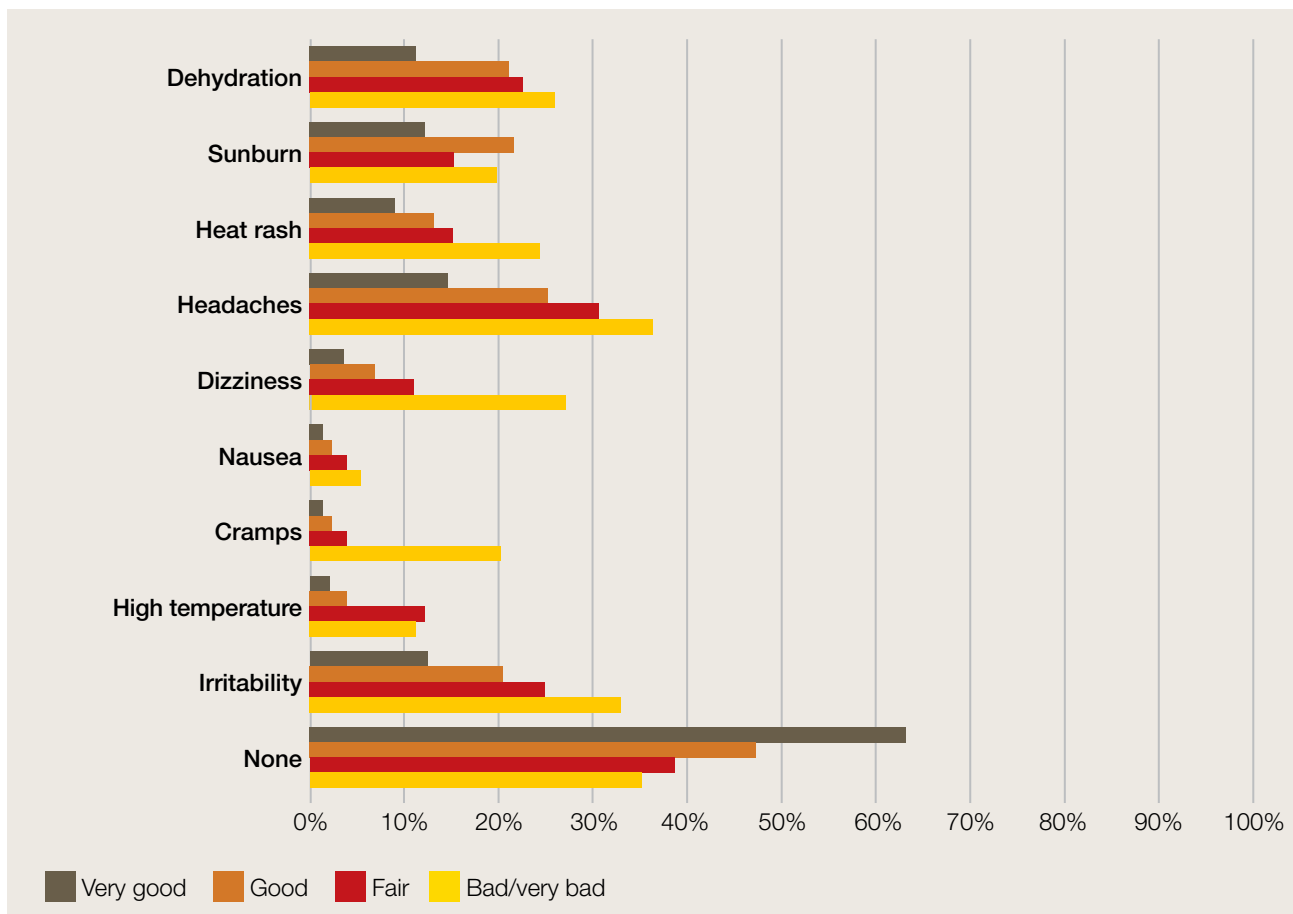




Table 5.17 shows these symptoms by a number of other socio-demographic characteristics. There are only a few other differences of note (besides age, having a LLSI or being in bad health which are described above). One difference, possibly due to the urban heat effect, is that participants living in London were the most likely to mention one or more of these symptoms (63.7%), with headaches (33.3%) and irritability (31.1%) being the highest of the regions. There were also differences by ethnicity, with Asian participants being the most likely to mention one or more symptoms (70.1%), in particular dehydration (32.9%) and headaches (49.1%).

Table 5.17 Hot weather-related health symptoms in summer 2017, by socio-demographics

	Dehy- dration	Sun- burn	Heat rash	Head- aches	Dizzi- ness	Nausea	Cramps	High temp- erature	Irritability	Contact NHS	None
	%	%	%	%	%	%	%	%	%	%	%
All	20.2	18.1	14.0	25.7	9.2	2.9	6.5	6.4	21.4	1.4	47.1
Gender											
Male	20.7	20.3	12.0	19.1	5.8	2.0	6.4	6.5	18.8	0.5	51.5
Female	19.7	16.1	15.8	31.8	12.3	3.7	6.5	6.4	23.7	2.1	43.1
Ethnicity											
White	18.8	18.3	11.4	23.0	8.7	3.0	5.9	6.4	20.8	1.1	49.0
Black	26.3	12.0	34.8	34.1	24.3	-	17.3	14.6	29.8	9.1	47.1
Asian	32.9	18.3	31.3	49.1	8.1	3.2	6.1	3.6	21.8	-	29.9
Mixed/Other	22.0	20.1	27.4	38.9	12.4	2.0	12.0	8.1	32.0	5.7	36.1
Region											
North East	14.3	16.6	18.5	26.9	2.4	1.7	2.8	11.8	27.4	-	47.1
North West	17.0	22.8	11.9	23.6	8.5	1.2	6.2	9.0	12.2	0.2	48.4
Yorkshire & The Humber	51.5	84.4	66.8	49.2	57.4	43.0	49.4	37.7	86.4	59.2	2.9
East Midlands	44.4	88.3	58.8	51.6	56.3	38.0	45.1	33.6	88.2	47.3	1.0
West Midlands	51.5	84.4	66.8	49.2	57.4	43.0	49.4	37.7	86.4	59.2	2.9
East of England	44.4	88.3	58.8	51.6	56.3	38.0	45.1	33.6	88.2	47.3	1.0
London	24.0	21.3	22.0	33.3	13.1	3.7	8.9	5.7	31.1	0.5	36.3
South East	23.7	16.2	12.0	24.4	5.8	1.4	4.3	2.8	17.2	1.0	50.0
South West	17.4	15.2	11.4	22.4	6.4	2.4	3.4	4.4	19.3	0.5	52.6
Urban/rural											
Urban	21.2	18.8	15.2	26.7	9.3	3.1	6.9	7.1	22.8	1.7	45.2
Rural	15.5	15.0	8.8	21.3	8.5	1.9	4.4	3.5	14.9	-	55.9
Disability											
Yes – affects daily life	26.3	18.6	19.9	26.6	19.4	4.9	17.9	8.6	33.9	1.4	40.2
Yes – not affect	21.3	15.7	10.7	19.2	11.2	5.1	5.6	8.0	17.8	3.2	53.0
None	18.5	18.6	13.5	27.1	6.3	1.9	4.0	5.5	19.3	0.9	47.3

Bases are similar to those in Table 5.7.

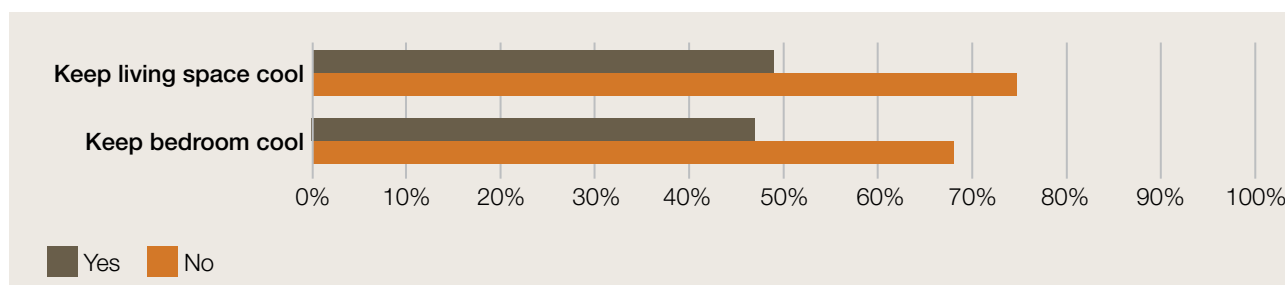
The likelihood of experiencing some symptoms was related to the types of actions participants did or did not take to protect themselves from the heat. For example, looking at responses for actions taken during the June 2017 heatwave, 21.7% of those who said they rarely/never stayed out of the sun between 11am and 3pm reported experiencing sunburn compared with 13.9% of those who always/often



stayed out of the sun. However, the association between action taken and symptoms experienced was not always as expected: e.g. among those who said they rarely/never drank cool fluids, only 4.1% experienced dehydration compared with 20.9% of those who always/often drank fluids; and among who said they rarely/never avoided alcohol 15.2% experienced headaches compared with 30.9% of those who always/often avoided alcohol. These counter-intuitive associations could be explained in a number of ways, e.g. perhaps people who think they never or rarely suffer from dehydration will not report it as a symptom, but they also may not feel the need to drink fluids in hot weather. By contrast, people who do experience problems of dehydration are likely to drink lots of fluids to try to counteract it.

Participants who reported being able to keep their living space and bedroom cool were significantly less likely to report having any of the heat-related health symptoms (Figure 5.15). However, this association was not found for any of the other housing characteristics asked about.

Figure 5.15 Percent experiencing 1 or more hot weather-related symptoms in summer 2017, by whether can keep living space and bedroom cool

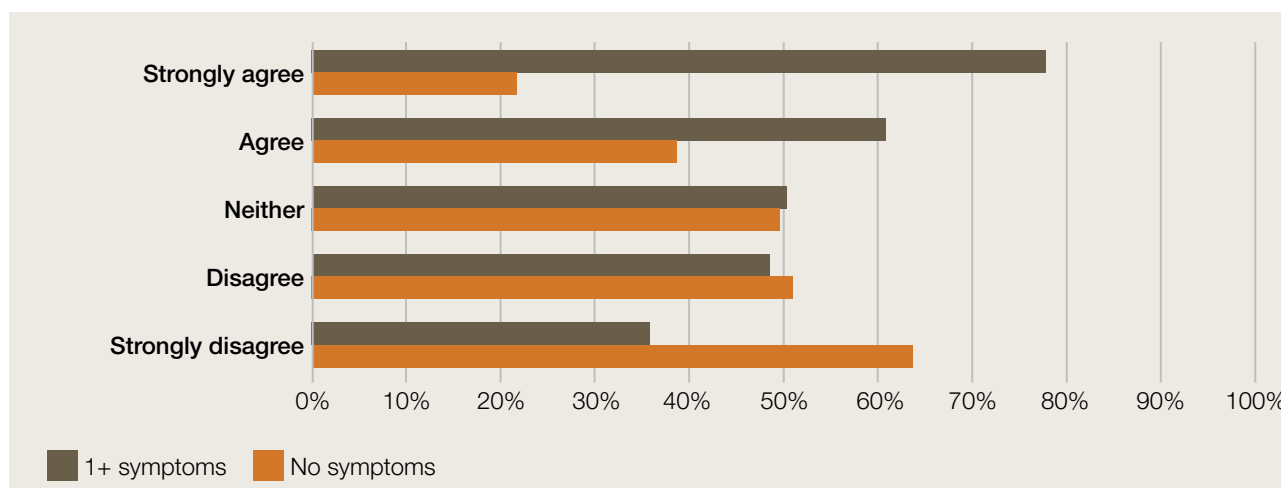


The provision of hot weather-related publicity/advice does not appear to be associated with the likelihood of people experiencing hot weather-related health problems. Participants who had heard the publicity were just as likely as those who did not hear it to report health problems (52.9% for both groups). Participants who said they had changed their behaviour as a result of hearing the advice were significantly more likely to report hot weather-related health symptoms (61.8%) than those who had heard the advice but did not change their behaviour (46.3%). Of course, it might be the case that people who consider themselves at risk of developing health problems resulting from hot weather are more likely to change their behaviour than those who do not perceive themselves to be at risk.

There was, however, a clear association between experiencing hot weather-related symptoms and participants' attitudes towards the health risks of hot weather to themselves, as shown in Figure 5.16. While two-thirds (63.8%) of those who agreed that hot weather was a risk to their health reported 1 or more symptoms during summer 2017, this was much higher than for those who said hot weather was not a risk to their health. However, even among the latter, nearly half (46.2%) of participants reported 1 or more hot weather-related symptoms.



Figure 5.16 Percent experiencing 1 or more hot weather-related symptoms in summer 2017, by whether hot weather is risk to own health



5.7 Summary of findings on public knowledge and behaviour

Most adults at-risk of heat-related morbidity or mortality, did not feel that heatwaves posed a health risk to themselves, but were more likely to identify a risk in others, especially those with greater physical or cognitive needs. The majority of participants aged 75+ and those with a LLSI did not consider themselves to be at risk, while only half (50%) of those in bad health said they were at risk. Similar or higher proportions expressed positive views about hot weather ('I love hot weather'). This is important as an individual's attitude to risk shapes their behaviour during hot weather. These findings are in accordance with results from previous studies (Abrahamson et al., 2009, Wolf et al., 2010, van Loenhout et al., 2016, Bassil and Cole, 2010).

The general public appears to be generally aware of the effectiveness of protective behaviours: two-thirds or more recognised the effectiveness of staying out of the sun 11am-3pm, drinking cool fluids, covering skin with clothing, limiting physical activity and opening windows at night. Other protective behaviours were recognised as effective by less than half of adults (keeping curtains closed on exposed windows during the day; avoiding alcohol; using an electric fan and keeping exposed windows closed during the day). The results were similar for the three vulnerable groups (aside from a few differences in detail).

All regions in England were issued a level 3 heat-health alert for a short period (17th to 21st) in June 2017. Half (51%) of the adults in our survey reported that they had heard hot weather-related publicity/advice during that heatwave. Among those who had heard the advice, 43% reported changing their behaviour as a result of the publicity (which means about one in five of the adult population reported changing their behaviour). However, hearing the publicity/advice was not associated with participants' perceptions of the effectiveness of protective behaviours. Among our vulnerable groups, participants aged 75+ were more likely to hear the publicity (64%), those aged 18-74 in bad health were less likely to (only 38% heard it), and adults with a LLSI were similar to the average (52%).



Protective behaviours taken by half or more of adults included drinking cool fluids (87%), opening windows at night (87%), staying in the shade (61%), limiting physical activity (56%), avoiding alcohol (51%), covering the skin with clothing (51%), and closing curtains in direct sunlight (48%). Using a fan (39%) and closing windows in the direct sunlight (35%) were least commonly taken. Eight of these actions were asked about in a survey following the summer 2013 heatwave, and the proportion of adults taking these actions in 2017 was higher for most of them (Public Health England, 2016 see Figure 6).

Adults aged 75+ were more likely than average to take most of these actions, aside from drinking cool fluids, using an electric fan or opening windows at night. Similarly, in the focus groups, age-related risk tended not to be perceived by many older participants as related to thermoregulation, and therefore they were less likely to take extra hydrating or other ‘indoor’ protective actions, such as using fans or opening windows at night. This should be seen in relation to a recent study which demonstrated that older people were less likely to be aware that they were ‘overheating’ and therefore to take appropriate thermoregulating actions (Waldock et al., 2018).

Overall, just under 2% of adults sought professional health advice during the June heatwave, as did about 3% of our vulnerable groups.

As shown by previous studies (Lefevre et al., 2015, Abrahamson and Raine, 2009, Wolf et al., 2010, Ibrahim et al., 2012, Kalkstein and Sheridan, 2007, Semenza et al., 2008), the likelihood of taking protective actions was associated with an individual’s perception of risk, such that participants who viewed hot weather as a risk to their own health were much more likely to take these actions than those who did not share this view. Taking the actions was even more strongly associated with an individual’s perception of the effectiveness of the action. Younger adults (18-44) were also more likely than adults aged 45+ to underestimate the health risk of hot weather and to have positive views overall about hot weather, which helps explain why they were less likely to take protective actions.

We asked participants aged 65+ and those under 65 with a LLSI whether they were contacted by anyone during the heatwave to check how they were. The vast majority were not (75%) and only 6% were contacted by a health professional (a GP/doctor, nurse or local authority social services). The vast majority of contacts were by neighbours/family/friends (21%). Nearly half of those aged 75+ were contacted (44.7%), but again it was mainly by neighbours/family/friends (38%). Some focus group participants felt that it was not appropriate for them to be targeted as potentially vulnerable by health and social care services, as recommended in the HWP, as this was not considered a good use of ‘scant’ resources.

Over half (53%) of all adults reported experiencing one or more hot weather-related health symptoms during the 2017 summer. This was higher among those aged 18-64 with a LLSI (63%) or in bad health (68%), but was lower among those aged 75+ (32%). The latter is explained by this group being more cautious in hot weather, especially in relation to the sun. In the focus groups, some participants felt they were more at risk of becoming burnt by the sun or getting skin cancer due to their age and ‘thinning skin’, echoing findings by Wolf and colleagues (Wolf et al., 2010), and felt this risk had increased due to climate change; this meant they were more likely to stay indoors or in the shade during the hotter parts of the day, and to use sun protection such as hats and lotion when out during the day. The likelihood of



reporting symptoms, in fact, was inversely related to age. Similar results have been previously reported elsewhere, e.g. by Khare et al. (2015) in a survey following the 2013 heatwave in the UK. While younger adults are less at risk than older adults, not only are they less likely to take many of the actions that would protect them from the heat, they are also more likely to take risky actions during periods of hot weather (e.g. increased physical activity, sunbathing and alcohol consumption).

The most common symptoms reported were headaches (26%), irritability (22%), dehydration/intense thirst (20%) and sunburn (18%). The health symptoms were not generally severe enough to require medical treatment, as only 1.4% of all adults reported contacting the NHS as a result of hot weather. The proportion of those aged 75+ contacting the NHS, however, was higher at 6.7%. There was a strong association with participant's health in general, with those in bad health much more likely to report many of these symptoms.

5.8 Limitations

The survey of the general public is based on self-reported behaviour. Thus we cannot be entirely sure whether the statements made reflect actual attitudes or past behaviours, particularly those relating to the most recent heatwave which was relatively short-lived and did not involve excessive heat. Although the data were weighted to take into account non-response among various sub-groups of the population, we cannot be certain that all bias is eliminated. Also, the survey included only residents living in private households, so some individuals who may be particularly vulnerable to hot weather have been excluded (e.g. the homeless).



6. Discussion

The Heatwave Plan for England (HWP) aims to protect health and reduce harm from heatwaves and severe hot weather. Its main intervention is a heat-health alert system that local authorities, which have formal responsibility for public health, in partnership with the agencies (such as the local NHS) that together form Local Resilience Forums, are required to establish and maintain. Through this system, commissioners of health and social care services alert service providers, such as hospitals, community services and care homes, of a heatwave being imminent once a regionally defined temperature threshold is breached.

The evaluation addressed the following three questions:

1. Has the introduction of the HWP in 2004 had any effect in terms of reducing morbidity and mortality?
2. To what extent, if any, has the HWP informed local decisions on management of heat-related health risk and response?
3. Is the general population aware of the risks of heat and overheating buildings, do they change their behaviour in hot weather and as a result of hearing heat alerts/ advice, and do they take any actions to prevent potential negative effects of hot weather (e.g. adapt their homes)?

The evaluation was a mixed method study, comprising three components, to examine the contribution of the HWP to protecting the health of the population during hot weather. To this end, we conducted:

1. A time-series analysis of daily mortality and emergency hospital admissions data in England to establish the relationships between high ambient temperatures and health outcomes.
2. Longitudinal case studies in five areas in England looking at the local implementation of the HWP.
3. A national survey of nursing staff in hospital, community and care home settings on their awareness of the HWP and actions taken during heat-health alerts
4. A survey and focus groups of members of the general public, to explore the extent to which adults are aware of the risks from hot weather to their health and whether they protect themselves by following the advice set out in the HWP.

6.1 Temperatures and health

The general summertime relationships between ambient temperature and daily mortality, and between temperature and daily emergency hospital admissions (as indicators of the health impact of hot weather), have not changed substantially, comparing a number of years before and after the introduction of the HWP in 2004. The epidemiological analysis of the relationships between daily temperature and health outcomes suggests that high temperatures in England are associated with an increase in deaths and emergency hospital admissions once location-specific threshold temperatures are reached. The temperatures at which the adverse health impacts become apparent are relatively moderate and well below the alert thresholds used in the HWP. This means that, as with cold weather, the greatest health burdens associated with heat occur outside the alert periods, thus raising the need for more general attention to mitigating the ill-effects of hot weather, including in early summer.

There have been no or low mortality burdens associated with recent heatwaves. This may be for a number of reasons, such as the intrinsic characteristics of the



heatwaves, for example, heatwaves having been not as extreme. Better awareness and behavioural adaptation strategies among the general public may also have dampened the health effects of hot temperatures. The HWP may also have contributed to reducing health impacts, specifically during alert periods, even if general temperature-health relationships have not changed substantially.

The risk of death or ill health during hot weather varies across the 44 Sustainability and Transformation Plan (STP) areas in England and has also changed over time, with many STP areas having seen increases in heat risk in recent years. In our analysis of the years 2007 to 2015, the relative risks from heat on mortality were greatest in the STP area of Hampshire & the Isle of Wight, and many areas of London were also at high-risk. During this period, relative risks increased most prominently in Lincolnshire. In the most recent period (2013-2015), Surrey Heartlands showed the highest heat-health risk. Many factors other than climate are likely to explain such spatial and temporal variations and future work should investigate which area-level factors explain variations in observed risk across STP areas.

Previous studies from Europe and South Korea have provided suggestive evidence that the number of excess deaths from hot weather may be lower if a hot summer follows a cold winter, due to a depletion of the pool of people at risk (Rocklöv et al., 2009, Stafoggia et al., 2009, Ha et al., 2011). However, our analysis did not confirm this finding.

Since the largest numbers of excess deaths associated with heat take place outside alert periods, this raises questions about the purpose of the alert system and the need for more emphasis on levels 0 and 1 of the HWP to ensure that vulnerable people are able to cope with temperatures that are high, but not excessively hot. The current alert systems may be successful in alerting people to the risks of very hot days, but it may be less suited to reducing the health burdens associated with moderately hot weather.

6.2 Implementation of the Heatwave Plan for England

We explored the implementation of the HWP, using interviews with managers and frontline staff, documentary analysis, and meeting observations, in five local areas in England from Spring 2017 to Spring 2018. In addition, a web-based national survey of nurses' knowledge, awareness and implementation of the HWP was conducted in September 2018, providing a comparison of nurses' heat-health awareness and practice within and across different healthcare settings.

In the case studies, local heatwave plans were in place in four of the five areas, typically developed by local authorities and other agencies involved in Local Resilience Forums. These plans tended to be closely aligned with the national HWP, particularly in relation to the organisation of the heatwave alert system. However, the scope and extent of year-round preparation varied between areas, with some local authorities being significantly more active than others. Our findings confirm concerns about year-round planning for hot weather not being given much priority (Wistow et al., 2017), although in areas with more frequent exposure to hot temperatures this seems to be changing.

Interviewees suggested that operational and business continuity plans for heatwaves existed in NHS hospitals, but that they varied as to whether they were developed in partnership with the local CCGs. In some areas, CCGs took a coordinating role, by preparing overarching emergency plans to which local NHS providers linked their own operational plans.



Most senior and middle-managers across health and social care were familiar with national and local heatwave planning, and managers of care home staff were more active as well as better informed, but there was little indication that this knowledge was shared by those providing services at the frontline such as nurses or care workers.

Our nurse survey provided similar results, illustrating that only a small proportion of nurses were aware of the HWP or if their organisation had its own plan. This is consistent with findings from previous studies that showed that frontline staff are often not familiar with local heatwave plans (Boyson et al., 2014, Gupta R et al., 2016). Nevertheless most practitioners, including nurses in the national nurse's survey, indicated having reasonable knowledge of heat-health preventive measures, expressing some confidence in taking the appropriate actions to protect patients during spells of hot weather and in taking a 'common sense' approach to dealing with hot weather when providing care to their clients. However, the nurse survey results suggest that this is at odds with the general lack of actions reported taken during level 2 and level 3 heat-health alerts, as well as some inappropriate actions (e.g. opening windows in direct sunlight during heatwaves), or employing only some of the recommended actions, such as 'supplying cold water' and 'turning off unnecessary lighting' but not 'ensuring cool areas' or 'rescheduling activities'. One explanation could be that such actions were not necessary (e.g. because the hospital may have had air conditioning or actions on wards may have been shared among a group of nurses). Another explanation is that the latter two actions are beyond the control of frontline staff and require either resources or detailed management attention. In any event, these findings do raise questions as to whether all frontline nurses are aware of all the actions they should be taking, particularly in light of the low level of awareness of the HWP. In turn, this suggests that some further training may be indicated so that nurses and other staff are aware of the importance of the recommended actions for patient comfort and safety.

Local case study interviewees suggested that heatwave planning was largely seen as an exercise in emergency preparedness rather than part of year-round public health and environmental planning. However, some local authority managers noted that they were in the process of revising and updating their plans to include the effects of severe weather, including heatwaves. NHS provider organisations appeared to be more active in year-round planning, largely ensuring that their buildings were resilient to heat, as part of their organisations' business continuity strategy. However there was little evidence of any local strategic planning related to hot weather as Local Health and Wellbeing Boards were rarely mentioned as being involved in this work, despite Public Health England, the local Government Association and NHS England recommending that they include long term planning and commissioning to reduce heat-related harm as their 'core business' (Public Health England, 2016).

We analysed local authority risk registers in the five case study sites. The analysis suggests that the risk of harm from hot weather was assessed consistently as lower than the risk of harm from other weather-related hazards such as flooding and cold. This may explain why hot weather did not feature more prominently in long-term environmental plans. It may also reflect that hot weather tended to be both infrequent and short-lived in these areas in the past. However, it is unclear what underpinned the classification of the risk of hot weather and whether this decision was based on, for example, an analysis of data on the effects of temperature on local service demand, as opposed to experience and opinion only.



All areas operated an alert system for heatwaves, as required by the national HWP. The alert system typically formed the backbone of the local implementation of the Plan, and the structure and operation of the alert system tended to be closely aligned to the structure and operation suggested in the national HWP. Managers in local authorities tended to find this part of the HWP particularly helpful. Many said that they would model the messages they cascaded to service commissioners and providers on the messages received from PHE.

However, managers in some areas felt that they did not benefit from the alert system as much as they could, because the temperatures in their specific part of the region tended to be lower than the temperatures forecast in other parts of the region that may have triggered the alert. This particularly applied to areas in the North of England, as well as some areas near the coast, that rarely experienced temperatures associated with a level 3 heat alert. Another concern was that, even if the heatwave alert threshold was breached, the expectation was that the hot weather would be too short-lived to warrant any action beyond the ‘warn and inform’ messages cascaded through the system. However, most managers felt that this was proportionate to the (perceived) local level of risk.

Some interviewees wondered whether the messages of the national HWP needed refreshing from time to time, as they feared messages could become less effective over time if repeated identically. Findings from our survey of the general public appear to support this suggestion, as, despite regular and consistent publicity over the years, a number of protective actions are still not perceived as effective by a majority of the public. Most adults, even members of vulnerable groups, still do not consider themselves at risk from the heat. There was also concern about the alert system being ill equipped to deal with sustained periods of hot temperatures that were below the threshold to trigger a level 3 heat alert. The 2018 summer with its sustained hot weather, but few breaches of the heatwave alert threshold, is likely to have reinforced this concern.

In the case studies we also asked managers in the NHS and in care homes about their roles in the implementation of the plan. Overall, most managers were confident that they could protect their clients from harm during episodes of hot weather, confirming findings from an earlier study of hospital staff (Boyson et al., 2014). However, there were differences in approaches between types of providers. Managers in hospitals tended to mention specific ‘heatwave’ plans that would be put into action during periods of hot weather. Managers in care homes, in contrast, tended to say that they knew how to keep their residents safe from harm, and that this formed part of their usual summer procedures, as protecting residents, including ensuring their hydration needs were met, fell within their safeguarding duties (Care Quality Commission, 2015). However, it was also pointed out that residents in care homes, especially older people, tended to have higher care needs than in the past, which meant that they could be particularly vulnerable to hot weather and less able to protect themselves. Managers in hospitals and care homes participating in interviews, as well as nurses responding to the survey, indicated that mechanical air conditioning was typically not used in their facilities, or was used in a few areas only (e.g. the staff room in a care home, or particular clinical areas within a hospital). Some hospital managers voiced concern about the safety of air conditioning in a hospital environment, particularly with regard to infection control. There were also concerns, both from interviewees and survey participants, about the affordability of air conditioning systems in the current health and care funding environment.



Whilst there was variation in how hospital staff prioritised and protected their vulnerable groups, all reported that they put in place some level of heat-health protection for their patients. It was less clear among community service providers. This related to individuals who were already in contact with community-based health and social care providers such as a GP, community nurse, or social care worker, as well as individuals who were not in regular contact with care services. Representatives of primary and community providers reported variable practices of identifying, prioritising and monitoring those considered to be most at risk during severe heat events. Both GPs and CCG managers noted that, in the event of hot weather, there were currently no mechanisms in place to prompt GPs to contact vulnerable people in the community, with GP practices reported to be largely focusing on preparing for any likely surges in patient consultations during this time. The nurse survey provided further detail on the level of HWP awareness and actions taken by nurses working in the community. A relatively low proportion of nurses in all community, residential and hospital settings said that their organisation identified at-risk patients (28% in all settings). Whilst an explanation for hospitals and care homes could be that they consider all patients and residents at risk, this is not the case for community healthcare, where patients would be likely to vary by risk. Added to this it can be assumed that patients and residents in hospitals and care homes can be observed directly around the clock if necessary, whereas this is not possible in the community, suggesting that a higher proportion of those working in the community should be identifying and prioritising their at-risk patients during this time. In the nurse survey many community nurses reported not to have taken any actions during heat-health alerts, and several articulated the view that some of the actions specified in the HWP, such as contacting all vulnerable patients during the alert level 3, were considered unrealistic given their current capacity. This was also expressed by GPs and some community nurses interviewed for the case studies; both groups stating that they did not have the time or capacity to contact individuals systematically. A recent interview study in England had noted that senior adult social care managers questioned the extent to which frontline staff had capacity to engage in year-round planning (Wistow et al., 2017). Our findings raise questions about the current capacity of staff to follow-up on vulnerable clients in the event of hot weather, and the potential impact of austerity on staff shortages.

This raises wider questions about the role of service providers in protecting vulnerable individuals who do not reside in an institutional setting such as a hospital or care home, and are not routinely in contact with a health or social care provider in the community. Such individuals seem currently to be ‘below the radar’ of service providers, including older people who live independently or who do not qualify for means-tested social care support. Of course, some of these individuals may be paying privately for social support, or have access to informal care from family members, but the amount of help they receive will vary depending on need and finances. While it may be that some of these people are receiving appropriate help and support during periods of hot weather, it remains the case that local care providers will not necessarily know who is or is not in this situation. In addition, few of the community service providers mentioned other groups potentially vulnerable to risks from heat, such as seasonal agricultural labourers, transient populations, homeless people, and people with alcohol or substance abuse problems.

The nurse survey also raised an important point about staff working conditions and the challenges this posed for implementing protective actions during heatwaves, as recommended in the HWP. Contextual factors were stressed, including: providing healthcare in poorly designed buildings which are not well adapted for climate change; a lack of funding and resources to implement all HWP actions; and often



poor working conditions with inflexible organisational policies. These were expressed by those working in all settings, but particularly by those working in NHS hospitals and in the community. Whilst occupational health would not be considered to be a major focus of the HWP, the lack of any mention of, or guidance on, employers' responsibility for staff welfare during severe hot weather is notable. This emphasis on staff working conditions may be partly explained by the fact that the nurse survey was administered through the RCN, which is the main professional trade union for nurses in the UK, though badged clearly as independent research.

In the case studies, we asked local authority managers about their activities to monitor the effects of the alerts. Such monitoring activities appeared to be routinely absent. It was noted that any 'major incident' declared would be formally reviewed, which would include an investigation into the actions taken by all actors. However, as no heat-related 'major incident' was reported in 2017, no formal review of actions could be observed.

6.3 Risk awareness and behaviour of the general public

We conducted a survey of adult members of the general public, and carried out focus groups with older people, to assess their attitudes towards hot weather, awareness of their risks to health, and protective behaviours taken during heatwaves.

A prominent finding was the relatively low level of risk awareness among members of the public, including those who are likely to be most vulnerable to hot weather, reflected in the survey. The majority of survey participants aged 75+ and those of all ages with a limiting long standing illness (LLSI) did not consider their health to be at risk during hot weather. Participants in the focus groups also tended not to see themselves as being at risk of heat-related harm despite the fact that they were older adults, mostly aged 75+. Although they knew about the risks of heat to health, in principle, they did not apply this principle to themselves and did not see themselves as 'vulnerable'. This finding confirms earlier research that suggested that the concept of 'vulnerability' is problematic, as it has the potential to alienate people and thus undermine efforts to improve their protection (Abrahamson et al., 2009, Mayrhuber et al., 2018, Bassil and Cole, 2010).

Overall, the general public has positive views about hot weather ('I love hot weather'), although this was more pronounced among younger than older adults (about two-thirds of the under 45s were positive about hot weather, but this decreased to just under half of those aged 65+). Some older adults who participated in the focus groups noted that they disliked 'very hot' temperatures, but these were considered to be rare in England.

There was substantial variation in public perceptions of the effectiveness of various behaviours that provide protection. In the public survey, a large majority (two thirds or more) recognised the effectiveness of many of the protective behaviours promoted in the HWP (e.g. staying out of the sun between 11am and 3pm, drinking cool fluids), but fewer than half recognised other behaviours as effective (e.g. keeping curtains and windows in direct sunlight closed during the day, avoiding alcohol, using an electric fan).

There was considerable variation in the protective behaviours that survey participants reported to have taken during the June 2017 alert period: while most stated that they always/often drank cool fluids and opened windows at night, fewer reported always/often using a fan or closing windows in direct sunlight to reduce exposure to heat. Findings from the focus groups were instructive in this respect, as some participants



registered concern about the costs associated with using electric fans over longer periods, which they noted were not subsidised by the government, unlike winter fuel. Older participants, especially those living alone, also explained that they would hesitate to open a window at night due to security concerns, especially if windows were on the ground floor. Only about half of participants said that they often/always limited their physical activity, avoided alcohol or covered their skin during hot weather, highlighting the importance of raising awareness of how effective these actions are in protecting people.

In the survey, younger people (aged under 45), in particular often seemed to ignore public health advice and did not report changing their behaviour during hot weather. While it is the case that younger people are not at the same risk as older people, it is still important to get the message across to young people, since they have more positive views overall about hot weather and are more likely to underestimate what risks there are (which at least partly explains why they are less likely to take protective actions).

Thus, it appears that adults have reasonable knowledge of which protective behaviours are effective, and this knowledge is associated with the behaviours they actually take during hot weather. However, the mitigating factor in whether or not these protective actions are taken is likely to be the person's perception of risk, and if they do not perceive hot weather to be a risk to their health (or if they have a positive view of hot weather), then even actions which are known to be effective are not likely to be taken. Similar findings have been reported elsewhere (Mayrhuber et al., 2018) to the effect that individuals will not take protective actions unless they perceive themselves to be vulnerable. Accounting for the evidence that people do not like self-identifying as 'vulnerable' (Basil and Cole 2010), there is scope for PHE messaging to focus more on convincing people of the risks of hot weather, and to help people self-assess their risks more realistically, without a label of 'vulnerability'.

The survey findings also raise questions about the effectiveness of public health publicity and advice. During the level 3 heat alert in June 2017, half of adults reported hearing hot weather-related publicity/advice during the heatwave, and among them, fewer than half (43%) said they changed their behaviour as a result of the publicity (although this could be due to many people taking protective actions already, or not seeing it as necessary as it was not thought hot enough to change). However, hearing the publicity/advice did not appear to be associated with the perceived effectiveness of protective behaviours, so it appears there is still scope for PHE advice to increase knowledge of protective behaviours where there is still poor understanding (e.g. about closing curtains on exposed windows during the day). Moreover, some vulnerable groups, such as adults in bad health, were less likely to hear the publicity/advice, suggesting that PHE should consider whether they can better target their publicity to reach these vulnerable groups.

The fact that it was younger people who were less likely to take protective actions than older people may also partly explain why they were more likely to report experiencing hot weather-related health symptoms during the 2017 summer period. Since they underestimate the risks, they are more likely to take risky behaviours (such as sunbathing and drinking alcohol), which result in hot weather-related symptoms including sunburn, heat rash, and headaches. Since hot weather-related publicity/advice has been provided by PHE for many years now, it appears there are still gaps in the messages both in reaching, and being heeded by, some groups, and it may perhaps be time for PHE to undertake more research on how best to provide messages that will resonate with young and old alike.



6.4 Conclusion

The analysis of the general summertime relationships between temperature and mortality or emergency hospital admissions does not provide evidence that the introduction of the HWP in 2004 has had an effect on these outcomes, although adverse impacts during individual heatwave periods have reduced in recent years, suggesting that there may have been some contribution from the actions encouraged by the HWP on alert days. The analysis shows that risk of death and ill health during hot weather varies between STP areas. This might be a reflection of differences in the implementation of the HWP between areas, but given that there is no definitive evidence of the impact of the HWP, the differences are more likely to be explained by other factors that modify heat-risk (e.g. differences in socio-economic characteristics). The health burdens associated with hot weather at temperatures below the alert thresholds set in the HWP, suggest that the current HWP is likely to make insufficient provision to prevent these outcomes.

This research suggests that the HWP has motivated local authorities and their partner organisations in Local Resilience Forums to implement and operate an alert and response system for hot temperatures. There were, however, few examples of reported activities that went beyond ‘warning and informing’, and a low level of awareness of the HWP and its recommended actions among those responsible for protecting patients and the public at the frontline. In addition, managers in parts of Met Office regions that rarely experienced temperatures at the threshold for taking action predicted for the region as a whole, tended towards an even more limited approach to implementing the recommended actions in the Plan. The finding that alert regions currently include areas with different probabilities of hot weather raises questions about whether a single regional approach to issuing heat-health alerts and related prompts to action is always appropriate. On the other hand, given the evidence that heat-health harm can occur at temperatures outside the alert period, there may be a continuing rationale for issuing alerts only at regional level. In addition, if climate change continues, many more parts of regions that currently fail to reach threshold temperatures will need to become accustomed to hotter weather and the need to take more robust action so region-wide alerts would become increasingly relevant.

Our findings raise questions about the capacity and, in some cases, capability of local health and care providers to initiate or facilitate protective actions that go beyond those seen as routine good practice (e.g. ensuring sufficient hydration of service users in hospitals or care homes). The lack of capacity to act is most acute among community and primary care providers where: responsibilities for heat-health protection seem to be less clear; the scale of the task is potentially very large; and ‘at risk’ people are hard to identify and engage when living in their own homes. The result is that there are significant gaps in protecting some vulnerable groups during periods of hot weather, particularly older people with some health problems but who are not in regular contact with health and social care providers. It may be possible to learn from the responses in other countries with similar health and care systems. For example, Italy has taken a more energetic approach to identifying and contacting potentially high-risk individuals, with GPs required to take a more active role in implementing local heatwave plans (de’Donato et al., 2018). While Italy has a hotter climate than England, the climate in England is changing and there may be an increasing need to more fully involve primary care to work with, and share data with, other community health and social care providers, including voluntary and community groups, so that they can better reach, and provide advice and guidance to, all those who are most vulnerable to severe hot weather, especially older people living in the community and outdoor workers.



Addressing the needs of these vulnerable groups is especially important as many people appear not to understand the risk posed by hot weather. While the HWP succeeds to the extent that it provides useful information about measures that individuals should take to protect themselves against the effects of heat on health, our survey of the general public suggests that it is less effective in helping people of all ages to understand their own risk of ill-health from hot weather.

6.5 Recommendations

- PHE to consider to organise, and possibly rename, the ‘Heatwave Plan’ to a ‘Summer Health Protection Plan’ to acknowledge that preparation is needed to reduce the risk of adverse health effects during temperatures below the current heat-health alert thresholds.
- PHE should ensure that more encouragement is given to local managers and frontline staff to improve their awareness of the HWP and to take stronger action in hot weather, recognising that heat-health harm begins to occur as soon as temperatures rise to average summer levels and well below the levels that trigger alerts.
- PHE to review procedures in the Plan to identify and provide preventive services to vulnerable people who are not routinely in contact with health or social care providers, such as older people who live on their own and transient groups such as agricultural labourers.
- PHE and the Local Government Association to review the capacity and capability of local authorities and other health and social care partner organisations, including those providing voluntary and community services, to implement protective actions arising from the HWP. This should include considering how primary and community care organisations could work together better to provide guidance, support and protection to vulnerable individuals and groups before and during extreme heat events.
- PHE to review the advice provided to local authorities and health and social care providers on planning for hot weather. This would include providing evidence-based recommendations to hospitals, care homes and similar facilities on air conditioning; improving staff welfare during severe weather events, particularly for those working in areas that are difficult to keep cool; and prioritising HWP awareness through mandatory training for all healthcare staff.
- PHE to revise public health advice/publicity in order to: improve public awareness of the risks of hot weather to health to enable a realistic self-assessment of risk among different population groups; tailor messages to the information needs and media usage of different population groups, including younger and older adults; and increase knowledge of the effectiveness of those protective behaviours of which many people are unaware (e.g. closing windows and curtains in direct sunlight during the day).



References

- Abrahamson, V. & Raine, R. 2009. Health and social care responses to the Department of Health Heatwave Plan. *J Public Health (Oxf)*, 31, 478-89.
- Abrahamson, V., Wolf, J., Lorenzoni, I., Fenn, B., Kovats, S., Wilkinson, P., Adger, W. N. & Raine, R. 2009. Perceptions of heatwave risks to health: interview-based study of older people in London and Norwich, UK. *J Public Health (Oxf)*, 31, 119-26.
- Age UK. 2017. Staying cool in a heatwave. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/731044/2018_Beat_the_Heat_Leaflet.pdf.
- Arbuthnott, K. G. & Hajat, S. 2017. The health effects of hotter summers and heat waves in the population of the United Kingdom: a review of the evidence. *Environ Health*, 16, 119.
- ARCC 2015. *So what: maintaining thermal comfort in hospitals with ventilation and good design*. ARCC Network. Available: <https://arcc.ouce.ox.ac.uk/wp-content/so-what/DeDeRHECC-so-what-final.pdf>.
- Armstrong, B. G., Chalabi, Z., Fenn, B., Hajat, S., Kovats, S., Milojevic, A. & Wilkinson, P. 2011. Association of mortality with high temperatures in a temperate climate: England and Wales. *J Epidemiol Community Health*, 65, 340-5.
- Bassil, K. L. & Cole, D. C. 2010. Effectiveness of public health interventions in reducing morbidity and mortality during heat episodes: a structured review. *Int J Environ Res Public Health*, 7, 991-1001.
- Beizaee, A., Lomas, K. J. & Firth, S. K. 2013. National survey of summertime temperatures and overheating risk in English homes. *Building and Environment*, 65, 1-17.
- Bittner, M. I., Matthies, E. F., Dalbokova, D. & Menne, B. 2014. Are European countries prepared for the next big heat-wave? *Eur J Public Health*, 24, 615-9.
- Boeckmann, M. & Rohn, I. 2014. Is planned adaptation to heat reducing heat-related mortality and illness? A systematic review. *BMC Public Health*, 14, 1112.
- Boyson, C., Taylor, S. & Page, L. 2014. The National Heatwave Plan – A Brief Evaluation of Issues for Frontline Health Staff. *PLOS Currents Disasters*, January 13, 2014. Edition 1. Available: <https://currents.plos.org/disasters/index.html%3fp=9013.html>
- Burchell, K., Fagan-Watson, B., King, M. & Watson, T. 2017. Urban Heat: Developing the role of community groups in local climate resilience. Policy Study Institute.
- Cabinet Office 2017. National Risk Register of Civil Emergencies: 2017 Edition. Cabinet Office, London.
- Care Quality Commission 2015. Guidance for providers on meeting the regulations.
- Carmichael, C., Bickler, G., Kovats, S., Pencheon, D., Murray, V., West, C. & Doyle, Y. 2012. Overheating and Hospitals – What do we know? *Journal of Hospital Administration*, 2.
- Caspersen, C. J., Pereira, M. A. & Curran, K. M. 2000. Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Med Sci Sports Exerc*, 32, 1601-9.
- Climate Just 2014-2017. Climate Just. Available: www.climatejust.org.uk/about.
- Committee on Climate Change 2014. Committee on Climate Change – Managing climate risk to well-being and the economy: adaptation committee progress report 2014. London: Committee on Climate Change.
- Cox, J. & Crouch, M. 2017. Committee on Climate Change: Adaptation Sub-Committee.



- Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A. & Sheikh, A. 2011. The case study approach. *BMC Medical Research Methodology*, 11, 100.
- De'donato, F., Scortichini, M., De Sario, M., De Martino, A. & Michelozzi, P. 2018. Temporal variation in the effect of heat and the role of the Italian heat prevention plan. *Public Health*, 161, 154-162.
- Department of Health 2012. Local Health Resilience Partnerships: Implementation Information and Joint Resource Pack.
- Exworthy, M., Peckham, S., Powell, M. & Hann, A. 2011. *Shaping health policy: Case study methods and analysis*.
- Green, H. K., Andrews, N., Armstrong, B., Bickler, G. & Pebody, R. 2016. Mortality during the 2013 heatwave in England – How did it compare to previous heatwaves? A retrospective observational study. *Environ Res*, 147, 343-9.
- Green, R. S., Basu, R., Malig, B., Broadwin, R., Kim, J. J. & Ostro, B. 2010. The effect of temperature on hospital admissions in nine California counties. *Int J Public Health*, 55, 113-21.
- Gupta R, Walker G, Lewis A, Barnfield L, Gregg, M. & L, N. 2016. Care provision fit for a future climate. Joseph Rowntree Foundation.
- Ha, J., Kim, H. & Hajat, S. 2011. Effect of previous-winter mortality on the association between summer temperature and mortality in South Korea. *Environ Health Perspect*, 119, 542-6.
- Hajat, S., Chalabi, Z., Wilkinson, P., Erens, B., Jones, L. & Mays, N. 2016. Public health vulnerability to wintertime weather: time-series regression and episode analyses of national mortality and morbidity databases to inform the Cold Weather Plan for England. *Public Health*, 137, 26-34.
- Hajat, S., Kovats, R. S., Atkinson, R. W. & Haines, A. 2002. Impact of hot temperatures on death in London: a time series approach. *Journal of epidemiology and community health*, 56, 367-372.
- Hajat, S., O'connor, M. & Kosatsky, T. 2010. Health effects of hot weather: from awareness of risk factors to effective health protection. *Lancet*, 375, 856-63.
- Heffernan, C., Jones, L., Ritchie, B., Erens, B., Chalabi, Z. & Mays, N. 2018. Local health and social care responses to implementing the national cold weather plan. *J Public Health (Oxf)*, 40, 461-466.
- House of Commons 2018. Environmental Audit Committee: Heatwaves: adapting to climate change. 9th Report. London: House of Commons.
- Ibrahim, J. E., Mcinnes, J. A., Andrianopoulos, N. & Evans, S. 2012. Minimising harm from heatwaves: a survey of awareness, knowledge, and practices of health professionals and care providers in Victoria, Australia. *Int J Public Health*, 57, 297-304.
- Jessop C. 2018. *The NatCen Panel: developing an open probability-based mixed-mode panel in Great Britain*. *Social Research Practice* (6). <https://the-sra.org.uk/Common/Uploaded files/Social Research Practice Journal/social-research-practice-journal-issue-06-summer-2018.pdf>.
- Johnson, S. & Bickler, G. 2007. Evaluation of the Department of Health National Heatwave Plan. Health Protection Agency.



Kalkstein, A. J. & Sheridan, S. C. 2007. The social impacts of the heat-health watch/warning system in Phoenix, Arizona: assessing the perceived risk and response of the public. *Int J Biometeorol*, 52, 43-55.

Khare, S., Hajat, S., Kovats, S., Lefevre, C. E., De Bruin, W. B., Dessai, S. & Bone, A. 2015. Heat protection behaviour in the UK: results of an online survey after the 2013 heatwave. *BMC Public Health*, 15, 878.

Kim, J., Lee, A. & Maya, R.-S. 2019. What to expect when it gets hotter: the impacts of prenatal exposure to extreme heat on maternal and infant health. Institute of Labour Economics, IZA Discussion papers.

Kovats, S. & Bickler, G. 2012. Health protection and heatwaves: The need for systematic reviews. *Cochrane Database Syst Rev*, Ed000044.

Lefevre, C. E., Bruine De Bruin, W., Taylor, A. L., Dessai, S., Kovats, S. & Fischhoff, B. 2015. Heat protection behaviors and positive affect about heat during the 2013 heat wave in the United Kingdom. *Soc Sci Med*, 128, 282-9.

Local Resilience Forum 2017 Interviews: Interview methodology and response summary. Available: www.theccc.org.uk/wp-content/uploads/2017/06/Local-Resilience-Forum-Interviews-Report-2017-Jacobs-1.pdf.

Lowe, D., Ebi, K. L. & Forsberg, B. 2011. Heatwave early warning systems and adaptation advice to reduce human health consequences of heatwaves. *Int J Environ Res Public Health*, 8, 4623-48.

Marangozov, R., Huxley, C., Manzoni, C. & Pike, G. 2017. Royal College of Nursing Employment Survey Royal College of Nursing.

Mayrhuber, E. A., Duckers, M. L. A., Wallner, P., Arnberger, A., Alex, B., Wiesbock, L., Wanka, A., Kolland, F., Eder, R., Hutter, H. P. & Kutalek, R. 2018. Vulnerability to heatwaves and implications for public health interventions – A scoping review. *Environ Res*, 166, 42-54.

Met Office 2018. Heatwave. Available: www.metoffice.gov.uk/learning/temperature/heatwave.

Nayak, S. G., Shrestha, S., Kinney, P. L., Ross, Z., Sheridan, S. C., Pantea, C. I., Hsu, W. H., Muscatiello, N. & Hwang, S. A. 2018. Development of a heat vulnerability index for New York State. *Public Health*, 161, 127-137.

Porritt, S. M., Cropper, P. C., Shao, L. & Goodier, C. I. 2012. Ranking of interventions to reduce dwelling overheating during heat waves. *Energy and Buildings*, 55, 16-27.

Public Health England 2015a. Heatwave Plan for England. Public Health England, Department of Health, NHS England.

Public Health England 2015b. Heatwave Plan for England: Making the case: the impact of heat on health – now and in the future.

Public Health England 2016. Heatwave 2013: evaluation of health impacts and responses. Unpublished.

Public Health England 2017. Heat-health warning: 2017. Gov.UK. Available: www.gov.uk/government/news/heat-health-warning-2017.

Public Health England 2018a. Beat the Heat: staying safe in hot weather. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/731044/2018_Beat_the_Heat_Leaflet.pdf.



Public Health England 2018b. The Heatwave Plan for England, Public Health England, Department of Health and social Care, NHS England London.

Public Health England 2018c. Hot Weather Warnings: 2018. Gov.UK. Available: www.gov.uk/government/news/hot-weather-health-warnings-2018.

Public Health England, Local Government Association & England, N 2016. Re: Heatwave plan for England. Letter to Local Authority CEOs, Local Authority Directors of Public health, Chairs of health and Wellbeing Boards, NHS England Regional Directors and Clinical leads of CCGs. London PHE publications gateway number: 2016071

Ritchie, J. & Spencer, L. 1994. Qualitative data analysis for applied policy research In: Burgess, A. B. A. R. G. (ed.) *Analysing qualitative data*. London: Routledge.

Rocklöv, J., Forsberg, B. & Meister, K. 2009. Winter mortality modifies the heat-mortality association the following summer. *European Respiratory Journal*, 33, 245-251.

Semenza, J. C., Hall, D. E., Wilson, D. J., Bontempo, B. D., Sailor, D. J. & George, L. A. 2008. Public perception of climate change voluntary mitigation and barriers to behavior change. *Am J Prev Med*, 35, 479-87.

Short, C. A., Lomas, K. J., Giridharan, R. & Fair, A. J. 2012. Building resilience to overheating into 1960's UK hospital buildings within the constraint of the national carbon reduction target: Adaptive strategies. *Building and Environment*, 55, 73-95.

Spector, J. T., Bonauto, D. K., Sheppard, L., Busch-Isaksen, T., Calkins, M., Adams, D., Lieblich, M. & Fenske, R. A. 2016. A Case-Crossover Study of Heat Exposure and Injury Risk in Outdoor Agricultural Workers. *PloS one*, 11, e0164498-e0164498.

Stafoggia, M., Forastiere, F., Agostini, D., Biggeri, A., Bisanti, L., Cadum, E., Caranci, N., De' Donato, F., De Liso, S., De Maria, M., Michelozzi, P., Miglio, R., Pandolfi, P., Picciotto, S., Rognoni, M., Russo, A., Scarnato, C. & Perucci, C. A. 2006. Vulnerability to heat-related mortality: a multicity, population-based, case-crossover analysis. *Epidemiology*, 17, 315-23.

Stafoggia, M., Forastiere, F., Michelozzi, P. & Perucci, C. A. 2009. Summer Temperature-related Mortality: Effect Modification by Previous Winter Mortality. *Epidemiology*, 20, 575-583.

The Lancet 2018. Heatwaves and health. *The Lancet*, 392, 359.

Thompson, R., Hornigold, R., Page, L. & Waite, T. 2018. Associations between high ambient temperatures and heat waves with mental health outcomes: a systematic review. *Public Health*, 161, 171-191.

Toloo, G., Fitzgerald, G., Aitken, P., Verrall, K. & Tong, S. 2013. Evaluating the effectiveness of heat warning systems: systematic review of epidemiological evidence. *Int J Public Health*, 58, 667-81.

Tompkins, E. L., Adger, W. N., Boyd, E., Nicholson-Cole, S., Weatherhead, K. & Arnell, N. 2010. Observed adaptation to climate change: UK evidence of transition to a well-adapting society. *Global Environmental Change*, 20, 627-635.

TT-Dewce 2016. Guidelines on the definition and monitoring of extreme weather and climate events: Draft version – first review by TT-Dewce December 2015 World Meteorological Organisation.

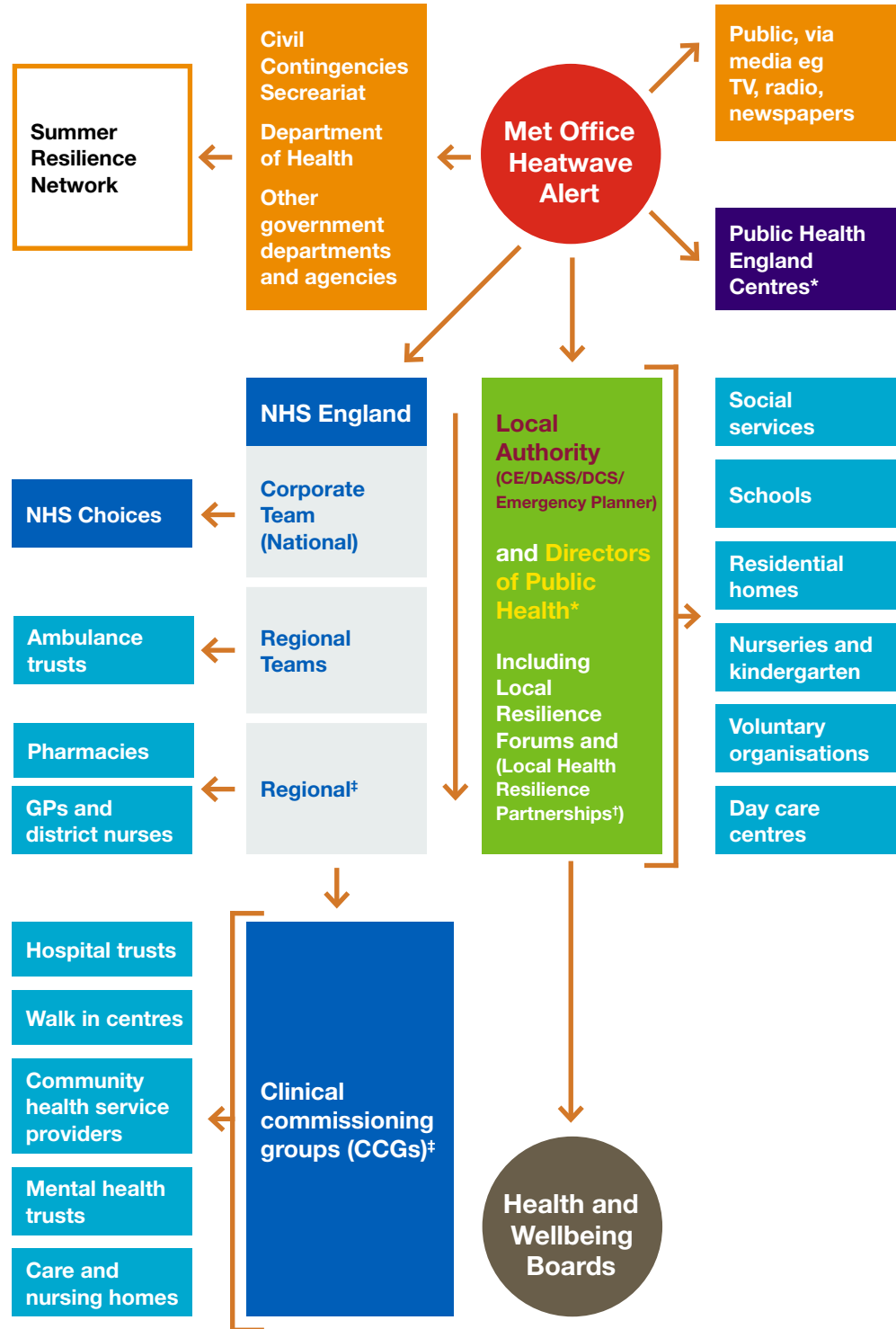
Van Loenhout, J. A., Rodriguez-Llanes, J. M. & Guha-Sapir, D. 2016. Stakeholders' Perception on National Heatwave Plans and Their Local Implementation in Belgium and The Netherlands. *Int J Environ Res Public Health*, 13.



-
- Waldock, K. A. M., Hayes, M., Watt, P. W. & Maxwell, N. S. 2018. Physiological and perceptual responses in the elderly to simulated daily living activities in UK summer climatic conditions. *Public Health*, 161, 163-170.
- Wang, X. Y., Barnett, A. G., Yu, W., Fitzgerald, G., Tippet, V., Aitken, P., Neville, G., Mcrae, D., Verrall, K. & Tong, S. 2012. The impact of heatwaves on mortality and emergency hospital admissions from non-external causes in Brisbane, Australia. *Occup Environ Med*, 69, 163-9.
- Weiss, C. H. 1998. *Evaluation: Methods for Studying Programs and Policies*, Prentice Hall.
- Wistow, J., Curtis, S. & Bone, A. 2017. Implementing extreme weather event advice and guidance in English public health systems. *J Public Health (Oxf)*, 39, 498-505.
- Wolf, J., Adger, W. N., Lorenzoni, I., Abrahamson, V. & Raine, R. 2010. Social capital, individual responses to heat waves and climate change adaptation: An empirical study of two UK cities. *Global Environmental Change*, 20, 44-52.
- Woodward, A. 2014. Heat, cold and climate change. *J Epidemiol Community Health*, 68, 595-6.
- Yin, R. K. 2009. *Case Study Research: Design and Methods*, SAGE Publications.



Appendix 1
Flowchart of
typical cascade
of heatwave
alerts



Notes

‡ NHS England Regional and CCGs should work collaboratively to ensure that between them they have a cascade mechanism for heatwave alerts to all providers of NHS commissioned care both in business as usual hours and the out of hours period in their area.

* PHE Centres would be expected to liaise with Directors of Public Health to offer support, but formal alerting would be expected through usual local authority channels.

† LHRPs and HWBs are strategic and planning bodies, but may wish to be included in local alert cascades.

Adapted from *Heatwave Plan for England* (2015: p24) Public Health England, NHS England, Crown Copyright 2015.



Appendix 2 Template invitation letter to local authority CEOs

London School of Hygiene and Tropical Medicine

Faculty of Public Health and Policy

15-15 Tavistock Place, London WC1H 9SH, United Kingdom

Reception: +44 0(20) 7927 2700 www.lshtm.ac.uk

To: Insert CEO of local authority

CC: Director of Public Health

Insert Date

Dear Insert name of CEO

Evaluation of the Heatwave Plan for England

The Department of Health, together with Public Health England, has commissioned an independent evaluation of the Heatwave Plan for England (HWP). This will be carried out by the Policy Innovation Research Unit based at the London School of Hygiene & Tropical Medicine. The evaluation will look at how effective the plan has been in reducing heat-related health problems. We are particularly interested in the extent to which the plan is put into practice in local areas and obtaining views on how it may be improved in future years.

Your local authority has been selected as a location for this evaluation, planned to commence from April 2017. The evaluation will largely involve interviews with staff involved with planning for hot weather. A letter of support for the research from Public Health England is attached.

We would be grateful if you could provide us with the **name and contact details of the person(s) leading on climate change/planning for hot weather** in insert name of LA. We will then contact this person directly, to explain the study and invite them to participate in an interview. We are anticipating that this person might be willing to act as our key informant for the evaluation and would be able to identify other significant personnel, agencies and organisations involved in planning for hot weather, or to suggest another person who might best fit this role.

Please send the name(s) and contact details to Lorraine Williams at the LSHTM (Email: Lorraine.williams@lshtm.ac.uk Tel: 020 7927 2671)

No information that can identify individuals, locations or organisations will be passed to the Department of Health or Public Health England and the research team will preserve the anonymity and confidentiality of participants in all publications of the results.

For further details, please find a summary of the evaluation overleaf. Please do not hesitate to contact myself or Lorraine Williams, should you require further details or clarification. We look forward to hearing from you.

Sincerely,

Bob Erens

Deputy Director, Policy Innovation and Evaluation Research Unit

Email: bob.eren@lshtm.ac.uk Tel: 020 7927 2784



Evaluation of the Heatwave Plan for England

The Heatwave Plan for England (HWP) was first published in 2004 as a result of the 2003 pan-European heatwave which accounted for an extra 2,000 extra deaths in England and Wales, and is an important health protection tool in the government's National Adaptation programme – preparing the UK to be 'climate ready'. The plan is prepared by Public Health England, in collaboration with NHS England and the Local Government Association, supported by the Met Office and the Department of Health. It aims to raise awareness of the harm to health from heatwaves and sets out actions to be taken by commissioners, health and social care professionals, individuals, local voluntary and community organisations, local government organisations and facilities such as care homes and hospitals, during a heatwave. Local areas are expected to take the recommendations in the HWP and adapt them to their own particular context.

With climate change, extreme temperatures are likely to become more normal and there is a need to evaluate the HWP to ensure that it is effective and recommends the right actions. The Department of Health, with Public Health England, has therefore commissioned the Policy Innovation Research Unit to carry out an independent evaluation of the HWP.

A significant part of the evaluation will be to look at the extent to which the HWP is implemented locally by health and social care services. The evaluation will include a sample of local authorities as 'case studies' from a number of regions across England, covering urban and rural areas with different weather patterns and other demographic factors.

Data collection for this part of the evaluation will include:

- Interviews with a small number of selected senior/middle health and social care managers responsible for planning for hot weather (e.g. selected members of Local Health Resilience Partnerships, Director of Public Health, managers/resilience officers in Acute/Community Trusts and Clinical Commissioning Groups).
- Interviews/focus groups with staff working at the frontline of health and social care (e.g. those responsible for people who may be more at risk during extreme weather conditions). These might include community nurses, health visitors, social workers, home carers and people working as carers in care homes.
- Carrying out a short online survey of other identified key health and social care personnel involved in hot weather planning following the summer (2017).
- Collecting documents, such as local plans, strategies, guides and public information relating to the HWP at a local level, for analysis. This would include any information provided on websites.
- Observing heatwave/climate change planning/strategy meetings (one per case study site)

This part of the evaluation will take place between April 2017 and March 2018, so we can look at how planning occurs at different times of the year.

Staff members will be invited to participate in interviews/focus groups in writing. Information provided will explain that participation is voluntary and will provide assurances about confidentiality and that the project findings will be reported anonymously, without identifying individual people or organisations. Participants may withdraw their consent at any time.



As well as interviews with health and social care managers and frontline staff, there are several other components to the evaluation.

- A time-series analysis of regional health data linked to weather to characterise heat-health relationships and trends over time.
- A national survey of the knowledge, attitudes and behaviour of the general population during heatwaves
- Interviews with a small number of the general public liable to be at risk from periods of hot weather (around 5-10 people per site). Interviews will discuss their risk awareness and behaviour before, during and after heatwaves.

The evaluation has ethics approval: LSHTM Ethics Ref. 12004/21.3.17 and is seeking R&D approval from the Health Research Authority.

The evaluation will submit a final report to the Department of Health and Public Health England in autumn 2018.



Appendix 3
PHE letter
of support

Extreme Events & Health Protection
Wellington House
London SE1 8UG

T +44 (0)20 7811 7153
www.gov.uk/phe

22 March 2017

Dear colleague

Re: Independent Evaluation of the Heatwave Plan for England

The Department of Health have commissioned the Policy Innovation Research Unit (PIRU) based at the London School of Hygiene and Tropical Medicine (LSHTM), to carry out an independent evaluation of the Heatwave Plan for England.

One part of the evaluation involves carrying out a small number of case studies with local authorities about any planning undertaken for dealing with hot weather in their area. Your local authority has been selected to be one of these case studies, and Public Health England would be most appreciative if your organisation would agree to help the evaluation team with this research. This will mainly involve PIRU researchers carrying out a small number of interviews with managers and frontline staff. Further details about the case studies are included in the accompanying LSHTM letter.

The results of the evaluation will be immensely helpful to Public Health England in improving the Heatwave Plan for England. The results will feed back into our regular updates of the Plan, the recommendations it contains, and our communications with local partners, so that it becomes more relevant and useful to local authorities and other users around the country.

I do hope that you will be able to support this work.

Kind regards

Dr Angie Bone
Head of Extreme Events and Health Protection, PHE
Angie.Bone@phe.gov.uk



Appendix 4 Participant information sheet (staff)



INFORMATION SHEET FOR PARTICIPANTS

Title of Study: Evaluation of the Heatwave Plan for England

Researchers: Bob Erens, principal investigator; Tommaso Manacorda; Lorraine Williams; Shakoor Hajat and Nick Mays

Ethics approval: [insert date and reference number of LSHTM ethics approval]

Nature and purpose of the study:

The Department of Health has commissioned the Policy Innovation Research Unit to undertake an independent evaluation of the Heatwave Plan for England (HWP). The purpose of the study is to determine how effective the HWP is including how well it is being implemented locally and to identify any opportunities for improving the plan in future years. The study will take place from January 2017 until December 2018.

What is involved in participating in the study?

We would like to interview people to find out their views and experiences of protecting patients and the public during heatwaves and about any actions have been prompted as a result of the Heatwave Plan. The interview will be either face-to-face or over the telephone and will likely last around 45 minutes.

Who is funding the study?

The study is being funded by the Department of Health

Confidentiality and anonymity:

Interviews will be conducted in confidence by one of the research team. We would like to record interviews with your permission. The transcript will be anonymous and stored securely in line with Research Ethics Committee guidelines. When reporting findings to the Department of Health and publishing findings in academic journals, care will be taken to ensure that no individual or organisation can be identified.

Contacts for further information:

Lorraine Williams
Research Fellow
London School of Hygiene
and Tropical Medicine
Department of Health Services
Research and Policy

Lorraine.williams@lshtm.ac.uk
Tel: 020 7927 2671

Tommaso Manacorda
Research Fellow
London School of Hygiene
and Tropical Medicine
Department of Health service Research
and Policy

tommaso.manacorda@lshtm.ac.uk
Tel: 020 7958 8291

Thank you for reading this information sheet and for considering taking part in this research.



Appendix 5
Consent form



CONSENT FORM

Title of Study: Evaluation of the Heatwave Plan for England

Researchers: Lorraine Williams

If you are happy to participate, please complete and sign the consent form below, then return to the researcher.

Statement	Please insert your initials in box for each statement
I confirm that I have read the information sheet dated 15/3/17 version 3 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.	
I agree that the researchers can use any direct quotes from interviews or focus groups, understanding that they will preserve my anonymity.	
I consent to the interview/focus group being recorded.	
I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers.	
I agree to take part in the above study.	

Name (print):	Signature:	Date:
Researcher name (print):	Signature:	Date:

This study has been approved by the London School of Hygiene and Tropical Medicine’s Research Ethics Committee (ref. 12004-1).



Appendix 6
Recruitment
leaflet (staff)

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



 **PIRU** POLICY INNOVATION
RESEARCH UNIT

Are you a health or social care professional working with older people and/or people with health conditions likely to be affected by periods of hot weather?

PARTICIPANTS NEEDED FOR RESEARCH

We are recruiting for volunteers to take part in a study about looking after people in hot weather

This would involve a one-to-one interview with one of our researchers (around 45 minutes) at your place of work, or over the telephone. Interviews will be conducted confidentially, we would not identify you or your organisation in any of our findings.

In appreciation for your time, you will receive a payment of £25

For further information please contact:

[Insert name and contact details of researcher]

Please provide your name, current role and email/telephone details and we will contact you back with further information about the study and interview.

This study has been reviewed by the Health Research Authority and has received ethics clearance by the London School of Hygiene and Tropical Medicine (ref. 12004-1). You are under no obligation to reply to this post, however if you choose to, participation in this research is voluntary and you may withdraw at any time.



Appendix 7 Interview schedules (managers and frontline staff)

Evaluation of the Heatwave Plan for England

Interview topic guide: senior managers/strategists

Note: interview questions will be adapted in relation to information provided from scoping local heatwave planning and strategy documents.

Pre-interview: Answer any questions and check informed consent signed. Check consent for recording interview.

1. Background and experience in heatwave planning

- a. Role/position in organisation (how long in current position – if less than 5 years what role before)
- b. Current role in heatwave planning
 - Tell me about the role you have related to heatwave planning in your council this year
 - Previous experience of heatwave or cold weather planning?

2. Leadership and accountability for heatwave planning

- a. What organisations are responsible for leadership on heatwave planning and response across the local system?
 - [prompt if not mentioned above] What role do the Local Health Resilience Partnership and the Health and Well-Being Board play in this? Where does the CCG/GPs fit? [who is ultimately accountable for local action and its impact?]

3. Preparation and planning for a heatwave – characteristics of local heatwave plan/strategy

- a. Can you briefly summarise how you currently plan and prepare for a heatwave?
 - Do you have a local planning/strategy document for heatwaves? [e.g. local heatwave and climate change adaptation plan – if not readily available ask for copy]
- b. [if not explained in last response] How do you plan year-round preparedness?
- c. [local adaptation of HWP] How have you used the Heatwave plan for England in your local planning? [HWP published annually since 2004 and reshaped in 2012 to fit PH outcomes framework]
 - Has it had any impact on your plans/preparations? If yes, in what way?
- d. How have your local plans changed in the last few years? – e.g. since PH moved to LA
- e. How similar is your local heatwave planning to the HWP?
 - What differences are there? [probe about any aspects not incorporated locally and why, e.g. national guidance materials ‘Beat the Heat’ used/adapted – action cards used]
- f. Are you aware of other organisational level heatwave planning/strategy documents? [e.g., local health and community trusts, CCGs – if appropriate refer to any plans/strategy documents available publically].
 - If yes, how do they link with yours? How are they planned and co-ordinated? – who co-ordinates?]
 - Are these plans directly using, or locally adapting, the advice/guidance within the HWP? [ask for any copies of these plans if not openly available on the intranet]



- g. [if not mentioned in earlier responses] How are independent care homes and hospitals/healthcare providers informed about heatwave planning and preparation? [probe if the HWP advice/guidance documentation distributed/used]
- h. [if not mentioned in earlier responses] How are you engaging local communities in this agenda? [probe which communities]
- i. How high a priority is heatwave planning for you (especially in times of austerity) – how is this compared to cold weather planning in terms of priority?

4. Actions during a heatwave

- a. How are you notified of an upcoming heatwave? [do you just hear about it from watching BBC weather?]
- b. In the event of a heatwave alert being received/announced, what is the local procedure across the local authority and other organisations [NHS] what advice and instructions do frontline staff receive? [Probe with reference to a recent level 2 alert]

5. Monitoring and reviewing the heatwave strategy

- a. How well do you think your local heatwave and climate change adaption planning is working, locally?
- b. How do you monitor and review your HWP – who is involved and how often is this done?
- c. Do you undertake any audits of heatwave alerts? [these are normally done after an alert, across the health and social care system, to ensure the alerts are reaching those who need to take the required actions]
 - If yes – how have these been? If no – why not?
- d. Have you identified any gaps in your local heatwave planning? – any areas that you feel in need of more attention?

[Probe the following if required]:

- Do you feel local providers have the capacity and capability to deliver their functions?
 - Are communication channels with providers/public satisfactory?
 - Are any organisations/professional groups difficult to engage? If yes, what effect would this have if there was a heatwave?
 - How about different population groups [link to the key groups identified for each area – e.g. festival goers, tourists, agricultural workers] – do you feel that the message may not be getting to certain groups?
 - How well do you think individuals and organisations understand the alert systems and actions?
 - How well are local organisations working together on heatwave plans and actions?
- e. How prepared do you feel for any possible heatwave this summer?
 - [probe] Is there anything urgent you feel needs to be put in place before the summer? [If so, what? – prompt staff training, engaging certain communities, public awareness raising]
 - Should the centre do anything differently/more – e.g. any changes needed to HWP?
 - f. In conclusion, what would you say was the most important issue to address for heatwave planning? To what extent do you feel this is reflected in the HWP?



6. Further interviews

- **[applies to key informant]** Who are the key personnel (senior managers/strategists) involved in helping plan and shape your local heatwave plan/strategy? Would it be possible to interview either all or a sub-sample of these to get their perspective on local implementation of the HWP. [ask for their help in effecting introduction].
- **[applies to senior/strategic managers]** We would like to interview a selection of operational staff, either middle managers and/or those working at the frontline about how they implement the local heatwave plan and would be grateful for a suggestion on who we might approach and how best to recruit them [ask for their help in effecting an introduction].
- **[if applicable]** Record if happy to be contacted for follow-up interview later in study late 2017/early 2018 and/or short 5 min telephone calls during/following any heat-health alerts during summer 2017.

Many thanks for your time.



Evaluation of the Heatwave Plan for England

Interview topic guide: frontline health and social care staff (including ‘middle managers’)

Pre-interview: Answer any questions and check informed consent signed. Check consent for recording interview.

1. Background and role in organisation

- a. Role/position in organisation (how long in current position – if less than 5 years what role before)
- b. Description of clients cared for – role/responsibility for ‘vulnerable clients’ (older people/young children/carers)

2. General knowledge and understanding of heatwave/heat-health and HWP

- a. What do you think is a heatwave? [Prompt about how heatwaves are defined – what is ‘hot weather’ – is this set to high, low?]
- b. Who would you consider most vulnerable from excess heat? [Prompt how/why?]
- c. What general protection strategies do you think people (general public) should employ in preparation for and during periods of excess heat?
- d. Are you aware of the HWP – and/or heatwave alerts?
 - If yes, have you read any of the HWP? – if yes expand
 - Would you say, in your experience, that [clients in your care] are aware of heatwave alerts? – Advice on what actions to take place in hot weather?
 - Do you think that [clients in your care] follow this advice? – If yes, how, if no why?

3. Local heatwave planning and practice

- a. How are you made aware of a hot weather alert in your area? [probe – communication from colleague/email alert /heard about it on news]
- b. Does your organisation/practice identify patients who may be vulnerable to hot weather? How do they do this [keep a list of vulnerable patients or other system to identify at-risk patients]
- c. Tell me about how you and your organisation prepares and plans for a heatwave: what key preparations do you/your practice/organisation make for spells of hot weather?
 - Is there a local plan you are aware of? Is this plan written down? (ask for a copy if needed) Do you have a specific role in this? Who, in your organisation, leads on preparation for spells of hot weather?
 - Do you know if/to what extent your organisation’s plan was based on the national HWP?
 - How useful/helpful did your practice/organisation find any of the HWP documents (provide titles or show) in making plans for heatwaves?
 - If you can remember, have local heatwave plans changed as a result of the national HWP? – how have they changed



4. Actions taken prior to and during periods of excess heat

- a. Thinking back to the last time there was a prolonged period of severe heat – what actions did you take in your organisation [if any?]
- Did you take any specific precautions prior to the ‘heatwave’ (e.g. during the alert period)
 - How well did you think you/your organisation coped? How did you know? (Were you informed formally/informally?)
 - If the same were to happen in the future, do you think your organisation would need to make changes? What and how?
 - Were there any specific obstacles identified? [Prompt if needed – lack of communication in organisation – e.g. defining responsibility for ensuring overall environment appropriate for clients (e.g. turning off heating during hot weather) lack of time to spend with most vulnerable]
 - Thinking back to this episode – how knowledgeable would you say your clients/patients were about the dangers of hot weather and how they could best protect themselves?
 - How knowledgeable would you say informal carers/relatives of vulnerable people are about the dangers of hot weather for their relative?
 - In general, what would you say the main barriers or obstacles to ensuring vulnerable people are protected from excess heat? [prompt if required – inadequate housing/environment, too much insulation, lack of knowledge of people in how to protect themselves, people not taking heat-health seriously – not feeling at risk]
 - Do you think you need more advice/guidance/training on this? – How about your organisation?

5. End questions

- a. Finally, is there anything further you would like to say about planning for and actions during heatwaves in your area of work?

Thank you for your time – information about where this information will go – reports/publication after and timeframe. Would they be willing to recommend/contact anyone else we may wish to speak to about this.



Appendix 8
Focus group
recruitment
leaflet

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE




PIRU POLICY INNOVATION
RESEARCH UNIT

Are you over 65 or care for someone over 65?
Would you be interested in helping us with our research?

PARTICIPANTS NEEDED FOR RESEARCH ABOUT
HOW PEOPLE COPE IN HOT WEATHER

On: [insert date and time]

At: [insert venue]

We are particularly interested in talking to people aged 75 and over, and people who have health conditions which might be affected by the heat.

Members of the focus group will be asked to respect confidentiality and we would not identify you by your name in any of our findings. In appreciation for your time, you will receive a payment of £25 and reimbursement of local travel costs.

Refreshments will be provided during the focus group.

For further information please contact:

[Insert name and contact details of researcher]

Please provide your name and email/telephone details and we will contact you back with further information about the study and focus group.

This study has been reviewed by the Health Research Authority and has received ethics clearance by the London School of Hygiene and Tropical Medicine (ref. 12004-1). You are under no obligation to reply to this post, however if you choose to, participation in this research is voluntary and you may withdraw at any time.



Appendix 9
Participant
information
sheet – focus
group (general
public)



INFORMATION SHEET FOR PARTICIPANTS

Title of Study: Evaluation of the Heatwave Plan for England

Researchers: Bob Erens, Lorraine Williams, Tommaso Manacorda, Shakoor Hajat and Nick Mays

Introduction

Following the severe heatwave in August 2003, the government put in place a heatwave plan that included warnings about severe weather and general guidance on how people and organisations should protect themselves from the effects of severe heat. The government wants to know how well their plan is working and, as part of this, we are carrying out a study about how people experience and cope during heatwaves.

Before you decide to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and ask us if there is anything that you are not clear of, or if you would like more information. Take time to decide whether or not you wish to take part.

Who are we?

We are a group of researchers working for the [Policy Innovation Research Unit](#).

What is involved?

If you agree, we would like you to participate in a focus group, which will be made up of 6-8 people similar to yourself. The focus group will take about 90 minutes and will seek your views about hot weather and heatwaves. Refreshments will be provided.

Why have I been invited to take part?

You have been invited to take part in this research because you are a member of the public and may be at risk of harm to your health from prolonged periods of severe hot weather.

Do I have to take part?

No, it is optional whether you take part, but before you decide we would like you to understand why the research is being done and what it would involve for you.

What do I have to do?

If you agree to take part in the focus group, simply sign the response form and return it to us in the pre-paid envelope. We will then contact you to confirm the date, time and venue for the focus group. Before the focus group starts, the researcher will answer any questions you have. You will then be asked to sign a consent form giving us permission to conduct the focus group. You can leave at any time.



What are the possible benefits and risks of taking part?

You will know that you are helping us to find out how the national heatwave plan is working in your local area. You will also be helping us develop recommendations for any changes to the government’s plan. There are no disadvantages except the time element required from you. You can withdraw from the study any time. If you do decide to withdraw, we will keep the information you have provided for the study unless we hear from you otherwise. We will also offer you a small payment of £25 to compensate you for your time.

Will my taking part be kept confidential?

While the researcher will maintain confidentiality, we cannot promise this on behalf of other participants, although it will be requested. Your comments may be used as quotations within the study findings, but will be anonymous and you will not be identified in any reports or publications arising from this study. The study has ethics approval from the London School of Hygiene and Tropical medicine.
[Ref: 10004/21.3.2017]

How is the project being funded?

The project is being funded by the Department of Health.

Whom should I contact for further information?

If you have any questions or require more information about this study, please contact one of the research team:

Lorraine Williams: Lorraine.williams@lshtm.ac.uk Tel: 020 7927 2671
Tommaso Manacorda: tommaso.manacorda@lshtm.ac.uk Tel: 020 7958 8291

Alternatively, if you have concerns or complaints about this study please contact:

Patricia Henley, Quality and Governance Manager,
London School of Hygiene and Tropical Medicine,
Keppel Street, London WC1E 7HT.
Email: patricia.henley@lshtm.ac.uk
Tel: +44 (0)20 7927 2626.

Thank you for reading this information sheet and for considering taking part in this research.

If you are happy to take part in the focus group please contact Lorraine Williams or Tommaso Manacorda by email or telephone as above.

Alternatively sign and date the slip below and return this to us using the enclosed stamped addressed envelope.

✂-----

I have read the above information and I am happy to participate in a focus group about hot weather.

Name: _____ Date: _____

Address: _____ Postcode: _____

Telephone: _____ Email: _____



Appendix 10
Consent form
(general public
– focus group)



CONSENT FORM

Title of Study: Evaluation of the Heatwave Plan for England

Researchers: Lorraine Williams

If you are happy to participate, please complete and sign the consent form below, then return to the researcher.

Statement	Please insert your initials in box for each statement
I confirm that I have read the information sheet dated 15/3/17 version 3 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.	
I agree that the researchers can use any direct quotes from interviews or focus groups, understanding that they will preserve my anonymity.	
I consent to the focus group being recorded.	
I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers.	
I agree to take part in the above study.	

Name (print):	Signature:	Date:
Researcher name (print):	Signature:	Date:

This study has been approved by the London School of Hygiene and Tropical Medicine’s Research Ethics Committee (ref. 12004-1).



Appendix 11 Focus group topic guide

Evaluation of the Heatwave Plan for England

Focus group topic guide

General public (and carers of those) identified as vulnerable to heat

- Statement on purpose of study, anonymity and confidentiality.
- Statement on disclosure:
Everything you tell me will be treated as confidential. However, should you mention something that leads me to believe that you and/or someone else is at risk of serious physical and/or emotional harm, I will have to pass this information on to the appropriate person.
- Answer any questions and check informed consents signed.
- Check consent for recording interview (will need to be consented by all – as in PIS)
- Agree aims and conduct of focus group
- Introductions (each to introduce themselves through facilitator)

Questions:

1. When we think about the weather, what would you say was ‘hot’?
2. What then is a heatwave?
3. Would you say that this is a problem in England? How frequent do they happen?
4. How do you know when we are expecting a heatwave [prompt – TV, radio, people, other?]
5. Can you name any health problems that are due to hot weather? [prompt if needed]
6. Who do you think is most at risk during a heatwave? Would you say you were at risk yourself? [prompt on heat-health behaviour on holidays/travel abroad and whether any difference]
7. Have you ever received any advice/guidance about what to do in a heatwave? Tell us what you remember [prompt if needed – sunscreen, appropriate clothing, avoid going out midday, fluid intake, no strenuous exercise, close certain windows indoors, shade windows etc.]
 - How was this advice provided (leaflets, coms from health/social care professionals/coms from family, friends/other?)
 - Did you heed any of this advice? If not why? [prompt about any advice on heat abroad] Did you find any of it useful?
8. Do you think that your home gets too hot in the summer months?
 - If yes, have you tried to do anything to change this? What did you do? When was this done?
9. Is there anything you would like to do/change to make your home less hot but can’t do for some reason [e.g. cost/access/other]?



-
10. Thinking back to the last time there was a long period of hot weather in England:
- Did you take any particular action? What did you do?
 - Did you get any calls/visits from any health or social care practitioners during this time – if yes do you remember who called – what was said/done?
 - Apart from close family/friends, did anyone else call/visit during this time (prompt local community group/neighbours/church reps) – if yes what was said/done?
 - Do you think anyone should be doing more at this time [e.g. social workers, GPs, voluntary organisations] – if yes what would help?
- Ask the group to indicate who has travelled to hot countries recently:
- [for those who have travelled to hot countries recently] How do you act here during hot weather compared to how you act abroad? (if differently) why do you think this is?
11. In this last ‘heatwave’ did you do anything differently to how you normally act/ behave prior to and during a heatwave? – if yes – why was this?
12. Are you aware of [show beat the heat leaflets aimed at cohort] these leaflets?
- If yes – where did you come across these? Do you heed their advice? If no – why not? Do you think they are helpful?
13. Finally what general advice would you give to protect yourself/others from severe hot weather?



Appendix 12
General public
questionnaire

HEATWAVE PLAN EVALUATION: GENERAL POPULATION
SURVEY QUESTIONS

The first set of questions is about hot weather.

To what extent do you agree or disagree with the following?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
I love hot weather					
Spending time in the sun is good for me					
Hot weather is a risk to my health					
Hot weather is a risk to the health of someone I know					
One good thing about climate change will be hotter summers in England					

How effective do you think the following actions are at protecting you from heat in the summer?

	Completely effective	Very effective	Somewhat effective	Slightly effective	Not at all effective
Staying out of the sun between 11am and 3pm					
Drinking cool fluids					
Covering up your skin with clothing or using a hat					
Limiting strenuous physical activity to the cooler parts of the day					
Using an electric fan					
Keeping curtains closed on windows exposed to direct sunlight during the day					
Keeping windows closed that are exposed to direct sunlight during the day					
Opening windows at night or in the cooler parts of the day					
Avoiding alcohol					

Are you able to keep your main living space at home cool during hot summer weather?

- Yes
- No



And are you able to keep your bedroom at home cool during hot summer weather?

- Yes
- No

Does your home have any of the following?

- Roof or loft insulation
- Cavity wall insulation
- A ceiling fan in any room
- Shaded areas outside your home (such as awnings or trees)
- External shutters on any windows
- White external walls

Most parts of England experienced hot weather in [June] this year between [17th and 21st June], depending on the part of the country you live in. Were you in England during that time?

- Yes – in England on all or some of those days
- No – out of England on all of those days

During the heatwave/hot weather in [June], how often, if at all, did you take the following actions to reduce any harm to *your health* from the heat?

	Never	Rarely	Occasionally	Often	Always
Stayed out of the sun between 11am and 3pm					
Drank cool fluids					
Stayed in the shade					
Covered up your skin with clothing or wore a hat					
Limited strenuous physical activity to the cooler parts of the day					
Used an electric fan					
Kept curtains closed on windows exposed to direct sunlight during the day					
Kept windows closed that are exposed to direct sunlight during the day					
Opened windows at night or in the cooler parts of the day					
Avoided providing alcohol					
Sought professional health advice					



Were you aware of any hot weather-related health advice and publicity during this period of hot weather?

- Yes
- No

If you answered yes:

Did you change your behaviour in the hot weather as a result of this health advice and publicity?

- Yes
- No

Would you say the health advice and publicity you heard was...?

- Very useful
- Fairly useful
- Not very useful
- Not at all useful

Which, if any, of the following people contacted you during the hot weather in [June] to check how you were?

- A GP or other doctor
- A nurse or other NHS staff
- Local authority/social services/social worker
- Neighbour/friend/family member
- Member of a voluntary organisation
- Other (please describe)
- No-one contacted me

At any time during this summer, did you experience any of the following as a result of hot weather or heat?

- Dehydration/intense thirst
- Sunburn
- Heat rash/red and dry skin
- Headaches
- Dizziness
- Nausea or vomiting
- Muscle weakness or cramps
- A high temperature
- Irritability
- A need to contact a GP or NHS 111, call an ambulance, or go to hospital or Accident & Emergency (A&E)
- Other (please describe)



Appendix 13
Invitation email
to nurses to
participate
in survey
[template]

NATIONAL HOT WEATHER SURVEY OF NURSING AND HEALTHCARE STAFF (NHS AND INDEPENDENT SECTOR)

We know the hot weather this summer has affected many of you in your workplaces. In this survey we are asking for your views and experiences about protecting patients most at risk during periods of severe hot weather (heatwaves), on planning for heatwaves and about what else might be done to help patients during the summer months.

Your feedback is very important in helping us gain a picture of how healthcare organisations manage during periods of severe hot weather and the types of advice and activities that would be most useful for the NHS and Public Health England (PHE) to provide.

The survey is being carried out by the London School of Hygiene & Tropical Medicine (LSHTM) with support from the RCN. Its results will help government revise guidance and plans so we are better able to deal with periods of severe hot weather.

To take part in this survey please click here [\[LINK TO SURVEY \]](#)

[\(or copy and paste this URL in full into a new browser window\)](#)

The survey should only take about 7 minutes to complete. Your answers will be kept completely confidential – absolutely no-one will even know if you have responded as only statistical results will be able to be seen and interpreted. Survey results will be available on LSHTM's research website (www.piru.ac.uk) next year.

Thank you very much for your valuable time.

[RCN SIGNATURE](#)



Appendix 14 Questionnaire for nurses

NATIONAL SURVEY OF NURSING AND HEALTHCARE STAFF

Q1.1 This questionnaire is aimed at nurses and healthcare staff working in acute, mental health, primary and community care and asks about how severe hot weather (heatwaves) affects your day-to-day work with patients and clients. We are interested in your views on planning for heatwaves and on what more should be done to help vulnerable patients during the summer months.

The survey should only take around 7 minutes to complete. If you can't complete it in one sitting, you can save your answers so you can return to it another time.

All your answers are strictly confidential.

This survey is being carried out by the Policy Innovation Research Unit (PIRU) at the London School of Hygiene & Tropical Medicine (LSHTM), with support from the RCN, on behalf of the Department of Health and Social Care and Public Health England.

Thank you for your help with this important survey.

To continue with the survey, please click 'I agree to take part in the survey' below.

I agree to take part in the survey

Q1.2 Currently, which health or social care setting are you primarily working in? If you only work for an agency/bank, please tick the setting you worked in for the longest period during June to September this year. *Please tick one only.*

- Hospital setting (1)
- Nursing/residential care home setting (6)
- Community setting (such as community health services, primary care, school service, etc.) (2)
- I am currently retired/on maternity/paternity leave/study leave/career break/unemployed (3)
- I work in academia (4)
- Other (5)

If Q1.2 = 1, 2, 6

Q1.3 Is this...

- NHS (1)
- Private (2)
- Local Authority (3)
- Charity or not for profit (4)
- Other (please type in) (5) _____

Q1.4 How many hours a week do you usually work?

- Less than 10 hours per week (1)
- 10 to 19 hours per week (2)
- 20-29 hours per week (3)
- 30-39 hours per week (4)
- 40 or more hours per week (5)
- Varies too much to say (6)



If Q1.4 = 2-6

Q1.5 In which region of England do you work?

- Northern (1)
- North West (2)
- Yorkshire & the Humber (3)
- East Midlands (4)
- West Midlands (5)
- East England (6)
- London (7)
- South East (excluding London) (8)
- South West (9)
- I work outside of England (10)

If Q1.5 = 1-9

Q1.6 Would you describe the area you do most of your work in as mainly...

- Inner city (1)
- Other dense urban area or town centre (2)
- Suburban residential (outskirts of a city or large town) (3)
- Rural (4)

Q1.7 How would you describe your current role in your organisation?

If you only work for an agency/bank, please tick the role you worked in for the longest period during June to September this year. *Please tick one only.*

- Managerial role – senior (1)
- Managerial role – middle (3)
- Frontline/patient/client facing role – senior (2)
- Frontline/patient/client facing role – junior (5)
- A student nurse (8)
- A supporting role (please say what) (6) _____
- Other (please type in) (7) _____

If Q1.7 = 1-7

Q1.8 Do you spend all or most of your time at work in any of the following specialities? *Tick all that apply.*

- Diabetes care (1)
- Cardiovascular/respiratory illness care (2)
- Dementia care (3)
- Mental health (including drugs and alcohol support) (4)
- Learning disabilities (5)
- Geriatrics/older people/end of life (8)
- Paediatrics/childcare/early years (6)
- None of the above (7)



Q1.9 About what percentage of the patients/clients you see would you say are aged 75 years or more? Please give your best estimate.

- More than 75% are aged 75 years or more (1)
- Between 50% and 75% are aged 75 years or more (2)
- About half (50%) are aged 75 years or more (3)
- Less than half are aged 75 years or more (4)
- None, I work only with children or with adults aged under 75 (5)
- Other (please type in) (6) _____
- Can't say (7)

Q1.10 Healthcare workers have many competing demands on their time and need to set priorities for dealing with patients/clients. In your view, how important is a patient's/client's vulnerability to hot weather for setting your priorities?

- Very important (1)
- Fairly important (2)
- Not very important (3)
- Not at all important (4)
- Can't say (5)

Q1.11 Do you have a regulated health professions qualification?

- Yes (1)
- No (2)
- Currently working towards one (3)
- Other (please type in) (4) _____

If Q1.11 = 1

Q1.12 How many years have you practiced in your current profession?

- Less than 1 year (1)
- 1 year, less than 2 years (2)
- 2 years, less than 5 years (3)
- 5 years, less than 10 years (4)
- 10 years or more (5)

If Q1.2 = 3-5 or Q1.4 = 1 or Q1.5 = 10 or Q1.7 = 8

Q1.13 Thank you for taking the time to complete the survey. The survey is only including RCN members who are currently working more than 10 hours a week in a hospital, nursing/residential care home, or community setting in England.



Section B: The Heatwave Plan for England and hot weather alerts

Q2.1 The Met Office issues hot weather alerts when it expects there to be high temperatures reached in regions of England.

- Were there any hot weather alerts issued this summer (that is, between 1st June and mid-September) in the region/area in which you were working?
- Yes, there was/were hot weather alert(s) in my region/area (1)
- No, there were no hot weather alerts in my region/area this summer (2)
- Can't recall (3)

If Q2.1 = 1

Q2.2 How are you personally made aware of a hot weather alert in your work setting? *Tick all that apply.*

- Verbal communication from manager or team lead, either one-to-one or at team meetings (1)
- Personal email from manager or organisation's lead on heatwave planning (2)
- The alerts are emailed/sent directly to me (for example, by the CCG, Local Authority, Met Office) (3)
- Written notification on staff noticeboard (4)
- Informally/word of mouth from colleagues/other staff (5)
- I hear/read about hot weather alerts from news or weather reports (6)
- Some other way (please type in) (7) _____

Q2.3 Hot weather alerts are part of the Heatwave Plan for England, which was implemented in England in 2004. Before today, had you heard of the Heatwave Plan for England?

- Yes (1)
- No (2)
- Don't know (3)

If Q2.3 = 1

Q2.4 Have you read any of the Heatwave Plan?

- Yes (1)
- No (2)
- Can't recall (3)

If Q2.3=1

Q2.5 Was the Heatwave Plan used by your organisation to help it make plans for summer or spells of hot weather? This could be anything from long-term planning to specific actions to take during spells of hot weather.

- Yes (1)
- No (2)
- Don't know (3)



Q2.6 Does your organisation/practice/service have its own written plan or instructions about what activities should be carried out when a hot weather alert has been issued by the Met Office or when there is a spell of hot weather?

- Yes (1)
- No (2)
- Don't know (3)

Q2.7 Does your organisation/practice/service identify patients/clients who may be vulnerable to hot weather, either by keeping a list of vulnerable patients/clients or by a system which identifies at-risk patients/clients?

- Yes (1)
- No (2)
- Don't know (3)

If Q2.1 = 1,3 and Q1.2 = 2 and Q1.5 = 2-9

Q2.8 A level 2 heat-health alert is when there is a high-risk of a heatwave in your area within the next 2 to 3 days.

There was a level 2 heat-health alert issued in your region on [e://Field/Level2] 2018. Thinking about this time which, if any, of the following actions did you personally take? *Tick all that apply.*

- Communicate heatwave alerts to other staff (1) [managers only]
- Ensure other staff are aware of their responsibilities in local heatwave plan (2) [managers only]
- Ensure sufficient staffing to cope with any potential needs (3) [managers only]
- Implement business continuity (4) [managers only]
- Check those that have been identified as high-risk have a visitor or phone call arrangements in place (5)
- Ensure patients/clients and their carers have the required information on how to protect themselves as described in the Heatwave Plan (such as staying out of the heat, cooling self down, keeping environment cool) (6)
- If visiting patients/clients, I check room temperature (7)
- Other actions (please type in) (10) _____
- Not applicable, as I did not work during the alert period (8)
- None of these (12)
- Can't recall/unsure (11)



If Q2.1 = 1,3 and Q1.2 = 1,6 and Q1.5 = 2-9

Q2.9 A level 2 heat-health alert is when there is a high-risk of a heatwave in your area within the next 2 to 3 days.

There was a level 2 heat-health alert issued in your region on $\$[e://Field/Level2]$ 2018. Thinking about this time which, if any, of the following actions did you personally take?

Tick all that apply.

- Communicate heatwave alerts to other staff (1) [managers only]
- Ensure other staff are aware of their responsibilities in local heatwave plan (2) [managers only]
- Ensure sufficient staffing to cope with any potential needs (3) [managers only]
- Implement business continuity (4) [managers only]
- Check indoor temperature (5)
- Record where patients/clients usually spend most time (6)
- Ensure cool areas are below 26 degrees Celsius (7)
- Review and prioritise high-risk patients/clients (8)
- Ensure sufficient cold water/ice/lollies available (9)
- Reschedule physio/other activities to cooler hours in the day (10)
- Other actions (please type in) (12) _____
- Not applicable, as I was not working during the alert period (11)
- None of these (14)
- Can't recall/unsure (13)

If Q2.1 = 1,3 and Q1.2 = 2 and Q1.5 = 2-9

Q2.10 A level 3 heat-health alert is when temperature levels have been reached in your region requiring specific actions targeted at high-risk individuals.

There was a level 3 heat-health alert issued in your region on $\$[e://Field/Level3]$ 2018. Thinking about this time which, if any, of the following actions did you personally take?

Tick all that apply.

- Visit or telephone high-risk patients/clients (1)
- Ensure patients/clients and their carers have the required information on how to protect themselves as described in the Heatwave Plan (such as staying out of the heat, cooling self down, keeping environment cool) (2)
- Advise carers to contact GP if they have concerns about patient/client's health (3) [paediatrics /childcare/early years only]
- Protect children from heat (such as providing cool water, sunscreen, hats) (9) [paediatrics /childcare/early years only]
- Maintain appropriate environment (such as adequate ventilation, shading) (10) [paediatrics /childcare/early years only]
- Closed school/nursery if too hot (11) [paediatrics /childcare/early years only]
- Other actions (please type in) (6) _____
- Not applicable, as I was not working during this alert period (4)
- None of these (8)
- Can't recall/unsure (7)



If Q2.1 = 1,3 and Q1.2 = 1,6 and Q1.5 = 2-9

Q2.11 A level 3 heat-health alert is when temperature levels have been reached in your region requiring specific actions targeted at high-risk individuals. There was a level 3 heat-health alert issued in your region on $\$[e://Field/Level3]$ 2018. Thinking about this time which, if any, of the following actions did you personally take? *Tick all that apply.*

- Check indoor temperature recorded frequently during hottest period where patients/clients spend most of their time (1)
- Reduce internal temperature through shading (2)
- Turn off unnecessary lighting/electrical equipment (3)
- Cool building at night by opening windows (4)
- Ensure any discharge planning takes home temperature and support into account (5)
- Other actions (please type in) (7) _____
- Not applicable, as I was not working during this alert period (6)
- None of these (9)
- Can't recall/unsure (8)

If Q1.7 = 1-3

Q2.12 During the summer alert period (1st June to 15th September), did you carry out any medication reviews of patients/clients who were considered to be at risk during periods of severe hot weather?

- Yes (1)
- No (2)
- Not applicable/not part of my role (3)
- Can't recall (4)

If Q1.7 = 1-3 and Q2.12 = 2-4

Q2.13 Were you aware of any colleagues who carried out medication reviews during the summer alert period?

- Yes (1)
- No (2)
- Can't recall (3)

If Q1.7 = 5-7

Q2.14 During the summer alert period (1st June to 15th September), did you, or any colleagues, carry out medication reviews of patients/clients who were considered to be at risk during periods of severe hot weather?

- Yes (1)
- No (2)
- Can't recall (3)



Q2.15 Compared with a typical working day, to what extent did your workload increase or decrease during spells of severe hot weather this summer?

- Increased a lot (1)
- Increased a little (2)
- Did not change at all (3)
- Decreased a little (4)
- Decreased a lot (5)
- Can't say/varied too much to say (6)

If Q2.1 = 1 and Q1.5 = 1

Q2.16 In your region, there were spells of hotter weather this summer, most recently around late June and early July. Did you do anything differently at work during that most recent spell of hotter weather? *Tick all that apply.*

- Yes, I followed my organisation's local heat plan (1)
- Yes, I followed national guidance as in the national heatwave plan (2)
- Yes, I made sure my patients/clients were protected and hydrated (3)
- Not applicable, as I did not work during that hot weather spell (5)
- No, I did not do anything differently (4)
- Other actions (please type in) (6) _____
- Can't recall/unsure (7)

If Q2.1 = 2 or Q1.5 = 1

Q2.17 Earlier you said you did not recall any hot weather alerts being issued this summer in your region, but there were spells of hotter weather, including in late June and early July. Did you do anything differently at work during that spell of hotter weather? *Tick all that apply.*

- Yes, I followed my organisation's local heat plan (1)
- Yes, I followed national guidance as in the national heatwave plan (2)
- Yes, I made sure my patients/clients were protected and hydrated (3)
- Not applicable, as I did not work during that hot weather spell (5)
- No, I did not do anything differently (4)
- Other actions (please type in) (6) _____
- Can't recall/unsure (7)

Q3.1 How confident would you say you were in recognising patients/clients with heat related illnesses?

- Very confident (1)
- Fairly confident (2)
- Not very confident (3)
- Not at all confident (4)
- Can't say (5)

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