Public health in a changing climate

Daniel Button and Anna Coote

How far has the shift of public health into local government affected efforts to mitigate and adapt to climate change in areas facing climate disadvantage? Climate change poses both a threat and an opportunity for public health. This report reviews current local strategies and actions to address climate change by public health departments and their partners. It explores barriers and opportunities for action, and identifies recommendations for local and national policy and practice.

The report shows that:

- the full potential of recent structural changes to the public health system is not being realised;
- the risks of climate change to health are occasionally acknowledged within Joint Strategic Needs Assessments; however, this awareness is seldom reflected in Joint Health and Wellbeing Strategies;
- many public health departments are taking climate action. This is often driven by individuals championing initiatives rather than strategy. Where actions have been taken, they are framed in terms of the shorter-term benefits to health and wellbeing; and
- cuts to local authority budgets and the long-term nature of climate change mean that climate change is seldom regarded as a priority.

May 2016
www.jrf.org.uk

Contents

Executive summary

Climate change has been described as both the greatest threat to public health in the 21st century, and the greatest opportunity (Costello *et al.*, 2009; Watts *et al.*, 2015).

Potential threats to public health from a changing climate include death and injury from extreme weather, including heat and flooding; increased effects from air pollution; the spread of disease; food insecurity; population displacement; and mental ill health. Many of the measures that could be taken in order to mitigate and adapt to climate change have co-benefits in terms of health and wellbeing. Well-insulated and ventilated homes, active travel (i.e. walking/cycling), flood and heat resilient green space, strong social cohesion, a sustainable health and social care system, a sustainable food system and diet, as well as a reduction in air pollution, can all have positive health benefits.

The recent shift of public health departments from primary care trusts to local authorities in England provides scope for more joined-up action to mitigate and adapt to climate change locally. This report outlines the findings of research into how far public health departments, since the shift, are outlining strategies and taking collaborative action to mitigate and adapt to climate change. The report explores the barriers and opportunities for action and makes recommendations for moving forward locally and nationally.

The research was conducted in two main stages. The first stage involved a document review of Joint Strategic Needs Assessments (JSNAs), Joint Health and Wellbeing Strategies (JHWSs) and Climate Change Strategies from a sample of 20 out of 152 areas across England, to examine strategic responses. The second stage involved a series of interviews and deliberative workshops in five case study areas to understand the responses in more detail, and determine the barriers and opportunities for action.

Strategies for mitigating and adapting to climate change

JSNAs and JHWSs are at the centre of changes to the health and social care system in England. They provide an important tool for Health and Wellbeing Boards (HWBs) to co-ordinate policy and action to mitigate and adapt to climate change across a locality, through public health and other local authority/health and social care provision. Although there is no statutory duty to include climate change within these documents, a number of national initiatives – such as the government's National Adaptation Programme, the Environment Agency's Under the Weather toolkit and Public Health England's Public Health Outcomes Framework (PHOF) – encourage areas to do so.

The review found that, although the risks of climate change to public health were occasionally acknowledged within JSNAs, this awareness was rarely reflected in subsequent JHWSs. Explicit, action-oriented strategies to mitigate and adapt to climate change were rare.

Measures that hold the potential to mitigate climate change by reducing carbon emissions (e.g. through active travel schemes and energy efficiency schemes to reduce fuel poverty) and support adaptation to climate impacts (e.g. through efforts to build more resourceful, cohesive communities) were frequently included within JSNAs. However, these were usually included for their health benefits; their relevance to climate change was rarely acknowledged. Inclusion of these issues within JSNAs did not always translate into strategic responses within JHWSs.

Action

Some actions are, nevertheless, being taken by public health departments and their partners within and outside local government. Across five case study areas, action ranged from fuel poverty programmes and flood resilience schemes, to action to encourage active travel and food growing.

Islington Council, for example, has a dedicated Seasonal Health and Affordable Warmth (SHAW) team within the environment department, which works closely with public health – receiving funds, as well as sharing capacity and time. Most of SHAW's work is dedicated to tackling fuel poverty, with the aim of reducing seasonal excess mortality and morbidity. Middlesbrough Council, meanwhile, funds and works in collaboration with Middlesbrough Environment City (MEC), a voluntary organisation, to deliver projects contributing to healthy, sustainable communities. Funded by public health, MEC have delivered a range of fuel poverty, food growing and active travel schemes.

In each of the five researched areas, however, action appears patchy. Rather than rounded approaches to mitigation and adaptation covering all key risks, vulnerable communities and areas of disadvantage, action is focused on a limited range of issues.

Opportunities for and barriers to action

The shift of public health into local government was seen across the five case study areas as a significant opportunity for collaborative action addressing climate change and the wider determinants of health. In each area, public health departments noted that they are now able to influence, and be influenced by, other council departments with responsibility for the wider determinants of health. Collaboration was often said to involve engaging with work going on elsewhere in the council and, less frequently, providing funds for initiatives with other departments or organisations.

Where actions were underway, they were attributed to a number of factors, which differed between localities. Rather than being driven by HWBs and JHWSs, they were often due to individuals championing initiatives at officer level, and within the voluntary and community sector (VCS). Where relevant activities had been undertaken, they were often framed in terms of their shorter-term benefits to health and wellbeing, or linked with specific opportunities to generate funds from external sources. Action was sometimes said to be driven by a history of environmental action within the local authority, and by previous experience of collaboration between health and local government. Other, less frequent, factors driving action included experiences of extreme weather events, and high-level leadership and support from HWBs, local authorities, and Clinical Commissioning Groups (CCGs).

While the shift of public health into local government presents a clear opportunity for public health to influence and support more joined-up local responses to climate change, there are still significant barriers to action in practice.

The full potential of the structural changes introduced by the Health and Social Care Act 2012 are not yet being realised for the purposes of climate mitigation and adaptation. Climate change was rarely on the agenda of HWBs. Heavy cuts to local government budgets have led councils to focus on an increasingly narrow list of priorities. Because of their long-term, largely non-statutory nature, responses to climate change seldom feature as any kind of priority. Local and national political indifference to climate change was also seen as a barrier to change.

Cultural differences between departments and organisations present a significant barrier to collaborative action on climate change, particularly when comparing the NHS, influenced chiefly by a medical model of illness, with a broader approach to promoting health and wellbeing that tends to prevail in local government. Developing an evidence base on effective actions is still seen as a barrier. A number of public health departments noted difficulties funding programme evaluations, while many of those outside of the health sector noted difficulties evidencing health outcomes.

Moving forward

While individual passion, commitment and perseverance have been effective in driving action in a number of areas, without strategic backing and leadership from HWBs, action on climate change is hard to sustain and likely to be marginalised as funds continue to diminish. In order to progress the public health and climate change agenda locally, areas need to ensure that:

- all of the local climate risks are outlined in JSNAs;

- JHWSs subsequently set out action-orientated strategies for mitigating and adapting to the assessed climate risks; and
- HWB members recognise the importance of tackling climate change and provide the necessary leadership to turn strategy into action across the locality.

In order to ensure progression on these three criteria, those currently championing the issue locally should:

- frame action in terms of synergistic shorter-term benefits – such as health inequalities, cost savings, quality of life improvements and local investment – which link to current local and national priorities;
- develop or improve approaches to evaluation and evidence outcomes; and
- highlight examples of good practice from other local authorities.

In addition, much can be done at a national level to progress the agenda. The Department of Health should work with Public Health England, the Sustainable Development Unit for Public Health England, and NHS England and other relevant parties, to:

- increase focus and funding on early action and prevention;
- improve knowledge and capacity building for HWBs;
- update the PHOF to include explicit climate mitigation and adaption outcomes and indicators;
- develop an online resource of case studies to collate, identify and share examples of good practice; and
- develop guidance on evaluation and available funding streams.

1 Introduction

Climate change has been described as the greatest public health threat that we face this century, with the lives and wellbeing of billions of people at risk (Costello *et al.*, 2009). Previous research by the Joseph Rowntree Foundation (JRF) has found that low income and disadvantaged communities are likely to be among the hardest hit by the direct impacts of extreme weather in the UK, by the knock-on effects of climate change overseas, and by policy and practice responses at home.

The recent transfer of public health from primary care trusts to local authorities in England provides scope for more joined-up action to mitigate and adapt to climate change locally. The shift brings together local government departments – with responsibility for services affecting many of the social and environmental determinants of health, including transport, flood risk management, emergency planning and social care (and in unitary areas, also housing, spatial planning and environmental health) – with public health officials whose focus is on improving health and wellbeing, and reducing health inequalities. Moreover, the formation of Health and Wellbeing Boards (HWBs) provides an important forum and set of tools for tackling climate change locally.

At a national level, there have been a number of initiatives to drive local climate responses. The National Adaptation Programme (NAP), for instance, sets out the government's strategy for adapting to the risks of climate change. The NAP describes actions that different sectors, including the health and social care sector, should take in order to ensure preparedness for a changing climate. Meanwhile Marmot *et al.* (2010) argues that climate change is a significant determinant of health and health inequalities.

This report aims to assess whether and how climate change mitigation and adaptation is being addressed through the public health agenda at the local level, since the shift of public health into local government. The objectives are to:

- review and assess current local strategy and action to address climate change, from public health and partners across the local authority and healthcare system, in areas of high climate disadvantage;
- explore barriers and opportunities to developing responses, and how barriers can be overcome and opportunities maximised; and
- identify recommendations for policy and practice.

Research methods

The study used a range of methods to address the research objectives outlined above:

- a document analysis;
- qualitative interviews; and
- deliberative workshops.

Document analysis

Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs) play a central role in the health and social care system in England. They represent an important set of tools for HWBs to co-ordinate policy and action to mitigate and adapt to the risks of climate change to health and wellbeing across a locality. As a first stage towards assessing whether the shift of public health into local government is promoting collaborative action to mitigate and adapt to climate change, a document analysis was conducted of JSNAs, JHWSs and Climate Change Strategies (CCSs) in 20 areas.

The analysis considered how far these documents recognised the risks of climate change to public health, set out strategies to mitigate and adapt to climate change, recognised the effects of climate change on vulnerable communities, and contained evidence of collaborative working.

In order to pick 20 areas for review, a purposive sampling method was used to create a sample frame with a spread of:

- urban and rural areas, including some coastal areas;
- different regions across England; and
- areas with high levels of climate disadvantage (in relation to river/coastal flooding, surface water flooding or heat) and/or fuel poverty, as indicators of need.[1]

JSNAs, JHWSs and CCSs were downloaded from local authority websites and an email was sent out to each area, to ensure that the documents were the most up-to-date and relevant.

Qualitative interviews and deliberative workshops

For the second phase, five areas out of the initial sample of twenty were chosen for further engagement. In each of the five areas, a series of four to six interviews and one deliberative workshop were carried out. Interview and workshop invitations were sent to HWB members, Clinical Commissioning Groups (CCGs), Directors of Public Health and public health officers, housing officers, planning officers, environmental and sustainability officers, environmental health officers, planning officers, Healthwatch, and members of the voluntary and community sector (VCS). In each area the Director of Public Health was approached first, who often delegated to the appropriate individual within the public health department. Further interviewees were identified during the first interview.

The primary aim of the interviews was to identify actions being taken, to begin to identify drivers of, barriers to and opportunities for action, and to identify participants for the workshops. The workshops then built upon the interviews by bringing together a group of participants to deliberate about how action was being driven and outcomes achieved locally, the barriers to and opportunities for driving action, and how these can be overcome and maximised, respectively.

The five areas for further engagement were selected to represent a range of areas facing potential heat disadvantage, flood disadvantage and fuel poverty issues across the English regions. Several areas initially selected as potential case study areas were unwilling to engage in the research due to capacity limitations, and so the sample had to be redrawn using areas with similar characteristics to the initial selection.

Report structure

This report is presented in five main sections.

Chapter 2 outlines the links between public health and climate change, as well as the opportunities presented by the recent structural changes to the health sector in England.

Chapter 3 examines the extent to which public health departments are working with other teams in local government to develop strategies to mitigate and adapt to climate change locally.

Chapter 4 looks at five case study areas and examines the actions being driven or influenced by public health departments.

Chapter 5 looks at the factors driving action locally, as well as the opportunities and barriers presented by the shift of public health into local government.

Chapter 6 the final section concludes and draws upon the findings of the literature review and empirical research to outline policy and practice recommendations for moving forward.

2 What are the links between public health and climate change?

The overwhelming weight of scientific evidence shows that the earth's climate is changing as a result of human activity. In 2013, Cook *et al.* (2013) examined 11,944 peer-reviewed climate abstracts from 1991 to 2011, finding that 'among abstracts expressing a position on anthropogenic global warming, 97.1% endorsed the consensus position that humans are causing global warming'. Papers rejecting the consensus are a 'vanishing small proportion of the published research' (*Ibid.*). Furthermore, the Intergovernmental Panel on Climate Change (IPPC, 2013) note that:

> It is extremely likely more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together.

If greenhouse gas emissions continue at the rate of the last decade, global average temperatures are projected to rise between 4–6°C above pre-industrial levels by the end of the century (Pielke *et al.*, 2008). Such a rise is far in excess of 'safe' levels of climate change, commonly set at 2°C and will have major impacts on people's health and wellbeing both globally and within the UK (*Ibid.*). Following the Paris agreement, national pledges to reduce emissions still fall short of staying within 2°.

This section draws out the links between climate change and public health, exploring how climate change will impact upon health and wellbeing. It examines how measures to mitigate and adapt to climate change have synergistic benefits for people's health. It also outlines the recent structural changes to public health in England, and the opportunities these changes present for joining up local responses to climate change in terms of both mitigation (reduction of greenhouse gases) and adaptation (to address the impacts of climate change). The section concludes with a brief survey of the existing evidence about emerging responses.

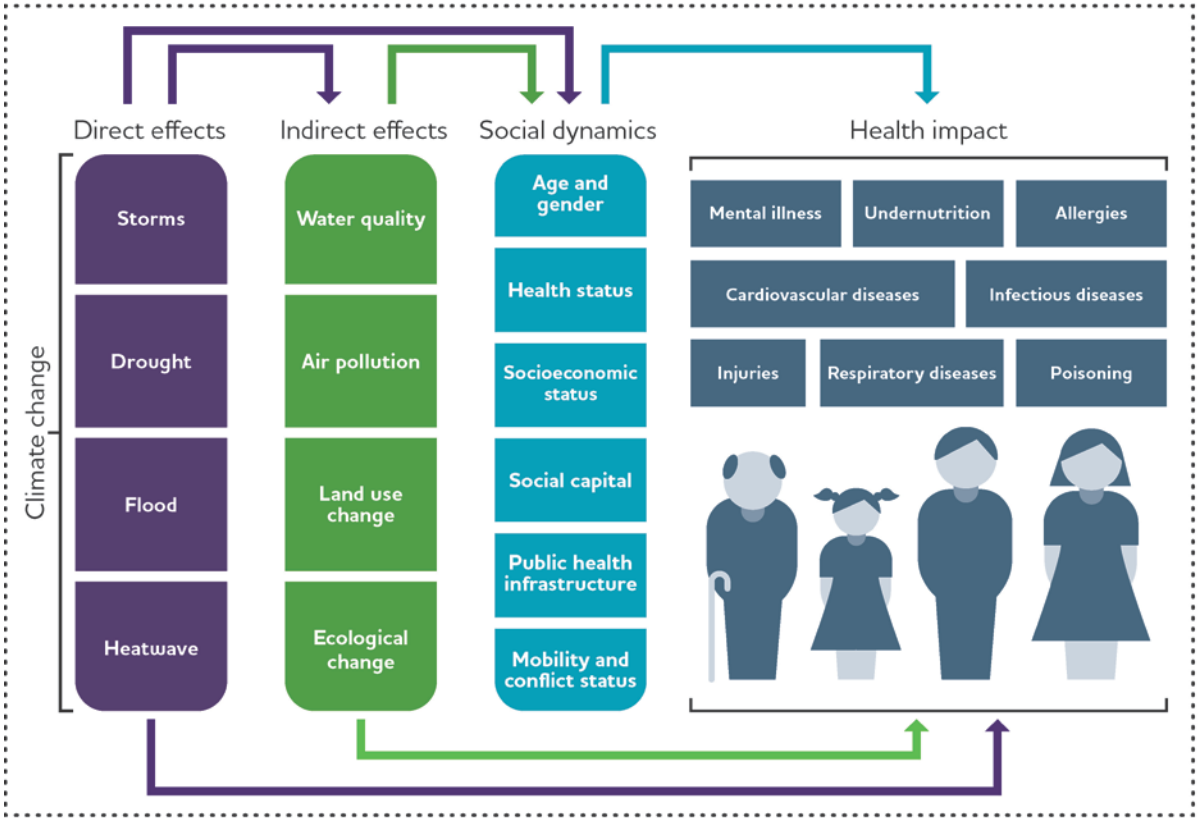
Climate change and global public health

The Lancet Commissions on Health and Climate Change were set up to assess the impacts of climate change on public health at a global level, and to explore policy responses to the issue. While climate change was found to represent 'the greatest heath threat of the twenty-first century', the synergies between measures to improve health and measures to mitigate and adapt to climate change led the Commission to conclude that tackling climate change represents the 'greatest public health opportunity'.

The Commission found that climate change is likely to affect public health both directly and indirectly. The direct risks of climate change to health include 'death and injury as a result of heat stress, drought, and intense storms' (Watts *et al.*, 2015). Indirect risks include 'changes in air pollution, the spread of disease vectors [carriers of disease], food insecurity and under-nutrition, displacement and mental ill health' (*Ibid.*). The impacts of climate change are found to be unevenly distributed: marginalised people, those experiencing poverty, people with disabilities, older people, and women and children bear the greatest risk internationally. This is likely to widen and entrench inequalities within and between countries worldwide (Walpole *et al.*, 2009).

The potential for climate change to affect the lives and wellbeing of billions of people prompted the Lancet Commission to declare that climate change represents the 'greatest health threat of the twenty-first century' (Costello *et al.*, 2009). Unless action is taken to rapidly reduce greenhouse gas emissions, climate change will negatively impact upon many of the main determinants of health.

Figure 1: The direct and indirect effects of climate change on health



Source: Watts *et al.* (2015)

Climate and public health in the UK

Temperatures in England have risen by almost 1°C since the 1970s (Department for Environment, Food and Rural Affairs, 2012). Future projections show that the UK faces warmer summers and winters, increases in summer rainfall and decreases in winter rainfall, as well as increases in the intensity and frequency of extreme weather events, particularly flooding and heatwaves (*Ibid.*).

While the impacts of climate change are projected to be much less severe in the UK than elsewhere, climate change nevertheless poses substantial direct and indirect threats to health and wellbeing. Risks are thought to include increased heat-related illness and death; flood-related illness and displacement; increases in food-, water- and vector-borne diseases; health impacts relating to air quality and aeroallergens; and skin cancer and sunburn (Climate Ready, 2014; see Box 1 for more details).

While the direct effects on health from climate impacts such as temperature changes are easier to project, indirect effects on health such as food scarcity may pose a greater risk (Committee on Climate Change, 2014).

Box 1: The impacts of climate change on health and wellbeing in the UK

Heat: In August 2003, over 20,000 people died in Europe because of an intense period of heat, including 2,000 excess deaths in the UK. Summers as hot as 2003 could be considered 'normal' by 2050 (Met Office, 2015). By this time, the effect of rising mean temperatures in the UK is projected to increase heat-related deaths from the current level of 2,000 to 7,000 per year (Committee on Climate Change, 2014).

Rising average temperatures will mean that the health burden of cold weather is likely to decline slightly. Vulnerability to cold weather will remain a significant issue, not because of climate change, but because of changing demographics as the population ages (*Ibid.*).

UV radiation and skin cancer: Around 2,000 people die from melanoma each year in the UK. Climate projections for the UK point to an increase in UV radiation; however, it is not currently possible to provide projections of the increased risk of skin cancer because of potential changes in behaviour (*Ibid.*).

Disease: Vector-borne diseases are influenced in complex ways by a number of different factors, making it hard to quantify future changes resulting from climate change. It is likely, however, that the activity of many ticks and mosquitoes will increase, and new pathogens could potentially be introduced to the UK. Climate change may also influence the incidence of water- and food-borne diseases, such as Salmonella (Vardoulakis and Heaviside, 2012).

Flooding: As flooding increases with a changing climate, the number of deaths from flooding could increase. The evidence, however, is uncertain. The effects of flooding on mental health and wellbeing, however, are thought to be significant. The 2007 floods in the UK, to take an example, led to a two- to five-fold increase in mental health symptoms (Committee on Climate Change, 2014).

Air quality: Between six and nine million people currently suffer from chronic respiratory conditions that make them sensitive to poor air quality. Population growth and ageing are likely to increase this number. It is projected that as average temperatures rise, so will the concentration of ground level ozone and air pollution, which is linked to increased premature death from heart disease, strokes, pulmonary disease, respiratory disease and lung cancer (WHO, 2014). However, although climate change may increase exposure to poor air quality, projections remain uncertain as it is dependent on wind direction and changes in prevalence of static weather patterns, as well as changes in temperature (Committee on Climate Change, 2014).

Climate change overseas: The impact of climate change overseas may have a significant effect on health in the UK. Foresight (2011) identifies a wide array of potential threats, including disruption to global food and energy supplies. In addition, there is likely to be more migration from heavily affected areas, which may affect the UK, and increase pressure on services, including health and social care.

In line with research into the projected effects of climate change at a global level, research by JRF has shown that low-income and disadvantaged communities are likely to be among the hardest hit by the consequences of climate change in the UK (Preston *et al.*, 2014).

Lindley *et al.* (2011) suggest the key factors that affect people's vulnerability to the direct effects of extreme weather (particularly flooding and extreme heat) include:

- individual characteristics – such as age or health;
- features of the physical environment – such as green space or housing characteristics, which accentuate or mitigate the impact of weather events; and
- people's adaptive capacity or their ability to prepare, respond and recover – which is influenced by knowledge, income, insurance, social networks, personal mobility, fear of crime, availability of public spaces, personal autonomy and housing.

Impacts are likely to be most acute in areas where high social vulnerability to climate change coincides with high exposure to climate hazards. These areas are referred to as 'climate disadvantaged', a term that is used throughout the remainder of this report. The elderly, those on low incomes, tenants in social or private rented housing, and those living on top floor flats (for heat) or basement flats (for flooding) are thought to be among the groups most vulnerable to climate impacts in the UK. Social vulnerability and climate disadvantage are unevenly distributed geographically, with the greatest social vulnerability in large urban centres and coastal areas. The north of England has much higher levels of socially derived flood-vulnerability than the south of England, while London has the most heat vulnerability (Lindley *et al.*, 2011).

Previous research by JRF has also shown that lower-income households are likely to be particularly susceptible to the indirect effects of climate change. Climate change is projected to impact negatively upon the supply of food overseas, which is likely to affect the price of produce imported to the UK. Rising food prices will hit the less affluent the hardest, making it even more difficult for those on low incomes to maintain a healthy diet (Preston *et al.*, 2014). Energy policies to mitigate climate change can also unduly affect those on a low income. One policy response to climate change has been to introduce levies on consumer energy bills. Lower-income households have been shown to pay more as a proportion of their income towards these levies, despite higher energy usage in high-income households (*Ibid.*).

Climate mitigation and adaptation

Responses to climate change are often divided into mitigation and adaptation measures. A mitigation response is defined by the IPCC as 'a human intervention to reduce the sources or enhance the sinks of greenhouse gases' (United Nations, 2014). Mitigation is about reducing greenhouse gas emissions and preventing further climate change. Adaptation responses, by comparison, are defined as 'adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderate harm or exploit beneficial opportunities' (*Ibid.*). Adaptation is about coping with the effects of a changing climate, and in particular dealing with the adverse impacts that may occur.

While there are limits to the levels of climate change that humans can adapt to, historical emissions mean that some climate change is inevitable. Both adaptation and mitigation are therefore necessary to address the likely impacts of climate change upon public health.

> Adaptation consists of managing the unavoidable. Mitigation involves avoiding the unmanageable. We must do both, we must do them together, and we must do them now.
> Wright (2014)

Synergies between health and climate change responses

Many of the measures that could be taken in order to mitigate and adapt to climate change are also likely to benefit health and wellbeing. Examples include developing energy efficient, well insulated and ventilated homes; active travel; green space; social cohesion; a sustainable health and social care system; a sustainable and nutritious food system; and a strong renewable energy sector (Box 2).

Box 2: Health benefits of climate action

Energy efficient homes: The domestic energy sector is responsible for more than a quarter of energy use and emissions in the UK (Palmer and Cooper, 2013). At the same time, high fuel prices and cold housing are a significant cause of poverty and excess winter deaths (Marmot *et al.*, 2010). Homes that are well insulated and ventilated, therefore, can be more energy efficient, with a lower carbon footprint, while providing a healthier living environment and reducing fuel bills. Programmes to retrofit homes to make them more energy efficient can also provide jobs for local people, reducing the risks to health posed by unemployment.

Active travel: Transport accounts for 21% of greenhouse gas emissions in the UK (Department of Energy and Climate Change, 2015). Road transport is the most significant source of emissions in this sector (*Ibid.*). Promoting more active forms of travel, including walking and cycling, holds not only the potential to reduce emissions, but also to promote health – both by increasing physical activity and reducing air pollution.

Green space: Access to green space is associated with high levels of physical activity and lower levels of obesity (Sustainable Development Commission, 2010). Moreover, the increased levels of physical activity associated with green space also have mental health benefits (*Ibid.*). At the same time, green space can act as a sustainable urban drainage system in the event of a flood, and provide cooling and shading effects in the event of a heatwave (Forest Research, undated; Bowler *et al.*, 2010).

Social cohesion: Communities with high levels of social cohesion are, in many circumstances, better placed to take collective action to mitigate and adapt to climate change, and are thought to be more resilient to adverse weather effects (Preston *et al.*, 2014). Social cohesion and social capital (i.e. social networks and support) are also understood to be good for both mental and physical health because of their stress buffering effects, effects on healthy behaviours, and contribution to a sense of meaning and purpose in life (Holt-Lunstad *et al.*, 2010; Cohen and Janicki-Deverts, 2009).

Sustainable food system and diet: Buying food that is grown locally helps to reduce emissions from transportation. Where food is produced in ways that are environmentally sustainable, it is likely to have a higher nutritional value. Making minor changes to diet by cutting down on meat consumption can also reap both climate and health benefits. The global livestock industry generates a fifth of the world's greenhouse gases, while it is predicted that 45,000 early deaths could be prevented by reduced meat consumption in the UK (Friends of the Earth, 2010).

Renewable energy: The current energy mix has a profound impact on human health. As well as exacerbating climate change, fossil fuels are already causing poor health through air pollution (Watts *et al.*, 2015). Reducing reliance on carbon intensive forms of energy will contribute to a healthier population and a reduction in emissions.

The case for action on climate change in the health and social care system

The health and social care system both contributes to the climate change problem and is likely to be severely affected by it. The sector therefore has a crucial role to play in both mitigating and adapting to climate change.

Given the ramifications of climate change on public health, the health and social care system is likely to face changes in the volume and pattern of demand. The system is already under significant pressure from the UK's ageing population and budget constraints. However, given the positive synergies between measures that address climate change and those that support positive health outcomes, taking action has the potential to prevent ill health occurring in the first place, and thus to reduce future pressure on the health and social care system. Prevention is a key focus of NHS England's Five Year Forward View (Stevens, 2014).

Extreme weather events that will become more frequent due to climate change will also threaten the effective functioning of health and social care services, both because of the impact of extreme weather upon the health and social care infrastructure and supply chains, and the ability of staff to get to work in an emergency. Some 10–14% of emergency services and 6–8% of hospitals, care homes and surgeries, for instance, are located in areas susceptible to flooding (Committee on Climate Change, 2014). The health and social care system, therefore, needs to ensure it is able to adapt both to the ways in which climate change will negatively impact upon the health and wellbeing of the population, and to the direct impacts of climate change upon the delivery of services, in order to ensure its own business continuity (SDU, 2012).

The health and social care system is also responsible for a large proportion of the UK's greenhouse gas emissions. CO_2 emissions from the health and social care sector in England account for around 12% of all domestic consumption of goods and services produced in the UK, and 5% of all CO_2 emissions associated with UK consumption (Coote, 2014). Institutions such as the NHS, therefore, have considerable power to mitigate climate change by designing and running services sustainably, by commissioning and purchasing goods and services in ways that reduce carbon footprints, and by leading by example through encouraging staff and patients to live more active, healthier and sustainable lives (*Ibid.*).

National drivers for public health action on climate change

Although there are no statutory requirements for the health and social care sector to implement action to mitigate and adapt to climate change, there are an increasing number of national initiatives that seek to drive such action locally.

In July 2013, the government published the UK's first National Adaptation Programme (NAP) (HM Government, 2013). The NAP is the government's strategy for addressing the risks of climate change set out in the UK Climate Change Risk Assessment, and both are statutory requirements that will be updated regularly under the Climate Change Act 2008. The NAP sets out a number of actions to be taken across different sectors to ensure preparedness for a changing climate. Health and social care is one of the main areas of focus, and the NAP includes the following objectives:

> To reduce the risk of death and illness associated with severe weather events and climate change, and increase preparedness and resilience to the impacts on public health.
>
> To promote climate resilience within the NHS, public health and social care system to ensure continuity of services and resilience of assets and estates, including the ability to deal with the increased demand for services associated with severe weather-related events.
> HM Government (2013)

The NAP recommends that HWBs include consideration of climate change and extreme weather within JSNAs and JHWSs, and that Directors of Public Health promote climate and extreme weather preparedness and resilience within the local health and social care system.

In January 2014, the Sustainable Development Unit for the NHS and Public Health England (SDU) launched the Sustainable Development Strategy for the health and social care system. The strategy 'describes the vision for a sustainable health and care system by reducing carbon emissions, protecting natural resources, preparing communities for extreme weather events and promoting healthy lifestyles and environments' (SDU, 2014).

The Department of Health, Public Health England, the SDU and the Environment Agency have been working together to support health and social care responses to climate change through the Climate Ready service, which aims to 'provide advice, guidance and tailored sector-specific support to help organisations adapt to a changing climate' (Climate Ready, 2014). This includes the Under the Weather toolkit for integrating climate change adaptation into the local health economy.

The Marmot Review of health inequalities, *Fair Society, Healthy Lives,* highlights the importance of tackling the environmental determinants of health, including fuel poverty and climate change. One of the recommendations of the review is to:

> ... prioritise policies and interventions that reduce both health inequalities and mitigate climate change, by: improving active travel [...] improving good quality green spaces [...] improving the food environment in local areas [...] and improving energy efficiency in housing' across the social gradient.
> Marmot *et al.* (2010)

In 2015, the Department of Energy and Climate Change (DECC) issued *Cutting the cost of keeping warm: a fuel poverty strategy for England*, which focuses on the important role of the health sector in responding to the issue (HM Government, 2015). As part of the strategy, £1 million of funding was released for 'warmth-on-prescription' projects to enable healthcare professionals to play a part in tackling fuel poverty by prescribing insulation and energy-efficient boilers for vulnerable patients (*Ibid.*). DECC have recently published the results of an online survey cataloguing health-related fuel poverty schemes across the UK (National Energy Action, 2015).

The Public Health Outcomes Framework (PHOF) sets out the Department of Health's vision for the new and reformed health system, as well as a series of indicators to monitor progress. The framework encourages local authorities to consider the wider determinants of health, and includes indicators relating to fuel poverty, green space, sustainable development and air pollution (Department of Health, 2013). The PHOF, however, does not include any specific measures for adapting to climate change or weather extremes.

Finally, Public Health England co-ordinates heatwave and cold weather plans on behalf of the health and social care sector to support responses to extreme weather, setting out what should happen before and after periods of severe hot and cold weather (Public Health England, 2014).

Emerging health structures

In addition to the national drivers outlined above for action on climate change, the emerging new health structures in England provide an opportunity for related responses to be more co-ordinated across localities.

In 2012, the Health and Social Care Act significantly changed the structure of health and social care in England. Since 2013, CCGs – which are clinician-led and responsible for spending most of the NHS budget – replaced primary care trusts (PCTs). Public health responsibilities, which previously rested with PCTs, have parted from the NHS and now sit with local authorities. Each of the 152 upper tier and unitary local authorities has a public health team and Director of Public Health – although some are shared between authorities. These are responsible for championing 'health across the whole of the authority's business, promoting healthier lifestyles and scrutinising and challenging the NHS and other partners to promote better health and ensure threats to health are addressed' (Department of Health, 2012c).

These new structures provide more scope for public health departments to address the wider determinants of health, including climate change, since the shift brings together local authority departments – responsible for transport, flood risk management, emergency planning and social care (and in unitary areas, also housing, spatial planning and environmental health) – with public health officials, whose focus is on health and wellbeing. Indeed, Marmot *et al.* (2010) – which recommends tackling climate change and public health simultaneously – is often listed as a key driver of these structural reforms (Murphy, 2013).

Each upper tier and unitary local authority now has a HWB with a remit to 'bring together bodies from the NHS, public health and local government, including Healthwatch as the patient's voice, jointly to plan how best to meet local health and care needs' (Humphries and Galea, 2013). The government has been careful not define the exact focus of the boards, leaving this to be decided locally (*Ibid.*).

The boards have a core statutory membership of:

- an elected member;
- a representative of the local Healthwatch organisation;
- a representative of the local CCG;
- the local authority Director for Adult Social Services;
- the local authority Director of Children's Services; and
- the local authority Director of Public Health.

Beyond this core membership, boards are able to expand the membership to include a wider range of expertise.

The Health and Social Care Act placed the JSNA and the JHWS at the centre of the new HWB function. JSNAs are assessments of current and future health and social care needs of the local area (Department of Health, 2012a). The JHWS has been described as 'essentially an overarching commissioning strategy for the area through which the [Health and Wellbeing Board] should influence commissioning decisions informed by the evidence based JSNA' (Knight, 2012).

The content and focus of JSNAs and JHWSs are controlled at a local level. Responsibility for these documents lies with local authorities and CCGs working through the HWB. The Department of Health's guidance document notes that HWBs 'will need to decide for themselves when to update or refresh JSNAs and JHWSs' (Department of Health, 2012b).

The HWBs cannot enforce the content of their JHWS. They do not hold their own budget and cannot commission their own services. Rather, the Health and Social Care Act outlines a duty for CCGs and local authorities to have regard to the JHWS when developing their commissioning plans (Knight, 2012). It has been noted that 'the lack of clarity as to what this means in practice makes it a weak lever' (*Ibid.*). While HWBs can refer CCGs to NHS England if local commissioning plans do not adequately account for the JHWS, the HWB holds no power over local authority commissioners or NHS England (*Ibid.*). Their power over local commissioning is limited to informal influence.

Although there is no requirement for HWBs to address climate change, the formation of the boards establishes an important forum for collaboratively taking action to mitigate and adapt to the climate challenge. Moreover, the combination of the JSNA and the JHWS holds great potential to co-ordinate policies to mitigate and adapt to climate change across a locality. The Environment Agency's Under the Weather toolkit notes that:

> Health and wellbeing boards are in a unique position to provide leadership for climate change adaptation to improve the health and wellbeing of local communities. The strategies and assessment undertaken by them to establish commissioning priorities provide an important tool for influencing this wider agenda, in addition to delivering on health commitments.
> Climate Ready (2014)

Evidence to date

Since the shift of public health to local government is recent, there is little existing evidence of whether they are implementing actions to mitigate and adapt to climate change at the local level. A small number of studies have looked at how public health and HWBs have addressed the wider determinants of health in general, particularly work by the Local Government Association (LGA), the SDU and the King's Fund.

The LGA examined the transfer of public health into local government nine months after the formal transfer through a series of case studies. The authors note that 'it is striking how many local authorities are taking a whole-council approach to public health'. Actions to embed public health across the council include: other departments taking on responsibility for indicators in the PHOF; giving Public Health

departments additional responsibilities in areas such as leisure and environmental health; and forging stronger links with district councils (LGA, 2013).

In 2013, the King's Fund surveyed HWBs one year on from their formation by administering an online survey to the 152 local authority areas. The authors note that 'there was great emphasis among the answers on the six policy objectives set out in the Marmot review of health inequalities in England', with a particular emphasis on 'giving every child the best start in life' (Humphries and Galea, 2013).

In 2014, the Environment Agency's Climate Ready support service surveyed HWBs about their climate adaptation plans, to inform the SDU's national review of climate change adaptation responses in the health system. Out of the 152 areas surveyed, 29 boards responded. Of the 29 responses received, 20 either agreed or strongly agreed that the risks and opportunities for health and wellbeing from a changing climate and extreme weather events were being assessed. Some 18 of the 29 survey respondents (i.e. over 60%) either agreed or strongly agreed that local plans were in place to address the negative impacts to health and wellbeing as a result of the changing climate and extreme weather. However, it is worth bearing the low response rate in mind: results may be skewed in favour of positive responses, since those with strong climate change plans were more likely to have been motivated to respond (SDU, 2015).

The SDU's review also concluded that:

> The health sector is clearly at an early stage of development in relation to climate change adaptation. It recognises the need to prepare and respond to extreme weather events and that doing so sustainably will reap greater benefits for all. Some plans and mechanisms are in place however it is not yet systematic or fully integrated into local health systems or national roles.
> SDU (2015)

Conclusion

Although the direct impacts of climate change are likely to be much less severe in the UK than elsewhere, climate change nevertheless poses direct and indirect threats to health, including heat-related illness and death; flood-related illness and displacement; increases in food-, water- and vector-borne diseases; health impacts relating to air quality and aeroallergens; and skin cancer and sunburn. Impacts are likely to be most acute where high social vulnerability coincides with high exposure to climate hazards. Moreover, lower-income households are more susceptible to negative impacts from climate change (for example, because of rising food prices due to disrupted food production overseas disproportionately affecting their household budgets), and policy and practice responses at home (for example, if energy policies add costs to bills that, again, disproportionately impact them compared to those with higher incomes).

Although there is a lack of statutory requirements for public health departments to mitigate and adapt to climate change, a number of national initiatives encourage climate action by the health and social care sector locally. Moreover, many structural changes to public health outlined in the Health and Social Care Act – notably the shift of public health into local government, and the formation of HWBs – represent a significant opportunity for co-ordinated climate action locally.

There is little existing evidence about whether public health departments are implementing action to mitigate and adapt to climate change. However, a small number of studies suggest that action is being taken to address the wider determinants of health in general. According to one study, some public health departments are also beginning to pursue the climate mitigation and adaptation agenda locally.

The next chapter begins to plug the research gap by examining how public health and their partners in local government and the wider health sector are identifying needs and establishing strategies to adapt to and mitigate climate change.

3 Strategies for mitigating and adapting to climate change

As a first stage towards assessing whether the shift of public health into local government is promoting collaborative action to mitigate and adapt to climate change, a rapid review of JSNAs, JHWSs and climate strategies from 20 areas was conducted (areas listed in Table 1 below). As noted earlier, the sample sought to cover those areas facing a range of potential issues of climate disadvantage across different regions in England, and to include a mix of urban, rural and coastal areas. (See research methods section in Chapter 1 for more information.)

JSNAs and JHWSs (driven by HWBs) were reviewed according to how far they:

- acknowledged the risks of climate change to public health;
- set out strategies to mitigate climate change including: explicit mitigation strategies, and implicit strategies with mitigation benefits (strategies to reduce fuel poverty, air pollution, active travel and sustainable food systems, for instance);
- set out strategies to adapt to climate change: explicit adaptation strategies for extreme weather now or in the future, or implicit strategies with adaptation benefits (strategies to improve green space and community resilience, for instance);
- acknowledged the effects of climate change on vulnerable communities; and
- contained evidence of collaborative working across sectors at a local level.

Climate change strategies, where applicable, were then reviewed according to how far they:

- recognised the risks of climate change to public health;
- made reference to local JSNAs or JHWSs; and
- contained evidence of collaborative working with the health sector.

Table 1: Climate disadvantage by sample area[2]

Sample area	River and coastal flood disadvantage	Surface water flood disadvantage	Heat disadvantage	Fuel poverty
Birmingham	Medium	Medium	Extremely high	High
Blackburn and Darwin	High	High	Relatively low	High
Buckinghamshire	Low	High	Average/ relatively high/ extremely high	Low
Dorset	High	Medium	Average	Low
Essex	High	High	Average/ extremely high	Low
Hackney	High	Low	Acute	Low
Haringey	Low	High	Acute	Medium
Herefordshire	High	Low	Average/ relatively low	High
Kingston upon Hull	High	High	Relatively high	High
Islington	Low	High	Acute	Low
Leicester	High	High	Average/ relatively high	High
Middlesbrough	Medium	Low	Average	High
Newcastle	Low	Low	Average	High
North East Lincolnshire	High	Low	Average	Medium
Oldham	Low	High	Average	High
Somerset	High	High	Average/ relatively high	Low
Sheffield	Medium	High	Average/ relatively high	High
Wakefield	High	Low	Average/ relatively high	Low
Warrington	High	Low	Average/ relatively high	Low
Windsor and Maidenhead	High	High	Relatively high	Low

Source: analysis of local authority data on proportion of neighbourhoods facing extreme climate disadvantage from www.climatejust.org.uk/map. See Note 1 for details.

Recognition of climate change as a public health issue

Out of the 20 JSNAs reviewed, eight explicitly referenced climate change and its possible effects on health within their JSNA. In four of these cases, climate change was not covered in any detail and was only mentioned in a cursory manner. In four, however, climate change was discussed in more depth.

While climate change was occasionally cited within JSNAs, this awareness rarely translated into JHWSs. Out of the 20 areas' strategies reviewed, only two explicitly cited climate change in their JHWS. Even in these two areas, the strategies were broad and high level, rather than operational and action-orientated (Box 3). The lack of climate change inclusion within JHWSs reflected a general pattern whereby JSNAs tended to be wide-ranging and JHWSs were narrower in focus and scope.

Box 3: Recognition of climate change

Newcastle's JHWS included climate change as a 'cross cutting issue':

> Climate change will bring more frequent and severe extreme weather events resulting in increased flood risk and potential overheating. We will prepare for these impacts by making sure the settings in which people live, work, learn, play and use services are resilient to this changing environment.

Warrington's JHWS outlined intentions to 'work in partnership to reduce our CO_2 emissions and ensure we are as prepared as possible to deal with the impacts of climate change and other threats'.

Mitigation

Of the JSNAs and JHWSs reviewed, many included measures that are relevant for the climate change agenda, but were not badged as such. Efforts to curb fuel poverty and air pollution were the most frequent examples. Overall, however, issues identified in initial needs assessments through JSNAs were not reflected in strategic responses in JHWSs.

Out of the 20 areas reviewed, 18 included an assessment of fuel poverty in their JSNA. Yet high awareness of the impact of fuel poverty upon health did not always translate into strategies to tackle it; only 11 out of the 20 JHWSs reviewed included a fuel poverty component. A number of these strategies were broad and high level. It should also be noted here that since specific action-oriented approaches were rarely set out, we cannot tell whether subsequent actions on fuel poverty contribute to environmental goals (e.g. if a strategy recommends poverty alleviation measures to offset fuel bills, or energy efficiency measures such as home insulation that could help to reduce emissions).

Air pollution was covered in 13 JSNAs, yet only three air pollution strategies were outlined within JHWSs. Active travel was covered in 13 JSNAs. Only eight areas, however, included active travel within their JHWSs. A more infrequently cited synergistic measure was sustainable food production (two JSNAs and three JHWSs).

Examples of areas where issues were identified are set out in Box 4.

Box 4: Identifying issues linked to mitigation

Islington's JSNA includes a subsection on Seasonal Health and Affordable Warmth (SHAW), which sets out the risks of cold weather to health, including: key facts, figures and issues; the current services and programmes available to alleviate fuel poverty; and future targets, including fuel poverty referrals and home energy efficiency improvements.

Haringey's JSNA cites air quality and its effects on health and wellbeing. The JSNA outlines levels of air pollution in the borough, and the evidence base for the links between poor air quality and poor health.

Newcastle assesses the extent of active travel in the borough in their JSNA, while its JHWS outlines a commitment to support active travel options as an employer.

Climate impacts and adaptation

Overall, three areas cited the adverse effects of heat on the health of the current population within their JSNA, while five areas cited the adverse effects of heat as a result of a changing climate. Only one JHWS outlines any heat adaptation strategy.

Four areas considered the risk of flooding to their current populations, while four areas noted how this was likely to change in the future as a result of climate change. No JHWS outlined explicit plans to adapt to the effects of flooding.

Box 5: Adaptation assessment

Essex's JSNA cited the dangers of heat to seasonal health:

> Seasonal deaths are an important public health concern which sees an increase in mortality among older people. These deaths mostly occur during winter but also during heat waves.

Similarly, Islington's SHAW JSNA chapter noted the dangers of heat during the summer:

> Excess seasonal deaths (due to extreme hot and extreme cold weather) can affect the entire population but certain groups are more at risk such as the very young, elderly and those with long-term conditions. [...] those with respiratory conditions and CVD are the most at risk when the weather is very hot.

Newcastle's JSNA assessed the risk of surface water flooding in the city, and how critical services – schools, hospitals, social care homes, police stations, fire and ambulance services, prisons, sewage and electricity installations – are likely to be affected in the event of a flood.

Despite the lack of an explicit strategy to adapt to flooding and heat, many needs assessments – and some strategies – included green space initiatives, as well as measures to improve social connectedness, which have benefits for adaptation to extreme weather as well as wider health benefits.

Green space was cited in 11 out of the 20 JSNAs reviewed. Four areas included green space in their JHWS. Of the 20 areas, 14 noted the importance of social capital, community resilience, community connectedness, community cohesion or social networks in their JSNAs. Some 13 areas included strategies to improve social connectedness within their JHWSs. (See Box 6 for examples of adaptation).

Box 6: Adaptation measures

Newcastle's JSNA contained a substantial subsection dedicated to green space, including an analysis of the accessibility and use of green space in the city. In its JHWS, Newcastle noted that streets 'need to provide a layout, shops, services, parks and green spaces that make active living and healthy eating easy to do'.

Blackburn and Darwin's JSNA noted the link between family and community social capital, and health and wellbeing. Their JHWS included a commitment to:

> Develop and implement a more strategic approach to prevention and early help for older people, which will include commissioning initiatives to build social capital and strengthen opportunities for older people to engage with social networks within their neighbourhoods and communities.

Vulnerable populations

Out of the eight areas that acknowledged the health effects of climate change within their JSNAs, three explicitly noted the undue effects of climate change upon vulnerable populations (see Box 7).

Box 7: Vulnerable populations

Hackney's JSNA noted that 'without urgent action climate change will inevitably have the greatest impact on people living in poverty, both in the UK and globally'.

Middlesbrough's JSNA estimated that 'climate change will have a disproportionate impact on disadvantaged, vulnerable and deprived groups compared to the rest of the population'.

Fuel poverty, as noted earlier, is a common theme in many JSNAs and JHWSs. Ten out of the 18 of those touching on this theme recognised the impact of fuel poverty on vulnerable populations (see Box 8).

Box 8: Fuel poverty and vulnerable populations

Warrington's JSNA noted that:

> Fuel poverty has damaging effects on health and quality of life. Research identifies that certain groups are particularly vulnerable with regards to fuel poverty and the adverse effects of cold housing. These include older people, particularly those living on their own, lone parents, young children, disabled people and families where adult members are either unemployed or working on a low income.

Islington's JSNA warned that:

> Excess seasonal deaths can affect the entire population but certain groups are more at risk such as the very young, elderly and those with long-term conditions.

Evidence of collaborative working

Most JSNAs and JHWSs cited the necessity of collaborative working on public health issues, especially on the wider determinants of health. Encouraging collaborative forms of working is a statutory duty of the HWB, and documents produced by the boards reflect this. Specific collaborative commitments to tackle climate change were rare, however. Only one JSNA committed to collaborative working to tackle climate change (see Box 9).

In the 20 areas reviewed, 13 had local authority-wide climate change mitigation strategies, and eight areas had adaptation strategies. The vast majority (15 out of 17) of these documents recognised the link between public health and climate change, either because of the risk posed to health by a changing climate, or because of the public health opportunities presented by efforts to tackle climate change.

Only four areas' climate change strategies contained evidence of collaborative working. Newcastle's climate strategy, for instance, includes a strategic outcome to 'improve the ability of health services to prepare for and adapt to extreme weather events'. In Birmingham there was also evidence of links being made across different stakeholders, with actions for public health, the Birmingham Environmental Partnership, and the Birmingham Health and Wellbeing Partnership.

It was uncommon for climate change strategies to link to JSNAs or JHWSs (one out of 17), or for JSNAs and JHWSs to link to climate change strategies (one out of 17). It should be noted, however, that many of the areas' climate change strategies were written before the Health and Social Care Act 2012 (nine out of 17) and had not been updated at the time of this research.

Box 9: Collaboration

Middlesbrough JSNA made an explicit reference to the area's One Planet Living strategy and committed to collaborative working to promote it. Their JSNA noted a commissioning intention to:

> implement through partnership working the One Planet Living Action Plan to bring public health benefits, enhance quality of life and reduce burdens on health services.

And to:

> raise awareness about the importance of greater integration of the climate change, One Planet Living and public health agendas to recognise mutual benefits of greater joint working.

Table 2: Summary of document review by area

Area	Climate change		Heat now		Heat in the future		Flooding now		Flooding in the future		Fuel poverty		Air pollution		Active travel		Food production		Green space		Resilience*		Mitigation or adaptation plan	Links climate change and health	Cites JSNA or JHWS	Evidence of collaboration with health
	Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs)																						Climate Change Strategies (CCSs)			
Birmingham																										
Blackburn and Darwin																										
Buckinghamshire																										
Dorset																										
Essex																										
Hackney																										
Haringey																										
Herefordshire																										
Kingston upon Hull																										
Islington																										
Leicester																										
Middlesbrough																										
Newcastle																										
North East Lincolnshire																										
Oldham																										
Somerset																										
Sheffield																										
Wakefield																										
Warrington																										
Windsor and Maidenhead																										
Total	8	2	3	0	5	1	4	0	4	0	18	11	13	3	13	8	2	3	11	4	14	13	15	15	1	4

Joint Strategic Needs Assessment

Joint Health and Wellbeing Strategy

Climate Change Strategy

* Or connected concepts: social capital, community resilience, community connectedness, community cohesion or social networks.

Good practice

There were a number of examples of especially good practice within the document review sample:

- Newcastle: Newcastle's Future Needs Assessment includes an in-depth consideration of the impacts of climate change and the environment as a determinant of health, with a separate chapter on the global ecosystem, the natural environment (green space and air quality), the built environment (including homes and fuel poverty) and environmentally friendly lifestyles.[3]
- Warrington: Warrington's JSNA includes a sub-section on the wider environmental context. This chapter delves into the potential impact of climate change in the area and outlines a number of priorities for commissioning.[4]
- Middlesbrough: Middlesbrough's JSNA includes a chapter on the environment as a wider determinant of health, which covers the risks of climate change. The JSNA also outlines a number of commissioning priorities including working in partnership, raising awareness and ensuring that public services lead by example.[5]

During the process of the research, a number of good practice examples from areas outside of the review sample were identified, including:

- Kent: Kent County Council's JSNA has a section entitled 'health, wellbeing and sustainability' that includes recommendations to enhance partnerships and joint action, to embed sustainability within all policies, and to embed sustainability into all aspects of new service procurement. Kent County Council's sustainability and health working group published its *Joint Strategic Needs Assessments: a guide to integrating sustainability*. The guide 'aims to support partnership working in the integration of sustainability into the JSNA and demonstrate the clear benefits of this approach'.
- Sheffield: Every year, each Director of Public Health publishes a report on the health and wellbeing of the local population. In 2014, Jeremy Wright, then Director of Public Health at Sheffield City Council, chose to write his report on climate change and health. The report focuses on: why climate change is a threat to health; how it will affect health in Sheffield; and what Sheffield City Council should be doing about it (including tackling physical inactivity and obesity, active travel, reduced meat consumption, fuel poverty and creating warmer homes, increasing social capital, strengthening the local economy, and developing a low carbon health and social care system).

Conclusion

JSNAs and JHWSs now play a pivotal role in the health and social care system in England, and provide an important tool for public health teams, HWBs and local authorities to co-ordinate policy and action to mitigate and adapt to climate change across a locality. Although there is no statutory duty to include climate change within these documents, a number of national initiatives – such as the government's NAP and the Environment Agency's Under The Weather toolkit – have encouraged areas to do so.

Our review found that, although the risks of climate change to public health are occasionally acknowledged with JSNAs, this awareness is rarely reflected in subsequent JHWSs, and climate change is not a mainstream issue. While nearly one-third of JSNAs recognise climate change as a concern, only one in ten are identifying it as a strategic priority in their JHWS. Explicit, action-oriented strategy to mitigate and adapt to climate change is uncommon.

Measures that hold the potential to both mitigate climate change (i.e. reductions in fuel poverty and active travel schemes) and adapt to climate change (i.e. green space initiatives and measures to build more resourceful communities) are frequently included within JSNAs. However, these are usually included for their health benefits, while their relevance to climate change is rarely acknowledged. Once again, inclusion of issues with JSNAs seldom translates into JHWSs.

It is important to recognise that the inclusion of an issue within both JSNAs and JHWSs does not necessarily mean that action will follow, as HWBs lack both executive powers and a commissioning

function. Moreover, many areas developed their JSNAs and JHWSs shortly after the shift of public health into local government, and have not yet refreshed these documents. It is possible that practice has since moved on. There is also some disconnect with local climate change strategies, which often precede the newer health-related strategies, and scope for greater connection when strategies are refreshed.

In order to look beyond strategies to assess whether action to mitigate and adapt to climate change is being taken, the next chapter sets out the findings from a series of case studies in five areas chosen for further engagement, to support a more detailed understanding of work underway at the local level.

4 Actions to mitigate and adapt to climate change

This section of the report describes actions being taken by public health departments and their partners within the five areas chosen for further engagement. (See research methods section in Chapter 1 for information on sample selection.)

Case study 1: Oldham

Oldham is a metropolitan borough of Greater Manchester in the north-west of England. Oldham has a high proportion of surface water flood disadvantaged neighbourhoods, and also a high proportion of fuel poor neighbourhoods (see Table 1).

Oldham's JSNA assessed the level of fuel poverty in the area, and its JHWS noted a fuel poverty initiative in the area. Public health officers at Oldham Council have been active in a number of initiatives that contribute to climate mitigation in the area, including initiatives to improve active travel, access to green space and food growing, as well as action to reduce fuel poverty.

Two of the main strands of work – fuel poverty and food growing – are explored below.

Fuel poverty

Warm Homes Oldham aims to bring together the disparate strands of help available for those in fuel poverty.[6] If a resident is struggling to heat their home, a member of the Warm Homes Oldham team will be sent out to assess the resident for:

- physical energy efficiency improvements through ECO grant funding, including loft and cavity wall insulation, solid wall insulation, hard to treat cavity insulation, new boilers and heating controls;
- behaviour change advice on how to use their system more efficiently and understand heating controls; and
- income maximisation advice, including help applying for grants to alleviate fuel debt, help with tariff switching, help getting off prepayment meters, and checking entitlement to benefits.

Older residents get a follow up visit from Age UK, which fits additional upgrades – from radiator panels to energy saving light bulbs – and provides additional preventative services as necessary, ranging from befriending schemes to a handyman service.

All three main partners in the programme – public health, the CCG and Oldham Housing Investment Partnership – signed a joint agreement to fund the project with an initial £200,000 investment, and re-invest savings back into the project each year. At the beginning of the project, it was anticipated that the NHS would stand to gain the biggest savings from the initiative, and so it pays £250 for every person brought out of fuel poverty, while public health pays an extra £50.

In a video on the Oldham Council website,[7] Dr Naseem T. Gill, NHS Oldham, notes that:

> A particular benefit from the scheme is that of the collaborative working that's occurring. And that's collaboration between the health sector, social services and housing associations. We know that no one organisation is responsible for the wellbeing of patients, and therefore collaborating in this way is not only unique, but also provides a more holistic way of improving the health and wellbeing of the population of Oldham.

The target set for the first year of the project was to lift 1,000 people out of fuel poverty. This figure was exceeded by 74 people. The target set for the second year of the project was to lift 1,200 people out of fuel poverty, which was exceeded by 47 people.

The Centre for Regional Economic and Social Research (CRESR) at Sheffield University has been commissioned to evaluate the impact of the scheme using pre- and post-intervention questionnaires about health and wellbeing. Twelve in-depth case studies of people using the schemes have also been developed. The evaluation demonstrated positive gains in perceived health impact, general health and wellbeing, mental health and energy spending.

Since the start of the programme, households using the service have been asked to sign consent forms to enable access to health records. Analysis of this data is being used to understand changes in physical and mental health following the intervention.

Food growing

Get Oldham Growing began in 2014.[8] Recognition of the high levels of food poverty in the area led to a public consultation on the issue. Get Oldham Growing was subsequently set up to encourage partnership working between the council and residents, community groups and local organisations to encourage and facilitate food growing across Oldham.

So far, growing 'ambassadors' – local residents who are able to provide peer support to those wanting to start their own growing projects – have been established in each of the five wards in Oldham. The council is now identifying land that can be developed as hub areas for growing projects. The idea is to redevelop the land and encourage growing projects, with groups generating their own revenue by selling food and flowers, and setting up onsite cafés.

The project is driven and funded primarily by public health officers, who work closely with the environmental services and green space teams to identify hub areas and negotiate access to the land. Environmental services have also contributed funding to the programme.

Case study 2: Islington

Islington is a borough of Inner London. It has a high proportion of neighbourhoods facing extreme surface water flood disadvantage and acute levels of heat disadvantage. Table 1 states that Islington has a low proportion of fuel poor households; however, the measure used (the 'high cost, low income measure') has been criticised for under-representing small households. Given Islington's urban locality with high-density homes, this measure is likely to under-represent fuel poverty in the borough.

Islington's JSNA includes an assessment of fuel poverty, heat and air pollution. Its JHWS sets out a strategic commitment to encourage active travel. Public health staff have also been active in many other climate mitigation and adaptation actions: they have taken action to improve access to green space and sustainable food, and have emergency hot and cold weather plans in place. Islington has a dedicated SHAW team.[9] Although SHAW sits within the environment department and has its own dedicated budget, it works closely with public health – receiving funds as well as sharing capacity and time. SHAW's work on fuel poverty and seasonal heat is explored below.

Fuel poverty

Most of the SHAW team's work is dedicated to tackling fuel poverty with the aim of reducing seasonal excess mortality and morbidity, including the following programmes:

- The Seasonal Health Interventions Network (SHINE): more than 90 organisations across the borough refer clients to the SHINE team, who then make contact and assess the resident for a range of 30 potential services, ranging from grants for heating and insulation, to support with bills and energy debt, from benefits checks to befriending services, and air quality alerts. SHAW have also been externally insulating an estate in Islington, which the Public Health team have been evaluating.

- Well Winter Campaign: each winter the council works with the community and voluntary sector to contact hundreds of older, vulnerable residents and offer them support through the winter. This involves targeted door-knocking to raise awareness of public health interventions.
- Warmth on Prescription: SHINE has been given a grant from the Department of Energy and Climate Change for a Warmth on Prescription scheme. Residents will be referred by health and social services when they are seen to have serious health conditions and be in need of help. SHINE will then carry out household energy efficiency improvements.

Heat

Although the main policy driver behind the SHAW team's work is fuel poverty and its impact on health, they have also examined the effects of summer heat. Programmes include:

- The Climate Resilience Islington South Project (CRISP): the aim of the CRISP initiative is to assess how vulnerable residents cope in hot weather and how they can be better prepared. The project surveyed 450 vulnerable households in the area, finding that most people did not recognise the potential effects of hot weather upon their health.
- Cool It: this involved a series of presentations for community groups focused on behaviour change as a way to increase resilience.
- Mapping Urban Heat Risk: SHAW has worked in collaboration with the engineering firm Arup to identify and explain the factors contributing to urban heat risk, to map and visualise the risk factors, and to develop responses to address these risks.

Case study 3: Wakefield

Wakefield is a metropolitan district of West Yorkshire in the Yorkshire and the Humber region of England. Wakefield has a high proportion of neighbourhoods facing river flood disadvantage and average to relatively high levels of heat disadvantage (see Table 1).

Wakefield's JSNA includes an assessment of fuel poverty and need for active travel within the borough. Public health officers are now driving strands of work to improve air quality, focusing on pollution from transport sources, and working with planning, transport and housing colleagues to tackle carbon emissions. Details of this strand of work are explored below.

Air pollution

The public health department at Wakefield Council was involved in the development of the West Yorkshire Low Emissions Strategy, which aims to bring about co-benefits for health and climate by lowering emissions and improving air quality, by transforming transport in the borough. The strategy has four themes: building an evidence base (to prove the benefits of low emissions to health and climate); creating a low emissions future; reducing transport emissions (improving private and public fleets as well as encouraging active travel); and reducing non-transport emissions (industrial emissions as well as low-CO_2 alternatives that have negative health impacts).

Public health officers have been active in implementing the strategy, sitting on a regional air quality group, engaging with a regional air quality learning set, and attending national Public Health England workshops on air pollution. The public health and transport teams are currently writing a joint strategy to enable joint working to promote safer, healthier, more sustainable forms of travel.

In addition, public health is active in a sustainability partnership made up of a range of organisations including Wakefield Council, Wakefield District Housing, Wakefield College, Wakefield CCG, West Yorkshire Police and Groundwork Wakefield. Each year the group publishes a sustainability guide focusing on good practice in the area, covering sustainable housing and public buildings, electric vehicle infrastructure and sustainable travel.[10] The guide highlights a number of public health projects, including work to encourage active travel through Wakefield Health Rides (guided cycle routes through the district) and Wakefield Health Walks (guided walking routes).

Case study 4: Somerset

Somerset is a county in south-west England with low levels of fuel poverty, high levels of river, coastal and surface water flood disadvantage, and average to relatively high levels of heat disadvantage (Table 1).

Somerset's JSNA includes an assessment of fuel poverty and its JHWS includes active travel and sustainable food growing. There are strands of work to improve active travel in the county, and plans in place to deal with hot and cold weather. The public health department at Somerset County Council has been involved in responding to the floods of winter 2013/14 and ensuring the resilience of the population to future weather shocks.

Flooding

In 2013/14, the Somerset Levels and Moors experienced a severe flooding event. Huge parts of the Somerset Levels were under water for a period of months, with residents of the Moorland, Chadmead and Fordgate areas forced to leave their homes (Environment Agency, 2015). After the flood, Somerset County Council, local MPs, businesses and residents drew up the Somerset Levels and Moors Flood Action Plan.[11] This is a strategy for adapting to floods in the area, which includes plans to dredge the rivers Tone and Parrett, increase drainage, and invest in flood management and infrastructure. The floods received high-level political attention, with David Cameron commenting that 'money is no object in this relief effort'. The government later provided £20.5 million towards the estimated £100 million cost of the action plan, with £10 million coming from the Department for Food and Rural Affairs, £10 million from the Department for Transport and £500,000 from the Department for Communities and Local Government.

One of the key aims of the plan is to build local resilience, which is concerned with 'helping people [to] help themselves and each other to reduce vulnerability', by recovering from the floods, and preparing and adapting for possible future floods. Public health officials at Somerset County Council have played a key role in supporting the community resilience strand of the action plan, for example by placing 'wellbeing workers' in villages to deal with the long-term effects of the flooding on mental health. They have worked with the Civil Contingencies team to set up the Housing and Health Recovery Group. This is a network of support for people whose homes were damaged by the floods. It operates through village agents, who act as the first port of call for people in need of help, distributing funds and referring people to the relevant services.

Public health officials are also involved in the Community Resilience in Somerset Partnership (CRISP), made up of members of the Council, the Environment Agency, and Devon and Somerset Fire and Rescue Service among others, to help communities plan and prepare for flooding and other emergency events.[12] CRISP helps communities to develop emergency plans by identifying local risks and hazards, locating local vulnerable people, and finding local resources, equipment and materials. They also provide case studies of other community resilience projects and small sums of money for equipment.

Public health staff at Somerset County Council are now working closely with Public Health England to study the effects of flooding on mental health in the area.

Case study 5: Middlesbrough

Middlesbrough is a unitary authority in the north-east of England. The area has medium levels of river/coastal flood disadvantage, average heat disadvantage and high levels of fuel poverty (Table 1).

Middlesbrough's JSNA notes the risks of climate change, including flooding, heat, skin cancer, rising food costs, air pollution, and changes in pathogens and pests. Middlesbrough's JSNA includes assessments of green space, energy efficiency and active travel. However, the JHWS includes no explicitly climate-related strategy.

Public health officers have undertaken a variety of climate mitigation actions in collaboration with Middlesbrough Environment City (MEC).

Mitigation

MEC was originally formed when Middlesbrough was named one of four Environment Cities as part of a competition to find innovative ways to manage cities sustainably.[13] The charity works closely with partners to deliver a diverse range of projects each year using the One Planet Living approach. The basis of One Planet Living is that if everyone consumed resources as we currently do in the UK, we would need three planets to sustain us. One Planet Living consists of ten principles that are designed to enable individuals, communities and organisations to become more sustainable. Health and wellbeing are key One Planet Living principles, as are equity and local economy, culture and community, land use and wildlife, sustainable water, local and sustainable food, sustainable materials, sustainable transport, zero waste and zero carbon.

MEC works closely with public health by sharing funding, capacity and time to draw out the synergies between health and climate change, and deliver projects contributing to healthy, sustainable communities. In 2013/14, funded by public health, MEC delivered a range of fuel poverty, food growing and active travel schemes, including:

- Support for vulnerable people to access home energy efficiency measures: MEC has supported 595 households with cavity wall insulation, external wall insulation, and loft insulation and boiler replacements. It has trained over 150 residents and front line workers as 'energy champions', enabling them to give advice on basic energy efficiency to their neighbours and clients, and to refer residents at risk of cold- and damp-related illnesses to available services within the area.
- Promotion of healthy, sustainable food: MEC, along with Middlesbrough Council Public Health, Teesside University, Thirteen Group Housing and others, formed the Middlesbrough Food Partnership. The partnership has developed a Food Action Plan around six themes: health and nutrition, local and sustainable food, reducing food waste, tackling food poverty, education and skills, and a strong local food economy. In addition to the food partnership, Middlesbrough Public Health and James Cook University Hospital, together with Teesside University, and Middlesbrough and Askham Green Colleges, are exploring the potential of large-scale local food buying.
- Urban farming: public health has funded MEC to deliver the town's Urban Farming programme for growing food in public spaces, culminating in an annual 'town meal' event. The project aims to raise aware of food miles and encourages the productive use of green space.
- Healthy Cooking: this project provides culinary training in the community, to raise awareness of the benefits of cooking at home, and to encourage people to use local and seasonal produce.
- Active travel: two strands of work funded by public health include Hearty Beats and Emerging Communities. Hearty Beats works with primary schools through a programme of physical activity, cycling, food growing and healthy eating, aimed at addressing the early signs of cardiovascular disease and promoting the links between healthy and sustainable living. Emerging Communities aims to reduce the risk of type 2 diabetes among black and minority ethnic residents through a programme of cycling, walking and support for food growing.

Middlesbrough's HWB has a series of implementation sub-groups. MEC's director sits on the Wellbeing in Middlesbrough Partnership, the implementation sub-group responsible for the wider determinants of health.[14]

Conclusion

This section of the report has described actions being taken by public health departments in the five areas chosen for further engagement.

The case studies show that, even without action-oriented strategies to mitigate or adapt to climate change, public health departments are still taking relevant action. However, this appears patchy. Rather than a rounded approach to mitigation and adaptation covering all issues, vulnerable communities and areas of disadvantage, action is focused on a limited range of concerns.

5 Opportunities and barriers for action

This section outlines the drivers, opportunities and barriers faced when implementing public health responses to climate change in the five areas chosen for further engagement. Throughout each area, the shift of public health into local government was seen as a significant opportunity for collaborative action with local authority departments responsible for a number of the environmental determinants of health. Action was said to be driven by a number of factors, some of which differed between localities. These included:

- individuals championing initiatives within the VCS, and at officer level within the local authority;
- emphasising the shorter-term benefits of activities to health and wellbeing, as well as opportunities to save money and bring in external funding;
- previous experience of collaboration between the local authority and public health;
- a track record of environmental action within the local authority;
- experience of extreme weather;
- leadership and high level buy-in; and
- national initiatives such as the PHOF.

While the shift of public health into local government presents an unprecedented opportunity for public health to influence action on climate change, there are still significant barriers to action. These differ between localities and include:

- heavy cuts to local government spending;
- the long-term, largely non-statutory nature of responses to climate change;
- a lack of strategic board and HWB backing;
- cultural differences between departments;
- difficulties funding evaluations and evidencing health outcomes; and
- local and national political indifference to climate change.

Drivers and opportunities

Public health in local government

It was evident in each of the five areas that the shift of public health to local authorities has aided collaboration between public health and local government on the wider determinants of health, including climate change. This view was universal throughout the interviews and workshops, and did not depend upon role. One Director of Public Health described the shift as a "generational opportunity".

Public health departments are now able to influence, and be influenced by, other council departments with responsibility for wider determinants of health, including in unitary areas, planning, housing, environment and transport, as well as social care, emergency planning and flood risk management.

> The shift has helped public health address the wider determinants in general. We can now get involved in the discussion, when before we were on the outside.
> Director of Public Health.

It should be noted that housing, planning and environmental health are district council responsibilities, and so will still be separate from public health except in unitary authorities. Somerset County Council was the only non-unitary authority studied in depth, and they had included representatives of the district council on their HWB. This was said to have improved relationships with the district council. District council representatives, however, are not statutory members of HWBs and so will not be present on HWBs country-wide.

Public health departments in three out of five of the case study areas had funded other council departments to deliver strands of work with climate mitigation and adaptation synergies. Public health at Islington Council had previously funded the SHAW team, for instance, while public health at Oldham Council continues to part-fund the Warmer Homes Oldham Project (see Chapter 4). Both funding other departments and jointly funding initiatives was said to be easier since the shift.

> Public health is well linked in with all departments within the council, and now has greater influence over the wider determinants. Public health funds a lot of other departments to deliver public health outcomes. I can't imagine this happening when public health was in the NHS.
> Public health officer

While public health departments delivered their own climate action and funded other council departments and external organisations to do so, there was consensus among areas that most of their collaborative work on the issue was about engaging and influencing what is going on elsewhere in the council:

> It's more about how are we going to influence action, not necessarily how we are going to spend a certain amount of money. It's about influencing other departments and making sure there is a public health aspect to their work.
> Public health officer

Merely being in the same building as other council departments was said to be a huge opportunity for collaboration. One public health officer spoke about the relationships that were being built because of the close proximity of teams within local government buildings, and the increased avenues of communication this presented:

> The shift of public health has significantly helped with collaborative working, both because we are in the local authority which is the key lead on many of these areas and because we share a physical space. I have environmental health, planning, travel all within the same building. The relationship with environmental health is particularly strong because I can just walk down stairs and talk to them.
> Public health consultant

> We are now better able to work on 'culture change' with other departments, influencing departments such as planning to take account of the wider determinants of health.
> Public health officer

Many participants noted that collaboration will only get stronger as relationships develop and public health departments get used to the environment and culture in which they now find themselves.

Local champions

In the majority of areas studied, a number of strands of work were said to be driven by officers taking the initiative, rather than as a result of strategy.

> There are various ways in which departments can drive action and work together without that high level strategy.
> Public health strategist

In two out of the five areas studied, it became clear that the role of a particular local champion was of paramount importance. These local champions were not from within the public health team, but were

successful in engaging public health in the climate change debate, drawing out the synergies and securing funding.

One local champion was from the VCS, while another was from inside the council. Receptive public health officials were thought to be crucial for local champions to work effectively.

> A lot of this comes down to personalities – is there someone pushing it, is there someone receptive to the pushing.
> VCS leader

Synergistic benefits

Where action was taken, it was seldom attributed to an intention to mitigate or adapt to climate change. More often, it was described as being taken because of benefits that accrue in other areas, such as health promotion or financial savings for households. Measures to reduce fuel poverty by improving energy efficiency, for instance, was said to be driven by a need to help families save money, to improve health and wellbeing, and eventually to achieve cost savings for the NHS.

> Few people will do something for the benefit of the environment. So it's more, do you want to save money, and with an added by-product of doing something for the environment. So it is reduction of carbon, but sold primarily in terms of social justice.
> VCS leader

The synergistic benefits of climate action were strong drivers in each of the areas studied. However, the particular way in which climate action was framed in terms of synergistic benefits differed according to the political make-up and priorities of the local authority.

External investment

Across each of the areas studied, the availability of funding for action on climate mitigation and adaptation was of primary importance. Where external funding was available, this was seen as an important rationale for taking action, and immediately relevant at a time of local government spending cuts. Oldham, for instance, stressed the local investment aspect of Energy Company Obligation (ECO) funding as a key driver behind galvanising high-level support and enthusiasm for their scheme across the council:

> Everyone is making cuts all the time and it's a way of bringing in investment to the borough that you wouldn't normally have. Through, for example, the £200,000 that the partners provided in the first year, it brought in over £1 million worth of external funding through ECO. As well as all the health benefits, you're also bringing in over a million pounds worth of investment.
> Housing officer

A history of environmental action and collaboration

In two of the areas studied, public health involvement in collaborative working on climate change was driven by a history of environmental action. In Islington Council, for instance, sustainability has been a key council priority for some years. This meant that there was a large sustainability team, with in-house knowledge and expertise that was able to draw out the synergies and make the case to the public health department. Middlesbrough is another example, where the One Planet Living status meant that there was strong awareness of the synergies between sustainable living and health, driven by Middlesbrough Council's One Planet Living Action Plan, with a VCS organisation leading on community engagement in the plan.

Related to this, action on climate change was occasionally driven by a history of collaborative working between public health teams and the local authority. In Islington, for instance, there was an established collaborative relationship between public health and the council preceding the recent changes. Unique to the five areas studied, public health had a team within the council long before the formal shift of public health into local government. Although such an arrangement was rare, several areas noted a pre-existing relationship as a key driving force for action.

Experience of extreme weather

In Somerset, extreme weather was the main driver of adaptation measures, although these measures were not framed in terms of climate change. Indeed, the severity of the floods of winter 2013/14 meant that public health measures supporting adaptation – such as building community resilience and mental health treatment – were an immediate necessity. Future flooding events are now at the forefront of council priorities and plans are being put in place to strengthen the resilience of the population.

As well as creating the necessity for action from public health, the severity of the flooding in Somerset drew in external resources and political capital, which are absent in many other areas. It should be noted, however, that while experience of extreme weather brought the impetus to adapt to the risk of future flooding, it has not generated any public health-driving climate mitigation responses in the area, or any adaptation responses beyond flood risk adaptation.

Leadership

High-level interest and leadership from HWBs, Directors of Public Health, elected members with a health or climate portfolio, and CCG leaders were cited as important drivers of action in some areas, although missing in several of the areas studied. High-level leadership was thought to be extremely important for gaining support and influence, and encouraging collaborative working and continued funding at a time of government cuts.

> Having senior people sign up to something from the start within the partner organisations really helped. It raised awareness of the project. It's brought this project much more to the forefront.
> Housing officer

> The Director of Public Health accepts that these things are really important. There is high-level buy-in. Those people have the budgets and the ability to influence other parts of the council. None of this would happen without buy-in from the members, the portfolio holders and those with influence. Political support is very important, without it, we would really struggle.
> Public Health Officer

Individual stories about what works were listed as an important way to achieve high-level buy-in.

> We got the head of the CCG and the Director of Public Health to go out to one of the resident's homes [...] to conduct an interview [with a beneficiary of the programme]. This is something that they still quote back to me all the time [...] real life stories have stuck in their minds.
> Housing officer

National initiatives

A number of national initiatives were said to be influential in driving action at the local level. Most frequently, the PHOF was said to play an important role in shaping the public health agenda locally in each of the areas studied. This was reflected in the results of the document review, which found that the most common forms of climate action included within the JSNAs and JHWS were fuel poverty and green space, which also have indicators within the PHOF.

Also frequently cited as important in shaping the public health agenda at the local level were the Marmot Review of health inequalities, *Fair Society, Healthy Lives,* and Public Health England's heatwave and cold weather plans. The NAP was not noted as a key influencer of action locally.

Barriers

Local government budget cuts

Between 2010/11 and 2014/15, cuts to local government budgets resulted in a 27% reduction in the sector's spending power in England (Porter *et al.*, 2014). Previous research into local government action to tackle climate change has found that in the context of austerity, as budgets are slashed and climate-related staff are made redundant, action to mitigate and adapt to climate change is being deprioritised as a local government goal (*Ibid.*). Our research confirmed this finding, with many areas citing reduced budgets as the greatest barrier to action.

> The sustainability team used to be enormous, and we were driving the green, sustainability agenda. But it has been cut enormously. Sustainability is no longer a driver. It's not a corporate or organisational objective.
> Housing officer

Both the long-term nature of climate change and the non-statutory nature of measures to tackle it have meant that climate measures have been among the first to be cut. Unlike core services with an immediate effect, climate action represents low-hanging fruit in the search for financial savings (Porter *et al.*, 2014).

> The long-term nature of it makes it hard to tackle. As you get closer and closer to operational people, their timescales get smaller and smaller. Reductions to local government budgets have exacerbated this problem. Councils are struggling to maintain short-term and essential services, meaning that longer-term issues are thrown out of the window.
> Public health consultant

Although public health budgets have previously been ring-fenced, planned cuts of up to 7% will diminish the ability to deliver any programme of work beyond those required by statute. One public health officer noted how the majority of the budget already goes towards statutory services (children's public health services, health checks, sexual health services, public health advice and health protection), and so a further cut in expenditure will make responses to climate change extremely difficult.

> Out of the budget, although national government doesn't necessarily dictate what we spend it on, we have five mandated services. We consume 80–90% of the budget on those mandated services. With cuts to public health it's barely going to cover what we need for those five mandated services. We are influenced by the conditions we live in. We don't have any flexibility or leeway to prioritise anything that we haven't been told to.
> Public health officer

High-level priorities and awareness

Although the shift of public health into local government was said to have helped in terms of collaboration between departments, the full potential of the structural changes in the Health and Social Care Act were not being realised for climate mitigation or adaptation. In most areas studied, climate change was not on the agenda of the HWB. It was often said that priorities set by national government, particularly the integration of health and social care, dominated board efforts, at the expense of the wider determinants of health.

This may be a reflection of the statutory membership of the board. Although boards are able to broaden their membership to include members with expertise in the wider determinants of health – whether housing, planning or environment – they are not required to do so. Many of the areas studied kept their board membership close to the statutory requirements. Some included housing departments, but often this was said to be because of housing's relation to social care, rather than as a wider determinant of health.

Strategy

Reflecting the findings of the first phase of the research, many interviewees in the case study areas noted that climate change strategies are not included within JHWSs. The lack of strategic backing meant that action was often driven by individual passion, commitment and perseverance at officer level.

Although individuals have been effective at driving action in many areas, this approach is not obviously sustainable longer term. Action driven by individuals is less likely to receive cross-departmental support, and is more prone to neglect due to staff turnover or financial constraint.

> The benefit of having it included in the Health and Wellbeing Strategy is that you get across the board buy-in. You get the CCG and all partners seeing this as an important issue [...] which may not be the case when you have just certain individuals championing things.
> Public health officer

Three barriers to the inclusion of climate change in JHWS were noted. One is the all-encompassing scope of the public health agenda. The national drive to tackle health inequalities has greatly expanded the role of public health, from being primarily about lifestyle and behavioural interventions, to including the wider determinants of health (the 'causes of the causes'). This led many to feel that public health is about everything in general and nothing in particular. As a result, HWBs are said to be inundated with requests from underfunded local government departments for the JHWS to include an increasingly wide and varied range of initiatives.

> GPs are so busy and under pressure, if you say climate change they aren't going to listen. There are 199 other people who want them to prevent their bit of ill health.
> Housing officer

The second barrier is the long-term implications of climate policy. Two areas noted that a long-term strategy was thought to be politically unpalatable at a time of severe spending cuts. It was impossible, they said, to sign up to long-term climate change adaptation and mitigation responses in a period of library closures and cuts to social care.

The third barrier concerns levels of decision-making. One area noted that JHWSs and JSNAs were developed and written at different levels of the organisational hierarchy. While JSNAs were developed by public health officers – with input from officers in other relevant council departments – JHWSs were developed at board level, where members felt compelled to focus on a narrower range of issues due to funding limitations and political concerns around long-term strategy (see budget cuts and strategy sections above). Since officers were typically those championing climate action locally, this goes some way to explaining why JSNAs occasionally noted the threat of climate change, while JHWSs often did not.

Culture

Cultural differences between organisations were cited as a primary barrier to collaborative action. The culture of local authorities was said to be more aligned with wellbeing and the wider determinants of health, while the culture of the NHS is predominantly about finding clinical solutions to problems of illness. This tends to shape the thinking of CCGs and still exerts an influence over public health departments.

Many participants noted difficulties engaging with CCGs about the environmental determinants of health. In terms of fuel poverty, for instance, a number of areas found it hard to obtain financial contributions from CCGs, or to get healthcare professionals to refer vulnerable residents to fuel poverty services – in spite of the potential cost savings to the NHS of preventing illness associated with cold homes.

> Health professionals have so many things to identify; my service is one of a few hundred that they have to refer to.
> Public health officer

The shared history between public health and the NHS means that currently, relationships remain strong. Over time, however, as staff move on, and public health adapts to the culture of local government, links could weaken. The shift of public health into local government, therefore, could potentially introduce a barrier between public health departments and the NHS.

Political indifference

A number of participants talked of the challenges of tackling climate change in the context of national political indifference, more so as relevant national funding streams diminished. For example, ECO once presented significant resources for tackling climate change, but ECO funding has reduced rapidly since its inception, with councils having to supplement the initiative with higher subsidies.

> One of the biggest barriers has been the constantly changing national funding streams [...] We were paying for around 10% of the heating systems that were going in. We're now paying for around 60% [...] ECO has reduced and reduced and reduced. The uncertainty around ECO funding levels makes it really hard. It's the biggest barrier we face.
> Housing officer

Signals from national government appear to be increasingly unsupportive of climate action. Since the 2015 general election, onshore wind subsidies, solar subsidies, the Green Deal initiative to insulate homes, and zero carbon homes regulations have all been cut back or dropped altogether.

Evaluation

Evaluation has the potential to drive action by demonstrating outcomes and financial savings. However, finding the funds for evaluation was said to be increasingly difficult, and the evidence needed to make a case for action was not always straightforward.

Many departments outside the health sector that were delivering programmes thought to have positive health impacts – such as a fuel poverty service initiated by a housing department – reported difficulties finding evidence of health-related outcomes. This made it harder to argue for public health collaboration and investment. Arguably, short-term, self-reported wellbeing gains are relatively straightforward to assess. By contrast, longer-term health gains are more difficult to evaluate, given the large number of confounding factors, indistinct causal pathways and problems of attribution. Part of the problem was the standard of evidence required by some CCGs and public health departments, which often require experimental, randomised control trial methodologies. Local programmes, however, are often too small and too short-term to show health outcomes when evaluated in this way.

Finally, many areas noted difficulties with data sharing arrangements. Sharing data about residents across departments, even within the same organisation, is rife with security and privacy concerns. Sharing such data with an external evaluator proves even harder. This makes objective evaluation of health outcomes a difficult task. Oldham successfully navigated this barrier by asking participants to sign a consent form at the beginning of the process, to allow access to health data (see Chapter 4 for more details), suggesting such barriers can be overcome with the right approach put in place from the start.

Conclusions

The five case studies supported the notion that the shift of public health into local government was a significant opportunity for collaborative action on climate change. This was viewed primarily in terms of the ability of public health teams to influence, and be influenced by, those council departments with responsibilities for the wider determinants of health. Collaboration was often said to involve engaging with, and ensuring a public health component to, work going on elsewhere in the council. Less frequently, public health departments were providing funding to support measures directly with other departments or organisations.

Action was said to be driven by a number of factors, some of which differed between localities. It was often due to individuals championing initiatives at officer level and within the VCS, rather than by HWBs and JHWSs. Where relevant activities have been undertaken, they were often justified by shorter-term benefits to health and wellbeing, and by opportunities to generate investment from external sources. Action was sometimes said to be driven by a history of environmental action within the local authority, and by previous experience of collaborating with the NHS. Other drivers included experiences of extreme weather events, and high-level leadership and support.

Despite the positive opportunities for collaborative action, there were still significant barriers to action. Heavy cuts to local government budgets have led councils to focus on an increasingly narrow list of priorities. Because of their long-term, largely non-statutory nature, responses to climate change seldom feature as any kind of priority. Although individual passion, commitment and perseverance have been effective in driving action in a number of areas, without strategic and high-level backing from HWBs, action on climate change is hard to sustain and prone to neglect, as funds continue to diminish.

Cultural differences between departments and organisations are seen as a significant barrier to collaborative action on climate change, particularly when comparing the NHS, influenced chiefly by a medical model of illness, with a broader approach to health and wellbeing in local government. A number of public health departments noted difficulties finding funds to evaluate programmes, while many of those outside the health sector noted difficulties finding evidence of health outcomes. Political indifference to climate change – locally and nationally – presented another barrier.

6 Conclusions and recommendations

The central question addressed by this research is whether and how the shift of public health into local government has led to public health departments collaborating with their partners, to drive action to mitigate and adapt to climate change in areas known to face climate disadvantage.

The study involved a brief review of relevant literature; a document analysis of JSNAs, JHWSs and climate change strategies in 20 areas; and engagement with staff in local authorities, the VCS and the NHS, through a series of interviews and deliberative workshops in five case study areas. Our findings point to the following conclusions:

- Although JSNAs occasionally acknowledge climate change and its effects on health, this recognition rarely translates into explicit, action-orientated strategies to tackle the issue.
- Many JSNAs acknowledge measures that have synergistic benefits for climate mitigation and adaptation, as well as for health; examples include some approaches to reducing fuel poverty, and measures to improve access to green space. However, these are cited for their health benefits, while their relevance to climate change is rarely acknowledged. And the fact that they feature in JSNAs seldom leads to their inclusion in JHWSs.
- While most local authorities have climate change strategies, and most of these documents recognise the link between health and climate change, few contain evidence of collaborative working with public health departments and HWBs. Many, however, were written before public health moved into local government. There is scope for better strategic linking in future.
- Many local authorities have been taking action irrespective of strategic backing to do so, although action has been patchy and seldom covers all of the risks faced. It tends to be due to individuals championing initiatives at officer level and within the VCS, rather than to any explicit strategic intent. Where relevant activities have been undertaken, they are often framed in terms of the shorter-term benefits that accrue to health and wellbeing, and/or to their capacity to generate investment from external sources.
- Other less frequent drivers of action include a history of collaboration between public health and the local authority, a track record of environmental action, local experiences of extreme weather events, and, in a minority of cases, high-level leadership and support.
- While the shift of public health into local government presents an unprecedented opportunity for public health to influence action on climate change as a well-evidenced determinant of health, there are still significant barriers to action.
- The full potential of the structural changes outlined in the Health and Social Care Act is not being realised for the purposes of climate mitigation or adaptation. In particular, in the majority of the areas studied, climate change is not on the agenda of the HWB, which tends to focus on a limited range of issues.
- Heavy cuts to local government budgets have led councils to focus on an increasingly narrow list of priorities. Because of their long-term, largely non-statutory nature, responses to climate change seldom feature as any kind of priority.
- Cultural differences between departments and organisations are seen as a significant barrier, particularly between the NHS, which is influenced chiefly by a medical model of illness, and local government, which takes a broader approach to promoting health and wellbeing.
- A number of public health departments noted difficulties funding programme evaluations, while many of those outside the health sector noted difficulties finding evidence of health outcomes.
- Another barrier is political indifference to climate change perceived at local and national levels.

Individual passion, commitment and perseverance have been effective in driving action in a number of areas; however, without strategic backing or collaborative cross-departmental support, action on climate change is hard to sustain and likely to be marginalised as funds continue to diminish. In order to progress the public health and climate change agenda locally, therefore, areas should ensure that:

- all of the local climate risks, and the opportunities for health presented by tackling climate change, are outlined in JSNAs;
- JHWSs subsequently set out action-orientated strategies for mitigation and adapting to all climate risks; and
- HWB members recognise the importance of tackling climate change and provide the necessary leadership to turn mitigation and adaptation strategies within JHWSs into action across the locality.

Suggested below are recommendations to encourage progress towards these goals. Three are for action at local level, while seven are for action at national level.

Recommendations for action at a local level

The examples presented in Chapter 4 suggest ways in which the case can be made successfully for including climate change within JSNAs and JHWBs, and for HWB buy-in and leadership. These are set out below, and are relevant to those who currently champion the issue locally.

1. Frame action in terms of synergistic, shorter-term benefits

Rather than talking about carbon reduction, sustainability and adaptation to extreme weather in the future, strategy and action can usefully be framed in terms of improving health and reducing health inequalities, cutting costs, improving quality of life and attracting funds from external sources. Measures to address climate change represent 'two for the price of one' in policy terms, and should be framed as such.

- Addressing health and wellbeing and reducing health inequalities: many of the actions needed to mitigate and adapt to climate change have benefits in terms of health and wellbeing. Action can therefore be linked to a number of national priorities, including the national drive to reduce health inequalities by addressing the social determinants of health, as outlined in Marmot *Review of health inequalities in* England. In addition, many local authorities are focused on responding to the negative impacts of austerity upon wellbeing. Some of these responses can be tackled alongside climate change. The well-documented 'heat or eat' dilemma shows how those on declining incomes have to choose between heating their homes to an adequate standard and eating sufficiently (Beatty *et al.*, 2014). For example, measures to improve the energy efficiency of homes can keep them warmer at a lower cost, reduce emissions and expand employment opportunities. Similarly, measures to increase local food production can improve access to healthy, affordable food and reduce emissions from food transported over large distances ('food miles').
- Cutting costs: the current financial crisis facing the NHS means that early action to prevent ill health has become a higher national priority, as outlined in the NHS Five Year Forward View (Stevens, 2014). Given the health benefits of many climate mitigation and adaptation measures, there is potential to tie action to the prevention agenda. Promoting active travel, for instance, could prevent ill health by reducing obesity and increasing general fitness. It is estimated that a 20% reduction in obesity in the UK would save the NHS £17 billion a year. (See also national level recommendation 1 below.)
- Attracting funds from external sources: while there are still some national funding streams available for action on climate change, opportunities to tap into them should be maximised. This can bring benefits on both fronts – climate and health – as well as bringing external investment into a local area. Ensuring that the local economy benefits from external investment – by using local labour to insulate and to install solar panels, for instance – holds the potential to provide more local jobs.

> Secure employment, at a minimum level of quality, has been found to be protective of health (Marmot *et al.*, 2010).

These synergistic benefits provide useful hooks to keep climate mitigation and adaptation relevant in in a time of austerity. A recent piece of research published in the journal *Nature Climate Change* found that the co-benefits of addressing climate change hold the potential to motivate pro-environmental behaviour for those both convinced and unconvinced that climate change is real, as well as for those with differing ideological outlooks. The paper concludes that 'communicating co-benefits could motivate action on climate change where traditional approaches have stalled' (Bain *et al.*, 2015).

While it is important to frame action in terms of the co-benefits of tackling climate change, it is still important to make the need to tackle climate change explicit, so that thinking about all programmes through the lens of carbon reduction and climate adaptation becomes routine in appraising all options for public health intervention. The co-benefits of tackling climate change and the intrinsic need to tackle the issue should sit side by side.

2. Develop or improve approaches to evaluation

Evaluation was found to be a key opportunity for progress, since evidencing outcomes was of primary importance for making the case for action and gaining support from directors, elected members and HWBs.

Although finances are squeezed and funds for evaluation are hard to come by, useful evidence can be collected using a range of methods that need not be resource intensive. Recent research has shown that public health policy-makers use a range of types of evidence. Qualitative, survey and questionnaire data were found to be used more frequently than systematic reviews, or experimental and meta-analysis data and evidence (Oliver and de Vocht, 2015). In Oldham, for instance, pre- and post-intervention subjective health questionnaires, combined with qualitative case studies highlighting human impacts, proved to be powerful in gaining continued high-level support and funding. (See also national level recommendation 6 below.)

3. Highlight and share examples of good practice

Highlighting examples of good practice from other local authorities can help to illustrate the synergistic benefits of tackling climate change and demonstrate what is possible. Some examples outlined earlier in this report – particularly work by Islington's SHAW department, the Middlesbrough Public Health and MEC collaboration, and Oldham's Warmer Homes project – are a good starting point. (See also national level recommendation 4 below.)

Recommendations for action at a national level

In addition to the steps that need to be taken at a local level, there is much that can be done nationally to encourage local responses to climate change. This research has identified the following national recommendations. These could usefully be led by the Department of Health working with Public Health England, the SDU and other relevant stakeholders.

1. Increased focus on early action

Many of our biggest societal challenges are preventable. Early action is about tackling causes rather than symptoms, and ensuring that preventable problems do not arise in the first place. While there has been much interest in early action, practice has not followed suit. As the *Early action: landscape review* noted:

> There is broad consensus that early action can lead to savings down the line, and improve people's lives. Successive government have not, however, been able to convert this consensus into effective action.
> Public Accounts Committee (2013)

In order to drive early action at a local level, the LGA has recently called for the government to provide a Prevention Transformation Fund to local authorities for investment in preventative services (LGA, 2015). Such a national drive to promote early action and prevention would provide impetus for local areas, including public health and HWBs, to tackle climate change through the kind of synergistic measures mentioned above.

2. Build knowledge and capacity for HWBs

While the Department of Health's statutory guidance on JSNAs and JHWSs does mention climate change as an issue to consider, it does so in a cursory manner. National-level encouragement of local public health responses to climate change need to be proportional to the extreme risks that climate change poses to health in England. The recent and continued experience of extreme weather events in the UK, including the flooding in both the winters of 2014/15 and 2015/16 (acknowledged to be more likely due to climate change), should reinforce this.

A stronger national approach could include updated guidance with a greater emphasis on the importance of including climate change within JSNAs and JHWSs, and knowledge and capacity building programmes for HWBs to ensure that the risks and opportunities are well understood.

3. Update the PHOF

The PHOF sets out the Department of Health's vision for the restructured health system in England. Although indicators for fuel poverty, green space, air pollution and sustainability are already included within the framework, the inclusion of explicit adaptation and mitigation measures would strengthen support for public health climate responses.

> If it's in the outcomes framework, then it becomes something that we should act on.
> Public health officer

4. Make good practice examples available online

An online resource for case studies of good practice would prove invaluable for local areas trying to make the case for climate action locally. This could be an interactive resource, where local areas upload case studies of initiatives from their area so that the resource evolves in line with action.

This could build on or evolve from existing resources, for example, the SDU website, the Environment Agency's Climate Ready resources, and the Joseph Rowntree Foundation/Environment Agency/Climate UK Climate Just website.

5. Funding stream guidance

A number of national funding streams for climate change issues – including the ECO – are still available. Guidance highlighting available funding sources would aid those wanting to champion climate issues, but who struggle to push this forward because of funding.

6. Evaluation guidance

A number of public health departments noted difficulties funding programme evaluations, while a number of council departments, outside the health sector, noted difficulties evidencing health outcomes associated with their action. Part of the problem was the standard of evidence required by some CCGs and public health departments, which was often focused on experimental, randomised control trial methodologies. However, local programmes are often too small and short-term to show health outcomes when evaluated in this way.

There is a need for a shift in the types of evaluation considered to be robust. There is a range of public health evaluation guidance aimed at exhibiting a wide range of evaluation methods. These include HM Treasury's *Magenta book* (2011) and Public Health England's Standard Evaluation Frameworks.[15] Examples of how to apply such methods in the context of climate change would help to achieve this shift.

Notes

1. Climate disadvantage is a measure developed by Lindley *et al.* (2011) to describe areas where there are both high levels of exposure to climate hazards (e.g. flooding or heat) and high levels of social vulnerability to the risks of climate change – i.e. these communities may feel particularly adverse effects on their wellbeing from extreme weather and climate change. See also www.climatejust.org.uk/map for maps informing the sampling approach.

2. These rankings are applied using data from the Climate Just website map tool: www.climatejust.org.uk/map. Local authorities were ranked according to the proportion of extreme river, coastal and surface water flood disadvantaged Middle Super Output Areas (MSOAs) in their region, and categorised as follows: 'Low' – in the bottom 40% of sample, with the lowest proportion of disadvantaged areas; 'Middle' – in the middle 40–60% of the rankings; 'High' – top 40% of sample, with greatest proportion of disadvantaged areas. Areas were also ranked according to the proportion of fuel poor households, using the official high-cost, low-income measure and categorised similarly as: 'Low' – 40% of local authorities with lowest rates; 'Medium' – middle 40–60% of local authorities; 'High' – top 40% of local authorities. Finally, areas were categorised according to their level of heat disadvantage on the following scale: 'slight', 'extremely low', 'average', 'extremely high', and 'acute'.

3. http://www.knownewcastle.org.uk/GroupPage.aspx?GroupID=62&cookieCheck=true&JScript=1

4. https://www.warrington.gov.uk/info/201145/joint_strategic_needs_assessment/1918/joint_strategic_needs_assessment_jsna

5. http://www.teesjsna.org.uk/middlesbrough-environment/

6. Warm Homes Oldham: http://www.oldham.gov.uk/warm_homes_oldham

7. http://www.oldham.gov.uk/warm_homes_oldham

8. Get Oldham Growing: http://www.oldham.gov.uk/getoldhamgrowing

9. Seasonal health and affordable warmth: http://www.islington.gov.uk/services/parks-environment/sustainability/energy-services/Pages/affordable_warmth.aspx

10. Wakefield sustainability guide: http://wakefieldfirst.com/downloads/files/140033%20Sustainability%20Guide%20LR.pdf

11. Somerset Levels and Moors Action Plan: https://somersetnewsroom.files.wordpress.com/2014/03/20yearactionplanfull3.pdf

12. Community Resilience in Somerset Partnership: http://communityresilience-ns.org.uk/wp/

13. Middlesbrough Environment City: http://www.menvcity.org.uk/

14. Wellbeing in Middlesbrough Partnership: http://www.middlesbroughpartnership.org.uk/index.aspx?articleid=11711

15. http://www.noo.org.uk/core/frameworks

References

Bain, P. G., Milfont, T. L., Kashima, Y., Bilewicz, M., Doron, G., Garðarsdóttir, R. B., Gouveia, V. V., Guan, Y., Johansson, L.-O., Pasquali, C., Corral-verdugo, V., Aragones, J. I., Utsugi, A., Demarque, C., Otto, S., Park, J., Soland, M., Steg, L., González, R., Lebedeva, N., Madsen, O. J., Wagner, C., Akotia, C. S., Kurz, T., Saiz, J. L., Schultz, P. W., Einarsdóttir, G. and Saviolidis, N. M. (2015) 'Co-benefits of addressing climate change can motivate action around the world', *Nature Climate Change*, Vol. 6, pp. 154–7

Beatty, T., Blow, I. and Crossley, T. (2014) 'Is there a 'heat-or-eat' trade-off in the UK?', *Journal of the Royal Statistical Society,* Vol. 177, pp. 281–94

Bowler, D. E., Buyung-Ali, L., Knight, T. M. and Pullin, A. S. (2010) 'Urban greening to cool towns and cities: a systematic review of the empirical evidence', *Landscape and Urban Planning*, Vol. 97, pp.147–55

Climate Ready (2014) Under the Weather: Improving health, wellbeing and resilience in a changing climate. Available at: http://bit.ly/1IkhVVG (accessed 3 February 2016)

Cohen, S. and Janicki-Deverts, D. (2009) 'Can we improve our physical health by altering our social networks?', *Association for Psychological Science*, Vol. 4, pp. 375–8

Committee on Climate Change (2014) *Managing climate risks to wellbeing and the economy.* London: CCC

Cook, J., Nuccitelli, D., Green, S., Richardson, M., Winkler, B., Painting, R., Way, R., Jacobs, P. and Skuce, A. (2013) 'Quantifying the consensus on anthropogenic global warming in the scientific literature', *Environmental Research Letters*, Vol. 8, pp. 1–7

Coote, A. (2014) *Understanding the links between social justice and sustainability.* London: New Economics Foundation

Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., Friel, S., Groce, N., Johnson, A., Kett, M., Lee, M., Levy, C., Maslin, M., McCoy, D., McGuire, B., Montgomery, H., Napier, D., Pagel, C., Patel, J., Puppim de Oliveira, J. A., Redclift, N., Rees, H., Rogger, D., Scott, J., Stephenson, J., Twigg, J., Wolff, J. and Patterson, C. (2009) *Managing the health effects of climate change*. London: University College London

Department for Environment, Food and Rural Affairs (DEFRA) (2012) *UK climate change risk assessment: government report*. London: DEFRA

Department of Energy and Climate Change (2015) *2013 UK greenhouse gas emissions, final figures*. London: DECC

Department of Health (2012a) *Local government's new public health functions*. London: Department of Health

Department of Health (2012b) *Statutory guidance on Joint Strategic Needs Assessments and Joint Health and Wellbeing Strategies*. London: Department of Health

Department of Health (2012c) *The new public health role of local authorities*. London: Department of Health

Department of Health (2013) *Improving outcomes and supporting transparency: a public health outcomes framework for England, 2013–2016*. London: Department of Health

Environment Agency (2015) 'Somerset Levels and Moors: reducing the risk of flooding'. Available at: https://www.gov.uk/government/publications/somerset-levels-and-moors-reducing-the-risk-of-flooding/somerset-levels-and-moors-reducing-the-risk-of-flooding (accessed 25 February 2016)

Foresight (2011) *International dimensions of climate change*. London: The Government Office for Science

Forest Research (undated) *Benefits of green infrastructure evidence note*. London: Forest Research

Friends of the Earth (2010) *Healthy plant eating: how lower meat diets can save lives and the plant.* London: Friends of the Earth

HM Government (2013) *The National Adaptation Programme: making the country resilient to a changing climate*. London: HM Government

HM Government (2015) *Cutting the cost of keeping warm: a fuel poverty strategy for England*. London: HM Government

HM Treasury (2011) *Magenta book*. London: HM Treasury

Holt-Lunstad J., Smith T. B. and Layton J. B. (2010) 'Social relationships and mortality risk: a meta-analytic review', *PLOS Medicine*, Vol. 7, pp. 1–20

Humphries, R. and Galea, A. (2013) *Health and wellbeing boards: one year on*. London: The Kings Fund

Intergovernmental Panel on Climate Change (2013) *Climate change 2013: the physical science basis*. Cambridge, UK & New York, USA: IPCC

Kent County Council (2013) *Joint Strategic Needs Assessments: a guide to integrating sustainability*. Available at: http://bit.ly/1RCC0jv (accessed 2 February 2016)

Knight, M. (2012) 'Development of the joint strategic needs assessment', in N. Churchill (ed), *Getting started: prospects for health and wellbeing boards*. London: Smith Institute

Lindley, S., O'Neill, J., Kandeh, J., Lawson, N., Christian, R. and O'Neill, M. (2011) *Climate change, justice and vulnerability*. York: JRF

Local Government Association (2013) *Public health transformation nine months on: bedding in and reaching out*. London: LGA

Local Government Association (2015) *Prevention: a shared commitment: making the case for a prevention transformation fund*. London: LGA

Marmot, M. G., Allen, J., Goldblatt, P., Boyce, T., McNeish, D., Grady, M., and Geddes, I. (2010) *Fair society, healthy lives: strategic review of health inequalities in England post-2010*. London: The Marmot Review

Met Office (2015) 'The heatwave of 2003'. Available at: http://www.metoffice.gov.uk/learning/learn-about-the-weather/weather-phenomena/case-studies/heatwave (accessed 4 February 2016)

Murphy, P. (2013) 'Public health and health and wellbeing board: antecedents, theory and development', *Perspectives in Public Health*, Vol. 5, pp. 248–53

National Energy Action (2015) *Catalogue of health-related fuel poverty schemes*. London: DECC

Oliver, K. and de Vocht, F. (2015) 'Defining 'evidence' in public health: a survey of policy uses and preferences', *European Journal of Public Health*. Available at: http://dx.doi.org/10.1093/eurpub/ckv082 (accessed 22 February 2016)

Palmer, J. and Cooper, I. (2013) *United Kingdom energy fact file*. London: DECC

Pielke R., Wigley T. and Green C. (2008) 'Dangerous assumptions', *Nature*, Vol. 452, pp. 531–2

Porter, J., Demeritt, D. and Dessai, S. (2014) *The right stuff? Informing adaptation to climate change in British local government*, Paper No. 76. Leeds: Sustainability Research Institute

Preston, I., Banks, N., Hargreaves, K., Kazmierczak, A., Lucas, K., Mayne, R., Downing, C. and Street, R. (2014) *Climate change and social justice: an evidence review*. York: JRF

Public Accounts Committee (2013) 'Early action: landscape review', Second Report. Available at: http://www.publications.parliament.uk/pa/cm201314/cmselect/cmpubacc/133/13302.htm (accessed 22 February 2016)

Public Health England (2014) *Cold weather plan for England*. London: Public Health England

SDU (2012) *Adaptation to climate change for health and social care organisations: co-ordinated, resilient, prepared*. Cambridge: SDU

SDU (2014) *Sustainable development strategy for the health and social care system 2014–2020*. Cambridge: SDU

SDU (2015) *Adaptation report for the healthcare system 2015*. Cambridge: SDU

Stevens, S. (2014) *Five year forward view*. London: NHS England

Sustainable Development Commission (2010) *Sustainable development: the key to tackling health inequalities*. London: SDC

United Nations (2014) 'Glossary of climate change acronyms'. Available at: http://unfccc.int/essential_background/glossary/items/3666.php (accessed 4 February 2016)

Vardoulakis, S. and Heaviside, C. (2012) *Health effects of climate change in the UK 2012: current evidence, recommendations and research gaps*. London: Health Protection Agency

Walpole, S., Rasanathan, K. and Lendrum, D. (2009) *Natural and unnatural synergies: climate change policy and health equity*. Geneva: World Health Organization

Watts, N., Adger, W. N., Agnolucci, P., Blackstock, J., Byass, P., Cai, W., Chaytor, S., Colbourn, T., Collins, M., Cooper, A., Cox, P. M., Depledge, J., Drummond, P., Ekins, P., Galaz, V., Grace, D., Graham, H., Grubb, M., Haines, A., Hamilton, I., Hunter, A., Jiang, X., Li, M., Kelman, I., Liang, L., Lott, M., Lowe, R., Luo, Y., Mace, G, Maslin, M., Nilsson, M., Oreszczyn, T., Pye, S., Quinn, T., Svensdotter, M., Venevsky, S., Warner, K., Xu, B., Yang, J., Yin, Y., Yu, C., Zhang, Q., Gong, P., Montgomery, H. and Costello, A. (2015) 'Health and climate change: policy responses to protect public health', *The Lancet*, Vol. 386(10006), pp. 1861–1914

World Health Organization (2014) 'Ambient (outdoor) air quality and health'. Available at: http://www.who.int/mediacentre/factsheets/fs313/en/ (accessed 4 February 2016)

Wright, J. (2014) *Climate change and health: Director of Public Health annual report for Sheffield 2014*. Available at: http://bit.ly/1RMbVeA (accessed 4 February 2016)

Acknowledgements

The authors would like to thank the case study areas for their time and contributions to this project. We would also like to thank Katharine Knox at the Joseph Rowntree Foundation for her guidance throughout the project and Gabriel Bristow for his research assistance, as well as David McCoy, John Middleton, Jeremy Wight, Angie Bone and Jim Hodgson for their advice.

About the authors

Daniel Button is a Researcher at the New Economics Foundation. His research focuses on a range of issues in social policy, including health and health inequalities, public service reform, co-production and eco-social policies.

Anna Coote is an Associate Director at the New Economics Foundation. A leading analyst, writer and advocate in the field of social policy, Anna leads work on developing a new social settlement to meet the challenges of the 21st century. This aims to promote wellbeing for all and sustainable social justice.

The Joseph Rowntree Foundation has supported this project as part of its programme of research and innovative development projects, which it hopes will be of value to policy-makers, practitioners and service users. The facts presented and views expressed in this report are, however, those of the authors and not necessarily those of JRF.

A pdf version of this publication is available from the JRF website (http://www.jrf.org.uk). Further copies of this report, or any other JRF publication, can be obtained from the JRF website (www.jrf.org.uk/publications) or by emailing publications@jrf.org.uk

A CIP catalogue record for this report is available from the British Library.

First published May 2016 by the Joseph Rowntree Foundation
PDF ISBN 978 1 91078 342 9
Reference number: 3195

Joseph Rowntree Foundation
The Homestead
40 Water End
York YO30 6WP
www.jrf.org.uk