

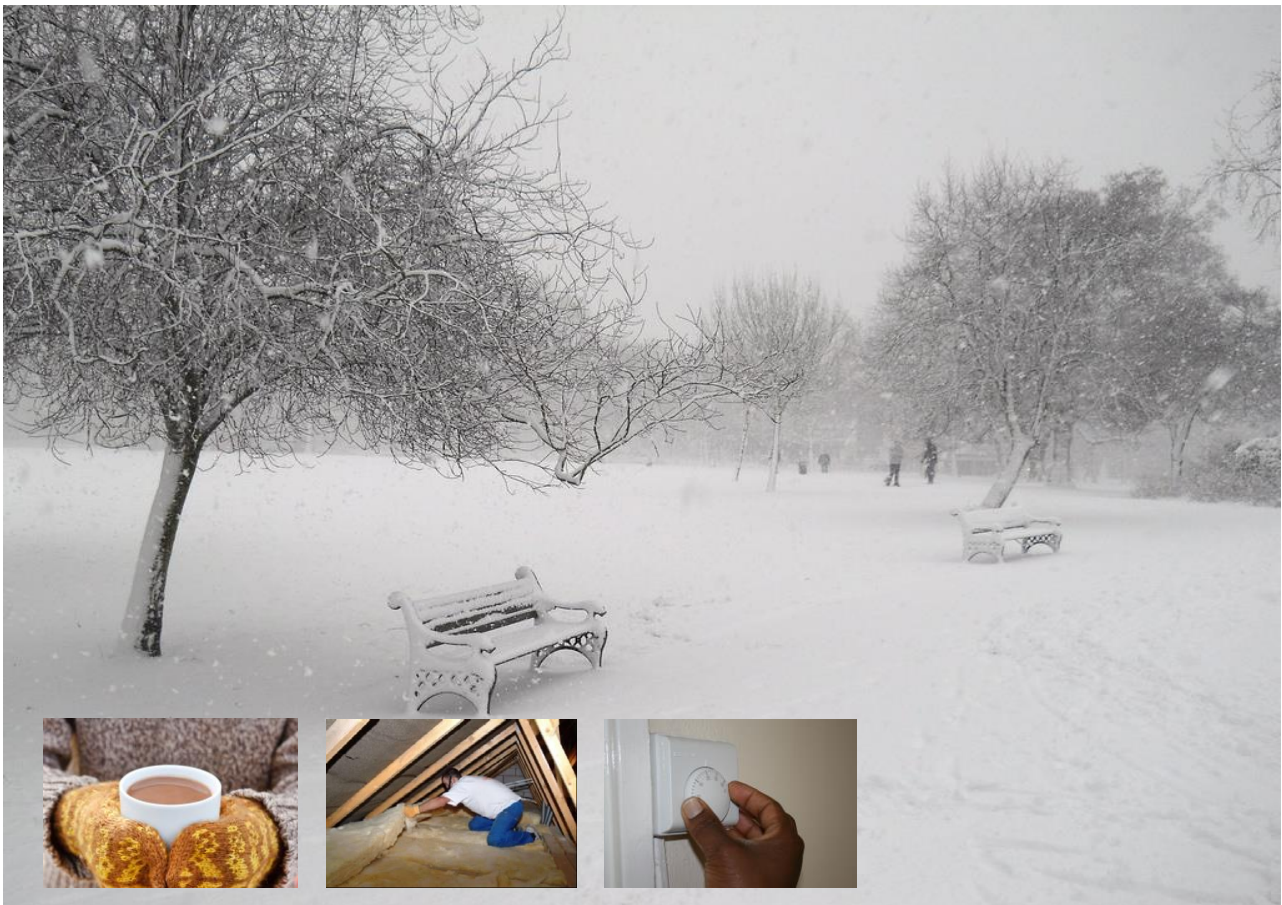


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Protecting and improving the nation's health

Cold Weather Plan For England Making the Case: Why long-term strategic planning for cold weather is essential to health and wellbeing



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List of abbreviations

A&E	Accident and Emergency
CCG	Clinical commissioning group
CMD	Common mental disorder
CO	Carbon monoxide
COPD	Chronic obstructive pulmonary disease
CWP	Cold Weather Plan
DECC	Department of Energy & Climate Change
DH	Department of Health
EPC	Energy Performance Certificate
EWD	Excess winter deaths
GP	General practitioner
HWB	Health and wellbeing board
JSNA	Joint strategic needs assessment
LGA	Local Government Association
LIHC	Low income high cost
NEA	National Energy Action
NICE	National Institute for Health and Care Excellence
NPV	Net present value
ONS	Office for National Statistics
PHOF	Public Health Outcomes Framework
PIRU	Policy Innovation Research Unit
SDMP	Sustainable development management plans
QALY	Quality adjusted life years
WHHP	Warm Homes Healthy People

Executive summary

This document aims to support the Cold Weather Plan for England (CWP) by providing the evidence of the effects of cold on health as well as what is known about the effectiveness of interventions.

Impact of cold weather on health

Cold and winter weather have direct and indirect effects on health. Direct effects include increased incidence of heart attack, stroke, respiratory disease, influenza, falls and injuries, hypothermia. Indirect effects include mental health effects from depression, reduced educational and employment attainment, and risk of carbon monoxide poisoning.

Extreme cold can kill directly through hypothermia, however this is rare and diseases of the circulation such as heart attack and stroke – account for around 40% of excess winter deaths, with approximately another third of excess winter deaths due to respiratory illness. The onset of cold weather leads to an almost immediate increase in weather-related deaths which can remain raised for up to four weeks. Deaths caused by cardiovascular conditions peak first followed by stroke and then respiratory.

Negative health effects start at relatively moderate outdoor mean temperatures of 4-8°C. Although the risk of death increases as temperatures fall, the higher frequency of days at moderate temperatures in an average winter means the greatest health burden in absolute numbers of deaths, occurs at more moderate temperatures.

The impact of cold weather on healthcare services

As temperatures fall there are increased hospital admissions from cold-related illnesses. Higher demand for beds is often compounded by difficulties in discharging patients and staff shortages due to illness or bad weather. Extreme weather may also have an impact on the number of ambulance call outs and response times and may prevent people from accessing primary care services.

Cold weather variability and climate change

The geographical distribution of cold weather is not uniform. Low temperatures tend to be more severe in rural and exposed areas, occurring earlier in some parts of the country than others. Despite the warming climate, we may still experience very cold winters, although such cold weather is likely to become less frequent. Cold is likely to remain the biggest cause of weather-related mortality in the 2050s.

Who is most at risk?

Cold related ill-health is a complex issue with many factors known to increase risk from cold. Population factors include older age, chronic and severe illness, children under the age of five, homeless people/street sleepers. There is some evidence to suggest a link between cold outdoor temperatures and adverse effects in pregnancy on the fetus, such as low birth weight and prematurity.

Housing and economic factors are key to cold weather vulnerability. There is a strong evidence base showing that cold homes have a negative impact on health and wellbeing. Excess winter deaths in the coldest quarter of housing are almost three times as high as in the warmest quarter. Many homes in England fall well below modern standards of insulation and heating, with over a quarter of homes occupied by people over 60 years of age failing to meet the decent homes standard. Fuel poverty is considered one of the major contributing factors to cold vulnerability; there were 2.35 million fuel poor households in England in 2013.

Behavioural factors are also important. Excess winter mortality is higher in England than in many other similar European countries. This difference may in part be due to the variation in behavioural patterns across Europe, both institutional and individual. Some illnesses and conditions can reduce the person's ability to self-care. Each year several billion pounds of benefits go unclaimed, additional income which could make a significant difference to the ability of vulnerable people to stay healthy in winter.

Interventions to prevent cold-related illness and death

Emergency action to protect health on the coldest days remains important, however shifting the emphasis to year round planning and all-winter action is expected to have the greatest impact on excess winter morbidity and mortality and winter pressures in the NHS and social care. This aligns closely with the [NICE Guidance on Excess winter deaths and morbidity and the health risks associated with cold homes](#).

Level 0: Year round planning

A multi-agency approach is required to tackle wider determinants, such as economic, social and housing issues in relation to cold-related deaths and illness. This is not something that can be tackled in the winter alone and requires a long-term strategic approach by all relevant sectors to assessing needs and the commissioning, planning and implementing of interventions.

There is evidence from a number of high-quality randomised controlled trials and other controlled observational studies both from the UK and other industrialised countries (notably New Zealand) that indicate potential health benefits in terms of symptoms of

chronic disease (particularly respiratory disease), mental well-being, reduced health service use and school/work absence.

Level 1: Winter preparedness and action

The onset of winter provides a focus around shorter-term initiatives such as seasonal flu immunisation, rapid winter warmth initiatives, awareness campaigns for health and social care provider staff, checking emergency and business continuity plans.

Levels 2 – 4: Severe winter weather is forecast through to national emergency

The increased emphasis on levels 0 and 1 in the plan is not intended to imply that levels 2-4, which are more reactive to extremes of winter weather, are no longer important. Extreme cold is associated with a high risk of morbidity and mortality, and snow and ice with an increase in injuries and severe disruption to services; the alert system and the actions that it triggers remain important.

Very limited evidence suggests preventive health measures targeted at vulnerable groups at the right time for example by sending text alerts direct to patients or making automated calls direct to patients may have benefits, but the evidence remains inconclusive.

The Public Health Outcomes Framework (PHOF) and other programmes

Cold weather outcomes are integral to the PHOF with two indicators directly related to cold weather: fuel poverty (1.17) and excess winter deaths (4.15) combined with 18 more across all four domains. Measures to reduce cold-related harm also link to indicators in four out of the five domains of [The NHS Outcomes Framework \(NOF\) 2014-2015](#)⁵².

The CWP builds on existing programmes and public health measures to protect individuals and communities over the winter period. A list of the key elements is appended to this document.

1. The effects of cold on health and healthcare services

There is a large and strong evidence base about the risk to health from cold weather and the effects of cold weather on health are predictable and mostly preventable.

The purpose of the Cold Weather Plan (CWP) is to avoid the adverse health effects of cold weather by raising public awareness and triggering actions by those in contact with people who are most at risk. This, in turn, could help to reduce pressures throughout the health and social care system. This document aims to provide further detail about the evidence of the effect of cold on health and what is known about the effectiveness of interventions in order to make the case for long term strategic planning and commissioning.

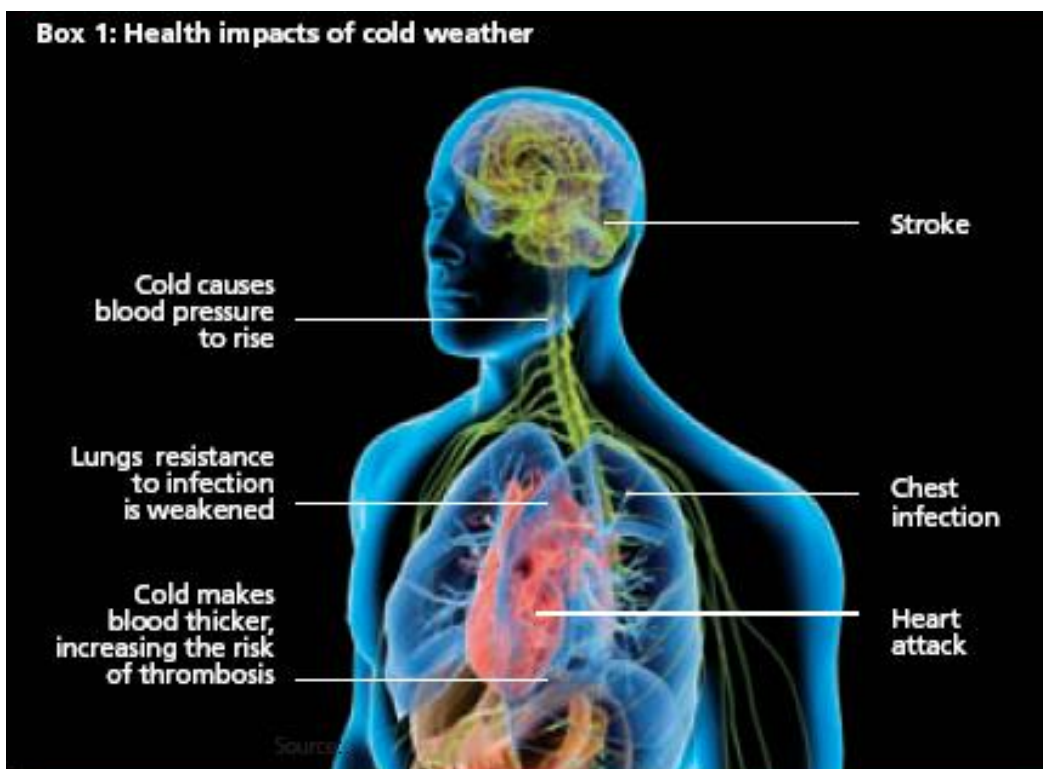
1.1 The impact of cold weather on health

Direct effects of winter weather include an increase in incidence of:

- heart attack
- stroke
- respiratory disease
- influenza
- falls and injuries
- hypothermia

Indirect effects of cold include mental health illnesses such as depression, and risk of carbon monoxide poisoning if boilers, cooking, and heating appliances are poorly maintained or poorly ventilated.

Figure 1.1: The health impacts of cold weather¹



Source: Department of Health 2009 annual Report of the Chief Medical officer¹

Indoor and outdoor temperatures and associated weather conditions during winter can have a clear impact on health in general (Tables 1.1 and 1.2). Evidence of impacts specific to children and adolescents is provided in this document, where possible.

Table 1.1: The effect of temperatures on health

Temperature	Effect
18°C (65°F)	Heating homes to at least 18°C (65F) in winter poses minimal risk to the health of a sedentary person, wearing suitable clothing. Additional flexibility around advice for vulnerable groups and healthy people is outlined in the main Cold Weather Plan document (p. 41)
Under 18°C	May increase blood pressure and risk of cardiovascular disease
Under 16°C	May diminish resistance to respiratory diseases
4-8°C	Mean outdoor temperature threshold at which increased risk of death observed at population level (see section 3)
5°C	Poses a high risk of hypothermia

Table 1.2: The effect of related winter conditions on health

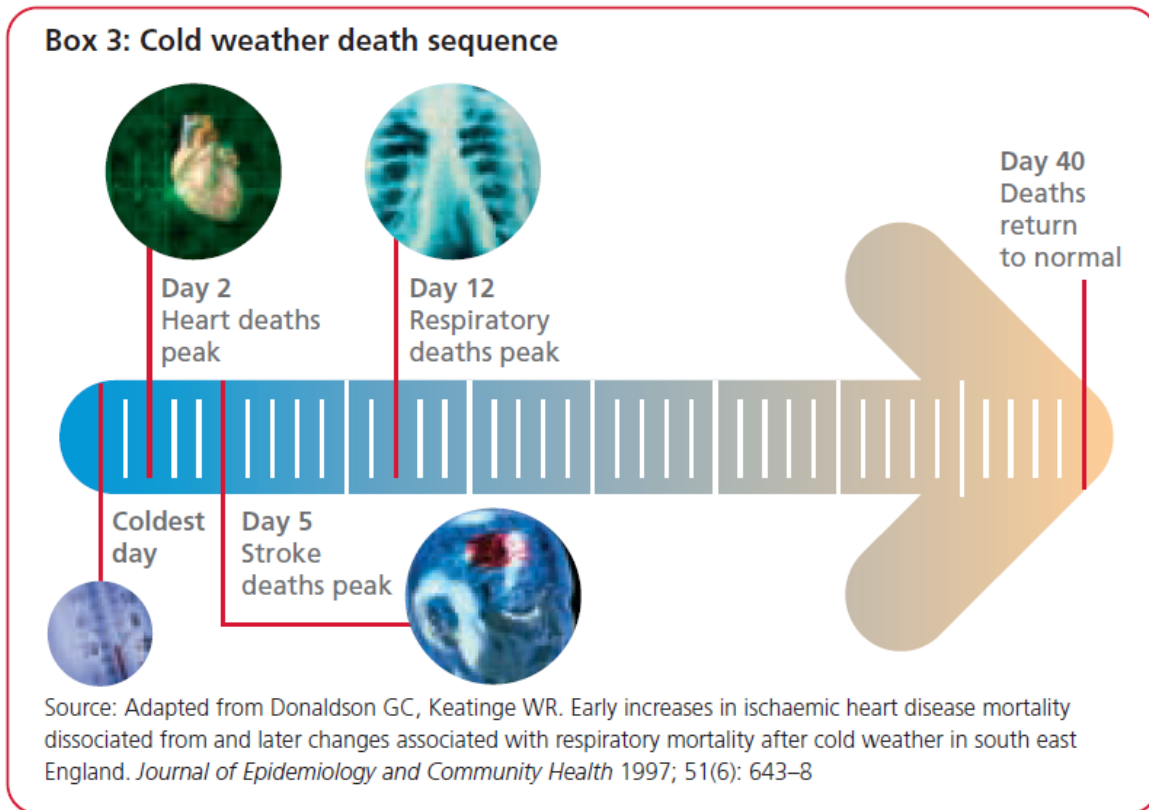
	Effect
Snow and ice	Disruption to service provision, and reduction in access to essential services (including health and social care, transport and school closures) Increased risk of falls, injuries

The human body responds in several different ways to exposure to cold weather and although exposure to extreme cold can kill directly through hypothermia, this is not the main cause of cold related illness and death.

Diseases of the circulation – including heart attack and stroke – account for 40% of excess winter deaths. Around one third of excess winter deaths are due to respiratory illness¹.

Weather-related deaths from heart disease increase almost immediately with the onset of cold weather, reaching their highest levels after two days. Increased incidence of stroke takes place approximately five days after the onset of cold weather periods and deaths from respiratory illnesses peak at 12 days (Figure 1.2).

Figure 1.2 The sequence of death in cold weather¹



The Department of Health (DH) commissioned an independent evaluation of the CWP from the Policy Innovation Research Unit (PIRU) in 2012.

The findings indicate that negative health effects start at relatively moderate outdoor temperatures of around 4-8°C. Although the risk of death increases as temperatures fall, the higher frequency of days at moderate temperatures mean that the greatest health burden in absolute numbers of deaths, occurs at these moderate temperatures. This means that action to prevent excess winter morbidity and mortality should not be restricted to the very cold days, but should be carried out throughout the year to protect the most vulnerable. The findings have been incorporated (for more information see section 3).

1.1.1 Cardiovascular disease

Exposure to cold temperatures increases blood pressure and risk of blood clotting in healthy people who are sedentary and wearing minimal clothing. Evidence suggests the threshold at which these effects start to occur is 18 (+/-0.5)°C; effects include increases in erythrocyte count and fibrinogen both of which are important for thrombus (blood clot) formation and rises in blood pressure². If clots occur in the heart and brain vessels, they can lead to heart attack and stroke. High blood pressure increases the risk of heart attack, heart failure, kidney disease, stroke or dementia.

1.1.2 Respiratory illnesses

When the weather is cold, people tend to spend more time indoors where they are more likely to be in close proximity to one another; this can aid the spread of infection.

Exposure to cold indoor or outdoor temperatures suppresses the immune system; diminishes the lungs' capacity to fight off infection; and increases constriction of the airways which stimulates mucus production. These factors are associated with an increased risk of bronchitis and pneumonia.

It is estimated that GP visits for respiratory illness increase by up to 19% for every 1°C drop below 5°C of the mean temperature³.

When a house is damp as well as cold, mould is likely to occur. This increases the risk of respiratory illness, particularly asthma. Home energy efficiency measures have been shown to significantly reduce absence from school in children due to asthma, and recurrent respiratory infections⁴.

A recent study found that older people who were living in fuel poor households, or who did not own their home, had significantly worse respiratory health (measured by peak expiratory flow rates)⁵.

1.1.3 Influenza (“flu”)

Most cases of flu in the UK tend to occur during an eight to ten week period during the winter. For most healthy people, seasonal flu is an unpleasant but self-limiting disease that they recover from within a week.

Flu in an older person, pregnant woman or someone with an underlying condition (particularly chronic respiratory or cardiac disease or those who are immunosuppressed) may be more severe.

Seasonal flu vaccinations⁶ can provide protection and are offered, free of charge, to those at risk. To see the full list, please visit the annual flu plan available at: www.gov.uk/government/collections/annual-flu-programme

1.1.4 Other infectious diseases

As well as influenza, cold weather is associated with an increase in the prevalence of other respiratory infections, such as respiratory syncytial virus. Other infectious diseases – such as bacterial infections and viral gastroenteritis (winter vomiting disease) – also have a seasonal pattern and may increase in winter.

1.1.5 Pregnancy

A review of the epidemiological evidence on seasonality of births outcomes and the impact of prenatal exposure to ambient temperatures found that seasonal patterns varied from country to country. Few studies examined the relationship between ambient temperature and birth outcomes, and rarely adjusted to other explanations for observed associations (confounding). The review reported peaks of preterm birth, stillbirth and low birth weight in winter as well as summer suggesting that extremes of temperature may be an important determinant of poor birth outcomes.⁷

1.1.6 Low weight gain in infants

Studies demonstrate that there is a relationship between living in cold homes and poor infant weight gain, attributed to the fact that children living in colder homes need greater calorific intake to fulfil growth potential.⁸

1.1.7 Hypothermia

Deaths directly caused by hypothermia represent only a small proportion of the total amount of excess winter deaths.

Hypothermia is a potentially fatal lowering of core body temperature caused by exposure to cold. One study looking at patients over 65 years attending emergency departments found peaks in incidence of hypothermia coinciding with periods of cold weather. More than one third of the 5% of patients with core body temperature below 35°C died. The majority of patients lived in relatively deprived postcodes⁹

1.1.8 Falls and injuries

Winter weather and cold homes affect mobility and increase the likelihood of falls and injuries – especially in frail and elderly people – because:

- symptoms of arthritis worsen in cold, damp houses
- strength and dexterity decrease as temperatures drop, increasing the risk of non-intentional injuries
- snow and icy conditions increase the risk of trips and falls outdoors¹⁰

In England, the number of emergency hospital admissions – due to falls on snow and ice – varies considerably from one winter to another. A recent study showed that the

weekly rate of emergency hospital admissions for falls on snow and ice is inversely related to the mean weekly temperature.¹¹

In the harsh winter of 2009/10, the rate of hospital admissions related to falls was particularly high for older people. The cost of emergency admissions that winter was estimated at £42m – with true healthcare costs estimated at being considerably higher.¹¹

1.1.9 Mental and social health and wellbeing

Damp, cold housing is associated with an increase in mental health problems, such as depression and anxiety. Living in these homes can affect people's ability to go about their daily lives. Some become socially isolated as they are reluctant to invite friends or family to a cold house, while others seek refuge elsewhere as an alternative to staying in.

Cold housing can also negatively affect children's emotional wellbeing and resilience. It can be difficult for children to study or do homework in a cold house, which affects educational and long-term health and work opportunities. Studies have suggested that more than one in four adolescents living in cold housing are at risk of developing mental health problems, compared with one in 20 adolescents who have always lived in warm housing.¹²

Although we cannot measure a direct increase in demand on mental health services due to cold weather, we know that there is an association between common mental disorder (CMD) –including depression and anxiety – and cold, damp homes. A questionnaire linking proxies for fuel poverty to CMD showed that 10% of those with CMD reported not being able to keep their home warm enough in winter, compared with just 3% without CMD. Of those with CMD, 15% said they had mould in their home, compared with 8% with no CMD.¹³

1.1.10 Carbon monoxide poisoning

Cases of carbon monoxide (CO) poisoning increase in winter because people may use malfunctioning or inappropriate appliances to heat their homes. Approximately 30 deaths have occurred from carbon monoxide poisoning each year over the latest 5 years (2010 to 2014) ;18 people died from CO poisoning from faulty household appliances in 2014.¹⁴ The previous 5 years (2005 to 2009) averaged about 40 deaths. . During cold weather, people may also try to reduce ventilation inside the house.

Incorrectly installed, poorly maintained and poorly ventilated cooking and heating appliances (such as those using oil, gas, coal, wood or paraffin) are the main sources of carbon monoxide poisoning in the home.

The **Smoke and Carbon Monoxide Alarm (England) Regulations introduced in 2015** require private sector landlords to install at least one smoke alarm on every floor of a premises used as living accommodation, and a carbon monoxide alarm in any room where solid fuel is used. The landlord must make sure the alarms are in working order at the start of each new tenancy.

Symptoms of carbon monoxide poisoning include:

- headache
- dizziness
- confusion
- disorientation
- memory loss
- fainting
- coma
- death

It can also cause harm to an unborn child.

1.2 The impact of cold weather on healthcare services

The impact of cold weather on the health sector includes effects on:

- hospital and emergency services
- primary, community and social care

1.2.1 The impact on hospitals and emergency services

Evidence shows that there is an increase in hospital admissions from cold-related illnesses, as the temperature falls. Admissions for chronic obstructive pulmonary disease increase as temperatures fall, particularly in those most socio-economically deprived¹⁵.

Hospitals and social care commonly face winter pressures. These often result from a high demand for beds and difficulties in discharging patients. This may be compounded by staff shortages due to illness.

Cardiovascular, respiratory and infectious diseases with a seasonal increase, as well as weather-related accidents – contribute to raising the number of admissions. Prolonged in-patient episodes can result, either due to medical complications or a delay in discharging patients because of lack of suitable accommodation.

Extreme weather can also have an impact on the number of ambulance call outs and response times. It has been suggested that for every reduction of air temperature by 1°C there is a reduction of 1.3% in performance (measured by response rate and response times). This may be related to the increase in volume of emergency calls and potentially adverse road conditions.¹⁶

1.2.2 The impact on primary, community and social care

Increased levels of illness due to cold weather can put a strain on local NHS services such as general practices and hospitals. There is evidence that cold weather may prevent people from accessing these services.

Over 1.3 million households have a category 1 hazard rating for excess cold. The total repair cost to bring all these dwellings to an acceptable level is estimated to be around £6bn. This cost would be paid back in just over 7 years through savings to the NHS of around £848m per annum. The costs to the NHS in the report are based on first year treatment costs only and do not include additional spending by social services, or economic losses through absences from work.¹⁷ Total costs to the NHS and the country are unknown.

1.3 Excess winter mortality – methods and findings

Excess winter mortality is measured using different methods, depending on the timeliness and purpose of the information.

1.3.1 Excess winter deaths

The Office for National Statistics¹⁸ (ONS) calculates excess winter mortality each year. This is calculated as winter deaths (deaths occurring in December to March) minus the average of non-winter deaths (deaths occurring in the preceding August to November plus deaths occurring in the following April to July divided by two). This estimate is published on an annual basis in November each year and is available by region and age-group.

There are around 25,000 excess winter deaths each winter in England. The number of extra deaths occurring in winter depends on temperatures, levels of disease (particularly influenza) in the population and other factors.

An extension of this calculation is the Excess Winter Deaths Index. This takes the number of excess winter deaths as calculated by ONS and divides it by the average of non-winter deaths on a three year rolling basis. This is published by age-group at local authority level allowing comparison between local authorities and examination of trends

over time. This information was previously published by the West Midlands Public Health Observatory, now part of PHE, and forms part of the **Public Health Outcomes Framework**.¹⁹

1.3.2 Near-real time mortality monitoring

PHE also undertakes weekly mortality surveillance which aims to detect and report acute significant excess mortality above usual seasonal levels in a timely fashion. Excess mortality is defined as a significant number of deaths reported over that expected for a given point in the year, allowing for weekly variation in the number of deaths. This information is used to guide an urgent response to a public health threat such as an influenza epidemic or temperature extremes. Information is published in a **winter health watch bulletin** on a weekly basis on the PHE website.

PHE published a report into excess winter mortality using this approach in July 2013.²⁰ This estimates that the number of excess deaths over and above that “expected” for winter by week of death registration through the Serfling approach has ranged between no excess and around 9,000 over the last 10 years.

1.3.3 Cold related mortality

Both methods above use all-cause mortality to estimate the impact of winter/seasonal mortality. With these methods it is difficult to determine the relative impacts of underlying causes such as influenza or extremes of temperature. Researchers have developed methods to quantify the explicit effect of weather factors (mainly ambient temperature) by assessing changes in the daily number of health events in relation to day-to-day fluctuations in the weather, and adjusting for other potential explanations for changes in mortality (such as circulating infections or air pollution). These time series studies indicate that there were around 41,000 cold-related deaths in 2000.²¹

1.4 Cold weather variability

Geographically, the focus of cold weather is not uniform. Low temperatures tend to be more severe in rural and exposed areas, such as high ground. Urban areas tend to be less cold. Cold temperatures associated with harm to health may occur earlier in some parts of the country, reinforcing the need to be well-prepared for cold weather in advance of winter.

Climate change does not mean an end to cold winters in England. Our climate is, in part, influenced by natural variations including changes in the amount of energy we receive from the sun, volcanic eruptions and natural cycles such as El Niño. Such variations will mean that, despite the warming climate, we may still experience very cold winters, although such cold weather is likely to become less frequent.

Winter morbidity and mortality will likely remain an issue, particularly if our population becomes less well adapted to cold conditions. Time series studies projecting future winter mortality suggest that the number of cold-related deaths will fall by about 2% to around 40,000 by the mid-century (2050) compared to around 41,000 at the beginning of the century (2000). Cold weather is expected to remain the biggest cause of weather-related mortality in England for the foreseeable future.²¹

The **National Adaptation Programme** report sets out actions to adapt to climate change for a number of sectors, including the health and social care system in the chapter 'Healthy Resilient Communities'.

2. Who is most at risk?

Cold related ill-health is a complex issue involving many factors. However, there are a variety of health risks that can be brought on or exacerbated by cold weather. Factors that increase the risk of ill-health from cold include:

2.1 Population factors

- **older age:** especially those over 75 years old (Table 2.1, Figure 2.1), or those living on their own who are socially isolated. Older people are more vulnerable to cold, partly because of an increased likelihood of suffering from pre-existing chronic illness, and partly because of a reduction in fat to retain body heat. They may be more vulnerable to indoor cold because of the increased time they spend at home and a higher prevalence of fuel poverty. However, it should be noted that the health of people of all ages is affected by cold homes
- **chronic and severe illness:** including heart conditions, circulatory disease, asthma, COPD, depression and anxiety, diabetes and arthritis
- **pregnant women:** there is some evidence to suggest a link between cold outdoor temperatures and adverse effects in pregnancy on the fetus, such as low birth weight and prematurity.
- **children under the age of five** are vulnerable to the cold due to immature thermoregulation and a high dependency level
- **homeless people/street sleepers** are vulnerable to the cold due to exposure to outdoor temperatures, and other factors which increase vulnerability to cold, such as social isolation, smoking, substance dependencies, mental illness and chronic and respiratory diseases which are more prevalent in this population

Table 2.1 Percentage of excess winter deaths by age group (all person), England and Wales, 2013/14¹⁸ (ONS method)

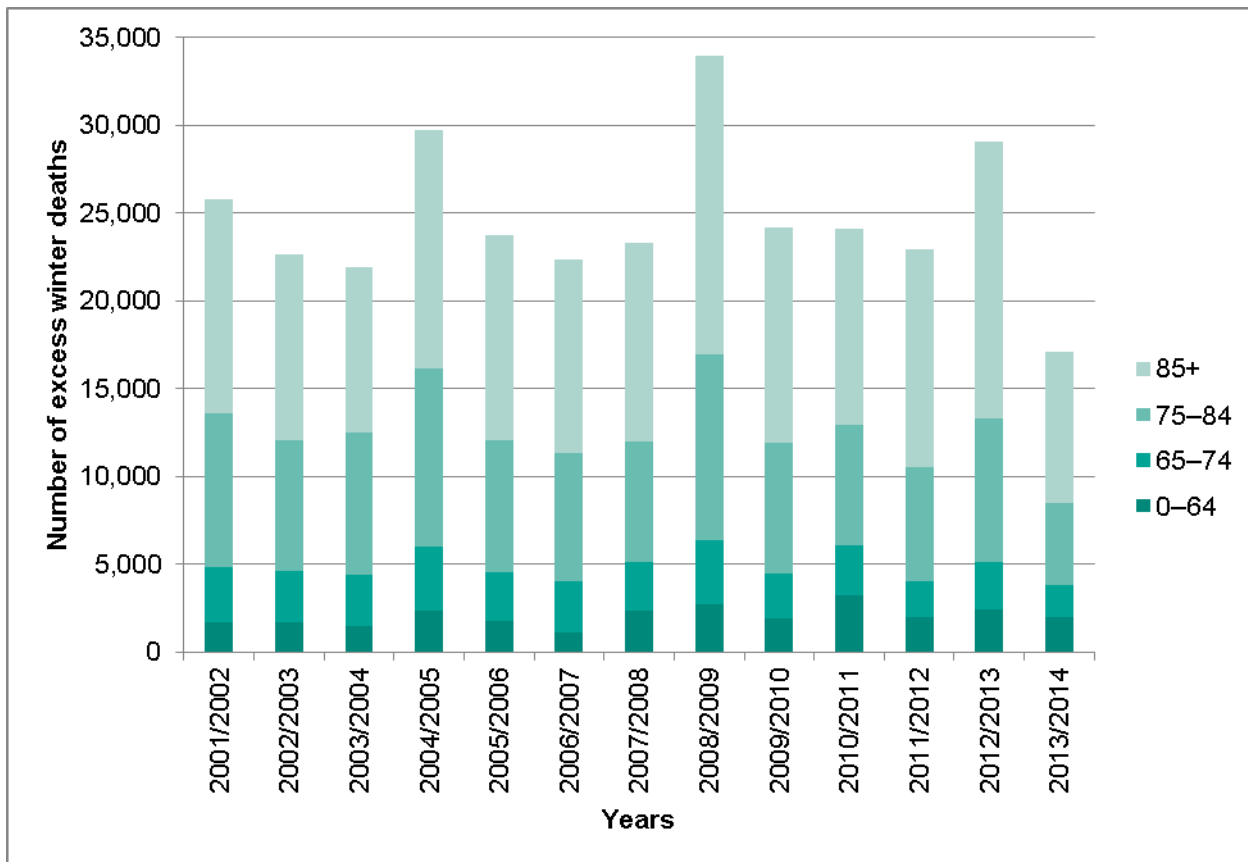
Age group	Percentage of excess winter deaths (%)
0-64	11.5
65-74	10.4
75-84	26.9
85+	50.0
All ages	100

Source: Office for National Statistics, 2015¹⁸

Excess Winter Mortality in England and Wales, 2013/14 (Provisional) and 2012/13 (Final)

Note: The total percentage of excess winter deaths for provisional data is rounded to the nearest 100.

Figure 2.1: Number of excess winter deaths by age group, England, 2001/02 to 2013/14¹⁸ (ONS method)



Source: Office for National Statistics (2015)¹⁸ Table 2: Excess winter mortality by age-group, region and country of residence, England and Wales 2002/2003 to 2013/2014 (provisional data).

Note: published excess winter death data does not allow a further breakdown of the 0-64 year age group.

2.2 Housing/economic factors

Fuel poor homes are less likely to be warm, dry homes. There is a strong evidence base showing one of the major contributing factors to a person living in low temperatures is the inability to heat their home affordably. This is known as fuel poverty.

Fuel poverty is determined by a combination of three factors:

- energy efficiency of the home
- household income
- fuel costs

Fuel poverty has been redefined following the Final Report of The Fuel Poverty review, *Getting the measure of fuel poverty*²² and a new “low income, high cost” (LIHC) indicator has been adopted by the Department of Energy & Climate Change (DECC) in the recent *Cutting the cost of keeping warm: a fuel poverty strategy for England*²³.

“households are considered fuel poor if:

They have required fuel costs that are above the median level; and

Were they to spend that amount they would be left with a residual income below the official poverty line.”

Using this definition, there were 2.35 million fuel poor households in England in 2013²⁴. The report also described, the “fuel poverty gap” - a measure of the depth of fuel poverty. This is the difference between a household’s modelled fuel bill and what their bill would be for them to be no longer fuel poor. The report states that at the time of writing there was a £877 million total fuel poverty gap in England. This equates to an average fuel poverty gap of £374 per fuel-poor household.

The prevalence of fuel poverty in this England varies according to region (Figure 2.2), household composition (Figure 2.3), tenure type and whether or not the house is connected to the mains gas network (as this is the cheapest common method of heating the home). A recent study suggests that the regional variation in fuel poverty is not explained by differences in rainfall and winter temperatures²⁵.

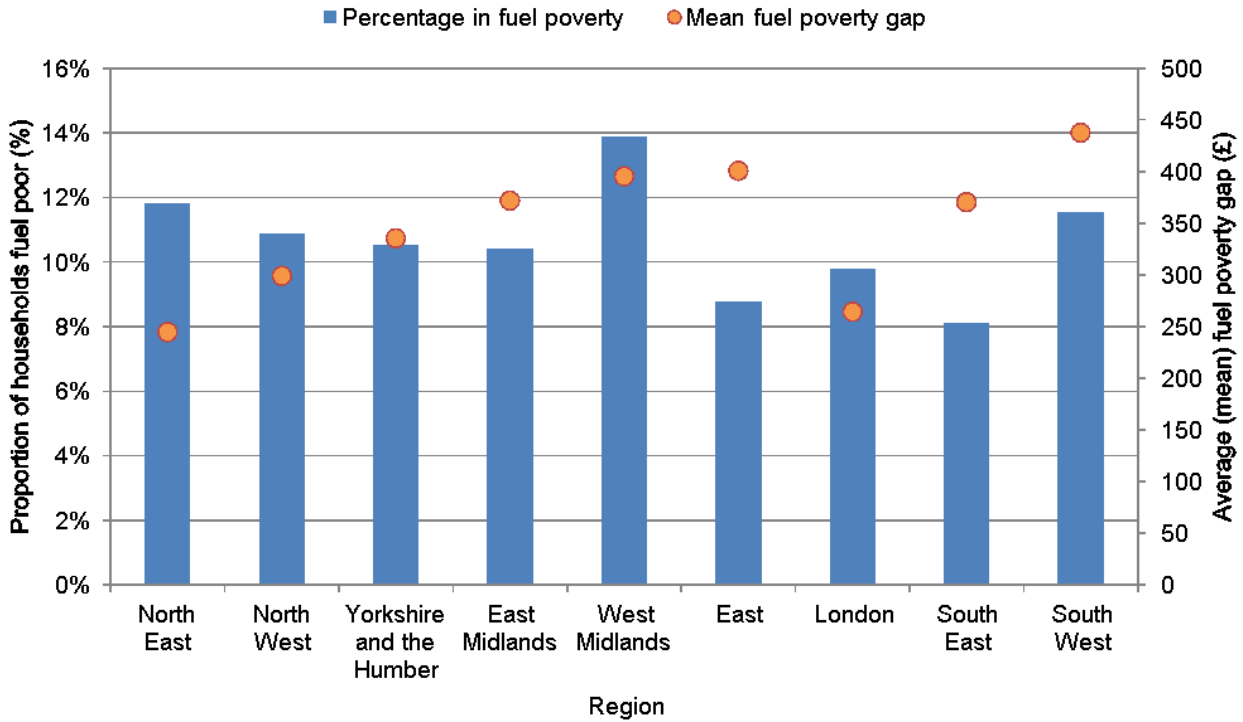
Fuel poverty is especially common in areas which are not on the mains gas work. Private sector housing continues to be over-represented in the numbers of fuel poor households with owner occupier properties being the most likely to be fuel poor, followed by homes in the private rental sector.

There have been significant improvements to building regulations over the last decade, and a push to improve the energy efficiency of older homes. However, there are still many homes in England that fall well below modern standards of insulation and heating.

Furthermore, older people – who are more likely to be at risk of ill health from a cold, damp home – are also more likely to be living in a home that fails to provide a reasonable degree of thermal comfort or living in a home that is not centrally heated. Evidence shows that over 26% of homes occupied by people over 60 years of age fail to meet the decent homes standard^{26,27}.

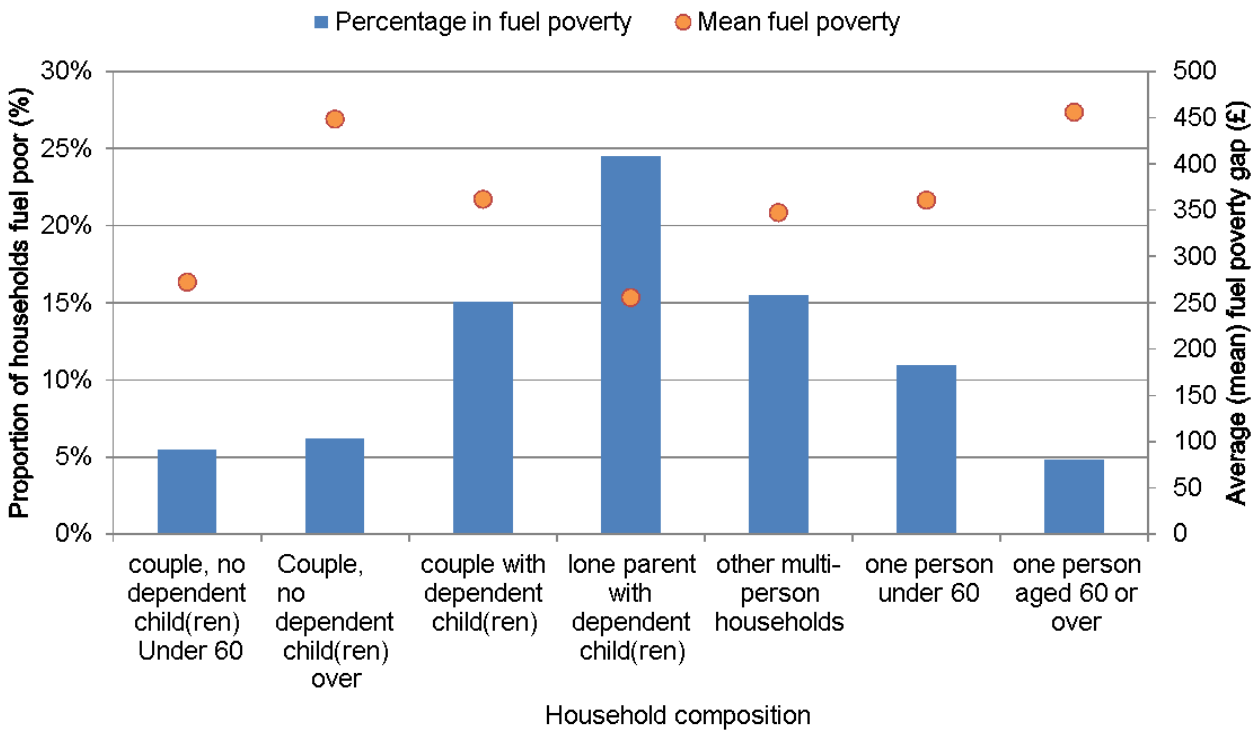
Although excess winter deaths occur in both warm and cold houses, there is a higher risk of illness and death in the latter. In their recent report, *The Health Impacts of Cold Homes and Fuel Poverty*²⁸, the Marmot review team estimated that “excess winter deaths in the coldest quarter of housing are almost three times as high as in the warmest quarter”. with 21.5% of all excess winter deaths attributable to the coldest quarter of housing because of it being colder than other housing.

Figure 2.2: Fuel poverty and associated average fuel poverty gaps by region, 2013



Source: Department of Energy and Climate Change (2015) Annual fuel poverty statistics report: 2015

Figure 2.3: Fuel poverty and associated average fuel poverty gap by household composition, 2013



Source: Department of Energy and Climate Change (2015) Annual fuel poverty statistics report: 2015

Note new fuel poverty definitions adopted by DECC (see section 3.1 for more information):

- the Low Income High Cost (LIHC) indicator is a measure of the extent of fuel poverty
- the Fuel Poverty gap is a measure of the depth of fuel poverty

Source: Department of Energy and Climate Change (2013) Fuel Poverty Report updated: August 2013.⁴

Those most likely to be at risk of ill health from living in fuel poverty include children people over 60 and on low income, and long-term sick and disabled people²⁸.

Health impacts associated with cold homes include:

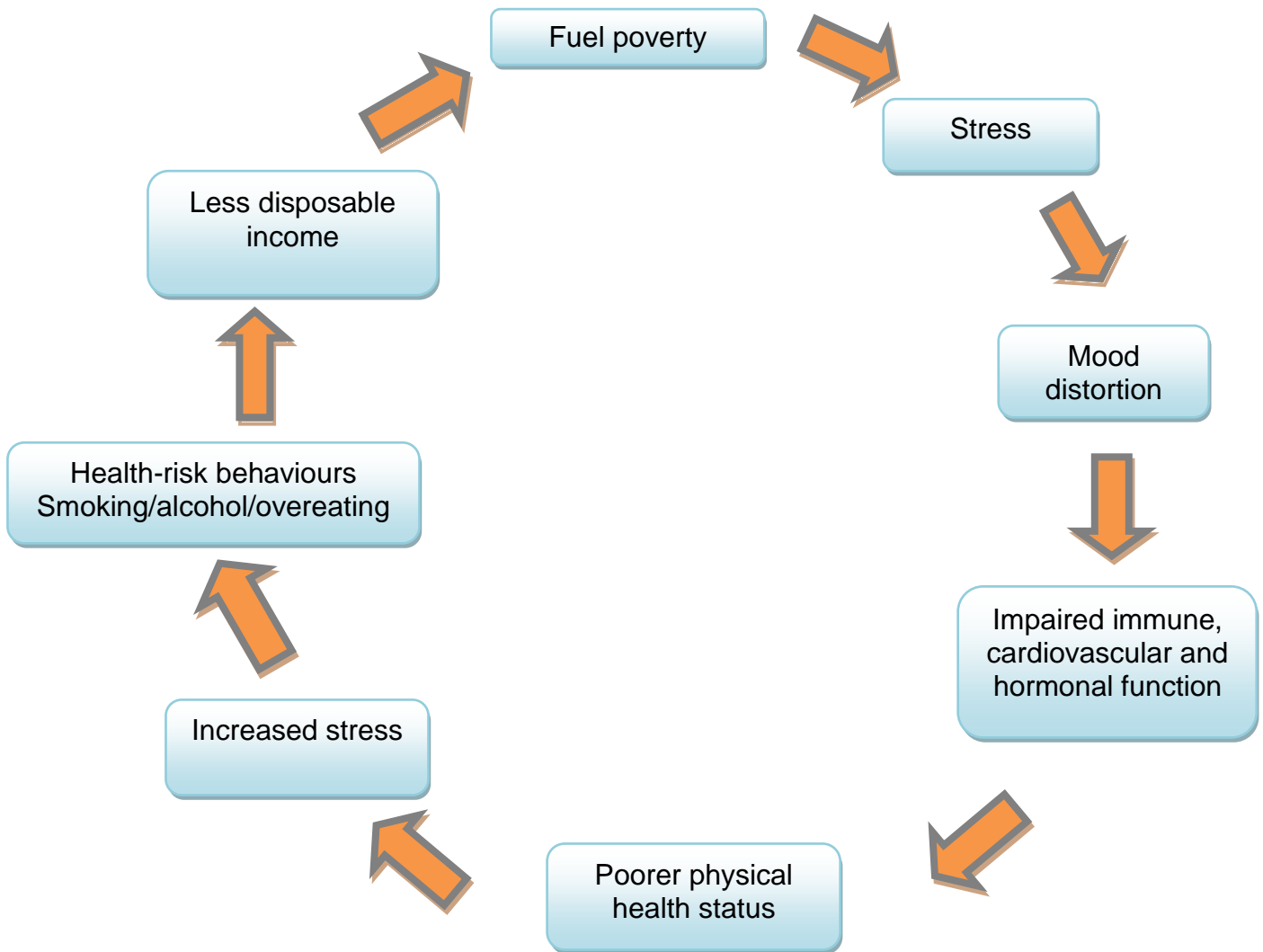
- increased risk of heart attack and stroke
- respiratory illnesses – adults and children
- low weight gain in infants
- a wide range of associated emotional and mental health and wellbeing issues
- poor diet and nutrition as a result of “heat or eat” choices
- falls and accidents
- worsening of existing health conditions or slow recovery from illness

A number of other studies on living in fuel poverty have consistently identified similar themes with regard to health impact.^{8,28,29}

There is also an increasing acknowledgement that some of the health impacts of fuel poverty may be mediated by its impact on mental health and wellbeing. This can be conceptualised in a causal pathway model, such as the one derived from a Public Health Agency (Northern Ireland) project³¹ (Figure 2.4). In this project, a realist synthesis assessment of available evidence (2000-2012) indicated the salience of testing a circle of risk model in future research.

Taken together this evidence indicates that we could prevent many of the yearly excess winter deaths and illnesses through warmer housing. Although some simple interventions can be undertaken during the winter months to improve warmth in the home, many require a year-round, proactive cross-sectoral approach, hence the emphasis on “level 0” year-round strategic commissioning, planning and action in the plan (section 3).

Figure 2.4: Postulated “Circle of Risk” model for fuel poverty



2.3 Behavioural factors

Winter behaviour . Excess winter mortality is higher in England (average 19% increase compared with non-winter) than in most other European countries, including much colder ones (Germany 11%, Finland 10%, France 13%)³². This difference may in part be due to the variation in behavioural patterns across Europe, both institutional and individual. It may be that people adapt less effectively to very cold weather, in countries such as England, where comparatively milder winters are more common. The broad pattern of increasing EDWI and increasing mean winter temperature from northern to southern Europe is supported by an analysis of more recent European excess winter death data.³³

Inability to adapt behaviour to stay warm. Some illnesses and conditions, such as mental illness, dementia and learning disabilities can reduce the person’s ability to self-care.

Not claiming benefits. Each year several billion pounds of benefits go unclaimed. In 2013/14, about £12 billion of income-related benefits overall were estimated as unclaimed in Great Britain. In 2013/14, the total amount of housing benefit alone that was left unclaimed was estimated to be between £3,160 million and £4,100 million.³⁴ The number of people that were entitled to, but not receiving housing benefit, was estimated to be between 1.1 and 1.3 million.

There are many different reasons why people do not claim the income they are entitled to. The additional income could make a significant difference to the ability of vulnerable people to heat their homes more affordably.

Not accepting help offered. There are many different reasons why people do not accept help offered. The [Warm Homes Healthy People Fund Evaluation 2012/13](#)³⁵ describes some of the challenges experienced around attitudes towards “free” interventions.

3. Interventions to prevent cold-related illness and death: the importance of level 0 and 1 actions

Although action to protect health on the coldest days remains important, shifting the emphasis towards year round planning and all-winter action is expected to have the greatest impact on excess winter morbidity and mortality and winter pressures in the NHS and social care.

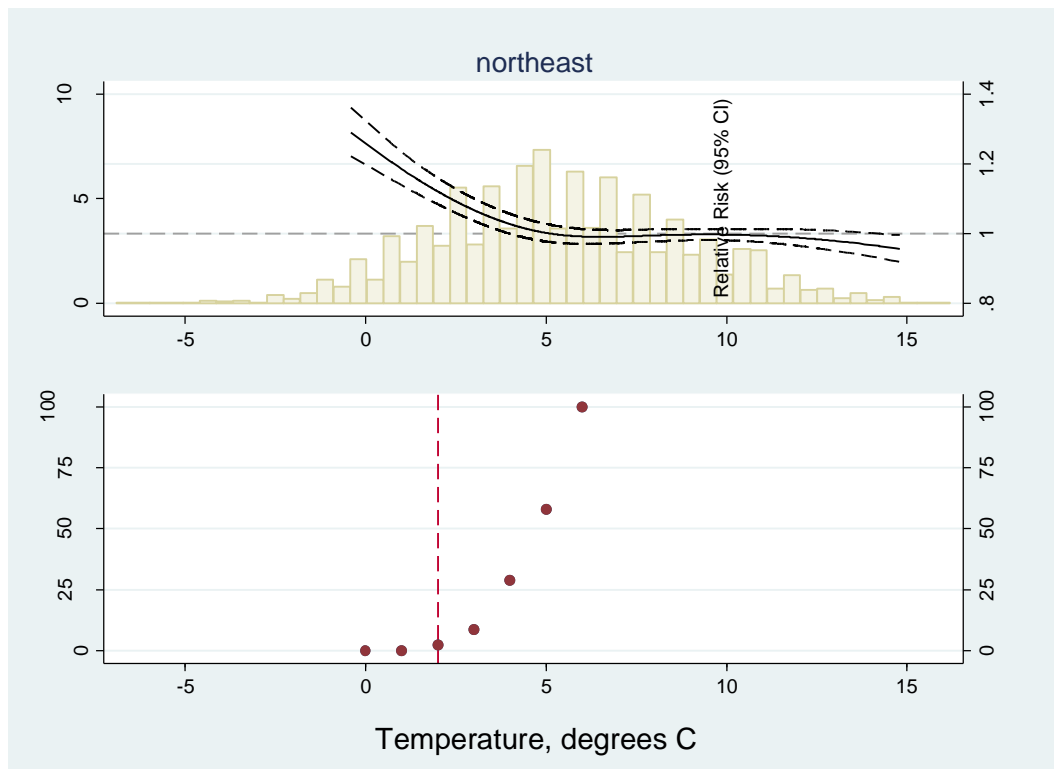
This is based on the findings of the 2012-13 evaluation of the CWP which indicate that the negative health effects of cold temperatures start at relatively moderate outdoor temperatures of around 4-8°C (depending on region). Although the risk of death increases as temperatures fall, the higher frequency of days at moderate temperatures mean that the greatest health burden in absolute numbers of deaths, occurs at these moderate temperatures, during a 'normal' winter.

This is illustrated in figure 3.1 using the North East as an example, but noting that the evaluation found very similar relationships in other regions. The top part shows increasing relative risk of death at progressively lower temperatures (line graph) superimposed on frequency of days at each temperature (histogram), demonstrating that most days in an average winter are above the 2°C threshold used to trigger the cascade cold weather alerts. The lower diagram combines this information to show the fraction of cold-attributable winter deaths by temperature level, demonstrating the majority of deaths (97% in the North East example) in an average winter occur at temperatures above the alert threshold temperature of 2°C.

Placing the alert threshold at higher temperatures would entail more frequent alerts; using the illustration, setting it at temperatures below which 50% of cold attributable deaths occur in an average winter would result in more than half of winter days being 'alert' days, risking alert fatigue and consequent inaction. Furthermore, in a harsh winter a greater proportion of the cold-related health burden (and health service use) would occur at temperatures below the 2°C alert threshold. Preparedness and response to these events therefore needs to remain robust and in place. The evaluation also contains feedback from end-users that they find the current alert system useful.

As with many other public health problems an approach is needed which addresses the low risk, but more frequent factors, alongside high-risk less frequent factors. The cold weather plan aims to provide this by including recommendations for action year-round and through winter to tackle cold homes and support vulnerable people, as well as emergency response actions during severe winter weather.

Figure 3.1 Relationships between Temperature and Mortality



Source: Cold Weather Plan PIRU Final Report (2015)

3.1 Level 0 – year-round planning and intervention

The CWP is only part of a wider response required to tackle excess winter deaths. There are many factors which contribute to vulnerability to cold. While action taken by health and social care services during winter can help to reduce excess deaths, a multi-agency approach is required to tackle wider determinants, such as economic, social and housing issues. This is not something that can be tackled in the winter alone and requires a long-term strategic approach by all relevant sectors to assessing needs and the commissioning, planning and implementing of interventions.

There is evidence from a number of high-quality randomised controlled trials and other controlled observational studies both from the UK and other industrialised countries (notably New Zealand) that indicate potential health benefits in terms of symptoms of chronic disease (particularly respiratory disease), mental well-being, reduced health service use and school/work absence.

For example, the 2013 Cochrane Review on **Housing Improvement as an Investment to Improve Health**²⁹ concluded that: “Improvements in warmth and affordable warmth may be an important reason for improved health. Improved health may also lead to reduced absences from school or work. Improvements in energy efficiency and affordable warmth may allow householders to heat more rooms in the house and increase the

amount of usable space in the home. Greater usable living space may lead to more use of the home, allow increased levels of privacy, and help with relationships within the home. An overview of the best available research evidence suggests that housing which promotes good health needs to be an appropriate size to meet household needs, and be affordable to maintain a comfortable indoor temperature.”

The National Institute for Health and Care Excellence (NICE) produced guidance on [Excess winter deaths and morbidity and the health risks associated with cold homes](#)³⁶ earlier in 2015. The recommendations from this guidance are summarised in Table 3.1.

[Cutting the cost of keeping warm: a fuel poverty strategy for England](#)²³ recognises the link between fuel poverty and health and emphasises the role of the health sector in tackling the issue.

The energy efficiency of a home is a key contributor to whether a home is fuel poor. Over 320,000 fuel poor households in England live in properties rated below band E level EPC rating. These households need to spend on average £1,000 a year more on energy to heat their home compared to a typical home²³. A new legal fuel poverty target states that by 2030, as many fuel poor homes as reasonably practicable must achieve a Band C energy efficiency standard.

Attempts have been made to establish the cost-benefit of energy efficiency measures for health. For example:

- one study estimated that the £109 million invested in the Warm Homes scheme in Northern Ireland between 2001 and 2008 potentially resulted in about £13 million saving to the NHS. This was a consequence of fewer children needing treatment for respiratory ailments, allergies and mental health problems. This result implied that 12% of the Warm Homes investment could be recovered from improvements to children’s health and mental wellbeing alone. When health effects for adults and older people are added, 42% of the Warm Homes investment could be covered. In other words, the study suggested that every £1 spent through the scheme may have saved the health service 42p¹².
- DECC has been working with external experts in health and energy to develop a methodology to estimate and monetise the change in quality adjusted life years (QALY) that results from improving the efficiency of dwellings and the resulting increase in temperatures. Initial estimates of the benefits associated with a range of interventions are expressed in terms both of QALY impacts and of estimated net present value (NPV). It is clear that there are substantial health benefits associated with some fuel poverty measures (Table 3.2).

Table 3.1 Summary of recommendations from the NICE Guidance on Excess winter deaths

Who should take action	Recommendation
<p>Strategic planners eg DECC, local authorities, NHS England, Public Health England, directors of public health, health and wellbeing boards</p>	<ul style="list-style-type: none"> • Develop a strategy • Ensure there is a 'single point of contact' health and housing referral service for people living in cold homes • Provide tailored solutions via the 'single point of contact' health and housing referral service for people living in cold homes • Ensure buildings meet ventilation and other building and trading standards
<p>Provider organisations and staff eg utilities, faith and voluntary sector organisations, housing services, installation and maintenance contractors, primary and secondary healthcare practitioners, social care practitioners, trading standards officers, environmental health officers</p>	<ul style="list-style-type: none"> • Identify people at risk of ill health from living in a cold home • Make every contact count by assessing the heating needs of people who use primary health and home care services • Non-health and social care workers who visit people at home should assess their heating needs • Discharge vulnerable people from health or social care settings to a warm home
<p>Training and awareness raising – all organisations</p>	<ul style="list-style-type: none"> • Train health and social care practitioners to help people whose homes may be too cold • Train housing professionals and faith and voluntary sector workers to help people whose homes may be too cold for their health and wellbeing • Train heating engineers, meter installers and those providing building insulation to help vulnerable people at home • Raise awareness among practitioners and the public about how to keep warm at home

Table 3.2: DECC estimates of values of warm home interventions

Intervention	Quality adjusted life years (QALY) saved per measure installed	Value of health saving per measure installed (£-NPV)
Cavity wall insulation	0.049	£969
Solid wall insulation	0.036	£742
Replacement boiler	0.009	£224
Central heating	0.012	£303

Reproduced from DECC Fuel Poverty: a Framework for Future Action, p.21
 NPV=net present value

However, many cost-benefit and health impact analyses struggle to capture the wider benefits of measures to address fuel poverty, such as the full impacts on mental health and wellbeing, lifestyle and social justice in both the short and long term, meaning that the health benefit may be underestimated.

Investment in energy efficiency can also bring economic benefit to local communities, which is an important driver for local councils. In 2011/12, the energy efficiency sector was estimated to account for 136,000 jobs and sales of £18 billion in the UK³⁷. Many councils have been leading local efforts to tackle fuel poverty, having delivered over half of all energy efficiency programmes in the country³⁷. The transfer of responsibility for public health to ‘upper tier’ local authorities will encourage closer alignment of programmes to improve local public health, housing, spatial planning and the environment. District councils (which provide housing services including affordable housing and enforcing minimum housing standards), also have a key role in connecting action to improve health and reduce fuel poverty.

The **Marmot Review**²⁸ concluded that energy efficient housing stock has multiple benefits to individuals and communities and that these measures are a sustainable way of:

- increasing thermal comfort in the home, reducing the health effects of cold homes
- reducing absence from school and work due to illness from cold homes
- reducing fuel consumption
- reducing fuel poverty
- reducing carbon emissions
- generating jobs in the local community
- increasing individual and community resilience
- reducing the burden on health and social care services, through improved physical and mental health and wellbeing

Energy efficiency measures and income maximisation schemes, educational and awareness raising activities around the effects of cold weather on health and what individuals can do to reduce their vulnerability can be implemented on a year round basis. Many of these interventions can address wider determinants of health and wellbeing, as well as having a direct impact on cold-related harm. Examples of interventions can be found in section 5 of this document, the evaluation reports for the [Warm Homes Healthy People Funds 2011-12 and 2012-13](#)^{35, 39} and on the [Local Government Association Knowledge Hub](#).

A Local Government Association (LGA) report [Tackling fuel poverty through local leadership](#)³⁸ outlines a number of different schemes and opportunities from the local government perspective. It emphasises the importance of partnership working, maximising resources, effective targeting and resident engagement.

It is strongly recommended that fuel poverty and reducing excess winter illness and death are considered as “core business” by health and wellbeing boards and included in joint strategic needs assessments (JSNAs) and joint health and wellbeing strategies (HWSs), in order to inform year-round commissioning.

3.2 Level 1 – winter action and preparedness

Although many long-term interventions require a year-round approach, the onset of winter provides a focus around which to add shorter-term initiatives such as:

- [seasonal flu immunisation](#)⁶ campaigns for both vulnerable groups and health and social care staff
- rapid winter warmth initiatives such as those implemented through both [Warm Homes Healthy People Fund schemes](#)^{35, 39}
- awareness campaigns for health and social care provider staff to alert them to the dangers of cold weather and to incorporate actions into the routine care of vulnerable individuals (eg signposting and/or referral of vulnerable people to sources of winter warmth/financial benefit)
- checking emergency and business continuity plans in readiness for very cold snaps/ snow and ice

Flu vaccination of healthcare workers can reduce pressures on the NHS by providing protection for essential staff and lowering the risk of infection to patients. The 2015 National Flu letter sets an ambition for 2015/16, that trusts must ensure a 100% offer of flu vaccination is made for all frontline staff, reaching a minimum uptake of 75%.

The 2014 to 2015 season saw 54.9% of all frontline HCWs (from all trusts) with direct patient care reported to have received the 2014 to 2015 seasonal influenza vaccine in England (an increase in uptake compared with 54.8% of all frontline HCWs

administered with the seasonal influenza vaccine in 2013/14). The highest seasonal influenza vaccine uptake by a trust was 90.1%, with 13.1% of all trusts (35/267) achieving vaccine uptake rates of 75% or more. Improving flu vaccine uptake for NHS frontline staff remains a priority.

3.3 Levels 2-4

The increased emphasis on levels 0 and 1 in the plan is not intended to imply that levels 2-4, which are more reactive to extremes of winter weather, are no longer important. Extreme cold is associated with a high risk of morbidity and mortality, and snow and ice with an increase in injuries and severe disruption to services.

The findings from the CWP evaluation are based on experience of previous winters where moderately cold days were far more frequent than extremely cold days. Reactive action to prevent harm to health and manage business continuity by services would be particularly important were we to experience an extremely cold spell for a prolonged period; the alert system and the actions that it triggers remain important.

Weather forecasts can be used to both project future demand on the health services and prevent illness in at-risk groups. Very limited evidence suggests preventive health measures targeted at vulnerable groups at the right time for example by sending text alerts direct to patients or making automated calls direct to patients may have benefits, but the evidence remains inconclusive.

For example, a weather and health forecasting service provided by the Met Office, dialled automated calls, in advance of bad weather to over 22,000 patients with COPD during the winter 2009/10. It was reported to reduce emergency hospital admissions for COPD by about 20%.⁴⁰ An independent evaluation of this service was unable to detect a significant change in admissions associated with the forecasting service but acknowledged that this could have been due to the limited power of the study to detect a significant effect. The evaluation concluded that more research was still needed.⁴¹

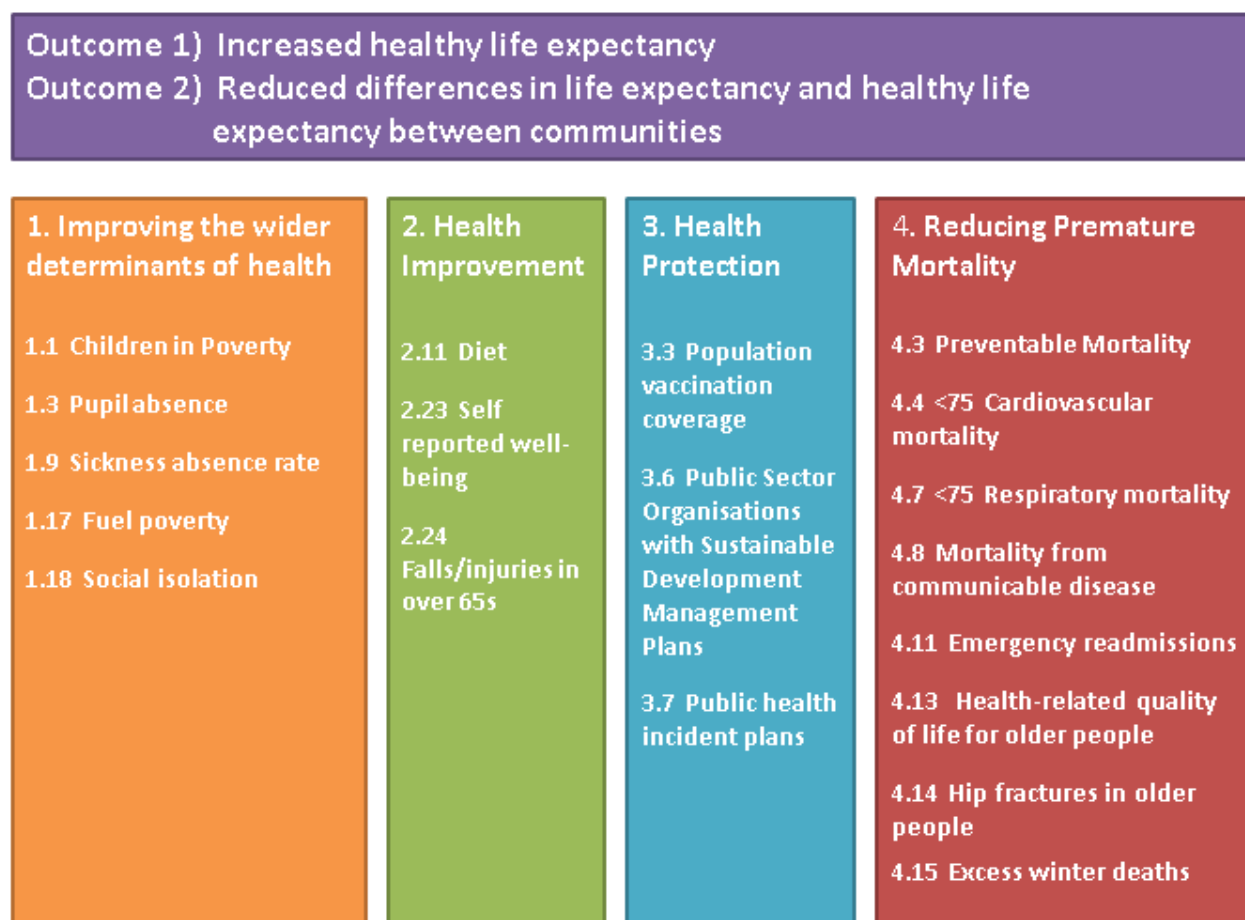
In developing recommendations for the NICE guidance on excess winter deaths, the evidence review⁴² acknowledged that the cold weather alert system had not yet been subject to a formal evaluation entailing empirical assessment of impact on health outcomes, though the recent evaluation of the plan provided qualitative evidence about the understanding of the alerts system and operational factors.

4. The Public Health Outcomes Framework and action to reduce harm from cold weather

The **Public Health Outcomes Framework 2013-16 (PHOF)** sets out desired outcomes and indicators to help us understand how well public health is being improved and protected.

There are two indicators within the framework that are directly related to this plan: fuel poverty (1.17) and excess winter deaths (4.15). However, action to reduce the harm from cold can be linked to many more outcome framework indicators connected to the wider determinants of health, such as poverty, educational achievement and social isolation (Figure 4.1).

Figure 4.1 PHOF indicators linked to action to reduce harm from cold weather



Domain 1: Improving the wider determinants of health

1.01 Children in poverty: The **Marmot Review**²⁸ indicates that children living in poverty are at higher risk of premature mortality and poor health outcomes in adulthood compared those who do not live in poverty. By reducing the numbers of children living in poverty, health outcomes and healthy life expectancy should improve. This indicator outcome will be measured by the number of children living in households where income is less than 60% of median household income, before housing costs.

Increasing energy efficiency through installing insulation and efficient heating systems, and income maximisation measures (ie benefit checks) can reduce cost of heating a home, and increase available money for expenditure elsewhere.

1.03 Pupil absence: Reducing absence from school is part of the government's commitment to increasing social mobility and to ensure every child can meet their potential.

Children are particularly vulnerable to respiratory problems such as asthma and recurrent infections if they live in cold, damp conditions. Installing energy efficiency measures has been shown to reduce absence from school, likely due to fewer respiratory ailments⁴. In children known to have asthma and recurrent infections, home energy efficiency improvements have been shown to reduce the number of sick days off school by 80%.^{43,44}

1.09 Sickness absence rate (adults, 16+): There are currently 140 million working days lost to sickness per year⁴³. As well as the effects on the individual, sickness absence impacts on employers and the state.

People with chronic conditions who work and live in low temperatures are likely to experience a worsening of their condition; this may subsequently affect their ability to work. It is therefore plausible, that increasing an individual's ability to heat their home affordably will have a positive impact on their health and wellbeing.

1.17 Fuel poverty: evidence shows that the three key factors influencing fuel poverty – low income, poor energy efficiency and high energy prices - are linked to living in cold homes⁴⁵.

Providing interventions to tackle each of these factors, such as insulation, efficient central heating systems, and income maximisation measures increase the likelihood that the home can be kept warm affordably²⁸.

1.18 Social isolation: Supporting people in remaining connected to their friends, family and community is a key element of the PHOF and is also an indicator in the **The Adult Social Care Outcomes Framework 2013/14**⁴⁶. This indicator will initially focus on those

engaging with social care and those who care for them. However, it is acknowledged that these are not the only groups who are socially isolated. The PHOF states that all parts of the health and social care system have a pivotal role in addressing social isolation across all population groups.

People most vulnerable to cold weather may also be socially isolated. Living in low temperatures may mean that a person is reluctant to invite friends and family into their home. One key aspect of the CWP is that communities and individuals are encouraged to look after themselves and others, as it is known that improving social connectedness can build resilience⁴⁷.

Domain 2: Health improvement

2.11 Diet – poor diet is a major contributor to illness and premature death in England. It increases the risk of some cancers, cardiovascular disease and type II diabetes. The costs of diet-related chronic diseases to the NHS and more broadly to society are considerable.

Fuel poverty has also been found to affect dietary opportunities. Higher fuel prices have a diminishing effect on disposable income and result in choices that have to be made on where money is spent – this can include a choice of whether to spend money on heating the home or “heat or eat”.⁴⁸ Increasing energy efficiency through installing insulation and efficient heating systems, and income maximisation measures (ie benefit checks) can reduce cost of heating a home, and increase available money for expenditure elsewhere.

2.23 Self-reported wellbeing is associated with lower rates of illness, quicker recovery from illness over a longer period of time and better physical and mental health. Data on wellbeing is a key component of JSNAs is an important focus for HWBs.

Self-reported wellbeing has also been shown to be affected by living in low temperatures. A recent survey in Ireland showed that the percentage of people reporting “very good health”, where there were no links to fuel poverty, was just under 50%. This compared with only 20% reporting the same where they also reported two or three indicators linked to fuel poverty⁴⁹. A number of studies have demonstrated that improving indoor temperatures through heating and energy efficiency interventions are associated with improved self-reported wellbeing²⁹.

2.24 Falls and injuries in the over 65s: Falls are the largest cause of emergency hospital admissions for older people, and significantly impact on long-term outcomes, eg being a major precipitant of people moving from their own home to long-term nursing or residential care. Falls are estimated to cost the NHS more than £2.3 billion per year⁵⁰.

Living in low temperatures hampers mobility and increase the likelihood of falls and non-intentional injuries – especially in frail and elderly. This can be for number of reasons; symptoms of arthritis worsen in cold, damp homes; strength and dexterity decrease as temperatures drop, increasing the risk of non-intentional injuries; and snowy and icy conditions increase the risk of trips and falls outdoors¹¹.

Domain 3: Health protection

3.03 Population vaccination coverage The PHOF indicator includes measures of influenza vaccine coverage of people aged 65 and over and at-risk individuals.

Influenza is major cause of winter illness. Timely vaccination of vulnerable people and those caring for them, including frontline health and social care staff is important to reduce winter morbidity and mortality, and relieve winter pressures on the NHS and social care⁶.

3.06 Public sector organisations with board approved sustainable development management plan. Sustainable development management plans (SDMPs) should support public health by strengthening community resilience and reducing health inequalities while addressing climate change. Adaptation and mitigation strategies should also be incorporated into sustainability plans. The PHOF states that the key influence for this indicator is the **Climate Change Act 2008**⁵¹ which sets out targets for the reduction of carbon emissions by 2050.

The energy efficiency of buildings is a key part of sustainable development management plans and action to reduce cold-related harm; the health and social care sector has a key leadership role in promoting measures that promote health, save money and reduce carbon emissions.

3.07 Comprehensive, agreed inter-agency plans for responding to public health incidents and emergencies: This is a proxy measure of the preparedness of local authorities and other relevant bodies to respond to a public health incident.

The CWP supports a multi-agency approach to both planning and response to cold weather, including severe winter weather events that impact on critical infrastructure.

Domain 4: Healthcare public health and preventing premature mortality

4.03 Mortality from all causes considered preventable. The PHOF defines preventable mortality as those causes which are avoidable through population or individual health interventions which limit exposure to harmful substances or conditions. This outcome links with mortality indicators in the [NHS Outcomes Framework](#)⁵².

Cold weather deaths are mostly preventable²⁸ and although largely related to cardiovascular and respiratory diseases, there are deaths due to hypothermia, carbon monoxide poisoning, influenza, and falls and injuries. Preventative measures such as increasing energy efficiency in the home through installing insulation and efficient heating systems can have health benefits. Specifically the causes in this indicator which are addressed by the CWP are: ischaemic heart disease, influenza, COPD and accidental injury.

4.04 Under 75 mortality rate from cardiovascular diseases (including heart disease and stroke). Cardiovascular disease is one of the major causes of death in adults under 75s in England. This indicator is shared with the NHS Outcomes Framework⁵² and underlines the importance of both prevention and treatment.

While most excess winter deaths occur in the 75 years and over age group, about 20% (or about 5,000 per annum) occur in those aged under 75. Some 40% of excess winter deaths are attributed to cardiovascular disease¹. Action to reduce premature winter-related deaths would be expected to contribute to reducing the under 75 cardiovascular mortality rate.

4.07 Under 75 mortality from respiratory diseases. Respiratory disease is one of the top causes of death in England in adults under 75, with smoking a major cause of COPD. This indicator includes deaths from influenza and pneumonia, as well as chronic respiratory diseases such as COPD and asthma. It is shared with the NHS Outcomes Framework⁵² and again underlines the importance of prevention and treatment.

Chronic diseases of the lungs are significantly exacerbated by cold, damp environments; deaths from these diseases and represent a third of all excess winter deaths¹. Seasonal influenza is an important cause of excess winter deaths. Action to reduce premature winter-related deaths, including vaccination of at-risk groups and healthcare workers, would be expected to contribute to reducing the under 75 respiratory mortality rate.

4.08 Mortality rate from communicable diseases. Control of communicable diseases is important for public health and deaths can often be prevented. This indicator includes deaths from influenza and pneumonia.

Seasonal influenza is an important cause of excess winter deaths and annual vaccination of at-risk groups and health care workers is recommended.

4.11 Emergency readmissions within 30 days of discharge from hospital. This outcome is shared with the NHS Outcome Framework's "Helping people to recover from episodes of ill health or following injury" and focuses on the role of health and social care professionals in co-ordinating appropriate support and services to enable people to return home from hospital or regain independence.

Patients who are discharged home and do not or cannot adapt their behaviour to keep themselves or their home warm may require readmission due to the fact that they continue to live in low temperatures. Examples of local schemes that provide examples of home safety checks can be found in the [Warm Homes Healthy People Fund evaluation reports 2011-12 and 2012-13 evaluation reports](#)^{35, 39}.

4.13 Health-related quality of life for older people. With an increasing ageing population, this indicator focuses on promoting wellbeing, preventing ill health and preserving independence.

Older people are over-represented in excess winter deaths figures. Improving their living conditions through improvements to the home particularly through energy efficiency measures in the home and falls prevention interventions have the potential to improve health and allow older people to stay in their homes for longer.

4.14 Hip fractures in people aged 65 and over. Hip fracture is a debilitating condition – only one in three sufferers return to their former levels of independence and one in three end up leaving their own home and moving to long-term care (resulting in social care costs). Hip fractures are common sequelae of falls.

Dexterity and mobility are affected by living in cold temperatures and this increases the likelihood of falls and accidental injury. Increasing mobility and dexterity through appropriately warm housing, through energy efficiency measures and through identifying those people who have Category 1 fall hazards in their home and taking remedial action^{53,54} will reduce the risk of falls and therefore the incidence of hip fracture in this population.

4.15 Excess winter deaths.

Excess winter deaths are a major cause of mortality, particularly among older people and those on low incomes. Cold weather exacerbates minor and pre-existing medical conditions, and mental health is negatively affected by fuel poverty and cold housing.

The central tenet of the CWP is to reduce excess winter morbidity and mortality by supporting planning, response and intervention at a local level, on a year-round basis.

Measures to reduce cold-related harm also meet indicators in four out of the five domains of **The NHS Outcomes Framework (NOF) 2014-2015**⁵²: Domain 1 – Preventing people from dying prematurely; Domain 2 - Enhancing quality of life; Domain 3 – Helping people to recover after an episode of ill health or following injury; and Domain 5 – Treating and caring for people in a safe environment and protect them from avoidable harm. It may also address three domains of **The Adult Social Care Outcomes Framework 2013/14**⁴⁶: Domain 1 – Enhancing quality of life for people with care and support needs; Domain 2 – delaying and reducing the need for care and support; and Domain 4 – safeguarding adults whose circumstances make them vulnerable and protecting from avoidable harm.

5. The Warm Homes Healthy People fund and data sharing for better health

5.1 Warm Homes Healthy People Fund

The aim of the Warm Homes Healthy People (WHHP) Fund was to support local authorities and their partners in reducing death and illness in England due to cold housing in winter. The fund was established, for two winters running (2011-12 and 2012-13), to support of the aims of the CWP for England, and was part of a wider suite of measures, which DH, the NHS and other government departments took to protect individuals and communities from the effects of severe winter weather.

Independent “process” evaluations of WHHP were carried out by the [Health Protection Agency](#) and subsequently [PHE](#) to assess how the WHHP Fund was implemented by local authorities.^{35,39} The reports aim to share examples of good practice and make recommendations for the future. Some examples of WHHP Fund interventions are illustrated in Figure 5.1. The evaluation reports and the Warm Homes Healthy People – Sharing Good Practice group on the [Local Government Association Knowledge Hub](#) contain many further examples of good practice.

The WHHP scheme was universally popular. Local authorities and their partners used innovative ways to try to reduce excess winter morbidity and mortality in line with the CWP for England. Projects clearly demonstrated that many interventions addressed some of the wider determinants of health, including social isolation, home safety, household budgeting, employment support, support for carers, community resilience, housing, carbon reduction and nutrition and exercise. Lessons learnt from the first initiative were used to improve implementation of the second for example by widening the target population. Partnership working was reported to be fundamental to successful implementation.

Challenges remain, particularly in identifying and engaging with some vulnerable groups such as those in private rented accommodation. The important role of health professionals in signposting and referring individuals to these sources of winter warmth/financial support was again emphasised. Health professionals need to be aware of the health effects of cold, damp homes and find ways to integrate these schemes into the delivery of primary and secondary care. The short deadlines and episodic nature of this funding did cause problems with bidding, implementation and engagement of stakeholders.

This emphasises the importance of a sustained approach to funding for interventions to reduce excess winter mortality and morbidity and for local areas to consider this “core

business”. Many local evaluations have incorporated plans for taking this work forward in the future, for example sourcing funding from the ring-fenced public health budgets at local authorities and/or from clinical commissioning groups (CCGs).

The evaluations provide evidence that partners on health and wellbeing boards, such as local authorities and clinical commissioning groups, may be able to use to inform integrated commissioning to provide year-round services to reduce cold weather related mortality and morbidity, fuel poverty and other health and social inequalities. This will mean that crucial intervention opportunities are not missed, ensure the sustainability and continuity of schemes, and assist local areas in meeting a substantial number of indicators in the PHOF⁵⁹, NHS Outcome Framework⁵² and the Adult Social Care Outcomes Frameworks⁴⁶.

“All I have ever wanted was to make sure my children are well looked after, I was failing. I never expected a knock at the door would result in all this. I now have a monthly budget I follow, a slightly higher income, a warm house and a better state of mind. Thank you to the Warm Homes Healthy People Project.”

Client, Citizens Advice Bureau, Tendering.

Figure 5.1 Examples of WHHP Fund interventions

Interventions	Examples
Helpline & Single point contact referrals	Telephone advice lines for housing, support and fuel poverty queries. Often directing individuals and professionals to sources of further help and benefits. Organisations found it useful to report back to shadow HWBB. Suggestions on independent professional line to aid tailored advice and rapid referral (e.g. for busy GPs). Line must be single point and simple so it is accessible and effective. Single point of contact also used for letter/fax/email to refer clients who could then be entered onto database and followed up. Single point contact could be housing association or community centre for sharing of information.
Heaters and home checks	Gas fire safety checks and repairs, boiler checks and repairs, home energy checks, explanation of heating systems to clients, help in refunding bills, emergency heating advice and provision and loft clearance.
Packs	Cold weather prevention packs, winter warmth packs and toolkits. Packs included resource packs, hot water bottles with messages and blankets. Helpful to share experience and advice between Authorities on the content, procurement, suppliers and storage facilities related to organising these packs.
Training	DVDs which aided the voluntary and community sector participants. Red Cross cold weather specific first aid training for district nurses and people in communities. Training of vulnerable groups such as the elderly, through peer support groups delivering specific education advice.
Grants	Small grants to individuals for minor improvements to homes. Donations from local companies to help improve access for professionals to reach vulnerable groups (e.g. snow equipment, snow tyres and pavement gritters).
Food delivery	Free hot meals and referrals to meals on wheels
Home visits	By both voluntary, health and community sector workers to distribute thermometers, give advice, deliver energy meters, check smoke alarms.
Advice	Key community buildings with access to community workers have extended opening hours. Mobile advice units giving information on fuel and benefits. Organisations providing relevant advice brought together to form partnerships.
Community Champions	To help achieve the aims and objectives of the CWP. Embed this role within local communities.

This list highlights a number of projects but does not aim to be an exhaustive list. For a more comprehensive summary of interventions, see the evaluations of the fund^{35, 39}

Figure 5.2: Summary of recommendations from Warm Homes Healthy People Evaluation Report 2012-13 ³⁵

Recommendations:

- WHHP programmes should be a commissioning priority for both local authorities and clinical commissioning groups as part of their core business
- year-round planning and alert and readiness should be considered as part of delivering sustainable schemes with the emphasis on prevention. This requires commitment of resources to allow year round preparedness in line with the CWP “Alert level 0”
- including issues such as fuel poverty and excess winter mortality and morbidity into JSNAs will help inform commissioning. With outcome frameworks for health and social care providers and public health emphasising the need to reduce hospital admissions, reduce premature mortality and improve quality of life (among other indicators), these schemes should continue, to meet the challenge of health and social care inequalities
- the benefits of projects funded by the WHHP Fund should be framed in terms of their effect on measurable outcomes, such as reduced hospital admissions and reduced premature mortality from cardio-vascular disease during cold weather
- if further central funding is to be provided, more notice should be given to allow local authorities to plan effectively and deliver certain aspects of the programmes prior to the onset of cold weather
- consideration should be given to sustainable sources of funding, enabling local authorities and their partners to take a year round, long-term approach as recommended by “Alert level 0” planning provision in the CWP for England
- messages should be simplified for maximal inclusivity and relevance. Keeping messages simple and universal may increase uptake of schemes in those populations who do not identify themselves as being vulnerable to the effects of cold weather
- partnerships should develop an explicit approach to data sharing to enable maximum impact on the community. Innovative ways of addressing data sharing issues between organisations that know about vulnerable people are needed. For example, GPs could provide letters to vulnerable patients in order to allow them to refer themselves to the scheme

5.2 Data sharing for better health

Some of the feedback from the Warm Homes Healthy People projects pointed to the challenges of data sharing between agencies at two levels:

- **population level:** sharing data between agencies who know about poor housing stock condition and those that knew about vulnerable people living in the community but not necessarily their housing conditions
- **individual level:** sometimes a range of different professionals supporting individuals knew that a person was living in a cold house, for example, but there weren't clear arrangements for either the sharing of information between professionals or clear guidelines as to where to refer that person onwards to maximise support which might be available

The benefits of greater sharing of information between agencies are clear, as it can result in better care, or warmer houses, for the clients and families involved.

However, there are complex issues related to information governance between agencies. Informed patient consent is crucial. A number of areas have developed useful protocols to support data sharing.

These information governance issues have taken on a wider significance with the transfer of public health functions from the NHS to local authorities since April 2013.

DH published a **factsheet**⁵⁵ summarising the health intelligence requirements for local authorities to support the delivery of their new responsibilities for protecting and improving public health, and describing the issues they will need to address, including:

- access to relevant health and social care data and evidence
- provision of specialist health intelligence skills and capacity
- governance of any confidential information used for health intelligence

This factsheet is supported by further publications such as the DH's report '**Information: To Share or not to Share. Government Response to the Caldicott Review**'⁵⁶ which sets out a series of recommendations to increase data sharing between health and social care providers to promote better care. These recommendations can be utilised to clarify the mechanisms for safely and securely sharing information between the NHS and local authorities to improve the commissioning and joined-up delivery of care services to those whose health is at risk from cold weather.

The WHHP Fund evaluations^{35,39} highlighted innovative ways of using existing data sets and knowledge to target their schemes to those who may not engage with health and social care services or those who are socially isolated.

For example, people in receipt of certain benefits, assisted bin collection lists, vulnerability mapping (based on housing stock), local knowledge from parish councils and village agent schemes (where those living in the community know those among them who are most vulnerable) and energy company priority users registers were all methods of identifying potential recipients of interventions.

The WHHP fund evaluation also highlighted how lack of participation from the healthcare sector provided challenges when trying to target those most vulnerable to the health effects of cold weather. Indeed, there was a perception that GPs and other healthcare providers are gatekeepers of high quality information about vulnerable people, unable to share data due to concern about Caldicott and data protection issues. There were local authorities, however, who found ways of engaging their local GP practices and community nursing teams. These included schemes using quick and simple single-point-of-contact referral systems and small financial incentives to refer patients into the scheme. These approaches were found to encourage referrals from data gatekeepers, who would identify those most vulnerable without having to provide full access to patient information.

Figures 5.3, 5.4 and 5.5 provide case studies showing how areas have worked in partnership to improve referral across agencies. Many more examples can be found on the Knowledge Hub noted in section 5.1 and in the LGA report [Tackling fuel poverty through local leadership](#)³⁷.

Figure 5.3: Targeting using a health risk stratification tool

Kirklees “Warm People in Warm Homes” project used the Kirklees NHS Predictive Risk Toolkit to target the most health vulnerable residents. This toolkit has been used by NHS Kirklees since 2009, with agreement from almost all local GP practices, providing risk stratification for 98.8% of Kirklees residents.

Partners decided to target the most vulnerable 1% (in terms of risk of hospital admission in the next 12 months) as part of their original mailshot. The chairs of the Kirklees CCGs were approached and asked for their backing to ask GPs to send out patient letters explaining about the project and informing of the telephone helpline should they want a warmth pack, advice or further help. The NHS encrypted numbers of the 1% most vulnerable were given to the GP practices to address and post the letters, with an incentive payment of 10p per letter. If an identified vulnerable resident was also under the care of Locala (community health provider), the mailshot was undertaken by Locala and not their GP. A total of 2020 letters were sent out by GPs and 800 by Locala. In addition 735 letters were sent out to residents supported by the council’s Adult Service home carer services, and 245 residents living in council houses (managed by Kirklees Neighbourhood Housing) were also targeted.

There was an overall response rate of around 21.5%. This is also supported in the number of respondents to the GP mail-out (413). The source of each letter can be identified as a unique reference number was given and should have been quoted when calling the helpline.

<http://tinyurl.com/Warm-Homes-2012-13>

Figure 5.4: Blackpool Counter Attack

Blackpool's Counter Attack service was initiated in 2006 as a two year project. Counter Attack was funded and delivered by a partnership of agencies including NHS Blackpool, Blackpool Council, Age Concern and Scottish Power Energy People Trust. Using outreach workers, the aim was to identify and understand the assumed barriers that prevented vulnerable households taking up available measures to combat fuel poverty. The service also aimed to recommend where provider agencies needed to re-focus their work to overcome these barriers.

It became apparent early in the project that the service could not ignore resident's immediate heating needs, so provision of remedial measures was added to the project. Over the initial two years, interventions completed resulted in an increase of uptake of existing measures to a value of £253,824, plus additional income benefits and allowances awarded to vulnerable residents totalling £1.1 million. As a result of the achievements of the pilot, the scheme was extended and mainstreamed.

Since the beginning of 2010 Counter Attack (rebranded as Warmth for Wellbeing) has been managed and delivered by Blackpool Council's Home Improvement Agency (HIA), Care & Repair. The combination of the HIA's "no wrong door" ethos and wide range of contacts in the private, voluntary and community and third sectors has led to closer working relationships and simple and innovative pathways into the service for professionals and residents alike.

In 2010/11 as well as facilitating an estimated £800,000 in additional income benefits and more than £360,000 in heating and insulation measures, evaluation of a sample of clients demonstrated a small, but statistically significant improvement in self-reported "Quality of Life" indicators.

Blackpool Counter Attack (and its successor Warmth for Wellbeing) is a clear demonstration of the effectiveness of local partnerships and sustained investment in improving the lives of Blackpool's most vulnerable residents.

For more information please contact Anne McDowall, Service Manager Blackpool Care & Repair, 01253 651555, anne.mcdowall@blackpool.gov.uk or Christine Smith, Community Energy Coordinator 01253 476340 christine.j.smith@blackpool.gov.uk

Figure 5.5: Safer & Warmer Swindon

"Swindon 'Safer & Warmer' project engaged with local pharmacies to promote their scheme. Certain medications were highlighted as being associated with patients most at risk of cold related morbidity and mortality. For example, medication to treat respiratory disease would be an indicator of susceptibility to cold and a leaflet – with a contact number and key components of the scheme – would be placed with the medication" – David Miles, Swindon Borough Council.

Appendix 1: The Cold Weather Plan and other winter programmes and resources

The CWP builds on existing programmes and public health measures to protect individuals and communities over the winter period. The key elements include:

- **annual seasonal influenza (flu) vaccination programme⁶**

<https://www.gov.uk/government/collections/annual-flu-programme>

This aims to protect people from the harmful effects of flu and is offered, free of charge, to certain at-risk groups. The national NHS staff seasonal flu vaccination campaign website can be found at: <http://www.nhsemployers.org/campaigns/flu-fighter> and @NHSFlufighter⁵⁷

- **pneumococcal vaccination programme** which aims to protect those people most at risk from pneumococcal disease which can cause meningitis, septicaemia and pneumonia
- **Stop norovirus spreading this winter** – This downloadable poster for health professionals contains information about norovirus, how it's transmitted and advice how to prevent spreading the disease.
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317140036483
- **NHS Choices** (www.nhs.uk/winterhealth). The main NHS website provides reliable advice and guidance throughout the year on how to keep fit and well. It includes information on topics such as: keeping warm; the dangers of carbon monoxide poisoning; the importance of eating well; and the symptoms of flu. The site also offers symptom checkers and details of all local health services
- **NHS winter pressures reporting and winter resilience programmes**. These are plans made locally and nationally over the winter to help the NHS and local agencies to manage the demands placed on essential services so they can continue to operate smoothly through severe winter weather.

NHS England will, each week, post on their website information for service professionals and users about the current volume of activity in response to the winter pressures, including regular data on A&E and ambulance activity.

<http://www.england.nhs.uk/statistics/statistical-work-areas/winter-daily-sitreps/>
<http://www.england.nhs.uk/statistics/ae/>

- **Winter Health Watch** – this is PHE’s webpage for information on winter health surveillance including syndromic, influenza, norovirus and mortality surveillance reports <https://www.gov.uk/government/organisations/public-health-england/series/winter-health-watch>
- **Excess Winter Deaths Atlas for England** - information about excess winter deaths produced by the Chief Knowledge Officer directorate at PHE, currently at: www.wmpho.org.uk/excesswinterdeathsinEnglandatlas/, pending migration to PHE website
- **Excess Seasonal Deaths Toolkit**⁵⁷ – this was produced by DH to help local communities take a systematic approach to reduce the risk of seasonal excess deaths in older people. <http://pbcc.files.wordpress.com/2012/02/ref-11-seasonal-access-deaths.pdf>
- **Big Energy Saving Network** - This programme provides grant funding and specialist training to over 170 ‘energy champions’ from third sector and community groups throughout Great Britain. These ‘champions’ deliver a programme of help and advice to vulnerable consumers and front line workers who come into contact with them. This outreach is designed to help vulnerable consumers reduce their energy costs by taking action on tariffs, switching and the take up of energy efficiency offers. <http://bigenergysavingnetwork.ning.com/>
- **The health impacts of fuel poverty and cold homes**
A report by the institute of health equity which reviews the existing evidence of the direct and indirect health impacts suffered by those living in fuel poverty and cold housing. It makes the case for aligning the environmental and health benefits of reducing fuel poverty and improving the thermal efficiency of the existing housing stock. https://www.foe.co.uk/sites/default/files/downloads/cold_homes_health.pdf
- **Fuel poverty and health toolkit**
A guide for public health professionals, health and wellbeing boards and local authorities in England. The guide is intended to be a tool for directors of public health and their teams, health and wellbeing boards, and colleagues across local authorities who want to start, extend or improve their work on fuel poverty. <http://www.healthyplaces.org.uk/themes/healthy-housing/fuel-poverty/>
- **BRE Housing health cost calculator**
The Housing Health Cost Calculator (HHCC) is a tool for calculating the health costs of hazards in homes, and the savings made where these have been mitigated or significantly reduced. <https://www.housinghealthcosts.org/>
- **Get Ready for Winter Campaign** – this is an annual web-based campaign hosted by the Met Office and is a portal for government departments and their

partners. The pages offer advice and links to a range of organisations to help individuals, families and communities prepare for winter.

<http://www.metoffice.gov.uk/learning/get-ready-for-winter>

- **Warm Homes, Healthy People Fund:** keeping people warm in winter – this is was an initiative where funds were made available for winter 2011/12 and winter 2012/13 to support local authorities and their partners in reducing death and morbidity in England due to cold housing in the coming winter. Information about individual schemes and examples of good practice are available in the two evaluation reports ^{35,39} and on the LGA knowledge hub.
<http://tinyurl.com/Warm-Homes-2011-12>
<http://tinyurl.com/Warm-Homes-2012-13>
<https://knowledgehub.local.gov.uk/web/warmhomeshealthypeoplesharinggoodpractice/welcome>
- **Keep Warm Keep Well** ⁵⁸ This provides advice on staying warm over the winter and checking on neighbours and relatives who may be vulnerable during cold weather, in order to reduce illness and deaths. Materials will continue to be available online to help local organisations communicate with the public.
<https://www.gov.uk/government/publications/keep-warm-keep-well-leaflet-gives-advice-on-staying-healthy-in-cold-weather>
- The **Equinox** leaflets (<http://www.equinoxcare.org.uk/climate-change>) developed by service users with help from medical staff, particularly:
 - *Alcohol and extreme cold weather*
 - *Drugs and extreme cold weather*
 - *Mental ill health and extreme cold weather*

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