Public Health England

UCL Institute of Health Equity

Local action on health inequalities:

Fuel poverty and cold home-related health problems

Health Equity Evidence Review 7: September 2014

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Public Health England's mission is to protect and improve the nation's health and to address inequalities through working with national and local government, the NHS, industry and the voluntary and community sector. PHE is an operationally autonomous executive agency of the Department of Health.

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The UCL Institute of Health Equity (IHE) is led by Professor Sir Michael Marmot and seeks to increase health equity through action on the social determinants of health, specifically in four areas: influencing global, national and local policies; advising on and learning from practice; building the evidence base; and capacity building. The Institute builds on previous work to tackle inequalities in health led by Professor Sir Michael Marmot and his team, including the 'Commission on Social Determinants of Health', 'Fair Society Healthy Lives' (The Marmot Review) and the 'Review of Social Determinants of Health and the Health Divide for the WHO European Region'.
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About this evidence review

This evidence review was commissioned by PHE and researched, analysed and written by the IHE. There are related evidence reviews available in this series. There is a companion summary briefing note available on this and other related topics from the same series. This review is intended primarily for directors of public health, public health teams and local authorities. This review and the accompanying briefing are part of a series commissioned by PHE to describe and demonstrate effective, practical local action on a range of social determinants of health.

This evidence review was written for IHE by Reuben Balfour and Jessica Allen.

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Key messages

1. A household is in fuel poverty if they are on a low income and face high costs of keeping adequately warm and other basic energy services. Fuel poverty is driven by three main factors: household income, the current cost of energy and the energy efficiency of the home.
2. Fuel poverty is associated with cold homes. England's housing stock is made up of relatively energy inefficient properties which can result in homes that are difficult or costly to heat. However, households can be cold without being in fuel poverty if people choose not to heat their homes adequately where they have the means to do so.
3. A social gradient in fuel poverty exists; those on lower household incomes are more likely to be at risk of fuel poverty, contributing to social and health inequalities.
4. The most recent data on fuel poverty in England indicates that there were 2.28 million fuel-poor households in 2012.[1]
5. Cold weather experienced in the winter months can affect or exacerbate a range of health problems, including respiratory and circulatory conditions, cardio vascular disease, mental health and accidental injury. In some circumstances, health problems may be exacerbated to a degree that they may cause death. In England, there were an estimated 29,200 excess winter deaths in 2012-13.[2] Estimates suggest that some 10% of excess winter deaths are directly attributable to fuel poverty and 21.5% of excess winter deaths are attributable to the coldest 25% of homes.[3, 4]
6. Projections suggest that the price of fuel will continue to rise in the future. This is likely to have consequences for the number of households in fuel poverty and cold home related-health problems.
7. Tackling fuel poverty and cold home-related health problems is important for improving health outcomes and reducing inequalities in health in England. Local authorities and public health are well placed to address issues relating to fuel poverty.

Introduction

This paper examines the evidence relating to the impact of fuel poverty on health and health inequalities and sets out some areas for action. It is intended for the interests of directors of public health and public health teams within local authorities, health and wellbeing boards, and other local authority officers.

The first part of this review provides an overview of fuel poverty, describing the evidence linking fuel poverty, cold homes and poor health outcomes. It examines the scale of the problem across England and trends over time. Evidence shows that living in cold homes is associated with poor health outcomes and an increased risk of morbidity and mortality for all age groups; furthermore, studies have shown that more than one in five (21.5%) excess winter deaths in England and Wales are attributable to cold housing.[4] While fuel poverty will affect households' ability to heat their home, it should be acknowledged that households can be cold without being in fuel poverty, if people do not heat their homes adequately whey they have the means to do so.

In addition to wide scale health damage, cold homes are also costly. While cost estimates vary widely, the charity Age UK estimates that the annual cost of cold temperatures to the NHS in England is £1.36bn, not including associated social care costs.[5] Research on the cost of housing-related ill health, where poor housing conditions are a main contributor, estimates that the annual cost to the NHS is £2.5bn. This includes costs accrued by primary care services, treatment costs, hospital stays and outpatient visits.[6]

The second part of this review provides a brief overview of national policy and sets out the role of local authorities and potential interventions at a local level. The government has introduced a range of national policies, such as the Green Deal and Energy Company Obligation (2013), which requires energy suppliers to provide measures which improve the ability of low income households to heat their homes, improving warmth. Other policies, including the warm home discount, winter fuel payments and cold weather payments, are designed to alleviate the situation of those on low incomes during cold weather.

Public health in local areas also has an important role in prioritising, tackling, designing and commissioning interventions to reduce fuel poverty and thereby improve health and health inequalities locally. Efforts to reduce fuel poverty require cross-sector partnerships, involving public health, to address the issue.

Fuel poverty is not just about poverty, but also about the quality of England's housing stock and energy efficiency. The review discusses some of the interventions that have been implemented at the local level to help people on low incomes during cold weather and to address cold home-related health problems. Local authorities and local organisations have taken action to tackle these issues through the implementation of interventions to:

- improve the energy efficiency of homes
- improve access to support mechanisms to tackle fuel poverty, low household incomes and protect against cold weather
- help residents reduce fuel bills
- support residents who are vulnerable to cold weather

The final section highlights gaps in the literature and recommends areas for further research. This paper is part of a collection of evidence reviews commissioned by Public Health England (PHE) and written by the UCL Institute of Health Equity. A corresponding briefing on this topic area is also available.

Throughout the paper, we have highlighted certain evidence and resources in boxes such as this one. These are labelled in the following ways:

Intervention – an example of a strategy, programme or initiative, taken by a local area, organisation or national government, that it is felt may contribute to reducing health inequalities by acting on the social determinants of health. It has either been evaluated and shown to be effective, or is considered to be an example of promising action.

Key message(s) – summaries of the key findings or action proposed in this paper.

Key literature – summaries of academic studies or other reports which provide key information relevant to the chapter, often taking into account a range of different programmes or projects.

1. What is fuel poverty?

Fuel poverty is driven primarily by three factors: income, the current cost of energy and the energy efficiency of the home.[7] In addition, a property's size, age and type of heating system are important in determining whether or not a household is fuel-poor[8]: older homes tend to be much less energy efficient than newly built homes (see section 3.3). The relatively low standard of energy efficiency across England's older housing stock means that heating the home can be difficult and/or costly, particularly for those on low incomes.[9] Fuel poverty can to lead to a lower temperature in a property than might be healthy.

A household is fuel poor if they are on a low income and face high costs of keeping adequately warm. In 2013, the government introduced a new definition of fuel poverty following recommendations made by John Hills in the Hills Fuel Poverty Review.[3] Under the new definition a household is in fuel poverty if:

- its income takes it below the poverty line (taking into account the cost of energy)
- its energy costs are higher than is typical for that household type[9]

In England, using the official definition of fuel poverty, there were an estimated 2.28 million fuel-poor households in 2012.[i] Trends in fuel poverty have remained reasonably stable under this indicator over the past 18 years (see figure 1).[10]

However, the old indicator, which is no longer officially used, shows somewhat different trends. This was based on a household needing to spend more than 10% of income to maintain an adequate level of warmth[i]. Figure 1 shows that according to this indicator, there was a large increase in fuel poverty from 2003 to 2011.The estimated fuel poverty gap[ii] also rose during this period.

[i] An adequate level of warmth is defined as 21°C for the main living area and 18°C for other occupied rooms.
[ii] The fuel poverty gap is the difference between a household's required fuel costs and what these costs would need to be for it not to be in fuel poverty

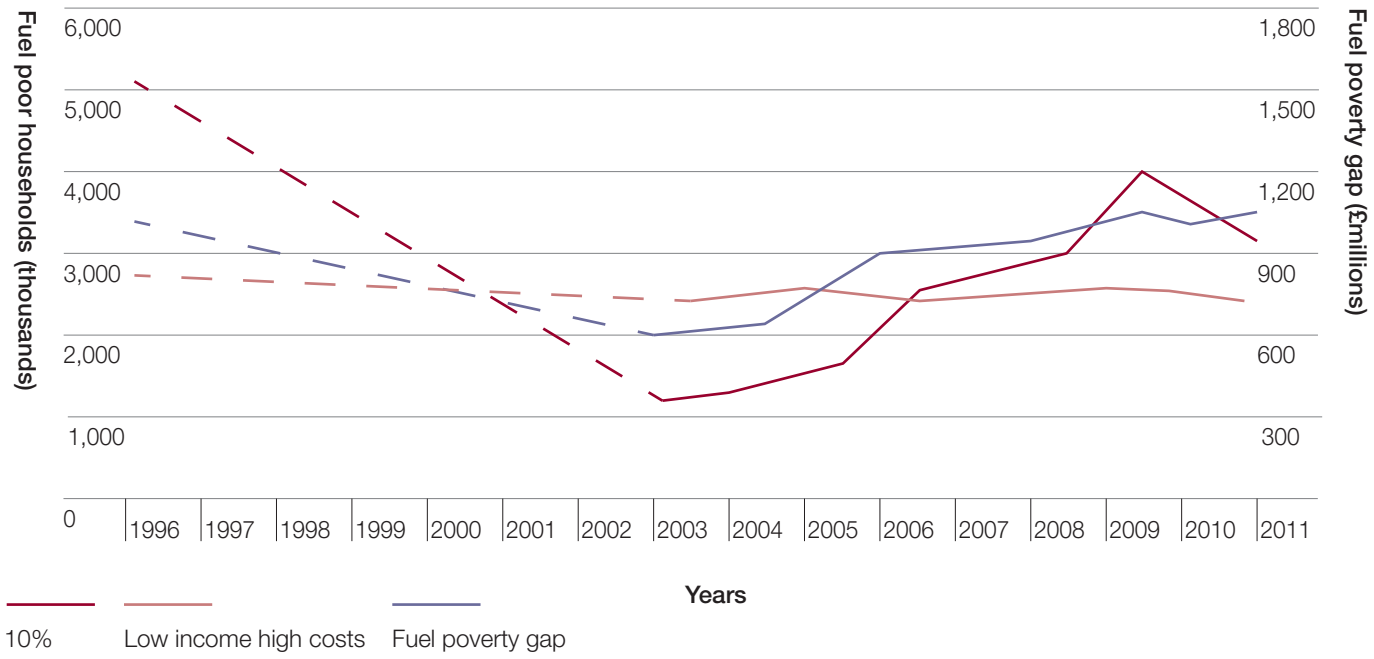

Figure 1. The 10%, low income high cost headcount and fuel poverty gap indicators of fuel poverty, England, 1996-2011
Source: (10)

Fuel poverty is related to low income, but there are mediating factors. For example, households on low incomes are more likely to live in the social rented sector which is, on average, more energy efficient than other housing sectors.[11, 12] Therefore, it is less likely that these households will experience a cold home.

2. Fuel poverty, cold-related health problems and health inequalities

There is a social gradient in fuel poverty with lower income households more likely to be at risk of fuel poverty than high income households, which is likely to contribute to social and health inequalities.[4] Groups that are already vulnerable such as young children, older people and those with pre-existing health problems will be particularly susceptible to cold. As outlined in section 1, fuel-poor households may experience cold conditions as a result of energy inefficient housing, finding it difficult and expensive to heat a home to an adequate temperature. Cold homes have been linked to an increased risk of developing a wide range of health conditions including, asthma, arthritis and pneumonia, as well as unintentional injury.[13]

A systematic review of the evidence linking fuel poverty and health indicates cold conditions and fuel poverty may have a moderate effect on adult physical health, but a significant effect on the mental health of adults and young people, children's respiratory health, as well as infant weight gain and susceptibility to illness.[7] These poor health outcomes contribute to inequalities in health.

Respiratory problems

There is clear evidence on the links between cold temperatures and respiratory problems. Resistance to respiratory infections is lowered by cool temperatures and can increase the risk of respiratory illness.[7] Cold temperatures have been found to impair the functioning of the lungs and may trigger broncho-constriction in asthma and chronic obstructive pulmonary disease.[14] Moreover, studies have found that visits to GPs for respiratory tract infections increased by up to 19% for every one degree drop in mean temperature below 5°C.[15, 16] A case-control study also found that people with asthma were two to three times more likely to live in cold and damp household conditions than non-asthmatics.[17]

Circulatory problems

Circulatory problems are also affected by cold. Research suggests that deaths from cardiovascular disease in England were 22.9% higher in winter months than the average for other times for the year.[18] Studies have found that cold affects circulatory health where temperatures fall below 12°C, which results in raised blood pressure, caused by the narrowing of the blood vessels, which can lead to increases in blood thickness as fluid is lost from circulation.[19] Increased blood pressure, and increased blood viscosity, can increase the risk of strokes and heart attacks.[20] In addition, research analysing coronary events in people aged 35-64 across 21 countries found coronary events to be more fatal during colder periods than in warmer periods.[21]

Mental health

There is clear evidence linking home temperatures and mental health. Evaluation of the government's Warm Front scheme (which offered a package of heating and insulation measures to people on certain income-related benefits; see section 4.1) found increases in room temperature were associated with reduced likelihood of experiencing depression and anxiety.[22] Similarly, another study found that young people living in cold homes were more likely to be at risk of multiple mental health symptoms, experiencing four or more negative mental health symptoms.[23] 28% of young

people lacking affordable warmth were at risk of multiple mental health symptoms, compared with just 4% of young people living in sufficiently warm homes. Furthermore, a significant proportion (10%) of children living in cold homes reported feeling unhappy compared with 2% of children living in warm homes.[23]

Children and young people

Cold homes and poor housing conditions have been linked with a range of health problems in children. The housing and homelessness charity Shelter found that children growing up in poor housing conditions (including cold living conditions) were more likely than others to experience mental health problems, such as depression and anxiety; more likely to experience slower physical growth and cognitive development; and had higher risks of respiratory problems, long term ill-health and disability.[24]

Similarly, children living in cold, damp and mouldy homes have been found to be between 1.5 and 3 times more likely to develop symptoms of asthma than children living in warm and dry homes.[25] Estimates from 2009, suggest that 1.1m children in the UK were affected by asthma – which can develop into a long-term and/or permanent condition. The estimated cost associated with asthma, to the NHS, is at least £847mn per annum (based on 2008 figures).[26, 27]

Furthermore, a study using data from the Families and Children Survey to determine the impact of cold homes on health found that an estimated 13% of children spent the last year living in inadequately heated homes between 2001 and 2005. Children living in inadequately heated accommodation were twice as likely to suffer from chest and breathing problems as children living in warm homes.[23]

People with long-term conditions

Studies indicate that cold conditions can exacerbate existing medical conditions including diabetes, certain types of ulcers and musculoskeletal pains.[28] As mentioned above, studies have found an association between cold homes and the increased likelihood of developing symptoms of asthma and bronchitis which can develop into long-term conditions.[23, 25] In addition, cold homes may slow down recovery following discharge from hospital.[29]

Older people

Older people may be particularly vulnerable during cold periods. Research suggests cold temperatures can cause blood pressure to rise in older people, increasing the risk of strokes and other circulatory problems.[30] One study examined residents aged over 65 across the London Borough of Newham and hospital admissions for respiratory diagnosis, ranking these against the Fuel Poverty Index (FPI). The FPI included factors of housing energy efficiency, low income, householder age and under-occupation. The study found the FPI to be a predictor of hospital admittance, indicating that a relationship exists between the energy efficiency of the home and winter respiratory symptoms among older people.[31]

Moreover, cold homes have been associated with lower strength and dexterity and exacerbated symptoms of arthritis, which can increase the risk of falls and unintentional injury.[20] Finally, a population based study looking at vulnerability to winter mortality in elderly people in Britain found around a 30% increase in mortality in winter among people aged 75 years or older; cold homes are likely to contribute to this figure.[32]

Links with wider determinants of health

Cold homes are associated with wider social determinants of health that can impact on long-term health outcomes and health inequalities.[4] Research has found an association between cold homes and poor educational performance among children, partly due to higher rates of sickness and absence from school.[33] Children living in cold homes were more likely to lack an adequate and quiet environment to carry out homework.[23] Additionally, a systematic review looking at housing improvements and socio-economic outcomes indicates that improvements in the warmth of the home could reduce absences from work, which is likely to have a positive impact on work-related health.[34]

Excess winter deaths

Fuel poverty and cold homes are also associated with excess winter deaths. Studies examining mortality trends show that the frequency of death is higher in winter months than at other times of the year,[35, 36] a phenomenon known as 'excess winter deaths'. The Office for National Statistics' standard method for measuring excess winter deaths compares the average number of deaths that occur during the winter period (December to March), with the average number of deaths that occur in the preceding four months (August to November) and the following four months (April to July).[2] Figure 2 compares the rolling five-year average winter death rate with the winter death rate for the year 2012-13.

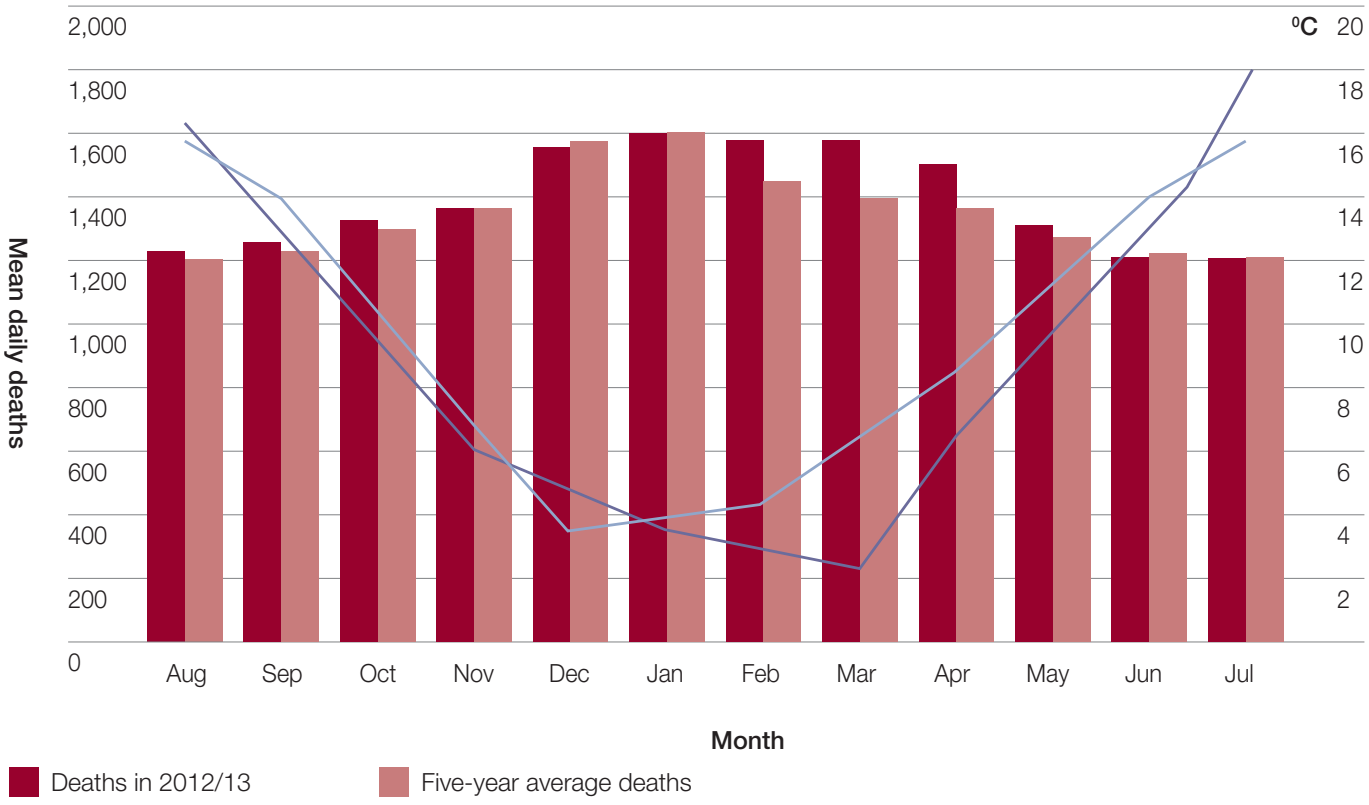

Figure 2. Mean number of daily deaths each month and mean monthly temperatures, August 2012-July 2013, England and Wales
Source: (12)

The reasons for higher rates of death in the winter months are complex. The Hills Review, Getting the Measure of Fuel Poverty, estimates that some 10% of excess winter deaths are directly attributable to fuel poverty.[3] Another review about fuel poverty, by the UCL Institute of Health Equity, estimates that excess winter deaths in the coldest 25% of housing are almost three times as high as in the warmest 25% and cold homes account for 21.5% of excess winter deaths.[4] In England, there were an estimated 29,200 excess winter deaths in 2012-13 – up 27% from the previous winter. On the whole, average temperatures during this period were lower for four out of the five winter months in 2012-13 compared with the five-year average, indicating the impact of cold on mortality rates.[2]

As well as impacts from cold homes, research indicates that cold weather experienced in the winter months can affect and/or exacerbate respiratory and circulatory conditions, mental ill-health and accidental injury linked to winter deaths.[37-39] Influenza is also a contributing factor to excess winter deaths and levels of influenza increased during the winter months.[2, 4] However, excess winter deaths still occur in years where there is no influenza epidemic.

Studies comparing excess winter death rates across different European countries indicate that the UK as a whole experiences higher rates of excess winter death compared with other European countries, including several countries that experience much colder winter months.[40] For example, the UK's rate of excess winter death is estimated to be 23% higher than Sweden's, despite the UK experiencing much milder winters.[41]

Table 1 below shows the coefficient of seasonal variation in mortality in fourteen countries of the EU. Those countries at the top of the table, made up of more northerly countries where temperatures tend to be colder, experience, on average, less variation in seasonal mortality – that is, fewer excess winter deaths – than more southerly countries, despite milder temperatures in the latter.

Country	Winter 1988-89 to winter 1996-97a EWDI (95% CI)	Winter 2002-03 to winter 2010-11	
		Total number of excess deaths	EWDI (95% CI)
Eastern Europe sub-region			
Bulgaria	n/a	53,547	17.0% (16.5–17.4)
Czech Republic	n/a	31,795	10.2% (9.8–10.7)[b]
Hungary	n/a	43,067	11.3% (10.8–11.7)[b]
Poland	n/a	110,794	10.2% (10.0–10.5)[b]
Romania	n/a	115,528	15.7% (15.4–16.0)
Slovakia	n/a	12,084	7.8% (7.2–8.5)[b]
Northern Europe sub-region			
Denmark	12% (10–14)	19,178	12.0% (11.4–12.7)
Estonia	n/a	5,828	11.9% (10.7–13.0)
Finland	10% (7–13)	13,091	9.2% (8.5–9.8)[b]
Iceland	n/a	474	8.5% (5.2–11.9)
Ireland	21% (18–24)	11,219	13.9% (13.0–14.8)
Latvia	n/a	10,498	11.5% (10.6–12.3)
Lithuania	n/a	13,215	10.6% (9.9–11.4)[b]
Norway	n/a	14,650	12.2% (11.4–12.9)
Sweden	n/a	33,810	12.9% (12.4–13.4)
UK	18% (16–20)	261,830	15.9% (15.7–16.1)
Southern Europe sub-region			
Greece	18% (15–21)	27,014	9.8% (9.3–10.3)b
Italy	16% (14–18)	248,802	15.2% (15.0–15.4)
Malta	n/a	2,440	28.3% (25.3–31.4)[b]
Portugal	28% (25–31)	74,704	25.9% (25.4–26.4)[b]
Slovenia	n/a	6,103	11.3% (10.2–12.4)
Spain	21% (19–23)	198,861	18.6% (18.3–18.8)[b]
Cyprus[c]	n/a	2,865	19.4% (17.2–21.7)[b]
Western Europe sub-region			
Austria	14% (12–16)	28,732	13.2% (12.6–13.8)
Belgium	13% (9–17)	46,370	15.7% (15.2–16.2)[b]
France	13% (11–15)	210,005	13.5% (13.3–13.8)
Germany	11% (9,13)	289,631	11.9% (11.8–12.1)
Liechtenstein	n/a	82	12.8% (3.0–23.7)
Luxembourg	12% (8–16)	1,397	13.0% (10.5–15.5)
The Netherlands	11% (9–13)	48,174	12.3% (11.9–12.7)[b]
Switzerland	n/a	25,287	14.4% (13.7–15.0)
14 European countries reported in Healy, 20039	16% (14–18)	1,479,005	14.5% (14.4–14.6)
All 31 countries	n/a	2,010,020	13.9% (13.8–13.9)

a: From Healy (2003)
b: Significantly different from the average EWDI for the other 30 countries in the analysis
c: Original classification—Western Asia

Table 1. Total excess deaths and mean Excess Winter Deaths Index (EWDI) for Europe for the period 2002-03 to 2010-11
Source: (42)

	CSVM	95% CI
Finland	0.10	0.07 to 0.13
Germany	0.11	0.09 to 0.13
Netherlands	0.11	0.09 to 0.13
Denmark	0.12	01.0 to 0.14
Luxembourg	0.12	0.08 to 0.16
Belgium	0.13	0.09 to 0.17
France	0.13	0.11 to 0.15
Austria	0.14	0.12 to 0.16
Italy	0.16	0.14 to 0.18
Greece	0.18	0.15 to 0.21
UK	0.18	0.16 to 0.20
Spain	0.21	0.19 to 0.23
Ireland	0.21	0.18 to 0.24
Portugal	0.28	0.25 to 0.31
Mean	**0.16**	**0.14 to 0.18**

Table 2. Coefficient of seasonal variation in mortality (CSVM) in EU-14 (mean, 1998-97)
Source: (4)

Part of this difference in excess winter death rates between the UK and other European countries is due to the UK's housing stock being less energy efficient, less well insulated and of a poorer standard compared to that of more northerly European countries. This is likely to result in lower indoor temperatures.[21]

Individual and institutional behaviours may also play a part in the rates of death. Due to factors including the length of time spent at home and/or being less physically active, particular groups are more susceptible to the ill effects of cold homes than others; they include caregivers, older people and infants; smoking is also a factor.[43] Additionally, people who have pre-existing health conditions may find these conditions are exacerbated by cold temperatures.[4]

3. Scale of the problem

This section looks at the scale of fuel poverty and cold home issues over time, given that the contributory factors to fuel poverty, including price of fuel, income and energy efficiency, also fluctuate.

3.1: The price of fuel

Average annual fuel bills have risen significantly in recent years, from £605 in 2004 to £1,306 in 2013. This is predominantly due to increases in the wholesale price of gas.[44, 45] This trend is set to continue. According to estimates from the Department of Energy and Climate Change (2013), the price of energy is set to rise by around 12% to 30% in real terms between 2013 and 2020, and by 10% to 38% between 2013 and 2030.[46] Without action, this likely to significantly increase levels of fuel poverty.

3.2: Household incomes

There has been a decline in real wages in recent years. Since 2008, the rate of inflation (Retail Price Index) grew faster than it had in previous decades, while the rate of nominal wage growth began to slow. This has had a negative effect on real wages: between 2010 and 2013, real wages fell, on average, by 2.2% per annum, affecting those towards the lower end of the income distribution most.[47]

The decline in real wages, coupled with increases in the average cost of fuel bills during the same period, is likely to have a negative impact on household incomes, and make it more difficult for many households to heat their homes affordably.

3.3: The energy efficiency of homes

According to data from the English Housing Survey, around 65% of households live in owner-occupied dwellings, 17% of households live in socially rented dwellings and 17% of households live in privately rented dwellings. Private renters have the highest housing costs, on average, amounting to 41% of their gross income.[12]

The level of households with very poor energy efficiency (measured by Standard Assessment Procedure [SAP][3] ratings) was 3% in 2011 for all households.[12] Older people are more likely than the rest of the population to live in homes with poor energy efficiency: among older people (aged 75 and over) the number of households with poor energy efficiency was 5% and they were more likely to be owner occupiers.[12] Households with poor energy efficiency are more likely to experience cold household temperatures and suffer poorer health as a result.

[iii] The Standard Assessment Procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of dwellings. Its purpose is to provide accurate and reliable assessments of dwelling energy performances, which are needed to underpin energy and environmental policy initiatives.

Table 2 contains data relating to the percentage of homes in England, by Energy Performance Certificate (EPC) banding and Standard Assessment Procedure (SAP) rating, based on 2008 figures taken from Energy Saving Trust data.[48]

EPC	SAP	% homes in England
A/B	81+	0.3
C	69-80	10.0
D	55-68	35.4
E	39-54	37.4
F	21-38	13.4
G	1-20	3.5

Table 3. Percentage of homes in England by Energy Performance Certificate (EPC) banding and Standard Assessment Procedure (SAP) rating, 2008
Source: (4)

In 2011, social rented dwellings had, on average, the best Standard Assessment Procedure (SAP) rating, at 63.0. In comparison, private rented dwellings had an average SAP rating of 55.8 and owner-occupied dwellings had an average SAP rating of 55.4. While households in social housing are more likely to have lower incomes, these ratings indicate that they live in more energy efficient housing and are, therefore, less likely to experience fuel poverty than the owner-occupier and private rented sectors.[49]

Table 4 shows the average indoor temperature by age of property taken from Wilkinson et al's 2001 study, which looked at the environmental and social determinants of excess winter deaths in England (based on data from the 1991 English House Conditions Survey).[18] It shows that the older the property, the lower the average indoor temperature.

Ages of property	Number of dwellings	Mean measured temp (^{0}C)	Temp under standard conditions	% of households with hall temp <16^{0}C at standard conditions
Pre 1900	660	17.3	16.7	38.8
1900-44	1,157	17.5	16.8	36.0
1945-64	853	17.6	17.0	35.8
1965-80	621	19.1	18.4	17.6
Post 1980	116	19.5	18.7	14.7

Table 4. Average indoor temperature by age of property
Source: (4)

Research has found no clear association between excess winter deaths and socio-economic deprivation.[50-52] This may be because socio-economic deprivation indicators do not account for energy efficiency of a property as a variable. In addition, while deprivation and fuel poverty are related, they are not the same thing.[4] In England, lower socio-economic and deprived groups tend to live in social housing which is, on average, more energy efficient than other types of housing.[12]

In 2010, under the 10% indicator, 60% of fuel-poor households were headed by a single adult; heating the home for a single adult household costs on average more than half of what it costs to heat a two-person household. This 60% of single headed households is comprised of those people over 60 years (31%), under 60 (20%), and lone parent households (9%).[53] However, under the low income/high cost indicator there are significant differences in measurement arising from changes in definition. Using the new indicator, 41% of fuel-poor households were headed by a single adult; of these 9% were households of one person aged 60 or over, 17% were one person under 60, and 15% were lone parents with dependent children (15%).[1]

3.4: Other considerations

The health costs of poor housing

Research into the cost of housing-related ill health, where poor housing conditions are a main contributor, estimates that the annual cost to the NHS is £2.5bn. This includes costs accrued by primary care services, treatment costs, hospital stays and outpatient visits.[6]

Off-grid properties

Reseach by the Department of Energy and Climate Change (DECC), in 2013, found that there are a number of properties in the UK which do not have access to mains gas. Somwehere between 0% and 15% of properties in local authorities had no gas meter (273 out of 376 local authorities), while figures from 2012 found some 45% of properties within nine local authorities did not have a gas meter. Properties not connected to gas mains are likely to be using more expensive fuels to heat their homes, including electricity and oil.[54]

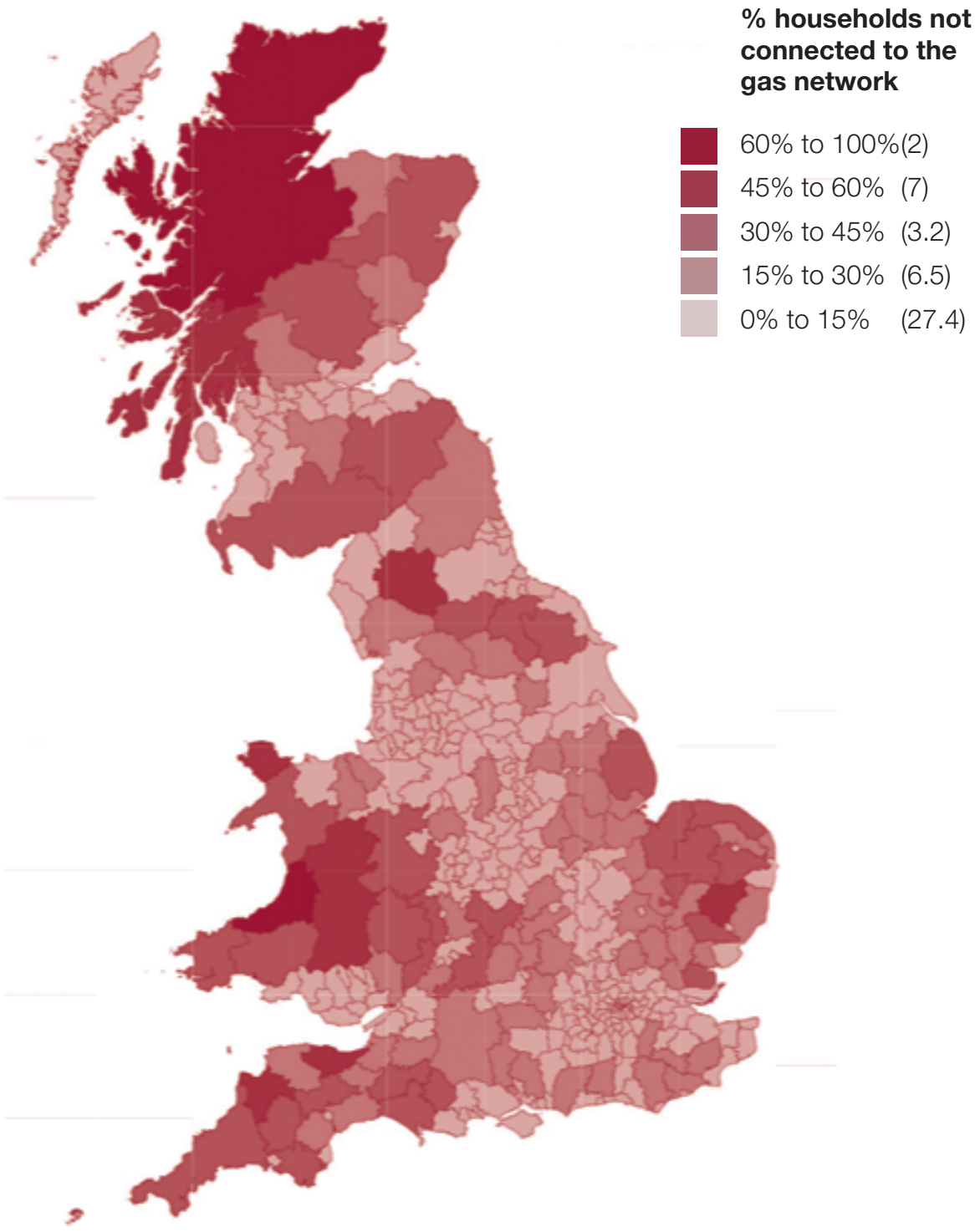

Figure 3. Proportion of properties without a gas meter by local authority (DECC sub-national estimates)
Source: (54)

Household behaviour

The Hills Review (2012), an independent review of fuel poverty in England, assessed the heating behaviour of households and how this affected health. Simply raising the income of the household through cash transfers to a level that is deemed no longer fuel-poor does not necessarily influence heating behaviours, nor does it guarantee that the added income will go towards energy costs. Similarly, some households may maintain low household temperatures even when they can afford to heat the home to an adequate temperature, yet choose not to. This is a particular concern for elderly populations.[3]

The Cold Weather Plan for England[55] seeks to address behavioural issues relating to cold weather, by increasing awareness of the risks of cold weather, including low indoor temperatures, as well as advice on how to prepare and react to cold weather. The plan also documents other behavioural considerations which may affect the temperature of the home and the ability of individuals to react to cold weather, including:

- the negative impact that existing mental illness, such as dementia, can have on a person's ability to appropriately care for themselves during periods of cold weather
- people being unwilling to seek or accept help that is on offer

Population ageing and other population needs

As the evidence discussed in the previous section shows, groups that are already vulnerable such as young children, older people and those with pre-existing health problems will be particularly susceptible to cold-related health problems. The health of these groups will also be affected by their broader social position. For example, an evidence review in this series highlights that disabled people are less likely to be in employment (Health equity evidence review 5: Increasing employment opportunities and improving workplace health); this group may therefore have lower incomes and spend more time in the home, which if the home is heated inadequately, would increase exposure to cold.

Projected population trends indicate that in England the number and proportion of older people will increase in the future. In 2010, the number of people aged 75 and over stood at just below 5 million. Projections indicate that by 2035 this could be 8.9 million.[5] As described above, research indicates that older people, particularly older people aged 75 and over, are more likely to be vulnerable to cold weather. Statistical data also shows that people aged 75 and over are subject to the greatest increases in excess winter deaths of any age group.[2, 32] Population projections suggest a significant increase in the number of people who are vulnerable to cold weather and will likely result in an increased rate of excess winter deaths.[57]

The variability of cold weather

Temperatures can fluctuate year-on-year and tend to be lower and more severe in rural and more exposed areas, such as high ground, compared with urban areas. Low temperatures may occur in different regions of the country at different times of the year and thus the risk to health varies spatially and temporally. This reinforces the need for continuous, year-round preparation for cold weather[57] and for locally appropriate responses.

4. What works to tackle fuel poverty and cold home-related health problems?

The previous sections have identified the negative effect fuel poverty and cold housing conditions have on health, as well as the scale of the problem. This section describes interventions that aim to tackle fuel poverty and the negative health outcomes of cold homes.

As discussed, evidence suggests that affordable and effective heating is linked to improved health outcomes, as well as reducing absences from work and school.[34] There have been considerable efforts to reduce fuel poverty and cold home-related health problems at national and local level, including the rollout of national policy, legislation, interventions, public campaigns and guidance. Efforts have focused on three main ways to tackle fuel poverty. These are:

- improving the energy efficiency of the home so that it can be heated to an adequate temperature for a lower cost
- ensuring households can take action and benefit from more open energy markets enabling them to negotiate the best energy deal suited to their needs
- increasing household incomes to reduce the level of net income spent on heating the home

In addition, there has been some focus on tackling cold home-related health problems by influencing household behaviour and increasing the capability of household to prepare for and react to cold weather.

4.1: Policy at the national level

In July 2014, the Department of Energy and Climate Change (DECC) laid draft regulations which seek to create a new fuel poverty target: to ensure that as many fuel poor homes as is reasonably practicable achieve a minimum energy efficiency standard of band C by 2030. In addition DECC published a consultation in July 2014 in preparation for a new fuel poverty strategy[58] which proposes new interim milestones as follows:

- as many fuel poor homes in England as is reasonably practicable to band E by 2020 – 15% of fuel poor households currently live in F and G rated homes
- as many fuel poor homes in England as is reasonably practical to band D by 2025 – 46% of fuel poor households currently live in E-rated homes

This consultation was accompanied by a number of documents of relevance including a literature review on understanding the behaviour of fuel poor households,[59] and the 'fuel poverty energy efficiency rating methodology', which sets out in detail how to measure the energy efficiency of fuel poor households in relation to a new fuel poverty target.[60]

The government has also recently consulted on implementation of private rented sector energy efficiency regulations using powers contained in the Energy Act 2011. These provisions are expected to mean that:

- by 1 April 2018, all eligible properties will have to be improved to a minimum energy efficiency standard before being let to tenants, except where certain exemptions apply, and:
- by 1 April 2016, tenants will have a right to request consent for energy efficiency measures that may not be unreasonably refused by the landlord.

To ensure that there are not upfront costs, landlords will not be obliged to make improvements where there is not Green Deal finance, ECO or other funding support available to undertake them. The government has also implemented a range of policies to address contributing factors to fuel poverty. These are briefly outlined below.

Improving energy efficiency in the home

The **Green Deal** was introduced in 2012 and allows a household to make energy efficiency improvements to their home, such as insulation, double glazing and heating upgrades. The scheme allows households to pay for some or all of the improvements over time through additional costs on their energy bill. Repayments are no more than what a typical household should save in energy costs.[61]

The **Energy Company Obligation**, introduced at the beginning of 2013, operates alongside the Green Deal. It places a legal obligation on the main energy suppliers to deliver subsidised energy efficiency improvements to low income households to enable them to heat their homes to a comfortable thermal level.[62]

Policy instruments like the Green Deal and Energy Company Obligation have not been in place long enough to have their impacts evaluated clearly. Given the continuing high rates of fuel poverty, it is important that national policy efforts to reduce fuel poverty are continued and intensified.

Key literature: Warm front: better health – health impact evaluation, 2008[22]

The Warm Front scheme was designed as a cost-effective solution to tackling fuel poverty by improving the temperature, energy efficiency and health of the occupants of participating households. The scheme has made an important contribution to the evidence base which links energy efficiency improvements and increases in the thermal environment of the home with improved health outcomes.

Evaluation of the scheme found that household temperatures increased after the intervention, including increased living room temperatures of on average 1.64°C and bedroom temperatures of 2.82°C. The evaluation also identified a number of health improvements:

- prevalence of common mental disorders fell from 300 to about 150 per 1,000 occupants
- the increase in household temperature, as a result of the scheme, was estimated to add an extra 0.56 months to the lives of a 65-year old couple living together; 0.33 months for a man and 0.22 months for a woman. The gross benefit of this impact could lead to thousands of life years saved each year

Funding for the Warm Front scheme was phased out in January 2013 and the scheme was replaced by the Green Deal and Energy Company Obligation (see below).

Helping households with their energy costs

The warm home discount scheme was introduced in 2011. It requires energy companies with over 250,000 domestic customers to give a discount on electricity bills to low income and vulnerable customers. The scheme assists around two million households each year and the government has committed to extending the scheme to 2015-16.[63]

The Big Energy Saving Network, launched in 2013, awards funding to eligible community and charitable organisations that help vulnerable consumers actively save money on their energy bills by switching suppliers and taking up offers of energy efficiency programmes. The government has extended the fund for 2014-15.[64]

Improving the income of households

The winter fuel payment is an annual tax-free, non-means-tested payment designed to help those over state pension age pay household heating costs. Payments are made during winter when fuel bills tend to be at their highest.[65]

The cold weather payment, first introduced in 1986, is a means-tested payment designed as an emergency measure to help people in receipt of certain benefits to meet their heating costs when local temperatures either drop, or are forecast to drop, to an average of 0°C or lower over a seven-day period.[66]

National and local partnerships

The Department of Energy and Climate Change local authority competition was launched in 2012, offering local authorities the opportunity to bid for funding to tackle fuel poverty, keep energy bills down and fund energy efficiency improvement works.[67] Funding was awarded to 60 projects across 169 local authorities throughout England. Although the competition is now closed, it is an example of national and local government working together to tackle fuel poverty.[64]

Part of the local authority competition funding went towards the Cheaper Energy Together fund which was launched in 2012 and supported the development of collective purchasing and switching schemes by local authorities or third sector organisations. The aim of the scheme was to encourage consumers to group together and use market power to negotiate better deals on their energy bills and save money.[68]

Supporting people to stay warm throughout winter

Key literature: the Cold Weather Plan for England[55]

The Cold Weather Plan for England is a framework that aims to protect the population of England from harm to health from cold weather. It aims to prevent major avoidable effects on health caused by cold weather by alerting people to the negative health effects and enabling them to prepare and respond appropriately.

It recommends a series of steps to reduce the risks to health from cold weather for:

- the NHS, local authorities, social care, and other public agencies
- professionals working with people at risk
- individuals, local communities and voluntary groups

The plan builds on the knowledge and experience of developing and improving the ability of the health and social care sector, and its partners, to deal with cold weather. The actions illustrated in the plan may be adapted and implemented to fit local situations. They include the cold weather alert system, which underpins the whole plan and comprises five main alert levels, each of which prompts a series of indicative actions:

- level 0 focusses on long-term year-round winter planning.
- levels 1–4 comprise of winter and cold weather preparedness up to a national emergency.

4.2: How local authorities might reduce fuel poverty and cold home-related health problems

Although many of the macro-economic factors leading to fuel poverty lie beyond their control, local authorities have a central role to play in tackling issues relating to fuel poverty and the negative health consequences relating to cold homes. Local authorities are well placed to understand and meet the needs of those living within local areas and can improve people's living conditions through effective targeting of resources tailored towards those most in need, and through working in partnership with other local agencies.[69] In order to successfully determine a household's fuel poverty status, detailed and accurate knowledge about that household's income and property characteristics, including size, age and type of heating system, are required.[8] In many respects, local authorities are better placed to know these than national organisations.

Additionally, local organisations may also be better placed to identify important population characteristics in relation to cold home-related health problems, such as those who are socially isolated, high risk groups and those with long-term illnesses (including older people and people with poor mental health).

Local authorities have a long history of activity in tackling both fuel poverty and cold home-related health problems. These endeavours can be strengthened as public health is now well placed to make alliances and partnerships with those in local authorities who have also been working to tackle fuel poverty, cold housing, and cold home-related health problems for a number of years. Supporting primary care to help identify and support people at risk is another important role for public health. Furthermore, public health professionals and local authorities more broadly can

influence the national debate and policies as they have a clear understanding of local drivers of fuel poverty and the needs of those vulnerable to the cold. Health and wellbeing boards can have an important role in collaborating and working with other parts of the local authorities, other stakeholders and local organisations including primary care and clinical commissioning groups. The UK Health Forum's fuel poverty guide can be used as a resource for local areas, as it sets out action that can be taken by public health professionals, health and wellbeing boards, and local authorities in order to reduce fuel poverty.[70] There is also a corresponding guide focussing on actions that can be taken within primary care, including by GPs and practice nurses.[71]
There are several examples of local authority led schemes, tailored to local circumstances that demonstrate clear impacts. Below we provide some examples of these actions and programmes to reduce fuel poverty.

Improving energy efficiency in the home

Implementing measures to improve the energy efficiency of homes has the potential to increase the temperature of the home and reduce energy costs, which may have a positive impact on health outcomes. In addition, improving the energy efficiency of the home could reduce carbon emissions and help create a more sustainable environment for the future.

Intervention: the Secure, Warm, Modern programme, Nottingham[72]

The Secure, Warm, Modern programme aimed to raise 28,500 council homes in the social rented sector up to and above the national Decent Homes standard, through the upgrading of central heating systems and installation of double glazing. It began in 2008 and is due to be completed in 2015.

Between 2008 and 2011, Nottingham City Homes invested in energy efficiency improvements to 21,080 homes. A two-year impact study was carried out by Nottingham City Homes, in partnership with Nottingham Trent University, to establish the wider social benefits of the programme.

Based on figures provided by the Energy Saving Trust, estimates suggest that tenants will save £3.5m on fuels bills every year as a result of the energy efficiency improvements made by Nottingham City Homes.

The Decent Homes Impact Study is a collaborative project between Nottingham City Homes and Nottingham Business School at Nottingham Trent University, backed by financial support from the Knowledge Transfer Partnerships programme.

Intervention: Residents 4 Low Impact Sustainable Homes (Relish), Worthing[73]

The Residents 4 Low Impact Sustainable Homes (Relish) project was launched in 2009 and is based in Worthing, West Sussex. It is supported by a number of local partners including housing associations. The initial pilot aimed to retrofit homes in a cost-effective way, to meet the Decent Homes standard and reduce carbon emissions, by spending no more than £6,500 on home improvements per household.

The work undertaken by the project includes:

- insulation improvements and repairs
- fire safety
- security improvements
- a wide range of other home improvements
- tailored education programme

Evaluation of a select number of homes during the 12-month pilot scheme found that:

- a household that received retrofitting works and the education programme saved £367.72 on its annual fuel bill (29.08% reduction).
- a household that received only retrofitting works saved £38.00 on its annual fuel bill (3.88% reduction).
- a household that received only the education programme saved £233.44 on its annual fuel bill (18.06% reduction).

Relish was pioneered by Worthing Homes in association with support from local surveying and construction companies.

The energy savings and efficiencies from programmes like these should have an impact on household incomes through the extra income available as a result of reduced energy costs. Additionally, insulation and energy efficiency improvements are likely to increase the temperature of the home, leading to positive health outcomes and reducing health inequalities.

Improving access to existing support mechanisms for owner-occupier households and households in the private rented sector

Survey data suggests that owner-occupied households make up the largest proportion of households in England at 65%, and that they have, on average, the poorest energy efficiency ratings out of all dwelling types with an average SAP rating of 55.4.[12, 49] Low-income owner-occupied households may be incapable of meeting the costs of home improvements (due to a lack of capital) to improve energy efficiency and increase household temperatures. These households may be able to receive assistance either under the Energy Company Obligation or through the Green Deal to implement energy efficiency measures. However, research indicates that there are no real incentives for energy efficiency improvements to be made in the private rented sector as landlords rarely see the benefit in reducing energy costs for local tenants, and tenants have little motivation to invest in measures to improve the energy efficiency of a property they do not own.[74] This suggests that interventions must be tailored to different types of tenancy.

Fuel poverty has been included in joint strategic needs assessments (JSNAs) and health and wellbeing strategies produced by local authorities, which take into consideration a range of issues related to fuel poverty, including its causes and its impact on health. JSNAs have also identified local populations most vulnerable to fuel poverty, and have mapped fuel poverty rates across local areas.[75] Other local authorities have developed plans to include fuel poverty in future JSNA publications.[76]

Local authorities can play a key role in ensuring that owner-occupiers and private rental sector tenants in local areas have the knowledge, help and support they need to access the resources to improve the energy efficiency of homes, maximise household incomes and reduce fuel poverty. There may be additional incentives or regulations on landlords to make necessary improvements to their properties to ensure greater energy efficiency and warmth.

The following case studies provide examples of local authorities that have implemented active campaigns to raise awareness of fuel poverty and cold homes, improve access to support and assistance, as well as help with other related issues such as debt.

Intervention: 'Beat the cold this winter' campaign, Essex[77, 78]

Essex County Council worked in partnership with NHS North East Essex and ten Essex Citizens Advice Bureaux to deliver an initiative based on the Citizens Advice Bureau's Reach Out pilot project in the Tendring district of the county. The Reach Out pilot supported hundreds of clients in Tendring to apply for £49,980-worth of benefits and helped them manage £102,000-worth of debt. Essex County Council then scaled up the initiative to deliver it across the entire county.

The county-wide project aimed to engage with disadvantaged, socially excluded and vulnerable people in order to address some of the underlying health-related issues they may experience. Qualified advisers were sent out to knock on doors and engage with residents of deprived communities.

As part of this community engagement, advisers used this opportunity to introduce a 'Beat the cold this winter' information pack and engage with clients about action that could be taken to reduce fuel poverty and prevent ill-health during the winter months. Depending on the client's response, advisers would then proceed with follow-up appointments or pass the client on to relevant agencies.

Over a four week period in the winter of 2011-12, the project successfully engaged with 2,100 clients, providing free, independent, confidential and impartial advice. A number of outcomes were recorded including:

- 1,545 people reduced their fuel poverty
- 1,007 signposts and referrals
- £318,601-worth of benefits claimed and other financial gains made
- £210,100-worth of debt managed
- £95,000-worth of debt written off

The initiative was part of a collaboration between Essex County Council, NHS North East Essex and Essex Citizens Advice Bureau and was funded by the Warm Homes Healthy People Fund. The campaign was launched in the winter of 2011-12 and the organisations have continued to work together to provide advice and support since then.

Increasing household income and reducing household debt is likely to have a positive impact on fuel poverty as households have more income to spend on heating the home. Increasing take-up of benefits such as pension credit is one way of increasing this income. Data from the Department for Work and Pensions shows a significant under-claim by those eligible for pension credit. The most recent data on pension credit take-up indicates that in 2009-10, the number of pensioners entitled to pension credit but who did not make a claim was between 1.21 million and 1.58 million. In addition, the total amount of pension credit that went unclaimed was estimated to be somewhere between £1.94bn and £2.80bn.[79]

When taking all six income-related benefits together, between £7.52bn and £12.31bn was left in unclaimed benefits in the year 2009-10, equal to 18.5% and 30.1% respectively of all benefits claimed for that period – or £40.56bn.[79] These figures indicate that there are millions of people, including over one million pensioners, who are eligible for benefits that would increase household income levels and could help to protect against fuel poverty as well as the ill effects of cold homes. It is likely that some eligible households that fail to claim their entitlement of benefits would be classed as fuel-poor.[8] Reasons for this benefit under-claim may vary. It is likely that, for some people, a lack of knowledge about eligibility or how to claim benefits may mean that they fail to make a claim; while other people may choose not to claim because they may not want to rely on the state for financial support.

Intervention: Oxfordshire Warm Homes Healthy People Project[80]

The Oxfordshire Warm Homes Healthy People Project began in 2011 (and was repeated in 2013 and 2014) and involves a collaboration between a wide range of organisations, including a number of district councils, Age UK, Citizens Advice Oxford and NHS Buckinghamshire and Oxford. It delivers practical support across a range of issues, including:

- refurbishments for households vulnerable to cold conditions
- benefit entitlement checks
- provision of fuel vouchers and food boxes
- energy advice training

Through active engagement and outreach with the public, the project delivered a range of services including:

- the Affordable Warmth Advice Service – delivering events to engage with the general public and a telephone helpline service
- benefit checks and debt advice – led by the Citizens Advice Bureau
- community connections scheme – to help address isolation in older people
- practical refurbishments to homes – giving grants to vulnerable households to make home energy improvements
- emergency fuel bill payment scheme – to help the fuel-poor meet their energy costs
- oil smart meter pilot – testing smart meters in homes to improve the management of fuel

An evaluation of the project's work from December 2012 to April 2013 was carried out by the United Sustainable Energy Agency. The findings are detailed below.

Affordable Warmth Advice Service: delivered outreach activity on 11 occasions at a variety of venues across the county, engaging with approximately 480 people. In addition 293 people contacted the service via the helpline.

Benefit checks and debt advice: the Citizens Advice Bureau provided help and support to 2,762 people on a range of issues. This included the delivery of 717 benefit checks at outreach sessions across the county resulting in 461 people successfully increasing their income. A conservative estimate of the overall income gained as a result of the benefit checks totals £922,000 per year (based on the 461 people).

Practical refurbishments: action resulted in 72 vulnerable households receiving grants for refurbishment work.

Emergency fuel bill payment scheme: 311 individual payments were distributed to households, providing support for an estimated 580 people.

Oil smart meter pilot: the pilot improved management of energy consumption, awareness of the cost of heating and the benefits of good warmth management.

While the case studies above illustrate the effectiveness of some local authority action in providing people with advice and accessing support for which they are eligible, other programmes have gone further to improve households' energy efficiency and reduce fuel poverty.

Intervention: the Affordable Warmth Access Referral Mechanism, Greater Manchester[81]

The Affordable Warmth Access Referral Mechanism is a programme linking health, housing and fuel poverty services, offering advice and help to people living in fuel poverty. The programme aims to increase referrals from frontline organisations to assist people experiencing fuel poverty.

It offers a range of support services, including:

- benefit and debt advice
- support with home repairs and improvements
- energy efficiency advice
- facilitating subsidised cavity wall and loft insulation
- support with grant applications for health repairs and replacements
- fire safety checks

An evaluation of the programme was carried out by Greater Manchester public health practice unit to identify the costs and benefits of the interventions. A cost-benefit analysis was conducted on 52 household interventions and analysed the impact of warmer housing on quality of life. The cost of the 52 interventions was estimated to be £88,800.

The evaluation identified a number of benefits, including:

- a dramatic increase in referrals from across the social and care sectors
- an estimated health gain of over £600,000 (value of total quality adjusted life years [QALYs])[iv]
- an estimated 2.55 life years gained from living longer (spread across 52 participating households containing 82 adults)
- an estimated gain in QALYs (in 82 adults) of between 1.67 and 31.16 (taken from six different scenarios)

The evaluation was commissioned by the UK Public Health Association and published in April 2011.

[iv] A measure of the state of health of a person or group in which the benefits, in terms of length of life, are adjusted to reflect the quality of life. One QALY is equal to 1 year of life in perfect health.

Intervention: Cornwall Together[83]

Launched in 2012, the Cornwall Together initiative is a county-wide collective switching scheme conceived by the Eden Project and backed by Cornwall Council, Community Energy Plus (CEP), Age UK, Citizens Advice Bureau, uSwitch, energyshare, Unison, St Austell Brewery, and the NHS. The scheme seeks to reduce household fuel bills, alleviate fuel poverty and improve public health. It is hoped that the scheme will reach, in total, more than 20,000 residents and save Cornwall an estimated £3.7mn in fuel bills through reductions of 10-15%.

The initiative helps individuals get the best possible energy deal by encouraging households to switch energy tariffs. It also aims to tackle fuel poverty through helping households spend less on energy, while investing in a Cornwall Together fuel poverty fund for the whole county. This fund is overseen by the NHS, CEP, Cornwall Council and the Eden Project.

The initiative also raises awareness of energy efficiency issues and attempts to source energy from more sustainable and environmentally friendly forms of energy where possible.

As part of the project, a comprehensive awareness campaign was delivered, targeting the most hard to reach, fuel-poor and vulnerable households in Cornwall.

Evaluation of the second round of energy switching identified a number of positive outcomes:

- the public campaign raised awareness in two-thirds of Cornwall's population
- 7,192 quotes were given and 1,174 customers switched their energy tariff (28% of whom were classified as being fuel-poor)
- it was estimated that the average household saving was £112 per household, amounting to a total of £130,000 going back into the pockets of local residents

Intervention: Switch Together, Save Together, Merseyside[84,85]

Switch Together, Save Together is a collective switching scheme implemented in Merseyside. Organised by a local charity called Energy Projects Plus, it receives backing from Halton Council, Knowsley Council, Liverpool City Council, Sefton Council, St Helens Council and Wirral Council.

It aims to reduce residents' energy bills through collective buying power to negotiate cheaper energy tariffs from suppliers.

During the first collective switch, which took place in June 2013, more than 4,200 residents joined the scheme. Total savings since the first switch now amount to an estimated £205,000.

Supporting local residents to reduce the price of fuel bills

While local authorities have little influence over the price of fuel, they can help households keep fuel bills down. Initiatives such as Collective Switching schemes and Collective Purchasing schemes are intended to help consumers get better deals on their energy bills.[82]

Intervention: Seasonal Health Interventions Network, Islington[86]

The Seasonal Health Interventions Network (SHINE) is a multidisciplinary project implemented in the London Borough of Islington. It aims, through a range of different avenues, to reduce hospital admissions and excess winter deaths. The service has been operating in the borough since 2010.

SHINE targets a number of vulnerable groups including:

- people aged over 75
- people suffering from respiratory diseases
- people suffering from cardiovascular disease
- people who have severe mental illness or dementia
- people suffering from autoimmune disease (a condition affecting the immune system)
- people suffering from haemoglobinopathies (a condition affecting the blood)
- households on low incomes with children under age five

SHINE is made up of 400 frontline staff coming from a range of services, including housing, health, adult social care, children's services and the voluntary sector. It also receives self-referrals from vulnerable households. The residents referred to SHINE by the frontline staff are assessed by advisers who provide advice on energy saving techniques and keeping warm, and, if need be, pass residents on to appropriate interventions to address specific needs. Interventions include:

- home interventions – such as home energy improvements, fire safety and community alarm services
- health interventions – such as flu jabs, health checks and falls assessments
- financial interventions – such as benefit checks, advice with energy and utility use and debt management
- general support interventions – Age UK enablement service, vulnerable utility customers register and befriending services

In 2013, the programme was enhanced to include an emergency credit scheme to support energy meter customers in meeting their payments. In addition, with the support of European Commission funding, SHINE is developing an early intervention programme to target low-income households with children and young people to improve financial capability and home management skills.

Since the project's start, SHINE has received more than 4,150 referrals from local residents. This has led to around 19,000 interventions. It is estimated that the programme has saved residents around £450,000 a year as a result of energy efficiency improvements.

Supporting residents vulnerable to cold weather

Although there are a number of factors that contribute to cold-related ill health and death, in the majority of cases there are preventative measures that can be taken to avoid such outcomes. Local authorities are well placed to identify those in the community who may be vulnerable during periods of cold weather and to support them by providing social care, housing assessments and with housing provision.

5. Areas for further research

There is a dearth of evidence from evaluations that demonstrate cost-effective interventions that address the negative outcomes of fuel poverty and cold homes. The majority of interventions present a number of outputs, such as increased household incomes and energy efficiency, but rarely include information on whether an increase in household income affected heating behaviours, the temperature of the home, reduced fuel poverty or resulted in improved health outcomes. Although interventions may appear to have increased household incomes, there is little evidence to suggest that people spend this extra income on heating the home. Similarly, while it is highly probable that interventions to improve household energy efficiency have had a positive effect on fuel poverty and household temperatures, there is little evidence that demonstrates positive health impacts and a reduction in the cost of fuel bills or fuel poverty. Greater effort needs to be made to evaluate a range of interventions to establish health outcomes and the impact on health inequalities in the short and long term.

There is also a lack of evidence that demonstrates effective interventions for reducing cold home-related health problems. This may be partly because this type of evaluation is complex; a number of variables exist which affect intervention outcomes which will change year by year, including the temperature, influenza epidemics and the price of energy. In addition, this may also be partly due to the period of time needed for interventions to yield measurable health benefits.

It is important that future studies and interventions carry out thorough evaluations of programmes to monitor performance and effectiveness including health outcomes. From an economic and healthcare perspective, identifying the impact of interventions on the number of GP visits or hospital admissions would be particularly useful for local authorities, health and wellbeing boards and commissioners. Keeping record of the number of GP visits, hospital admissions or re-admissions would provide data that could be used to calculate potential savings to the healthcare system.

Programmes that aim to increase household incomes, as a means of tackling fuel poverty, should seek to establish, in greater detail, information on household spending and whether increases in household income have a positive effect on fuel poverty, the temperature of the home and cold home-related ill health. Likewise, programmes that aim to help households reduce energy costs should also seek to establish whether the savings (on energy costs) households make on their energy bills have a positive effect on fuel poverty and cold home-related health problems.

Identifying the optimum indoor temperature for good health for different age groups, and for those with different health status, would make a significant contribution to the evidence base and to tackling the negative health impacts of cold homes. This would enhance the effectiveness of energy efficiency interventions and educational support on keeping warm in winter by providing a clear and concise thermal target of what constitutes a healthy temperature for the home. Uncertainty remains over whether the current guidance (21°C for main living room and 18°C for all other occupied rooms of the home) should be directed only at vulnerable groups or the population as a whole, in order to provide the best balance between the aims of safeguarding the health of occupants, avoiding unnecessary spending on fuel, and reducing carbon emissions.

Finally, there is a lack of research and regulation relating to fuel poverty and cold home-related ill health in the private rented sector. Research should highlight effective regulations that are practical and enforceable by local authorities.

Conclusion

Fuel poverty and cold home-related health problems have been a longstanding concern for national and local government. Fuel poverty is not just about income, but also about energy efficiency, the quality of England's housing stock and the price of energy.

The evidence outlined in this review indicates that fuel poverty is associated with cold homes and a wide range of poor health outcomes that contribute to inequalities in health. Cold homes have also been found to exacerbate existing health conditions such as respiratory and circulatory diseases, which has the potential to cause death, particularly among older people.

Efforts to reduce fuel poverty require cross-sectoral action including working across local authority departments and with stakeholders such as the NHS and community and voluntary organisations. Local public health teams have a clear role in prioritising, designing and commissioning interventions which contribute to reducing fuel poverty and ultimately improving the health of the local population.

Local authorities are well placed to tackle some of the issues relating to fuel poverty, as they have ways to identify households which are vulnerable to the effects of cold weather in their local area as well as responsibility for elements of both public health and housing. The interventions covered in this review address a range of aspects relating to fuel poverty and cold home-related health problems. These include interventions to improve the energy efficiency of the home, reducing the price of household fuel bills, making energy more affordable, improving household incomes through financial advice and support, and developing networks across frontline health and social care services to identify and protect those vulnerable to the effects of cold weather and/or fuel poverty.

Interventions that tackle fuel poverty and cold home-related health problems are likely to help local areas reduce health inequalities, save local and national services money and help level up the social gradient in health.

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