NICE National Institute for Health and Care Excellence

NICE guideline

Excess winter deaths and illness and the health risks associated with cold homes

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guideline is the basis of QS117.

Overview

This guideline covers reducing the health risks (including preventable deaths) associated with living in a cold home. It aims to improve the health and wellbeing of people vulnerable to the cold. Improving the temperature in homes, by improving energy efficiency, may also help reduce unnecessary fuel consumption.

Who is it for?

- Commissioners and managers
- Health, social care and voluntary sector practitioners
- Housing and energy suppliers
- People who may have health problems related to living in a cold home, their families and carers

What is this guideline about?

This guideline makes recommendations on how to reduce the risk of death and ill health associated with living in a cold home. The aim is to help meet a range of public health and other goals. These include:

- Reducing preventable excess winter death rates.
- Improving health and wellbeing among vulnerable groups.
- Reducing pressure on health and social care services.
- Reducing 'fuel poverty' and the risk of fuel debt or being disconnected from gas and electricity supplies (including self-disconnection).
- Improving the energy efficiency of homes.

Improvements to make homes warmer may also help reduce unnecessary fuel consumption (although where people are living in cold homes because of fuel poverty their fuel use may increase). In addition, such improvements may reduce absences from work and school that result from illnesses caused by living in a cold home.

The health problems associated with cold homes are experienced during 'normal' winter temperatures, not just during extremely cold weather. (An increase in death rates due to a drop in temperature varies across England but can happen when temperatures drop below about 6°C.)

Year-round planning and action by many sectors is needed to combat these problems. The guideline outlines a role for health and other practitioners in:

- prioritising which homes are tackled first
- shaping and influencing decisions about how homes are improved
- highlighting the importance of research, implementation and evaluation.

A wide range of people are vulnerable to the cold. This is either because of: a medical condition, such as heart disease; a disability that, for instance, stops people moving around to keep warm, or makes them more likely to develop chest infections; or personal circumstances, such as being unable to afford to keep warm enough.

In this guideline, the term vulnerable refers to a number of groups including:

- people with cardiovascular conditions
- people with respiratory conditions (in particular, chronic obstructive pulmonary disease and childhood asthma)
- people with mental health conditions
- people with disabilities
- older people (65 and older)
- households with young children (from new-born to school age)
- pregnant women
- people on a low income.

The guideline is for commissioners, managers and health, social care and voluntary sector practitioners who deal with vulnerable people who may have health problems caused, or exacerbated, by living in a cold home. It will also be of interest to clinicians and others involved with at-risk groups, housing and energy suppliers. (For further details, see who should take action?). In addition, it may be of interest to members of the public.

See about this guideline for details of how the guideline was developed and its current status.

1 Recommendations

Recommendation 1 Develop a strategy

Health and wellbeing boards should:

- Include the health consequences of living in a cold home in the joint strategic needs assessment process.
- Develop a strategy to address the health consequences of cold homes. This should include:
  - Identifying people whose health is at risk from cold homes.
  - Groups that may face particular problems, such as those living in hard-to-heat homes or who need more warmth (for instance, because of limited mobility or specific health conditions).
  - Assessing how heating and insulation needs to be improved to raise properties to an acceptable standard assessment procedure (SAP) rating. As a minimum, properties should be raised to a band C (69–80) and ideally, to a band B (81–91) rating.
  - A tailored programme to make any necessary changes, including preventive measures, all year round – not just in the winter.
  - Provision for 'normal' winter temperatures not just periods of severe cold[1].
  - Preventing mental and physical health problems as well as deaths from cold homes.
  - An outline of how the other recommendations in this guideline will be put into practice locally.
  - Identifying and meeting the training needs of local practitioners involved in providing the services.
- Ensure planning includes identifying relevant local interventions and providers from all sectors (such as relevant local authority departments, the health sector, utilities, housing organisations and organisations in the voluntary sector).

- Consider how the issues and actions identified are reflected in health and wellbeing and other relevant local strategies or plans and ensure actions take account of other local and national strategies.
- Ensure the strategy includes monitoring and evaluation. Also ensure any evaluation is used to improve the strategy and is made publicly available.

Recommendation 2 Ensure there is a single-point-of-contact health and housing referral service for people living in cold homes

Health and wellbeing boards should:

- Ensure a local single-point-of-contact health and housing referral service is commissioned (see recommendation 3) to help vulnerable people who live in cold homes. A wide range of people are vulnerable to the cold. This is either because of: a medical condition, such as heart disease; a disability that, for instance, stops people moving around to keep warm, or makes them more likely to develop chest infections; or personal circumstances, such as being unable to afford to keep warm enough. In this guideline, the term vulnerable refers to a number of different groups including:
  - people with cardiovascular conditions
  - people with respiratory conditions (in particular, chronic obstructive pulmonary disease and childhood asthma)
  - people with mental health conditions
  - people with disabilities
  - older people (65 and older)
  - households with young children (from new-born to school age)
  - pregnant women
  - people on a low income.

- Ensure anyone who comes into contact with vulnerable groups is able to refer people to the referral service. This includes: health and social care practitioners, fire prevention and safety services personnel and workers from charities and voluntary organisations, such as advice agencies.
- Ensure the referral service links with relevant national and local services that can provide a range of solutions. These are likely to include: health and social care providers, local housing providers, advice agencies (such as Citizens Advice Bureaux and money advice organisations), health and social care charities, voluntary organisations and home improvement agencies.
- Ensure the referral service:
  - Takes account of existing services.
  - Involves face-to-face contact, if necessary, with the person using the service, their families and their carers.
  - Works with the person and their carers to identify problems caused by living in a cold home and the possible solutions.
  - Makes it clear to the person and their carer what actions are planned (or taking place) and coordinates activities to minimise disruption in the home.
  - Encourages self-referrals using a free phone number.
  - Monitors and evaluates the impact of actions taken and gives feedback to the practitioner or agency that originally referred the person.

Recommendation 3 Provide tailored solutions via the single- point-of-contact health and housing referral service for people living in cold homes

Health and wellbeing boards and their partners (see who should take action?) should ensure the local single-point-of-contact health and housing referral service provides access to tailored solutions to address identified needs, rather than an off-the-shelf approach. Solutions should take into account the language and reading ability of recipients, including any vision or hearing problems. Solutions should include:

- Housing insulation and heating improvement programmes and grants. Programmes should be led, or endorsed, by the local authority and include those available from energy suppliers.

- Advice on managing energy effectively in the home and securing the most appropriate fuel tariff and billing system (including collective purchasing schemes, if available). Note: the most appropriate fuel tariff may not be the cheapest if, for example, someone does not have a bank account or needs to budget on a weekly basis.
- Help to ensure all due benefits are being claimed, as people receiving certain benefits may be entitled to additional help with home improvements – and may get help to manage their fuel bills and any debt.
- Registration on priority services registers (for energy supply and distribution companies) to ensure vulnerable households get tailored support from these companies.
- Advice on how to avoid the health risks of living in a cold home. This includes information about what these health risks are (see Public Health England's Cold weather plan for further information).
- Access to, and coordination of, services that address common barriers to tackling cold homes. For example, access to home improvement agencies that can fix a leaking roof, or to voluntary groups that can help clear a loft ready for insulation.
- Short-term emergency support in times of crisis (for instance, room heaters if the central heating breaks down or access to short-term credit).

Recommendation 4 Identify people at risk of ill health from living in a cold home

Primary health and home care practitioners should:

- In collaboration with relevant local authority departments, use existing data, professional contacts and knowledge to identify people who live in cold or hard-to-heat homes. This includes people who are particularly vulnerable to the cold (see recommendation 5).
- Include this information in the person's records and use it (with their consent) to assess their risk and take action, if necessary (see recommendations 2 and 3).
- Ensure data sharing issues are addressed so that people at risk can be identified.

See also Health risks of cold homes: data sources to support local services tackling health risks of cold homes (Public Health England, January 2019).

Recommendation 5 Make every contact count by assessing the heating needs of people who use primary health and home care services

Primary health and home care practitioners should:

- At least once a year, assess the heating needs of people who use their services, whether during a home visit or elsewhere, taking into account the needs of groups who are vulnerable to the cold.
- Use their time with people to assess whether they (or another member of the household) are experiencing (or are likely to experience) difficulties keeping their home warm enough.
- Be aware that living in a cold home may have a greater effect on people who have to spend longer than an average amount of time at home. This could include those with chronic health conditions (including terminal illnesses) or disabilities.
- Be aware that people may not want to admit they are having difficulties paying for heating and may try to hide this. (For instance, they might only put the heating on when expecting a scheduled home visit.)
- Give people at risk, and their carers, information about how living in a cold home can affect their health. They should also tell them about services that can help and refer them if necessary. Ensure recipients can understand and act on the information they are given.
- If a cold home is a risk to someone's health and wellbeing, assess the likely effect and identify how the situation could be improved. Make sure relevant services are aware who will take action and when. This could include:
  - referral to the local health and housing service
  - referral to a health service (for instance, to ensure the person is offered flu vaccinations at the start of the winter). (See also the NICE guideline on flu vaccination: increasing uptake for further information about who is eligible for the free flu vaccination and increasing uptake among eligible groups in primary and secondary care.)
- Record assessments and actions in the person's notes or care plans. Make this information available to other practitioners, while respecting confidentiality.

Also see recommendations 2 and 3.

Recommendation 6 Non-health and social care workers who visit people at home should assess their heating needs

People who do not work in health and social care services but who visit people at home (see who should take action?) should:

- Refer anyone who needs help with the problems of living in a cold home to the local single-point-of-contact health and housing referral service, if they give their consent (see recommendations 2 and 3).
- Give people who may be vulnerable to the cold information on the effect that living in a cold home can have on their health and what can be done to remedy this.

Recommendation 7 Discharge vulnerable people from health or social care settings to a warm home

Those responsible for arranging and helping with someone's discharge from a health or social care setting (see who should take action?) should:

- Assess whether the person is likely to be vulnerable to the cold and if action is needed to make their home warm enough for them to return to. This assessment should take place at any time of the year, not just during colder weather, and well before they are due to be discharged to allow time for remedial action. For instance, it could take place soon after admission or when planning a booked admission.
- As part of the planned discharge, coordinate the efforts of all the practitioners involved to ensure the home is warm enough. This could include simple measures such as turning on the heating before discharge, providing advice on the ill effects of cold on health, or providing advice on how to use the heating system. (It could also involve more complex measures – see below.)
- If needed, refer the person to the local single-point-of-contact health and housing referral system (see recommendations 2 and 3). For example, refer them if the heating system needs replacing or the property needs insulating, or to prevent or address fuel debt. (The latter may accrue during someone's stay in health or social care accommodation.)
- Ensure any heating issues are resolved in a timely manner, so as not to delay discharge from hospital.

Recommendation 8 Train health and social care practitioners to help people whose homes may be too cold

Training providers for health and social care practitioners (see who should take action?) should:

- Ensure training to support continuing professional development includes detail on the effect on health and wellbeing of living in a cold home and the benefits of addressing this issue (for example, insulation could save money on heating bills).
- Ensure ongoing training programmes raise awareness of local systems and services to help people who are living in homes that are too cold for their health.
- Ensure practitioners can raise the issue of living in a home that is too cold. They should also be able to advise on sources of support and help and know how to refer someone, if necessary.

Recommendation 9 Train housing professionals and faith and voluntary sector workers to help people whose homes may be too cold for their health and wellbeing

Training providers for housing professionals and for people working in the faith and voluntary sector (see who should take action?) should:

- Ensure those in contact with people who may be vulnerable:
  - are aware of how cold housing can affect people's health and wellbeing
  - can spot when and how someone is at risk of being too cold at home
  - know of local services designed to address these problems
  - understand how to refer someone for help.

Recommendation 10 Train heating engineers, meter installers and those providing building insulation to help vulnerable people at home

Employers who install and maintain heating systems, electricity and gas meters and building insulation and those involved in employee training (see who should take action?) should ensure

employees who visit vulnerable people are:

- Trained to deal sensitively with the needs of the person they are visiting. For instance, they should provide information about the work they are doing in a form that can easily be understood by the recipient.
- Aware of how a cold home can affect someone's health and are able to spot if someone is vulnerable to the cold and the risks they are facing.
- Able to identify if ventilation is adequate – and know how to put this right if it is not. This includes knowing who to call if there is a problem.
- Given accreditation for these skills.

Recommendation 11 Raise awareness among practitioners and the public about how to keep warm at home

Health and wellbeing boards, Public Health England and the Department of Energy and Climate Change should:

- Ensure up-to-date information is available in appropriate formats for both practitioners and the public on how cold homes can affect people's health.
- Address commonly held misconceptions, for instance, that drinking alcohol can help keep someone warm, that hypothermia is the main health problem caused by the cold, or that sleeping in a cold bedroom is good for your health.
- Ensure up-to-date details of national and local support is available for both practitioners and the public. This support might include: help to improve the fabric of the housing or the heating system; help to make heating the home more affordable; or general advice on how to keep warm.
- Ensure national advice takes into account local and regional variations in the kind of support offered.

Recommendation 12 Ensure buildings meet ventilation and other building and trading standards

Building control officers, housing officers, environmental health officers and trading standards

officers should:

- Ensure changes to buildings are carried out at least to the standards required by building regulations, in particular with respect to ventilation (see the government's Planning portal).
- Use existing powers to identify housing (particularly in the private rented sector) that may expose vulnerable residents (see recommendation 5) to the cold. Existing powers fall under both the housing health and safety rating system and trading standards legislation (in relation to energy performance certificates).
- Ensure any relevant problems are addressed.

[1] Although lower temperatures have a more significant effect on health, the ill effects from cold homes are seen when outdoor temperatures drop to around 6°C. Because temperatures in this range are much more common, this is when the greatest number of health problems caused by the cold occur.

2 Who should take action?

Introduction

The guideline is for those with an interest in health and housing. They could be working in local authorities, the NHS or other organisations in the public, private, voluntary and community sectors. It is also aimed at:

- utility companies, particularly energy suppliers and energy distribution companies
- others responsible for providing and maintaining heating systems and insulation in the home.

In addition, it will be of relevance to families, carers and other members of the public.

Who should do what at a glance

Who should take action	Recommendation
Department of Energy and Climate Change	11
Environmental health officers	12
Faith and voluntary sector organisations	3, 6, 9
Health and wellbeing boards	1, 2, 3, 11
Housing services	3, 6, 12
Installation and maintenance contractors	6, 10
Local authorities	3
NHS England	8
Organisations that coordinate or offer training, or that register and set standards for practitioners (for instance, royal colleges and universities)	8, 9, 10
Public Health England	11
Primary healthcare practitioners	4, 5
Secondary healthcare practitioners	4, 7
Social care practitioners	4, 5, 7

Trading standards officers	12
Utilities	3, 6, 10

Who should take action in detail

Recommendation 1

Health and wellbeing boards

Recommendation 2

Health and wellbeing boards

Recommendation 3

Health and wellbeing boards; local authorities; housing providers; energy utility and distribution companies; faith and voluntary sector organisations

Recommendation 4

Primary health and home care practitioners

Recommendation 5

Primary health and home care practitioners

Recommendation 6

People who do not work in health and social care services but who visit people at home, for instance: to carry out housing repairs, to read or install meters (including the installation of smart meters), or to provide general support or to socialise. This includes: faith and voluntary sector organisations; energy utility and distribution companies; housing professionals; installation and maintenance contractors

Recommendation 7

Secondary healthcare practitioners; social care practitioners

Recommendation 8

NHS England, universities and other training providers. This includes: accredited agencies that train practitioners in environmental health, nursing and allied professions, medicine and para-medicine, environmental health and housing

Recommendation 9

Training providers including: Chartered Institute of Environmental Health, Chartered Institute of Housing, National Council for Voluntary Organisations, National Association for Community and Voluntary Action, National Housing Federation, Board Development Agency, further education colleges and accredited NVQ training agencies, universities

Recommendation 10

Employers who install and maintain heating systems, electricity and gas meters and building insulation; training providers including energy utility and distribution companies, further education colleges and accredited NVQ training agencies

Recommendation 11

Health and wellbeing boards; Public Health England; the Department of Energy and Climate Change

Recommendation 12

Building control officers; housing officers; environmental health officers; trading standards officers

3 Context

Introduction

Public Health England's 2014 Cold Weather Plan notes that winter weather has a direct effect on the incidence of: heart attack, stroke, respiratory disease, flu, falls and injuries and hypothermia. Indirect effects include mental health problems such as depression, and the risk of carbon monoxide poisoning if boilers, cooking and heating appliances are poorly maintained or poorly ventilated.

The strongest link is between respiratory deaths and the cold. But because generally more people die from cardiovascular disease, cardiovascular illnesses and deaths account for a greater number of health problems. Overall, the number of excess winter deaths varies between years – generally it's around 24,000 in England and Wales. The number of excess deaths in 2013/14 was 18,200.

This represented the lowest figure since 1950/51 and reflects a prolonged period of milder than average weather after November 2013. The 5-year moving average shows a decreasing trend in recent years up to 2005/06, after which there has been a gradual rise (Statistical bulletin: excess winter mortality in England and Wales, 2013/14 Office for National Statistics). It is too early to tell whether the low figures for 2013/14 represent a new downward trend.

Most excess winter deaths and illnesses are not caused by hypothermia or extremes of cold. Rather, they are usually caused by respiratory and cardiovascular problems during normal winter temperatures – when the mean outdoor temperature drops below 5–8°C) (Making the case Department of Health). The risk of death and illness increases as the temperature falls further. However, because there are many more relatively 'warm' winter days than days of extreme cold, most cold-related ill health and death occurs during these milder periods.

Unlike illnesses and deaths associated with hot days (when the increase in the number of deaths lasts for a day or so after the heatwave) rates remain higher for up to 2 weeks after a cold spell has ended.

A household that cannot afford to heat its home is likely to be under stress, for instance, from being forced to live in the only heated room. Or it may need to choose between heating and food or other commodities or risk falling into debt.

Housing conditions

Housing conditions are a very important factor. The death rate rises about 2.8% for every degree Celsius drop in the external temperature for those in the coldest 10% of homes. This compares with a 0.9% rise in deaths for every degree Celsius drop in the warmest 10% of homes (Cold comfort Joseph Rowntree Foundation). The Marmot review team's The health impacts of cold homes and fuel poverty estimated that 'excess winter deaths in the colder quarter of housing were almost 3 times as high as in the warmest quarter'.

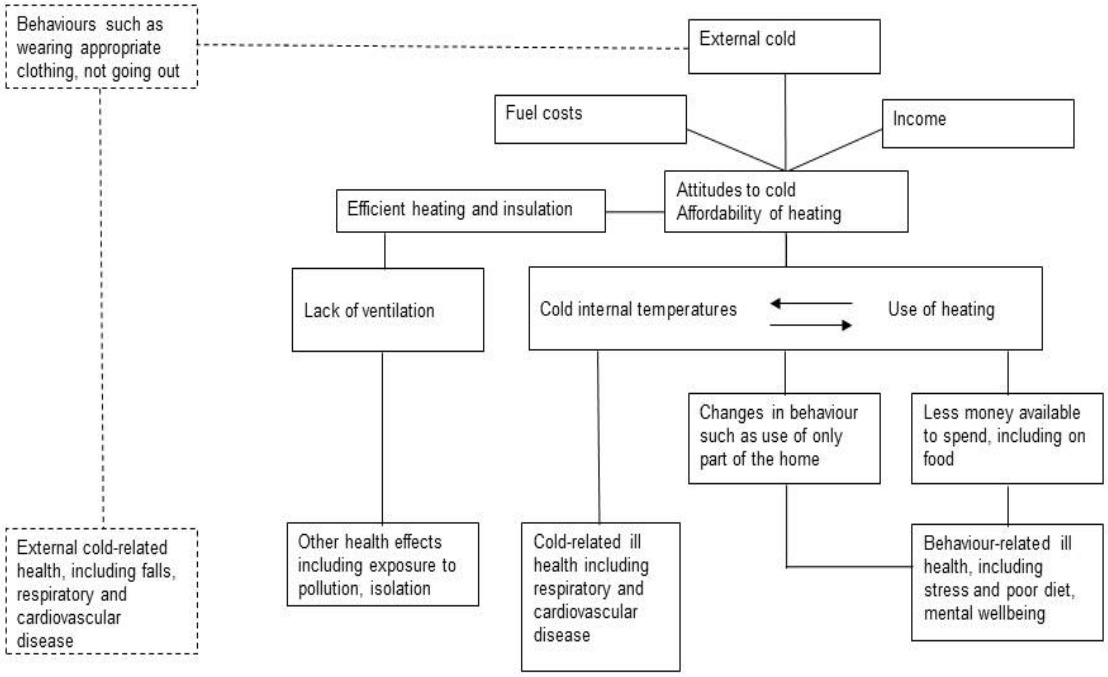
The importance of housing conditions is also emphasised by international comparisons that show lower rates of excess winter deaths in countries where homes are more energy-efficient.

Several factors also influence whether someone finds themselves living in a cold home – and how ill they may become as a result. These include:

- how efficient the heating system is
- how well insulated the home is
- whether the person can afford to heat their home (factors here include their income, the cost of fuel, the temperature needed to make the home feel warm enough and how long the heating needs to be on)
- the person's vulnerability to the effects of cold due to age or a medical condition.

Figure 1 shows the relation between these factors and their potential effect on health. Note that it is intended to give a simplified depiction of the complex interconnections between temperature, buildings, heating systems, cost, behaviours and health outcomes.

Figure 1 Factors linking cold temperatures to excess winter deaths and illness



Keeping homes warm: SAP ratings

How well buildings retain heat (often expressed as a standard assessment procedure or SAP rating) is an important factor in determining how much it will cost to keep housing at a given temperature. The SAP rating of housing stock across England varies considerably. In 2012 the average was 59 (out of 100). The proportion of energy-efficient housing (currently considered to be above 69) increased from 2% in 1996 to 18% in 2012. Around 2 million properties (9% of the housing stock) had a SAP of less than 30.

SAP scores vary according to the type of construction, level of insulation and type of heating system and its associated costs. Housing with insulated cavity walls, insulation to walls and roofs and central heating tend to have higher scores. Properties reliant on traditional forms of electric heating (such as storage heaters) may have a lower SAP score.

Older properties tend to have lower SAP scores (they are more likely to be less well insulated). The lowest rating is for pre-1919 stock (mean score 41) and the highest is for post-1980 housing (mean score 63).

Average SAP scores vary for different tenures. Average SAPs in the social sector (local authority and registered social landlord housing) are generally higher (around 60). They are generally lower in the owner-occupied sector (around 50) and particularly the private rented sector (around 45).

Keeping homes warm: affordability

Living in a relatively energy-efficient home is not the only factor influencing whether someone can keep their home warm. The affordability of the energy needed (determined by the cost of fuel and household income) is a key factor.

Understanding fuel expenditure: fuel poverty and spending on fuel, a 2010 study by the Centre for Sustainable Energy, identified groups who had found it particularly difficult to pay for adequate heating. The study found that households generally consume less fuel than they need, calculated from the 2007 English house condition survey (Department for Communities and Local Government). On average, households use only around two-thirds of the energy they actually need to stay warm enough at home. People on low incomes are more likely than average to use less heating.

Vulnerable and disadvantaged groups

In England, spending a high proportion of income on fuel tends to be associated with a low income rather than high heating needs. This pattern of expenditure tends to be associated more closely with some groups, such as lone parents.

A 2010 survey by the Centre for Sustainable Energy (You just have to get by) looked at people living on less than 60% of the national median income. Half said they found it difficult to pay their fuel bills. During the previous winter, nearly half (46%) had cut back on heating and 63% had lived in homes that were colder than they wanted them to be. Nearly half (47%) said the cold had made them feel anxious or depressed, and 30% said an existing health problem had got worse. Some (17%) did not feel able to invite friends or family to the home because of the cold.

Some groups are particularly vulnerable to cold homes. Again, this is caused by a variety of factors. For example, some people are likely to spend a larger part of their time at home, increasing both the likely cost of heating and their potential exposure to an inadequately heated home.

Excess winter deaths are more common among, but are by no means confined to, older people. In 2013/14 ('Statistical bulletin: excess winter mortality in England and Wales, 2013/14'):

- 51% of cold-related deaths were among people aged 85 and older
- 27% were among those aged between 75 and 84
- 22% were among people under 75.

Others, such as people with respiratory conditions, or an increased susceptibility to respiratory infections, are also likely to be at increased risk of health problems caused by living in a cold home.

Fuel poverty

Fuel poverty relates to a household's ability to pay for adequate heating. It can be caused by some or all of the following:

- a poorly insulated home
- inefficient or inadequate heating
- high fuel prices
- low income
- type of residents – for example, pensioners and disabled people may spend more time at home and therefore need heating on more often.

In England, the definition of fuel poverty changed after the 2012 Hills review (Department of Energy and Climate Change). It is now measured using the 'low income high cost' indicator. This means a household is said to be 'fuel poor' if its members are living below the official poverty line and have higher than average energy costs.

A previous definition (still in use in Wales, Scotland and Northern Ireland) is that someone is in fuel poverty if they need to spend more than 10% of their income on domestic energy bills to keep their home warm enough.

National policy

National policy linked to cold homes is driven by health (Public Health England's 2014 Cold Weather Plan), fuel poverty (Cutting the cost of keeping warm Department of Energy and Climate

Change) and environmental issues (Reducing the UK's greenhouse gas emissions by 80% by 2050 and 2013 Home Energy Conservation Act reports Department of Energy and Climate Change).

For instance, people on a low income may need to use more fuel to keep warm in poorly insulated housing. So any increase in fuel prices, either as a result of funding for insulation schemes or to reduce fuel use, will push some people into (or deeper into) fuel poverty. This will be true unless the increase in fuel prices coincides with, for example, improvements to the insulation of their own homes.

The suitability of accommodation is one of the factors that must be considered by local authorities under their general duty to promote wellbeing when carrying out their care and support functions under the Care Act 2014.

4 Considerations

This section describes the factors and issues the Public Health Advisory Committee (PHAC) considered when developing the recommendations. Please note: this section does **not** contain recommendations. (See recommendations.)

Background

4.1 Many factors may influence the variation in death rates between winter and summer. This includes the weather, seasonal infections, air pollution, behavioural changes and micronutrient levels. Most studies on the subject are based on data analyses for large populations (often whole cities or regions) for which health outcomes are related to outdoor, rather than indoor, temperatures. These studies show an effect attributable to cold. Often they also show a time-lag of up to 2 or 3 weeks between exposure to the cold and death or disease. The Committee noted that, because cold affects death rates, this implies it also has an effect on any associated ill health. This is corroborated by hospital admission data where warmer and colder seasons are compared.

4.2 The UK has a relatively high rate of excess winter deaths, based on international comparisons that use this definition.

4.3 In some years, cold weather is not restricted to the period between December and March (officially designated as 'winter' by the Office for National Statistics). This was the case in 2013, when the daily death rate was higher than average from February to mid-April. The cold-related deaths that occurred in April would have been assigned to the 'non-winter' period – so reducing the official number of excess winter deaths that year. Bearing this in mind, the Committee noted that it might be more accurate to use cold weather, rather than month, to calculate and examine excess winter deaths. On this basis, in the years without flu epidemics, cold is shown to be the most important factor contributing to a seasonal variation in death rates. Members also noted that such an approach may be useful when comparing differences between countries where cold winter weather may extend beyond the December to March period. Or when comparing differences with countries where winters routinely last for a relatively short period.

4.4 The Committee noted that 'excess winter deaths' is sometimes useful as a shorthand term. But members do not think it accurately describes all the health and wellbeing issues linked with cold and cold homes. They felt a focus on excess winter illnesses (as well as deaths) gives a more rounded picture of the risks associated with the cold. Members noted that cold-related illnesses affect people of all ages.

4.5 Interventions to address the health effects of cold homes include: policy (such as providing free boiler replacements); services (such as local efforts to implement policy and changes to buildings and heating); and changes made by individuals. (The latter could include loft insulation, double glazing or installing more efficient boilers.)

4.6 The Committee noted that interventions to ensure homes are warm enough are usually funded by government, the energy and distribution companies and the community and voluntary sectors. Usually, most health sector costs come from identifying and engaging with people who are most at risk of health problems from the cold and helping to ensure they have access to, and receive, the necessary support. The Committee did hear of examples where, for example, insulation or boiler replacements were funded directly by health bodies. But this was unusual.

4.7 The Committee noted the importance of considering cold-related illnesses (as well as deaths from the cold). There is a lack of evidence on the former. However, evidence does indicate that changes in home heating, insulation and temperature can have a beneficial effect on illnesses from a range of causes.

4.8 The Committee was aware of World Health Organization (WHO) findings from 1985 that there is no risk to healthy sedentary people living in accommodation with air temperatures of between 18 and 24°C (Health impact of low indoor temperatures). But this finding is rather old and does not state what air temperature is 'safe' for people who are not healthy. The Committee also noted that the 'comfort zone' for many people in the European Union appears to be around 21°C.

4.9 The Committee discussed the benefits of using a SAP assessment or other methods to determine the likelihood of a risk to health from cold housing. A home with a level B assessment would guarantee affordable warmth for any

occupant and was therefore considered the ideal. It also noted that a B rating was easily achievable in new buildings. In addition, the Committee noted that, on average, social housing in Northern Ireland currently has a SAP C rating.

4.10 The Committee noted that homes need adequate ventilation to prevent the build-up of radon, cigarette smoke and other potentially harmful pollutants in the home. Members also noted that this has to be balanced against the need to draught-proof homes to keep in the warmth. In addition, members noted that good quality building and adequate ventilation help reduce the risk of damp and mould.

Evidence

4.11 Much of the evidence relating to seasonal differences in death rates comes from time-series studies. In these, the studied population acts as its own control and the usual 'confounders', such as smoking, age or gender, are less important.

4.12 The Committee noted that there was limited UK evidence on how to prevent cold-related deaths (particularly relating to interventions).

4.13 The link between some minority ethnic groups and deprivation may mean that some of these groups are more likely to live in cold homes. Other groups, including recent immigrants from warmer climates, could also be particularly vulnerable during their first few years here. For example, they may be more likely to live in poor quality housing and they face an unusually complex energy market.

4.14 The Committee considered whether the problems associated with cold housing in urban areas were different to those in rural areas. The evidence did not show any significant difference in terms of the health impact. But this may be partly due to study difficulties caused by the dispersed nature of rural populations. The Committee did note that rural properties may be more likely to be 'off grid' and so reliant on more expensive forms of fuel. Members also noted that there may be more installation difficulties (due to difficulties accessing a property). But these issues were not considered to be exclusive to rural areas.

4.15 The evidence on issuing severe weather alerts did not demonstrate any health benefits. In addition, the guideline focuses on addressing issues related to cold

homes all year round – and not just during periods of bad weather. So the Committee did not make any recommendations on the use of severe weather alerts.

Health economics

4.16 PHAC noted the lack of health economics literature directly applicable to the UK. Thus a new health economic model was developed to assess the cost-effectiveness of interventions associated with cold homes. Limited evidence on the relationship between indoor temperature and health meant that the economic model was based on a number of assumptions, as follows:

- People only had 1 health problem. (The benefits of interventions for those with multiple vulnerabilities or multiple health problems are not fully captured.)
- The severity of common mental health disorders was not considered and the model does not capture wellbeing or happiness.
- Utility values for different health states were not adjusted for age or severity, and the potential impact of adjusting age or severity was not explored.

4.17 The Committee acknowledged that the economic analysis under-estimated the non-health benefits from a societal perspective by focusing on energy cost savings. Members noted that housing energy efficiency improvements could also lead to savings on carbon and on social care costs. It could also lead to productivity gains by reducing sickness absence from work.

4.18 The Committee noted that the results of modelling and sensitivity analyses were uncertain. Overall, however, housing energy efficiency interventions (such as roof insulation, double-glazing or boiler replacement) are cost-effective compared with current practice. This is particularly true of interventions aimed at households with a low standard assessment procedure (SAP) rating or aimed at vulnerable people. In both cases, these target groups gained the greatest health benefits.

4.19 The Committee discussed the potential benefit of providing a short-term fuel subsidy, combined with energy efficiency measures in the home. Members acknowledged that a short-term fuel subsidy alone would not be an effective alternative to energy efficiency measures. Fuel subsidy alone was reported to be

less cost-effective than when combined with energy efficiency measures from a health perspective. However, the Committee noted that neither health nor non-health benefits are fully captured.

Equalities

4.20 The Committee noted that some groups are more vulnerable to the adverse effects of cold. Information about these people may be held by a variety of services involved in some aspect of their lives. But action to address problems is likely to be hindered by the lack of access to this information, or lack of understanding of the options available to address problems. (For example, people may not know how to obtain support to install insulation.)

4.21 Several groups are more likely to suffer from the effects of cold homes. This is either because they are more likely to live in cold homes, or because they are more susceptible to its effects. For example, although not a homogenous group, people with disabilities are more likely to live in materially disadvantaged circumstances than others. They are also more likely to need more heat. With this in mind, members expressed concern that some people with disabilities may need to use benefits intended to support their independence to ensure their home is warm enough.

4.22 The Committee discussed the fact that cold weather adversely affects homeless people (including those living in 'non-typical' forms of accommodation such as mobile homes). However, to address their needs we would need to examine a different evidence base and this would be better addressed in a separate guideline. So this guideline does not include recommendations aimed at people who are homeless or not living in permanent structures that meet basic building control regulations.

Illness and deaths linked to the cold

4.23 There is an increase in deaths from almost all causes during cold weather. But cardiovascular and respiratory conditions are the key causes associated with cold weather and a cold home. Only a very small number of deaths are linked to hypothermia. Although the relative risk associated with respiratory conditions and the cold is greater than for cardiovascular disease, more people overall die of the latter – and therefore most excess winter deaths are attributable to

cardiovascular disease.

4.24 In England, a relatively sharp increase in the risk of death occurs when outdoor temperatures fall to around 6°C (with some variation between the regions in England). This indicates that significantly more cold-attributable deaths occur at a relatively higher mean temperature than on days of extreme cold. This is because, although the risks are relatively smaller when it is only moderately cold, there are more days of moderate than extreme cold.

4.25 Cold homes can have a significant effect on people's social activities. For example, they may not want to invite friends home because the house is cold, or only a small part is heated (to save money). The Committee noted that people living in cold homes frequently report that this has an effect on their daily life.

Services and policy

4.26 The Committee heard that services to ensure people are warm enough at home are generally patchy, both in terms of geographical coverage and duration. Lack of consistency makes it difficult for practitioners to know what type of service and support is available locally.

4.27 The Committee noted that local services to tackle cold homes in any given area may be provided by different local authorities. For instance, health and wellbeing boards are located in unitary, metropolitan borough and county councils, while housing departments are located in district, borough and city councils. In addition, members noted that hospitals and other health services may cover areas served by several local authorities. To add to what is a complicated picture, services provided by commercial or voluntary organisations have their own geographical distribution areas.

4.28 Many practitioners are already addressing the issue of cold homes (in particular, environmental health officers and housing officers). But the Committee felt that it would be particularly beneficial to encourage health practitioners to help target people whose health would benefit.

4.29 Often action to reduce the harm caused by living in a cold home is made more difficult because there is a lack of coordination of services, or a lack of understanding of who should take responsibility. The Committee noted that

visitors to vulnerable households should not assume action is being taken by anyone to ensure the home is warm enough.

4.30 The Committee noted that some people may feel stigmatised by admitting that they cannot afford to heat their home properly and may try to hide this. (For example, they may put the central heating on only when expecting a scheduled visit from a health or other practitioner.)

4.31 The Committee noted the importance of using a 'trusted intermediary' to help negotiate with the range of contractors that can address the problems caused by living in a cold home. (For example, local authority officers or representatives from voluntary service organisations.) Members also noted that this is best achieved face to face.

4.32 Current policies (such as Public Health England's 2014 Cold Weather Plan) already emphasise the need for year round planning. However, planning tends to focus on relatively short periods of severe weather. The Committee heard that, generally, health and wellbeing boards were not involved in planning all-year-round action to combat the more enduring ill effects of cold homes.

4.33 The Committee agreed that sustainable funding to maintain and coordinate local services is a key issue. It was given expert testimony that demonstrated the value of funding from clinical commissioning groups (see the expert papers in what evidence is the guideline based on? for details). Many of the services in the examples given were also funded via national or utility company programmes such as the Green Deal and the Energy Companies Obligation (ECO). The testimony also described a simple referral route as important.

4.34 The Committee discussed the potential roll-out of smart meters. This process will provide a contact with every householder (at least when smart meters are being fitted). But in addition, members discussed whether they could be used for remote data monitoring to identify homes using less energy than might be expected. Other possibilities, such as using these data in conjunction with telemedicine services, were also noted. The Committee noted data protection concerns related to data sharing.

Barriers

4.35 The Committee noted that a range of people were likely to be involved with those at risk from cold homes. These include health and social care practitioners as well as others from the housing, advice, utility and energy sectors. Workers from the voluntary sector and carers and neighbours are also likely to be involved. Because of the complexity of the problem, members noted the importance of making all these groups aware of how living in a cold home can affect people's health and how to access services locally.

4.36 The Committee discussed the training needs of professionals installing heating, insulation and other heating-related equipment (such as meters), in terms of supporting vulnerable and disabled people. Members agreed that quality of service played a big part in ensuring new equipment was accepted and used properly. They also noted that current training is largely restricted to safety issues.

4.37 There are many barriers to addressing cold homes. These include: a lack of awareness of the health issues; lack of local or national support (often linked to knowledge of what is available); and practical issues. (The latter could include not being able to insulate someone's loft because it is filled with their possessions.)

4.38 The Committee discussed the importance of using data effectively and storing it properly. It noted that data use issues are often cited as a barrier to implementing effective systems. Data handling was beyond the remit of this guideline. But the Committee noted that examples of good local practice do exist.

4.39 Stakeholders expressed concern about a possible increase in workload as a result of the recommendations. But the aim was to target people whose health might benefit the most. This, in turn, could help prevent ill health, so resulting in a reduced workload for the referring practitioner in the longer term.

4.40 Many stakeholders expressed concern about the availability and consistency of funding for interventions to improve cold homes. As noted in 4.6, much of this comes from government or the energy companies. The Committee noted that funding regimes are complex and that health inequalities could arise because of

the different criteria used. But the provision of national funding was outside the remit of this guideline.

5 Recommendations for research

The Public Health Advisory Committee (PHAC) recommends that the following research questions should be addressed. It notes that 'effectiveness' in this context relates not only to the size of the effect, but also to cost effectiveness and duration of effect. It also takes into account any harmful or negative side effects.

5.1 What effect does the temperature in the home have on the rate of illness, death and quality of life of different groups of vulnerable people? This includes the effect and interaction of multiple vulnerabilities (such as age and pre-existing disease). It also includes the effects of intervening factors like fuel poverty, poor housing and outdoor temperature. Analysis is needed of existing UK-based databases.

5.2 What are the barriers to, and facilitators for, action and coping strategies among people vulnerable to cold-related illness and death with respect to cold homes (including ventilation)? (This includes self-disconnection when using pre-payment meters.) Analysis of quantitative and qualitative research is needed.

5.3 How effective and cost effective are different types of intervention to prevent a range of cold-related illnesses and death? How do these vary with groups in different circumstances? They should be of a sufficient scale to be meaningful, use objective measurements and include 'natural experiments', including the roll-out of smart meter technology.

5.4 What is the relationship between improved home energy efficiency and the indoor temperature selected by people living in a representative cohort of UK housing types? What is the trade-off between reduced fuel bills and higher indoor temperatures following alterations to home energy efficiency?

5.5 What opportunities are there to use electronic systems to reduce the health risks associated with cold homes? For example, could temperature alert systems be linked from a smart meter to a health or social care provider?

More detail identified during development of this guideline is provided in gaps in the evidence.

6 Related NICE guidance

- Chronic obstructive pulmonary disease in over 16s: diagnosis and management (2018) NICE guideline 115
- Transition between inpatient mental health settings and community or care home settings (2016) NICE guideline 53
- Sunlight exposure: risks and benefits (2016) NICE guideline 34
- Vitamin D: increasing supplement use among at-risk groups (2014, updated 2017) NICE guideline PH56
- Falls in older people: assessing risk and prevention (2013) NICE guideline CG161
- Social and emotional wellbeing – early years (2012) NICE guideline PH40
- Chronic obstructive pulmonary disease (2011, updated 2016) NICE quality standard 10
- Prevention of cardiovascular disease (2010) NICE guideline PH25
- Amantadine, oseltamivir and zanamivir for the treatment of influenza (2009) NICE technology appraisal guidance 168
- Depression in adults (2009, updated 2018) NICE guideline CG90
- Reducing differences in the uptake of immunisations (2009, updated 2017) NICE guideline PH21
- Social and emotional wellbeing in secondary education (2009) NICE guideline PH20
- Mental wellbeing and older people (2008) NICE guideline PH16
- Oseltamivir, amantadine (review) and zanamivir for the prophylaxis of influenza (2008) NICE technology appraisal guidance 158
- Social and emotional wellbeing in primary education (2008) NICE guideline PH12

7 Glossary

Excess winter deaths

Almost all causes of death show some variation with season. Overall, the death rate is higher during winter months and these deaths are referred to as 'excess winter deaths'. In the UK, these figures are based on death rates from December to the end of March.

Hard-to-heat homes

Hard-to-heat homes include:

- those with solid walls
- those with no loft space
- those in a state of disrepair
- high rise blocks
- those not connected to (and that cannot be connected to) the gas grid.

Other factors, such as listed architectural features, accessibility or construction quality may make it difficult to significantly improve the SAP rating (see standard assessment procedure below). Such properties are sometimes described as 'hard to treat'. Although important, the major issue from a health perspective is to ensure properties are not 'hard to heat'.

Home improvement agencies

Home improvement agencies are local organisations that help older people, people with disabilities and vulnerable people to live in safety and with dignity in their own homes. Services focus on ensuring existing housing is fit for purpose and that vulnerable people, predominantly homeowners, can live independently for as long as possible. Locally they may be known as 'care and repair' or 'staying put' agencies.

Priority services registers

The priority services registers are schemes offering extra free services to people who are of

pensionable age, are registered disabled, have a hearing or visual impairment, or have a long term health problem. They are run by energy suppliers and distributors.

Self-disconnection

Self-disconnection occurs when a pre-payment meter is not topped-up (either accidentally or intentionally) before all the credit, including emergency credit, is used and the supply is cut off.

Standard assessment procedure

'Standard assessment procedure' (SAP) refers to an index that reflects the cost of heating a dwelling. The index depends on the rate of heat loss determined by: building fabric, degree of insulation, ventilation and the cost of the heating. This last factor is determined by heating efficiency, fuel price and solar gain. SAP ratings are frequently divided into 7 bands (A to G). A (most efficient) runs from 92–100, B from 81–92, C from 69–80, D from 55–68, E from 39–54, F from 21–38 and G from 1–20.

Registered social landlord

Registered social landlord is the general name for not-for-profit housing providers approved and regulated by the government through the Housing Corporation. Most registered social landlords are also known as housing associations.

8 Summary of the methods used to develop this guideline

Introduction

The reviews, primary research, commissioned reports and economic modelling report include full details of the methods used to select the evidence (including search strategies), assess its quality and summarise it.

The minutes of the Public Health Advisory Committee (PHAC) meetings give further detail about the Committee's interpretation of the evidence and development of the recommendations.

Guideline development

The stages involved in developing public health guidelines are outlined in the box below.

1. Draft scope released for consultation
2. Stakeholder comments used to revise the scope
3. Final scope and responses to comments published on website
4. Evidence reviews and economic modelling undertaken and submitted to PHAC
5. PHAC produces draft recommendations
6. Draft guideline (and evidence) released for consultation (and for fieldwork)
7. PHAC amends recommendations
8. Final guideline published on website
9. Responses to comments published on website

Key questions

The key questions were established as part of the scope. They formed the starting point for the reviews of evidence and were used by the PHAC to help develop the recommendations. The overarching questions were:

Question 1: Which subpopulations are more vulnerable to cold temperatures and poorly heated or expensive-to-heat homes? What factors contribute to vulnerability and how do these factors

interact with each other?

Question 2: How effective and cost effective are interventions and approaches to reduce excess winter deaths and morbidity and the negative health consequences of cold weather and cold homes?

The subsidiary questions were:

1. How effective are these interventions?

2. How does effectiveness vary according to demographic, geographic, health, housing and socioeconomic characteristics?

3. What effect do these interventions have on health inequalities?

4. What effect do these interventions have on the wider determinants of health (for example, carbon dioxide emissions)?

5. What adverse effects are associated with changes to energy efficiency or the cost of heating? (For example, reduced ventilation may be associated with increased levels of indoor air pollution, including radon, and overheating may be associated with an increased risk of cot death.)

Question 3: What systems and strategies have been used to identify vulnerable and at-risk populations and what effect do they have?

The subsidiary questions were:

1. What activities and interventions support effective delivery and implementation of approaches to reduce excess winter deaths and the negative health consequences of cold weather?

2. What influences the effectiveness of an integrated approach to addressing risk and vulnerability?

3. What are the most effective methods for reaching at-risk and vulnerable subpopulations?

4. What approaches increase uptake and enhance the acceptability of effective interventions?

5. What facilitators and barriers influence delivery and implementation?

These questions were made more specific for each review.

Reviewing the evidence

Effectiveness reviews

Three reviews were conducted:

- Review 1: 'Factors determining vulnerability to winter- and cold weather-related mortality/ morbidity'.
- Review 2: 'Interventions and economic studies'.
- Review 3: 'Delivery and implementation of approaches for the prevention of excess winter deaths and morbidity'.

Identifying the evidence

The literature search involved searching a range of databases and grey literature resources. Databases searched included: Avery Index, HMIC, ICONDA International MEDLINE, PsycINFO, Social Science Citation Index and Social Policy and Practice. The searches were limited to the last 20 years (1993 to October 2013) and to English language publications. See reviews 1–3.

Details of the search strategies are given in the reviews.

Selection criteria

Inclusion and exclusion criteria for each review varied and details can be found in reviews 1–3.

Quality appraisal

Included papers were assessed for methodological rigour and quality using the NICE methodology checklist, as set out in Methods for the development of NICE public health guidance. Each study was graded (++, +, −) to reflect the risk of potential bias arising from its design and execution.

Study quality

++ All or most of the checklist criteria have been fulfilled. Where they have not been fulfilled, the conclusions are very unlikely to alter.

+ Some of the checklist criteria have been fulfilled. Those criteria that have not been fulfilled or not

adequately described are unlikely to alter the conclusions.

– Few or no checklist criteria have been fulfilled. The conclusions of the study are likely or very likely to alter.

Summarising the evidence and making evidence statements

The review data were summarised in evidence tables (see the reviews in Supporting evidence). The findings from the studies were synthesised and used as the basis for a number of evidence statements relating to each key question. The evidence statements were prepared by the external contractors (see 'Supporting evidence').

The statements reflect their judgement of the strength (quality, quantity and consistency) of evidence and its applicability to the populations and settings in the scope.

Commissioned reports

Expert papers were also commissioned. These were:

- 'Alzheimer's and dementia in relation to cold homes and excess winter mortality and morbidity'
- 'Benefit changes, fuel poverty and disability'
- 'Children's health and wellbeing and cold homes'
- 'OFGEM's vulnerable consumer strategy and related initiatives'
- 'Policy update and the ECO'
- 'The role of CCGs in addressing the impact of cold homes'
- 'The role of energy companies in addressing the impact of cold homes'
- 'Working in local partnerships to address the impact of cold homes'.

Cost effectiveness

There was a review of economic evaluations and an economic modelling exercise. See review 2 'Interventions and economic studies' and 'Excess winter deaths: economic modelling report'.

Economic modelling

A model was developed to quantify the changes in indoor environmental conditions associated with energy efficiency interventions (improvements to the building fabric and ventilation control). The model also aimed to explore the potential impact of being able to afford more effective heating due to a fuel subsidy.

An economic model was constructed to incorporate data from the reviews of effectiveness and cost effectiveness. The results are reported in 'Excess winter deaths: economic modelling report'.

Economic analysis was undertaken from different perspectives including the NHS, NHS and local government, householder and societal. The risks and benefits associated with home energy efficiency measures and a fuel subsidy were quantified using a complex chain of assumed causal linkages. For some links, the evidence base was limited and the results are therefore uncertain.

The model did not address potential non-health benefits, such as the carbon savings resulting from the modelled changes in energy demand. This means the benefits may have been underestimated.

The results indicated that using home energy efficiency measures, combined with a fuel subsidy, was cost effective. Home energy efficiencies alone were more cost effective than a fuel subsidy. Greater health benefits were achieved when the former were targeted at households with a low standard assessment procedure.

How the PHAC formulated the recommendations

At its meetings between October 2013 and April 2014, the Public Health Advisory Committee (PHAC) considered the evidence, expert report and cost effectiveness to determine:

- whether there was sufficient evidence (in terms of strength and applicability) to form a judgement
- if relevant, whether (on balance) the evidence demonstrates that the intervention, programme or activity can be effective or is inconclusive
- if relevant, the typical size of effect
- whether the evidence is applicable to the target groups and context covered by the guideline.

The PHAC developed recommendations through informal consensus, based on the following criteria:

- Strength (type, quality, quantity and consistency) of the evidence.
- The applicability of the evidence to the populations and settings referred to in the scope.
- Potential effect on the target population's health, and the size of the effect.
- Effect on inequalities in health between different groups of the population.
- Equality and diversity legislation.
- Ethical issues and social value judgements.
- Cost effectiveness (for the NHS and other public sector organisations).
- Balance of harms and benefits.
- Ease of implementation and any anticipated changes in practice.

If possible, recommendations were linked to evidence statements (see the evidence for details). If a recommendation was inferred from the evidence, this was indicated by the reference 'IDE' (inference derived from the evidence).

9 The evidence

Introduction

The evidence statements from 3 reviews are provided by the London School of Hygiene and Tropical Medicine.

This section lists how the evidence statements and expert papers link to the recommendations and sets out a brief summary of findings from the economic analysis.

How the evidence and expert papers link to the recommendations

The evidence statements are short summaries of evidence, in a review, report or paper (provided by an expert in the topic area). Each statement has a short code indicating which document the evidence has come from.

Evidence statement number 1.1 indicates that the linked statement is numbered 1 in review 1.
Evidence statement number 2.1 indicates that the linked statement is numbered 1 in review 2.
Evidence statement EP1 indicates that expert paper 1 is linked to a recommendation.

If a recommendation is not taken directly from the evidence statements, but is inferred from the evidence, this is indicated by **IDE** (inference derived from the evidence).

Recommendation 1: evidence statements 1.1, 1.11, 1.13, 2.10, 3.5; EP1, EP3, EP4, EP6, EP7

Recommendation 2: evidence statements 1.1, 1.10, 1.11, 1.12, 1.13, 2.10, 3.5; EP3, EP4, EP6, EP8

Recommendation 3: evidence statements 1.1, 1.10, 1.11, 1.12, 1.13, 2.10; EP3, EP4, EP5, EP6, EP8

Recommendation 4: evidence statements 3.2, 3.5; EP3, EP4, EP6, EP7

Recommendation 5: evidence statements 1.3, 1.6, 1.9, 1.12, 1.14, 2.1, 2.3, 2.7; EP1, EP2, EP3, EP4

Recommendation 6: evidence statement 3.5; EP4, EP6, EP8

Recommendation 7: EP4, EP6

Recommendation 8: evidence statement 3.5; EP4, EP6

Recommendation 9: evidence statement 3.5; EP4, EP8

Recommendation 10: EP4

Recommendation 11: evidence statements 2.6, 3.5; EP3, EP4, EP5, EP6

Recommendation 12: evidence statement 2.10; IDE

Economic modelling

Providing home heating and insulation interventions to households where someone has chronic obstructive pulmonary disease, heart disease or is older than 65 was found to be cost effective from the perspective of the health sector. (This assumes that the health sector does not bear the full costs of the physical changes to the building fabric.) In some cases, the full cost of the intervention could potentially be justified solely on the basis of the health benefits alone.

One of the key factors in determining cost effectiveness is whether the potential indoor air pollution caused by altering ventilation rates during energy efficiency upgrades can be avoided. (If ventilation is poor and this leads to health problems, the interventions will not necessarily be cost effective.)

The modelling compared programmes targeting low SAP homes where people were at risk of ill health with programmes aimed at all homes where people were at risk of ill health. The targeted approach was much more cost effective.

Fuel subsidies are less cost effective than home energy efficiency measures, but the former may be more suitable over shorter time frames. That's because they avoid a large capital investment cost for people who may have a comparatively short life expectancy, or who expect to move home in a comparatively short period.

Quantification of the risks and benefits associated with home energy efficiency and fuel subsidy interventions is based on a model involving a complex chain of assumed causal links. For some of those links, the evidence base is limited and the results should, therefore, be interpreted as indicative only. However, they do provide a guide to the relative merits of broad interventions.

The specific scenarios considered and the full results can be found in the economic modelling report.

10 Gaps in the evidence

The Public Health Advisory Committee (PHAC) identified a number of gaps in the evidence related to the programmes under examination based on an assessment of the evidence, stakeholder and expert comment. These gaps are set out below.

1. It is not clear to what extent cold-related deaths are primarily a seasonal or a temperature-related phenomenon. For some conditions, there is a clear medical reason why cold causes or exacerbates them (for example, cardiovascular-related conditions). This is not true in other cases (for example, Alzheimer's disease).

(Source: Evidence review 1)

2. There are no accurate estimates of the degree to which various diseases can be attributed to cold temperatures in the UK. This includes how long a period of cold weather is needed before these diseases emerge.

(Source: Evidence review 1)

3. It is uncertain to what extent vulnerability to the cold relates to outdoor or indoor temperatures in the UK. Similarly, the degree to which outdoor temperature may affect indoor temperature and ill-health is unknown.

(Source: Evidence review 1)

4. There is a lack of rigorous, UK-based epidemiological evidence on the degree to which different housing energy efficiency interventions modify the risk of cold temperature-related deaths and illnesses.

(Source: Evidence review 2)

11 Membership of the Public Health Advisory Committee and the NICE project team

Public Health Advisory Committee C

NICE has set up several Public Health Advisory Committees (PHACs). These standing committees consider the evidence and develop public health guidelines. Membership is multidisciplinary, comprising academics, public health practitioners, topic experts and members of the public. They may come from the NHS, education, social care, environmental health, local government or the voluntary sector. The following are members of PHAC C:

Chair

Gina Radford
Centre Director for Anglia and Essex, Public Health England

Core members

Ross Cowan
Community core member

Eileen Kaner
Professor of Public Health Research, Newcastle University

Stephen Morris
Professor of Health Economics, University College London

Jasmine Murphy
Consultant in Public Health, Leicester City Council

Kamran Siddiqi
Clinical Senior Lecturer, University of York

David Sloan
Retired Director of Public Health

Topic members

Barbara Hanratty
Clinical Senior Lecturer, Hull York Medical School, University of York

Raymond Jankowski
Deputy Director of Public Health, NHS Hertfordshire

John Kolm-Murray
Seasonal Health & Affordable Warmth Coordinator, London Borough of Islington

Christine Liddell
Professor of Psychology, University of Ulster

Andrew Probert
Community topic member

Simon Roberts
Chief Executive, Centre for Sustainable Energy

Expert testimony to PHAC

Tim Anfilogoff
Programme manager, Hertfordshire valleys Clinical Commissioning Group

Gareth Baynham-Hughes
Deputy Director, Fuel Poverty, Department of Energy and Climate Change

Martin Chadwick
Chief Officer, Beat the Cold

Philip Cullum
Partner, Consumer Policy and Demand Side Insight, OFGEM (Office of Gas and Electricity Markets)

Christine Liddell
Professor, School of Psychology, University of Ulster

Carolyn Snell
Lecturer in Social Policy, The University of York

Neil Walker
Energy and Renewal Surveyor, Watford Borough Council

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Sue Jelley
Senior Editor

Susie Burlace
Editor

Declarations of interests

The following members of the Public Health Advisory Committee made declarations of interest. All other members of the Committee stated that they had no interests to declare.

Committee member	Interest declared	Type of interest	Decision taken
Gina Radford	None	N/A	No further action required
Ross Cowan	Unpaid trustee of the Health and Race Equality Forum	Personal non-pecuniary interest	No further action required
Ross Cowan	Part-time employment with a voluntary organisation which includes work supporting voluntary, community and social enterprise involvement on Health and Wellbeing Boards including use of NICE guidance	Personal non-pecuniary interest	No further action required
Barbara Hanratty	Brother-in-law employed as a statistician by Pfizer in the Republic of Ireland	Personal family interest	No further action required
Raymond Jankowski	Wife is the head of immunisation division at Public Health England and is involved in the national plans for Flu vaccinations	Personal family interest	No further action required
Eileen Kaner	The topic of excess winter deaths is the focus of 1 PhD student at the Institute for Health and Society at Newcastle University, for which Eileen is the Director	Non-personal pecuniary interest	No further action required

John Kolm-Murray	Employed by Islington London Borough Council as a seasonal health and affordable warmth coordinator	Personal pecuniary interest	No further action required
John Kolm-Murray	Employer received NHS reablement funding in 2012/13 and funding from the Department of Health's Warm Homes Healthy People fund in 2011/12 and 2012/13	Non-personal pecuniary interest	No further action required
John Kolm-Murray	Director of National Right to Fuel Campaign and Steering group member of End Fuel Poverty Coalition. Deputy Chair of Carbon Action Network	Personal non-pecuniary interest	No further action required
John Kolm-Murray	Trustee of British Gas Energy Trust	Personal non-pecuniary interest	No further action required
Christine Liddell	None	N/A	No further action required
Steve Morris	Received consultancy fees in 2011/12 from GlaxoSmithKline to undertake a cost-effectiveness analysis of mepolizumab in adults and adolescents with severe asthma	Personal pecuniary interest	No further action required
Jasmine Murphy	None	N/A	No further action required
Andrew Probert	None	N/A	No further action required

Simon Roberts	Employer (Centre for Sustainable Energy) may benefit from a market expansion and increased funding available due to the publication of the guidance. Will not create a direct benefit, but may increase fundraising opportunities to deliver programmes	Non-personal pecuniary interest	No further action required
Kamran Siddiqi	Received funding on behalf of the University of York from the Medical Research Council (MRC), the National Institute of Health Research (NIHR), Cancer Research UK and the International Development Research Centre in Canada	Personal pecuniary interest	No further action required
Kamran Siddiqi	Employer (University of York) has an interest in public health areas of research and has secured research grants from NIHR, MRC and several other organisations for a variety of public health topics	Non-personal pecuniary interest	No further action required
Kamran Siddiqi	Has an academic interest in a number of public health research topics including: tobacco cessation; second-hand smoking; preventing tobacco uptake; and ethnicity and health. Has written and presented on these topics and has secured research grants from various public bodies and charities including NIHR	Personal non-pecuniary interest	No further action required
David Sloan	None	N/A	No further action required
Carolyn Snell	Grant holder of Eaga Charitable trust, through York University. Eaga funded work presented at the fifth NICE excess winter deaths Public Health Advisory Committee meeting	Non-personal pecuniary interest	No further action required
Carolyn Snell	Has made policy recommendations as a result of the research being presented	Personal non-pecuniary interest	No further action required

Frances Quinn	Member of British Polio and tutor on a self-management of long-term conditions course, which involved signposting people to information on exercise, nutrition and vitamin D	Personal non-pecuniary interest	No further action required
Other declarations			
Martin Chadwick - topic expert	Employer received funding via Stoke-on-Trent City Council and Staffordshire County Council from the Warm Homes Healthy People fund in 2011/12 and 2012/13	Non-personal pecuniary interest	No further action required
Martin Chadwick - topic expert	Member of the steering group of the National Right to Fuel Campaign	Personal non-pecuniary interest	No further action required
Philip Cullum - topic expert	Employed by the energy regulator Office of Gas and Electricity Markets (OFGEM)	Personal pecuniary interest	No further action required
Philip Cullum - topic expert	Has managerial responsibility for OFGEM's policy and regulatory work on consumer vulnerability along with its consumer research function	Non-personal pecuniary interest	No further action required
Philip Cullum - topic expert	Has expressed views on the role of energy companies in helping consumers in vulnerable situations, in the context of his role at OFGEM. Also commented on such issues between 2005–11 as deputy chief executive at the National Consumer Council, then Consumer Focus. Also worked at Which? in the mid-1990s, latterly as head of the policy team, and it is likely that he commented on similar issues then	Personal non-pecuniary interest	No further action required

Helen Stockton - topic expert	Employed by National Energy Action (NEA)as a senior research and policy officer. In this role she was recently involved in the delivery of an evaluation of 2 programmes in Durham and Darlington, the aims of which included reducing excess winter deaths and cold-related morbidity. The research was commissioned by Durham and Darlington NHS Foundation Trust	Personal pecuniary interest	No further action required
Helen Stockton - topic expert	Employed by NEA as a senior research and policy officer. NEA is a charity that campaigns for greater investment in energy efficiency. Its work includes making recommendations to government, health sector and other stakeholders on interventions that could improve thermal efficiency and reduce fuel poverty, ill-health and preventable deaths	Non-personal pecuniary interest	No further action required

About this guideline

What does this guideline cover?

The Department of Health (DH) asked the National Institute for Health and Care Excellence (NICE) to produce this guideline on excess winter deaths (see the scope).

The absence of any recommendations on interventions that fall within the scope of this guideline is a result of lack of evidence. It should not be taken as a judgement on whether they are cost effective.

How was this guideline developed?

The recommendations are based on the best available evidence. They were developed by the Public Health Advisory Committee (PHAC).

Members of the PHAC are listed in membership of the Public Health Advisory Committee and the NICE project team.

For information on how NICE public health guidelines are developed, see the NICE public health guideline process and methods guides.

What evidence is the guideline based on?

The evidence that the PHAC considered included:

- Evidence reviews:
  - Review 1: 'Factors determining vulnerability to winter- and cold weather-related mortality/morbidity' was carried out by the London School of Hygiene and Tropical Medicine. The principal authors were: James Milner, Zaid Chalabi and Paul Wilkinson.
  - Review 2: 'Interventions and economic studies' was carried out by the London School of Hygiene and Tropical Medicine. The principal authors were: James Milner, Zaid Chalabi and Paul Wilkinson.
  - Review 3: 'Delivery and implementation of approaches for the prevention of excess winter deaths and morbidity' was carried out by the London School of Hygiene and Tropical Medicine. The principal authors were: James Milner, Zaid Chalabi and Paul Wilkinson.
- Economic modelling:
  - 'Excess winter deaths: economic modelling report' was carried out by the London School of Hygiene and Tropical Medicine. The principal authors were: James Milner, Ian Hamilton and Zaid Chalabi.

- Expert papers:
  - Expert paper 1: Alzheimer's and dementia in relation to cold homes and excess winter mortality and morbidity'. The principal author was Christine Liddell, University of Ulster.
  - Expert paper 2: 'Children's health and wellbeing and cold homes' by Christine Liddell, University of Ulster.
  - Expert paper 3: 'Benefit changes, fuel poverty and disability' by Carolyn Snell, University of York.
  - Expert paper 4: 'Working in local partnerships to address the impact of cold homes' by Martin Chadwick, Beat the Cold.
  - Expert paper 5: 'OFGEM's vulnerable consumer strategy and related initiatives' by Phillip Cullum, OFGEM.
  - Expert paper 6: 'The role of CCGs in addressing the impact of cold homes' by Tim Anfilogoff, Hertfordshire Valleys Clinical Commissioning Group and Neil Walker, Watford Borough Council.
  - Expert paper 7: 'Policy update and the ECO' by Gareth Baynham-Hughes and Fern Leathers, DECC.
  - Expert paper 8: 'The role of energy companies in addressing the impact of cold homes' by Maria Wardrobe, National Energy Action.

Note: the views expressed in the expert papers above are the views of the authors and not those of NICE.

In some cases the evidence was insufficient and the PHAC has made recommendations for future research. For the research recommendations and gaps in research, see recommendations for research and gaps in the evidence.

Status of this guideline

The draft guideline, including the recommendations, was released for consultation in June 2014. At its meeting in September 2014, the PHAC amended the guideline in light of comments from stakeholders and experts and the fieldwork. The guideline was signed off by the NICE Guidance Executive in January 2015.

All healthcare practitioners should ensure adults have a high quality experience of the NHS by following NICE's recommendations in patient experience in adult NHS services.

All health and social care providers working with people using adult NHS mental health services should follow NICE's recommendations in service user experience in adult mental health.

The recommendations should be read in conjunction with existing NICE guidance unless explicitly stated otherwise. They should be implemented in light of duties set out in the Equality Act 2010.

The guideline is available on NICE's website. The recommendations are also available in a NICE Pathway for practitioners whose remit includes public health and for interested members of the public.

NICE produces guidance, standards and information on commissioning and providing high-quality healthcare, social care, and public health services. We have agreements to provide certain NICE services to Wales, Scotland and Northern Ireland. Decisions on how NICE guidance and other products apply in those countries are made by ministers in the Welsh government, Scottish government, and Northern Ireland Executive. NICE guidance or other products may include references to organisations or people responsible for commissioning or providing care that may be relevant only to England.

Implementation

NICE guidelines can help:

- Commissioners and providers of NHS services to meet the requirements of the NHS outcomes framework 2013–14. This includes helping them to deliver against domain 1: preventing people from dying prematurely.
- Local health and wellbeing boards to meet the requirements of the Health and Social Care Act (2012) and the Public health outcomes framework for England 2013–16.
- Local authorities, NHS services and local organisations determine how to improve health outcomes and reduce health inequalities during the joint strategic needs assessment process.

NICE has developed tools to help organisations put this guideline into practice.

Updating the recommendations

This guideline will be reviewed 3 years after publication to determine whether all or part of it should be updated. Information on the progress of any update will be posted on the NICE website.

Update information

Minor changes since publication

November 2019: A link to Public Health England's Cold weather plan in recommendation 3 was updated. A link to Public Health England's implementation support resource, Health risks of cold homes: data sources to support local services tackling health risks of cold homes was added to recommendation 4. A link to the NICE guideline on flu vaccination: increasing uptake was added to recommendation 5.

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