

Appendix A: Summary of evidence from surveillance

2019 surveillance of excess winter deaths and illness and the health risks associated with cold homes (2019) NICE guideline NG6

Summary of evidence from 2019 surveillance

Studies identified in searches are summarised from the information presented in their abstracts.

Feedback from topic experts who advised us on the approach to this surveillance review, was considered alongside the evidence to reach a view on the need to update each section of the guideline.

2019 surveillance summary	Intelligence gathering	Impact statement
Context to NICE guideline NG6		
<p>Minimum indoor temperature</p> <p>The cold weather plan for England: protecting health and reducing harm from cold (Public Health England, October 2018) recommends 18°C as day and night minimum temperature for those 65 and older or anyone with pre-existing medical conditions.</p> <p>A systematic review(2) considered evidence from the UK and countries with similar climates to</p>	<p>Context – national strategy</p> <p>The surveillance review identified the following document published since the development of NICE guideline NG6:</p> <p>Cutting the cost of keeping warm: a fuel poverty strategy for England (Department of Energy and Climate Change, March 2015). This fuel poverty strategy brings together work done in recent years with a new partnership approach and a new set of</p>	<p>Minimum indoor temperature</p> <p>The Committee that developed the guideline was aware of World Health Organization 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</p>

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<p>establish minimum indoor temperature thresholds for English homes in winter. Evidence from 20 studies of mixed types indicated that minimum indoor temperatures in winter of 18°C should be recommended for all, which would reduce risk to health when wearing suitable clothing.</p> <p>Vulnerable groups & effects of cold or fuel poverty</p> <p>We identified 3 UK studies that aimed to identify populations vulnerable to the consequences of cold temperatures and poorly heated or expensive to heat homes, and to identify the factors that contribute to vulnerability and how these factors interact.</p> <p>An analysis(3) of the Scottish chronic obstructive pulmonary disease (COPD) hospital admissions, 2001-2010, sought to establish whether the relationship between temperature and admission differs with deprivation. The authors identify that winter and socioeconomic deprivation factors together increase the rate of COPD admissions more among deprived people than among affluent people in winter than in the summer months.</p> <p>An analysis(4) of 2 prospective studies (the British Regional Heart Study and the PROSPER trial) sought to investigate effects cold spells on cardiovascular disease (CVD) and any modifying factors. CVD risks were higher in both studies in</p>	<p>policies to build on that programme. The strategies are complementary to NICE guideline NG6, for example, it aims to improve energy efficiency, identifying households and using local data.</p> <p>A topic expert identified the following report as relevant to the surveillance review: Committee on fuel poverty: third annual report (2018). This third annual report monitors government progress on the 2015 fuel poverty strategy (see above). The report indicates that overall progress is stalling, with a mixed performance across each of the 3 main measures.</p> <p>Content identified by NICE</p> <p>During intelligence gathering we identified the following report: Health risks of cold homes : data sources to support local services tackling health risks of cold homes (Public Health England January 2019). This report cites NICE guideline NG6 and quality standard QS117. It is a related implementation tool that may support local practitioners and could support recommendation 4.</p> <p>We identified the annual fuel poverty statistics report: 2018 (Department for Business Energy & Industrial Strategy 2018). The report highlights the proportion of households in England in fuel poverty was estimated to have increased by 0.1 percentage points from 2015 to 11.1 per cent in 2016 (approximately 2.55 million households). The</p>	<p>'comfort zone' for many people in the European Union appears to be around 21°C.</p> <p>A minimum indoor temperature threshold was beyond the remit of the guideline but the guideline and analysis that support it are informed by thresholds outlined by the cold weather plan for England: protecting health and reducing harm from cold.</p> <p>The recent study on minimum indoor temperature thresholds for English homes in winter provides evidence to support minimum indoor temperatures in winter of 18°C.</p> <p>Recorded EWD</p> <p>The most recent ONS report for England and Wales (2017/8) highlights a significant increase in EWD. This is in a context of funding constraints which have persisted over recent years, with experts pointing to a negative impact of time-limited funding of projects intended to reduce EWD. Evidence from the annual fuel poverty statistics report: 2018 also indicates that fuel poverty is increasing, leading to further challenges in this context.</p> <p>Implementation issues</p> <p>Topic experts commented on the challenges for local implementation of this guideline. There were 3 key issues of note: budgetary constraints, lack of</p>

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<p>winter months, although the higher risk of fatal or non-fatal events during cold spell was only statistically significant in the British Regional Heart Study. From that study there was an increased risk for ever-smoker and moderate/heavy drinkers and during winter.</p> <p>A time series regression analysis of English hospital admission data(5) assessed the relationships between wintertime weather and mortality or morbidity. The study identified that very elderly and people with COPD were most at risk from low temperatures.</p>	<p>report provides some context to NICE guideline NG6, although the current guideline does not cover national policy or fuel poverty payments per se.</p> <p>General comments received from experts</p> <p>Recorded excess winter deaths</p> <p>One expert highlighted that the 5 year moving average for excess winter deaths (EWD) in England and Wales has been increasing slowly but steadily – from 27,200 in 2008/09 to 34,300 in 2015/16. We note that the recent data from the Office for National Statistics (ONS) indicates a further increase to 50,100 EWDs for 2017/18, which is the highest recorded rate since winter 1975/76 (Excess winter mortality in England and Wales: 2017 to 2018 (provisional) and 2016 to 2017 (final)).</p> <p>Implementation issues</p> <p>Concerns were expressed by 2 experts that uptake of the recommendations is variable. Where they have been adopted, this activity has often not been sustained as the funding has only been available on a short-term basis. Overall, 3 experts identified that some professional communities were not aware of the guideline and there was a need for greater promotion and dissemination.</p> <p>Conversely, an expert noted that there are examples of good practice, usually where there is</p>	<p>local support for reducing EWD (and related implementation issues) and uncertainty about roles and responsibilities of people who work in the area. These challenges were acknowledged by the Committee at the time of guideline development.</p> <p>Local commissioners and health and wellbeing boards have a responsibility to publicise and promote the activities in the guideline – the success of the recommendations in the guideline will depend on local support structures. They should also consider, adapt and implement the recommendations in the context of local workforce structures and arrangements. The guideline does recommend who should take action for each area of activity, which should help clarify how local planning could be co-ordinated around workforce responsibilities.</p> <p>In addition, the guideline does recommend training for health and social care practitioners, housing professionals and heating/building engineers to help address implementation barriers. It also recommends targeting people whose health might benefit the most – to help manage the potential workload and prioritise certain groups.</p> <p>It is acknowledged that recommendations across the guideline will be interpreted in a context of budgetary constraints and that will have an impact on implementation. However, no data are available on the uptake or implementation of NICE guideline</p>

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	<p>local, proactive leadership. In these circumstances the guideline was reported to have a notable benefit.</p> <p>Furthermore, 2 experts mentioned that there is uncertainty about roles and responsibilities for implementing the recommendations, as these are often shared, with the consequence being that no one takes a lead and implementation is overlooked. It was noted that housing associations and primary care professionals are engaged at a sub-optimal level. Relating to these comments it was suggested that clarification of roles and responsibilities was needed in the guideline.</p> <p>Vulnerable groups</p> <p>A number of experts acknowledged the importance of supporting vulnerable groups who are at risk of the adverse effects of cold; examples provided included households with young children, older people, people with disabilities and people with mental health conditions (citing dementia and Alzheimer's disease).</p> <p>One expert identified that males under 65 had the greatest relative increase in EWDs, based on ONS data (winter 2017/18).</p> <p>One expert emphasised that homeless people are vulnerable, but not identified in the guideline.</p> <p>One expert also highlighted that people, in particular families with young children, living in the</p>	<p>PH50 to clarify implementation and uptake and the impact on the guideline.</p> <p>It should be acknowledged there are pockets of good practice, as mentioned by experts, and NICE has received case studies of how NICE guideline NG6 has been used in practice (see shared learning resources).</p> <p>To support implementation we propose to link to the following report Health risks of cold homes : data sources to support local services tackling health risks of cold homes (Public Health England, January 2019) from 'tools and resources' tab of the current guideline. It is a related implementation tool that may help local practitioners and could support recommendation 4.</p> <p>NICE is also developing a quick guide for the guideline which will support home care staff implement the recommendations. Publication is expected in November 2019.</p> <p>We will also consider links to relevant PHE support and implementation tools as they become available.</p> <p>Vulnerable groups</p> <p>The groups that were mentioned by experts during the current surveillance review are identified as vulnerable groups in the guideline. The Committee that developed the guideline noted that some groups are more vulnerable to the adverse effects</p>

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	<p>private rental sector and not receiving benefits have been identified by the Committee on Fuel Poverty as ‘underserved’ but still at significant risk of cold homes – with many families having to choose between ‘heat or eat’ [to use their limited money for food or heating their home].</p>	<p>of cold. 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.</p> <p>The Committee also noted that information about vulnerable 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.</p> <p>Two groups that were noted by the experts, but not identified as vulnerable groups in the guideline, are men under 65 and homeless people – in part, based on recent ONS data. There may be some cross-over in these populations. Furthermore, men under 65 may be covered in the vulnerable population identified in the guideline as ‘people on a low-income’ or ‘people with disabilities’. Given that men under 65 had a large and significant percentage point increase in excess winter mortality in the most recent data for 2017/18, we will check at future surveillance reviews if this trend is sustained, but at present there is no reason to change the recommendations. Overall, women are most affected by excess winter mortality.</p>

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		<p>The Committee discussed the fact that cold weather adversely affects homeless people. However, to address their needs a different evidence base would be required. So NICE guideline NG6 does not include recommendations aimed at people who are homeless.</p> <p>Vulnerable groups & effects of cold or fuel poverty</p> <p>The 3 UK studies that aimed to identify populations vulnerable to the consequences of cold temperatures provided support for the vulnerable groups identified in the guideline; the studies identified older people, people with COPD (and social deprivation) and older people with CVD were at greater risk of morbidity and mortality during winter time.</p> <p>New evidence is unlikely to change guideline recommendations.</p>
<p>Recommendation 1 Develop a strategy</p>		
<p>No relevant evidence was identified.</p>	<p>No topic expert feedback was relevant to this section.</p>	<p>No new evidence identified to change the recommendation.</p>

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<p>Recommendation 2 Ensure there is a single-point-of-contact health and housing referral service for people living in cold homes</p>		
<p>No relevant evidence was identified.</p>	<p>No topic expert feedback was relevant to this section.</p>	<p>No new evidence identified to change the recommendation.</p>
<p>Recommendation 3 Provide tailored solutions via the single-point-of-contact health and housing referral service for people living in cold homes</p>		
<p>Housing insulation and heating improvement programmes</p> <ul style="list-style-type: none"> A quasi-experimental cohort study in New Zealand(6) considered the effect of insulation and heating retrofits on cardiovascular and respiratory-related mortality in people 65 years and over with prior respiratory (n=1561) or circulatory (n=3287) hospitalisations. The intervention group was compared with control residents living in similar properties and locations. The hazard rate observed for cardiovascular group indicates a statistically significant beneficial effect for the sub-cohort who received the insulation intervention. There was evidence of a protective effect of the insulation intervention for the respiratory sub- 	<p>During intelligence gathering for this review we identified the cold weather plan for England: protecting health and reducing harm from cold (Public Health England, October 2018), a framework intended to protect the population from harm to health from cold weather. It aims to prevent the major avoidable effects on health during periods of cold weather in England by alerting people to the negative health effects of cold weather and enabling them to prepare and respond appropriately. It recommends a series of steps to reduce the risks to health from cold weather. The 2014 version of the report is linked from NICE guideline NG6, recommendation 3. The guideline will be updated to cross-reference this updated report. See editorial amendments.</p>	<p>Housing insulation and heating improvement programmes</p> <p>At the time the guideline was developed there was very limited UK evidence on how to prevent cold-related deaths. The available evidence was limited to housing and specifically the energy efficiency upgrade and mostly related to housing. The evidence identified during this surveillance review is also limited but includes new evidence from UK studies. There is mixed evidence for housing insulation and heating improvement programmes to reduce cold-related morbidity and mortality. The mixed evidence on health benefits and improving the indoor environment casts some doubt on the value of investments. However, in some examples the study authors acknowledge</p>

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<p>cohort, although it was not statistically significant. There was no evidence of additional benefit from the heating retrofit.</p> <ul style="list-style-type: none"> An NIHR funded mixed methods study(1) considered the impact of home energy efficiency (HEE) interventions. The gains in indoor temperatures of HEE in England 2002-10 were estimated to be a 'modest' +0.09°C on days of maximum outdoor temperature of 5°C; this relates to an estimated annual reduction of 280 cold-related deaths. An NIHR funded mixed methods study(7) considered energy performance interventions in low-income areas in Wales. Controlled multilevel interrupted time series analyses and economic evaluation were conducted to estimate changes in internal hydrothermal conditions following the intervention. The study found no impact of energy performance investments for physical health, although there were improvements in subjective wellbeing; it was noted that energy use was reduced in the low-income areas, thereby having a benefit to broader living conditions. The economic evaluation found no impact on cost saving, due to non-significant changes in emergency admissions for cardio-respiratory conditions. 	<p>Housing insulation and heating improvement programmes and grants</p> <p>An expert identified an evaluation report of a home energy improvement scheme: Warm Homes Oldham evaluation: final report (Sheffield, Sheffield Hallam University 2016). A mixed methods study of the Warm Homes Oldham scheme evaluated home energy improvements and advice to people at risk of fuel poverty (across 176 homes). A pre- and post-questionnaire survey (n=427) indicated statistically significant improvements in fuel poverty status, self-reported health and general wellbeing.</p> <p>The economic analysis found total QALY gain was 26.4 years and significant potential monetary benefits to individuals when considering extension to life and improvements to general wellbeing, from an investment of £250,000 per year. In addition, modelling provided an estimate for the fiscal benefits of improvements to general wellbeing, which included a saving of £45,000 per year in direct costs to the NHS.</p>	<p>that a wider range of benefits are available from these interventions, such as reduced fuel bills and carbon emissions and improved subjective wellbeing, which would be beneficial to the vulnerable populations that might be targeted. Overall, the evidence for home improvements remains limited. With an increasing emphasis on energy efficiency and reducing carbon emissions the interventions are likely to gain greater significance from an environmental perspective, despite some uncertainty about direct health benefits. Economic analysis that supported the guideline acknowledged that HEE interventions are energy saving and the associated energy cost savings in part offset the capital investment.</p> <p>Other studies</p> <p>The 2 studies that covered support with managing energy and providing thermal clothing were limited and do not offer any firm conclusions that would impact the guideline.</p> <p>The single study that looked at WFP provides context information to supporting people to claim available benefits that are due. Although the study did not identify any health benefit from claiming the payment, this is insufficient evidence to change the recommendation.</p>

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<ul style="list-style-type: none"> ● A time-stratified case-crossover analysis(8) looked at the impact of energy efficiency façade retrofitting on cold-related mortality in Barcelona from 1986 to 2012. There were differentiated intervention effect; notably, in women, the interventions could act as a protective factor and cold-death association was reduced significantly when analysing only deaths from neoplasms, circulatory system and respiratory system causes together; whereas, in men the intervention was a risk factor. <p>Advice on managing energy effectively in the home</p> <ul style="list-style-type: none"> ● An open label RCT(9) considered the effects providing instruction in home heating to increase indoor temperatures and decrease ambulatory BP among elderly people (n= 359, mean age 71.6). The intervention included information on setting the temperature 1 hour before rising time to 24°C and remaining in the living room for at least 2 hours. Control conditions was not reported in the abstract, but included housing insulation. The intervention significantly increased room temperature by 2°C and significantly decreased SBP and DBP by 4.43/2.33 mmHg, after adjusting for confounding factors. 		<p>New evidence is unlikely to change guideline recommendations.</p>

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<p>Help to ensure all due benefits are being claimed</p> <p>The following study is not in the remit of the current guideline as it is about a national payment scheme. However, we have included the study as winter fuel payments are a common benefit that may be claimed in England, and therefore relate to the context of the recommendations about claiming due benefits.</p> <ul style="list-style-type: none"> • An NIHR funded analysis(10) of the English Longitudinal Study of Ageing (ELSA) data was performed to establish whether receiving the Winter Fuel Payment (WFP) is associated with raised household temperature levels and improved health. No evidence was found that the WFP was associated with differences in either household temperature or the health of qualifying compared with non-qualifying households. <p>Providing thermal clothes</p> <ul style="list-style-type: none"> • An RCT(11) studied the impact on morbidity or providing thermal clothing (socks, top and hat) compared with usual care during winter (Brisbane, Australia) to patients with heart failure aged 50 years or over (n=91). While most (85%) participants reported using the thermal gear, the authors report that both groups did not wear sufficient clothing and 		

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<p>regularly experienced indoor temperatures below 18°C. There was no statistically significant difference between the groups in the mean number of days in hospital during winter.</p>		
<p><u>Recommendation 4</u> Identify people at risk of ill health from living in a cold home</p>		
<ul style="list-style-type: none"> ● A case-crossover analysis(12) was conducted using patient data for people who were aged over 65 and died between April 2012 and March 2014 (n=34,777) to investigate whether sociodemographic characteristics, clinical factors, and house energy efficiency characteristics could predict cold-related mortality. The authors set out to examine whether GPs could use data to identify patients most at risk of death from living in cold homes. The analysis estimated whether death was associated with temperature and interactions with personal or household characteristics. Although lower 3-day temperatures were associated with higher risk of death no modifying factors were observed, indicating that routinely available data does not enable health professionals to identify older people at risk of death. 	<p>No topic expert feedback was relevant to this section.</p>	<p>The new evidence suggests that the use of local available data may not support identification of older patients at risk of death from living in cold homes or because of winter weather. The recommendation does not specify the use of data in this way, although it is useful to note the challenges of identifying which people are most at risk. In contrast, the second study indicated that a self-report questionnaire identifying 4 'measures of cold homes' during winter could be used to identify men at risk of winter mortality.</p> <p>The limited evidence suggests that further research is needed before considering any changes to the recommendation on identifying people at risk of ill health from living in cold homes. There is a related recommendation for research in the guideline which covers the following questions: 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</p>

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<ul style="list-style-type: none"> A prospective analysis(13) of men aged 74-95 (n=1402) in the UK that reported difficulties in keeping warm in winter sought to establish those at risk of dying (after 2.1 years) and its relations to 4 self-reported measures of cold homes. Manual social class, difficulties making ends meet and not being married were associated with the 4 measures of cold homes. Of the study group 126 men died, with those reporting 3 measures of cold homes having significantly increased mortality. 		<p>social care provider? (see section research recommendation 5 below).</p> <p>No new evidence identified to change the recommendation.</p>
<p>Recommendation 5 Make every contact count by assessing the heating needs of people who use primary health and home care services</p>		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<p>Recommendation 6 Non-health and social care workers who visit people at home should assess their heating needs</p>		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.

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<u>Recommendation 7</u> Discharge vulnerable people from health or social care settings to a warm home		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<u>Recommendation 8</u> Train health and social care practitioners to help people whose homes may be too cold		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<u>Recommendation 9</u> Train housing professionals and faith and voluntary sector workers to help people whose homes may be too cold for their health and wellbeing		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<u>Recommendation 10</u> Train heating engineers, meter installers and those providing building insulation to help vulnerable people at home		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.

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<p>Recommendation 11 Raise awareness among practitioners and the public about how to keep warm at home</p>		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<p>Recommendation 12 Ensure buildings meet ventilation and other building and trading standards</p>		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<p>Research recommendation 1</p> <p>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.</p>		
Evidence from the UK was found that relates to this question and is outlined in the section above on ‘vulnerable groups & effects of cold or fuel poverty’ .	No topic expert feedback was relevant to this section.	New UK evidence relating to this question supports current guideline sections on vulnerable groups.

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<p>Research recommendation 2</p> <p>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.</p>		
<p>Under the current surveillance review we did not search for evidence to address this question.</p>	<p>No topic expert feedback was relevant to this section.</p>	<p>No new evidence identified to change the recommendation.</p>
<p>Research recommendation 3</p> <p>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.</p>		
<p>Evidence from OECD countries was found that relates to this question and is outlined in the section that discusses recommendation 3.</p>	<p>Topic experts provided evidence from the UK that relates to this question and is outlined in the section that discusses recommendation 3.</p>	<p>No new evidence identified to change the recommendation.</p>

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<p>Research recommendation 4</p> <p>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?</p>		
No relevant evidence was identified.	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.
<p>Research recommendation 5</p> <p>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?</p>		
Evidence from the UK was found that relates to this question and is outlined in the section that discusses recommendation 4 .	No topic expert feedback was relevant to this section.	No new evidence identified to change the recommendation.

Editorial amendments

Recommendation 3 refers to PHE’s Cold weather plan for England 2014. The link will be amended to refer to the current version: [Cold weather plan for England 2018](#).

We propose to add a cross-reference from recommendation 5 to NICE guideline [flu vaccination: increasing uptake](#) (NG103) for further information about who is eligible for the free flu vaccination and increasing uptake among eligible groups in primary and secondary care.

We propose to link to the implementation support resource, [Health risks of cold homes : data sources to support local services tackling health risks of cold homes](#) (Public Health England, January 2019), from [‘tools and resources’](#) tab of the current guideline.

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