NHS Bolton

Assessment of the Impact on Health and Health Costs due to Fuel Poverty in Bolton

Author: Alfred V Barker. B.A., M.Sc., D.M.S. PG.Dip.

August 2011

Introduction

The links between fuel poverty and poor health have been well documented. The documentation relates to health issues mostly structured around Excess Winter Mortality. This report deals with all the major impacts on health and health costs involving mortality and morbidity including mental health and wellbeing. As such this report, although drawing significantly on the established Health Impact Assessment template also applies new areas of assessment for the health costs linked to fuel poverty.

The major purpose of this report was to highlight the levels of morbidity, as well as mortality, attached to fuel poverty and to be able to estimate, bearing in mind the data available and the limits of the method of estimation, a health cost of these levels.

For the purpose of this report the author has used the most up to date available data, which, for Bolton, shows that in 2008-09, there were 23,500 people in Fuel Poverty and there was a total of 210 excess winter deaths.

It should be recognised that for some of the data it has been necessary to use best possible estimations, from the data available, throughout this report in order to achieve conclusions and recommendations.

Key Words: Fuel Poverty, Health Impact Assessment

Acknowledgments

With thanks to all those who have been involved in the various steering groups and all those who have helped to make this report possible especially:
Katie Bretherton - Affordable warmth Project Worker, NHS Bolton
Leesa Hellings - Health Development Specialist, NHS Bolton
Jayne Wood - Health Improvement Specialist, NHS Bolton
Shan Wilkinson - Public Health Researcher, NHS Bolton
Mark Cook - Public Health Intelligence, NHS Bolton
Neil Bendel - Head of Health Intelligence, Public Health Manchester

Organisation Acknowledgements

Bolton Council
Bolton at Home
Scottish Power Ltd. who provided the funding for the Affordable Warmth Project Worker

Health Impact and Fuel Poverty in Bolton

NHS Bolton identified, from a literature review (Barker 2011) that Fuel Poverty (FP) interventions had a significant effect on physical health and mental health and wellbeing outcomes and also the health costs linked to these issues, and that by carrying out an impact assessment of health and health costs would both evaluate and provide an evidence base for these effects.

Traditionally issues arising around fuel poverty have sat within the housing departments of the Local Authority with remits related to, raising awareness about FP among local services providers and the general population, installation of energy efficient home improvements through national and local grants, and welfare benefits checks.

Bolton has been at the forefront in partnership working with key agencies through its Affordable Warmth Steering Group (AWSG) and the development of the Affordable Warmth Strategy (Bolton's Affordable Warmth Delivery Plan 2009) The AWSG have conventionally measured the success and impact of its programmes through standard monitoring data such as number of energy efficient home improvements installed, value of grants obtained, number of people receiving welfare benefits advice and Excess Winter Deaths (EWD). The group felt that these indicators and limited monitoring does not take into account the added value of the programmes and does not reflect the real health impact including morbidity and well-being of people Bolton living in FP. In particular the measurement of EWD may have limitations, for instance not taking into account seasonal fluctuations or any differences in a population such as by age, or any growth in population over time.

After reviewing the above, NHS Bolton introduced the concept of Health Impact Assessment (HIA) to the AWSG and a decision was made to conduct a modified Assessment based on the HIA template, to establish the actual health impact of FP, looking at both mortality and morbidity. It was also decided to stretch the impact assessment to include mental health and well-being and also to look at adapting the assessment to estimate the health costs of FP to NHS Bolton.

The results from these assessments, with respect to FP, would then shift the focus from the main traditional source of data such as EWD to more consistent and extensive data, such as excess winter admissions and morbidity related to these, combined with Quality Adjusted Life Years (QALY's).This would provide a view reflecting the wider impact of FP on both physical health and mental well-being. The HIA will help to inform further development of the

programmes with improved targeting of resources whilst demonstrating the wider impact of fuel poverty on health and well-being.

Health Impact Assessment

Health Impact Assessment (HIA) assesses the positive and negative effects of a project, programme, or policy on health, and on health inequalities through the distribution of those effects (Scott-Samuel. A. 1996. WHO 1999).

HIA is intended to help make decisions by predicting the health consequence if a proposal is implemented. In addition to assessing the health consequences it also produces recommendation as to how the good consequences for health could be enhanced and how the bad consequences could be avoided or minimised. It aims to predict not only the overall consequences for a population but also the distribution of health impacts in that population, which groups benefit and which groups lose or at least benefit less. HIA may be used to assess policies, programmes or projects. Those undertaking the HIA should always carefully consider the requirements and the concerns of the decision makers, whom they intend to inform.

The principles and methods of HIA can be used to assess health consequences as part of another impact assessment (such as Environmental Impact Assessment) or in conjunction with a Mental Health and Wellbeing Impact Assessment (MWIA) (Cooke, A., Friedli, L.2011). Whether the health consequences of an intervention or proposal are assessed with an HIA or as part of some other assessment is not the critical issue. The important criterion is that they are thoroughly assessed. HIA uses both a biomedical and social definition of health, referred to as the Social Determinants of Health (see below), recognising that though death, illness and disease (mortality and morbidity) are useful ways of measuring health they need to be fitted within a broader understanding of health and wellbeing to be fully of value.

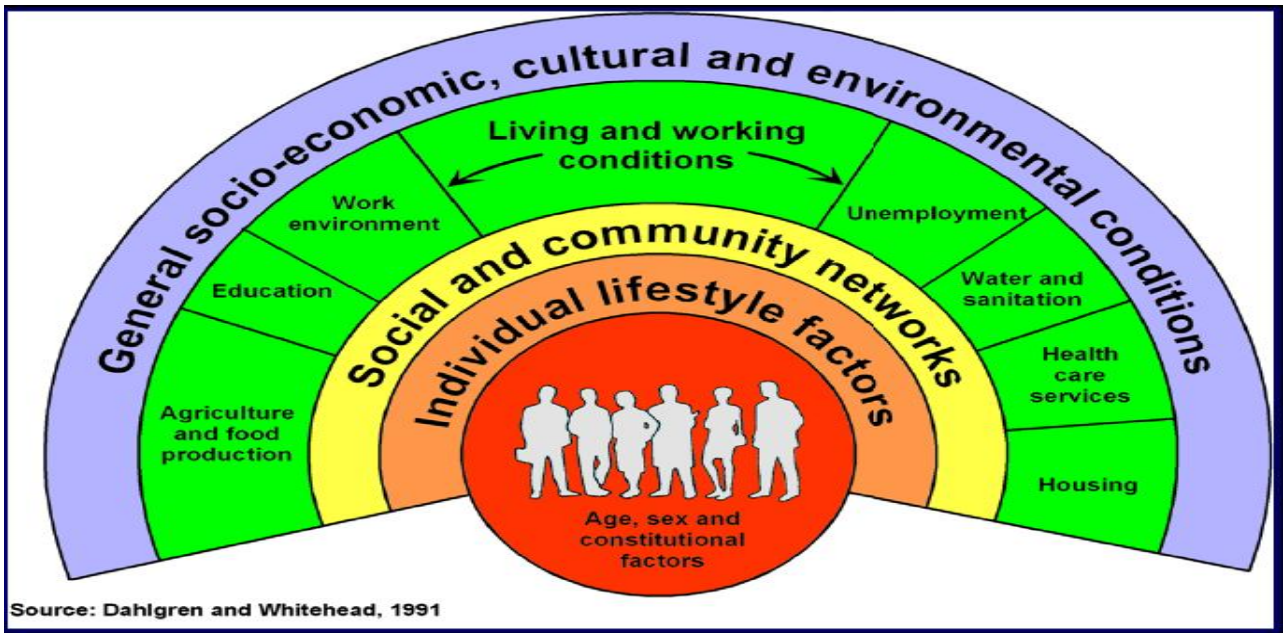
Health Inequalities and Determinants of Health

There is increasing recognition that many contemporary health issues are profoundly influenced by factors outside the traditional realm of health and health care. These factors are referred to as the determinants of health (Dahlgren G, Whitehead M. 2007).Factors such as literacy, poverty, employment, housing and racism contribute to disparities in life expectancy as well as to health-related quality of life. There is increasing pressure to tackle the wider social determinants of health, through the implementation of appropriate interventions. However, turning these demands for better evidence about interventions

around the social determinants of health into action requires identifying what we already know and highlighting areas for further development. (Bambra C, Gibson M, Sowden A 2009).

In order to evaluate and monitor interventions, HIAs will relate to the widely cited Dahlgren and Whitehead 'rainbow' model of the main determinants of health (Figure 1), as a framework to help to identify the range of social determinants of health upon which the intervention could be based.

Figure 1: Dahlgren and Whitehead's Model of the social determinants of health



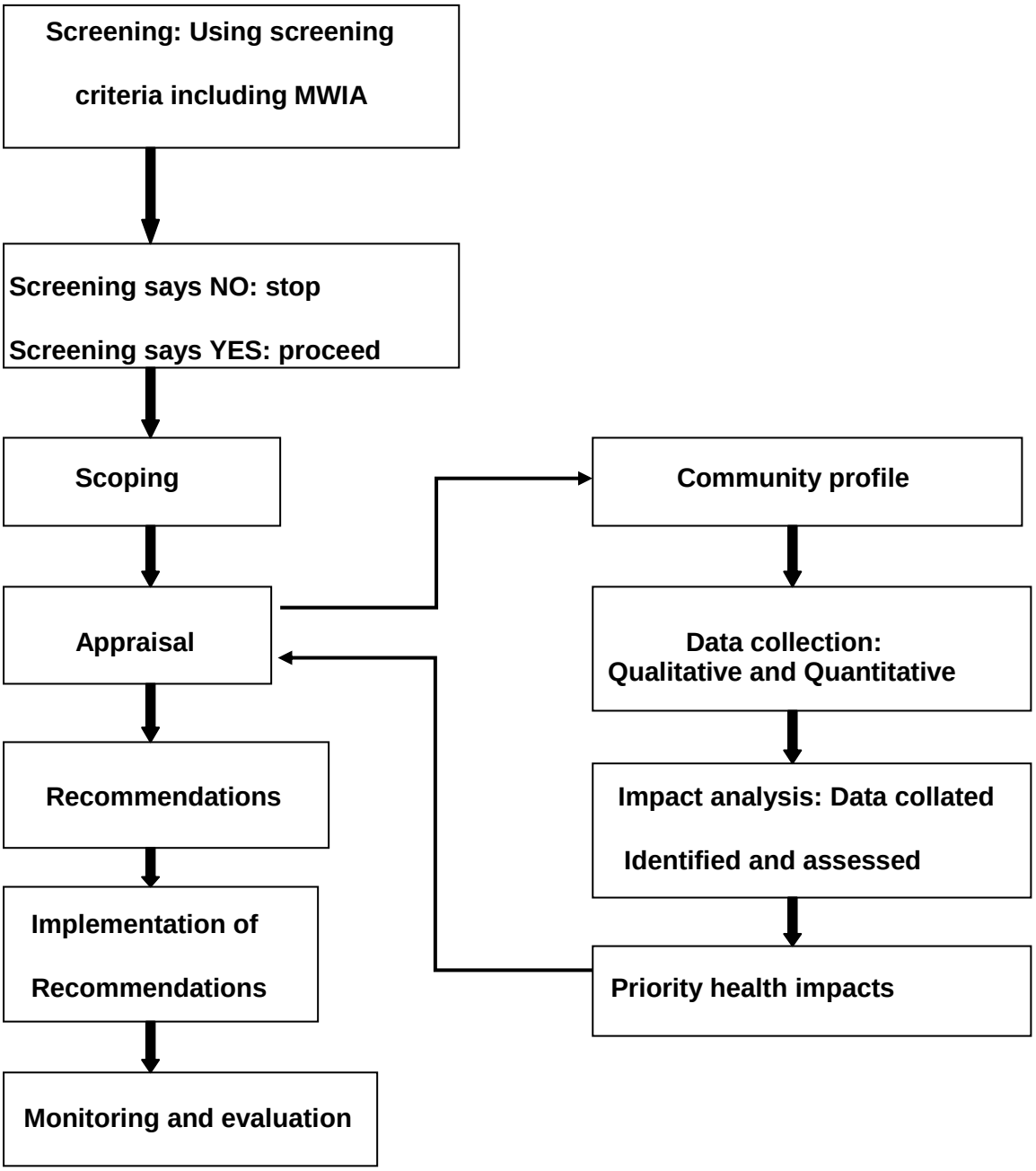
Why do HIA

There are very few interventions policies or actions, which do not affect health in some way. Non-health sector proposals, where health is not the primary objective frequently have major implications for the health and well being of people. Often these health consequences will not be anticipated unless an HIA is undertaken. Decision making at policy, programme or project level is about trade offs. Decision makers have to try to achieve best outcomes in numerous areas including financial, political and popularity as well as health and frequently have to trade off gain in one area against gain in another. HIA helps them to appreciate the health gains and losses with different options. HIA can also contribute to health equity by identifying the different groups within the population who will experience health gains and

losses under each proposal so that decision makers can see how the proposals affect health inequality and so choose the most equitable.

The HIA process consists of a series of steps which are described here as discrete stages (Figure 2). However experience shows that the different stages can overlap with each other, for example, screening and scoping are sometimes carried out as one exercise.

Figure 2.The HIA process



Screening

A screening process quickly and systematically establishes:

• Whether a particular policy, programme or project has an impact on health.

• How a policy may affect the health of the vulnerable sections of the population.

• It is likely that there will be a significant impact on mental health and wellbeing

• The likely direction and scale of the health impacts - are they negligible, serious or speculative.

• Whether the effects are short term or long term and whether effects are direct or indirect.

• If there is a need for a more detailed assessment.

•If there is a need for a Mental Health and Wellbeing Assessment.

• If HIA is the best way to effectively address health and equity issues.

Screening should be kept as simple as possible. Even if the decision is not to do a HIA, screening will be beneficial because it can raise awareness of health impacts among decision-makers and prompt them to consider these in the future.

Screening and Scoping

The proposal for this reports Impact Assessment was titled, ‘Assessment of the Impact on Health and Health Costs due to Fuel Poverty in Bolton’ The framework for the Assessment was mortality, morbidity and health costs related to fuel poverty.

For the purpose of screening, to determine if an HIA would be appropriate for this proposal, a small steering group was set up, consisting of the facilitator, Affordable Warmth Strategy Manager, Affordable Warmth Project Worker and the Health Improvement Specialist Mental Health and Wellbeing. The screening was done as a desk top exercise, by the steering group, which examined the above screening criteria in order to determine whether to proceed with a HIA: the outcome is shown below.

Screening Outcome for Fuel Poverty

Tick the appropriate outcome

Overall, health impacts are unlikely or relatively minor and easy to address		Comment on the impacts in any report. Do not proceed with HIA	
Overall health impacts are likely to be substantial or difficult to ascertain	√	Proceed with HIA	Rapid HIA
It is likely that there will be a significant impact on mental health and wellbeing	√	Integrate HIA with MWIA	MWIA Workshop

From this screening exercise it was agreed to carry out both a Rapid HIA and a MWIA, as FP was identified as having a significant effect on mental health and wellbeing, and to integrate the results of both assessments.

Health Impacts of Lowering Fuel Poverty Risk

Past studies involving fuel poverty with relation to Housing and Health tended to concentrate more on the housing conditions and their relationship to mortality (excess winter deaths).

However more recent studies have shown that being unable to afford a warm home (or fuel poverty) is now a well-established human health risk (WHO, 2007).

Mortality statistics do not reflect the considerable public health burden attached to cold-related morbidity (disease), including primary care, prescription use, long-term care needs, and pressures on hospital beds.

At least 30 peer-reviewed publications on the health impacts of fuel poverty in the UK have emerged in the last 2 years. They contribute to a large-scale body of scientific evidence that a lack of affordable warmth is a primary contributor to morbidity and consequently health inequalities (Liddell, 2009).

Although there is little published information about the cost to the NHS of this increased morbidity, limited studies have shown that extrapolated approximations of cost are possible

The Department of Health December 2009 fact sheet estimated that for the North West, the annual cost to the NHS of excess cold in homes is £117,376,200.

Overall, the building Research Establishment has calculated that poor housing costs the NHS at least £600 million per year (Nicol, S. et al. 2010).

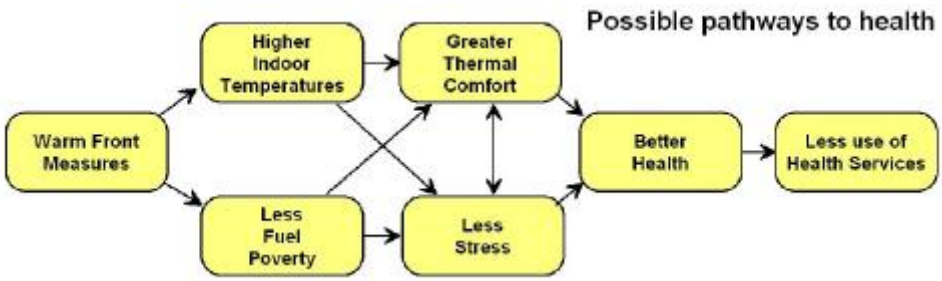
For many years, the health impacts of fuel poverty were thought to be largely confined to vulnerable groups particularly senior citizens. However, it is becoming increasingly clear that the health impacts of fuel poverty extend throughout a persons lifespan, from effects on newborns (Frank et al., 2006) through to effects on people in their last months of life (Morris, 2007) and is not necessarily confined to any particular vulnerable group.

These health impacts influence both mortality rates (deaths) and morbidity rates (illness), and the health effects (and therefore health costs) are also equally apparent in both mental and physical domains (Green & Gilbertson, 2008), incurring a double burden.

Behind the figures for mortality, there is also a morbidity toll. A life in fuel poverty not only damages health, but also adds to financial hardship and reduces the quality of life for people. It puts additional pressures on health professionals, NHS waiting lists and hospital beds, with significant pressure falling on primary care and emergency care after cold snaps that could be avoided by preventative measures to improve the quality of people's homes and correspondingly their quality of life.

A study of the health of people, before and after receiving insulation and heating measures under the Government's Warm Front scheme (Warm Front Study Group 2008), showed some important relationships between improving the affordable warmth of households and individual householder's health: Figure 3 illustrates the pathways to health following Warm Front interventions.

Figure 3 Possible Pathways to Health following Warm Front Interventions



For this report the study looks at the direct most commonly linked, physical impacts on health, both mortality and morbidity and, through further studies, the effects, both direct and indirect of Fuel Poverty on Mental Health and Wellbeing (Barker, Wood 2011).

Mortality

For this study mortality refers to excess winter mortality due to the effects of the cold weather and being in fuel poverty.

Excess winter mortality is defined as deaths occurring in December to March minus the average of the deaths occurring in the preceding August to November and the following April to July. The excess winter mortality (EWM) index is calculated so that comparisons can be made between sexes, age groups and regions, and is calculated as the number of excess winter deaths divided by the average non-winter deaths.

There were an estimated 36,700 excess winter deaths in England and Wales in 2008/9, an increase of 49 per cent on the previous year, according to provisional estimates (Office for National Statistics.)

The causes of these excess winter deaths are usually linked to chronic health conditions, such as Cardiovascular and Respiratory disease which are exacerbated by the decrease in temperature.

For 2008-9 the total excess winter deaths for Bolton was 210 and this is the figure used in the calculations for this study.

Morbidity

Excess winter morbidity due to fuel poverty is characterised by both physical illness and impaired mental health and wellbeing. For the purposes of this study these are listed below in Table 1

Table 1

Health Morbidity Risk	**Effects**
Cardiovascular Disease	Increase in blood pressure Increase in risk of heart attack or stroke
Increased Respiratory Disease	Impairment of lung function exacerbating asthma and COPD events
Impaired Mental Health and Wellbeing	Stress, Depression and Social isolation
Physiological Changes	Allergies, Mild infections
Increased Accidents in the home	Falls

In order to quantify the effects of the harm caused by the above risks it was decided to use the Housing and Health Safety Rating System. (HHSRS) described below.

Housing and Health Safety Rating System (HHSRS)

The HHSRS (Health and Safety Rating System (England) Regulations 2005) is a new approach to evaluating the potential risks to health and safety posed by deficiencies identified in dwellings. It shifts the focus of the assessment of housing conditions from the structure of dwellings to the potential effect on health. It is this shift of focus that allows the HHSRS to be linked into the Health Impact Assessment.

The HHSRS assessment is based on the risk to the potential occupant who is a member of the age group most vulnerable to a particular housing hazard.

The hazards are classed according to severity of health outcome and range from extreme harm, which includes death, to moderate harm which still may be significant enough to warrant medical attention. These classes are shown, with examples, below:

Class I

A Class I harm is such extreme harm as is reasonably foreseeable as a result of the hazard in question, including:

Death from any cause

Class II

A Class II harm is such severe harm as is reasonably foreseeable as a result of the hazard in question, including:

(a) Cardio-respiratory disease

(b) Asthma

(c) Non-malignant respiratory diseases

Class III

A Class III harm is such serious harm as is reasonably foreseeable as a result of the hazard in question, including:

(a) Hypertension

(b) Neuropsychological and physiological impairment

(c) Impairment of Mental Health and Wellbeing

(d) Increased accidents in the home (falls, fires)

Class IV

A Class IV harm is such moderate harm as is reasonably foreseeable as a result of the hazard in question, including:

(a) Occasional severe discomfort

(b) Occasional mild pneumonia

(c) Regular serious coughs or colds

This study has apportioned the above 4 classes of harm to the various mortality and morbidity health outcomes associated with fuel poverty. The study recognises that some of the morbidity health outcomes may vary in severity and hence in classification, therefore the values ascribed to the classes are for this study only, using knowledge and data gathered by the steering group.

Table 2 shows the relationship, for this study, between Mortality and Morbidity and HHSRS class rating.

The rating for mental health and well being was decided after carrying out a Mental Health and Wellbeing Assessment (MWIA).

Table 2

Mortality	**HHSRS Class Rating**
Excess winter deaths	**1**
Morbidity	
Cardiovascular Disease	**2-4**
Increased Respiratory Disease	**2-4**
Impaired mental health and wellbeing	**3-4**
Physiological changes	**2-4**
Increased Accidents in the home	**1-4**

Impaired Mental Health and Wellbeing

Although associated with several of the health effects of fuel poverty, Mental Health and Wellbeing is not classified as a specific in the HHSRS ratings. It is more difficult to define Mental Health and Wellbeing than Physical Health and Wellbeing, as it is involves complex situations where social, cultural and individual realities interact.

However various studies (Sumby, Ford, Rodger 2009) have noted a positive improvement in the mental health of occupants post energy efficient interventions.

For example, those living in damp dwellings experienced more emotional distress (Martin et al.1987) and poorer mental health in general (Hopton and Hunt, 1996, as cited in Krieger

and Higgins, 2002) than those not living in damp conditions. Dampness and mould have been significantly associated with mental ill-health among children, whereas dampness, mould and cold indoor conditions are significantly associated with anxiety and depression (Hyndman, 1990).

Other research carried out as part of the health impact evaluation of Warm Front

(Green, Gilbertson 2008) found that many reported perceptions of improved physical health and comfort, especially of mental health and emotional well-being.

Greater warmth and comfort also enhanced emotional security, and recipients were more content and at ease in their homes'. This provides an insight into the more social and emotional impact of fuel poverty.

The health gains reported in the New Zealand Housing, Heating, Insulation and Health *study* (Howden Chapmen, et al 2007) with regard to mental health were more marked.

This might be accounted for (Liddell, Morris, 2010) by the possible joint effects of fuel poverty and ill health (especially if one is perceived to exacerbate the other).

For this report a HHSRS class had to be assigned to the health effects of Mental Health and wellbeing. In order to ascertain this class rating, as this is not a recognised standard in the HHSRS ratings, it was agreed by the steering group to carry out a Mental Health and Wellbeing Assessment (MWIA).

This was done through an additional steering group, with specialities related to fuel poverty, using the MWIA Toolkit. The results of this MWIA , added to data provided by the Bolton Health Survey (Bolton Health and Wellbeing Survey, 2010), allowed a HHSRS class to be assigned to Mental Health and Wellbeing with respect to Fuel Poverty. This is discussed briefly along with the assignment of the class rating in Appendix 1.

(Barker, Wood, 2011) explore the use of MWIA in this report more fully.

The next stage of the study was to link the health effect class ratings to Quality Adjusted Life Years (QALYs) see below, and from this to derive a cost figure, by attaching a monetary figure to the level of QALY apportioned to the class of Mortality and Morbidity arising from Fuel Poverty.

There is little published information on the cost to the NHS associated with living in cold damp houses.

Some direct evidence comes from small scale intervention studies (Bardsley, M. 2000) where extrapolated growth results show that the cost to the NHS, in 1994 prices, to be approximately £600 million.

Also as discussed earlier it has been estimated that for 2009 in the North West, the annual cost of excess cold in homes is £117,376,200.

As explained above this study uses the linkage of HHSRS rating to QALYs to achieve a cost figure, of fuel poverty for NHS Bolton.

Quality Adjusted Life Years (QALYs)

The quality-adjusted life-year (QALY) is a measure of the value of health outcomes. Since health is a function of length of life and quality of life, the QALY was developed as an attempt to combine the value of these attributes into a single index number. It is used in assessing the value for money of a health intervention

Within health and health care, the greater the preference for a particular health effect, the greater the utility associated with it. 'Utilities' of health effects are generally expressed on a numerical scale ranging from 0 to 1, in which 0 represents the 'utility' of the state "Dead" and 1 the 'utility' of a state lived in "Perfect Health"

The basic idea underlying the QALY is simple; it assumes that a year of life lived in perfect health is worth 1 QALY. (1Year of life x 1 Utility= 1QALY) and that a year of life lived in a state of less than this perfect health is worth less than 1.

Over the last two decades (Prieto, L. A Sacristán, J. 2003) QALYs have become increasingly widely used as a measure of health outcomes. The QALYs combine changes in morbidity and mortality in a single indicator and although they are easy to calculate via simple multiplication their absolute accuracy may be challenged due to the estimation of utilities associated with particular health states being a complex task.

This study accepts the complexity of accuracy of values it has ascribed to QALYS due to the above and recognises the results are estimations.

QALYs offer a rounded measure of improvement, representing physical and mental well-being as well as monetary costs to a health organisation such as the NHS. This seems appropriate given that housing improvements such as affordable warmth aim to protect human health and mental well-being. Furthermore, linking QALYs to improvements in the hazard rating of a house provides a supplementary combination of “human” and “house” which further reflects the nature of an affordable warmth programme - in other words, the model applied here is suited to the goals of this particular intervention programme.

Health Effect Monetary Values Ascribed to QALYs

The health effect monetary values ascribed to the QALYs are shown below. For the purpose of this study the monetary value of a QALY is set at the value calculated for a human life.

A range of monetary values for a QALY is currently in use across UK Government Departments, from a lower value of £ 20-30,000 per QALY based on the upper threshold used in England by the National Institute for Clinical Excellence (NICE) through a median value of £50,000 to an upper value of £80,000

Taking into account this range of values it was decided for this study to use the monetary value of £50,000 based on the views of the Department of Health.

The HHSRS has a standard formula for calculating the QALY value for each class rating of harm with:

Class 1, Death, costing 1 QALY, equivalent to £50000

Class 2, Severe harm costing 0.40 QALYs equivalent to £20000

Class 3, Serious Harm costing 0.03 QALYs equivalent to £1500

Class 4, Moderate Harm costing 0.002 QALYs equivalent £100

Mortality Results

The issue of excess winter deaths is a complicated one. There is considerable evidence that excess winter deaths are related to low indoor temperatures and poor thermal efficiency (Wilkinson et al, 2002). It is also accepted that cold weather contributes to excess winter mortality but the exact numbers attributable to the excess cold and fuel poverty is difficult to ascertain. A review by the Chief Medical Statistician (Alderson, 1985) examined the

relationship between season and mortality, and concluded that about 80% of variance in winter deaths is associated with changes in temperature. Hence for this study we have attributed 80% of the total excess winter deaths to excess cold.

The other 20% of excess winter deaths are related to factors other than cold, such as air pollution, lack of exposure to sunlight, influenza incidence and diet. (Khaw K-T, Woodhouse P. 1995) It has also been shown (Khaw K-T. 1995) that certain medical conditions are linked to excess cold, with 50% of the excess winter deaths from cardiovascular disease and 33% from respiratory disease. Further the actual percentage of cardio vascular and respiratory due to fuel poverty is 80% of the cardiovascular and respiratory excess cold deaths as shown below in Table 4, which is the most recent data, 2008-09, for excess winter deaths for NHS Bolton.

Table 4 Excess Winter Deaths in Bolton 2008-09

	Year 2008-09
Total Excess Winter Deaths for Bolton	**210**
Percentage due to excess cold (80%)	**168**
Predicted Percentage of Cardio vascular due to excess cold (50%)	**84**
Actual percentage of Cardiovascular due to excess cold (42%)	**71**
Actual percentage of Cardio vascular due to Fuel Poverty (80% of excess cold deaths)	**55**
Predicted Percentage of Respiratory due to excess cold (30%)	**50**
Actual percentage of respiratory due to excess cold (46%)	**78**
Actual percentage of respiratory due to Fuel Poverty(80% of excess cold deaths)	**62**

In the winter of 2008-09 there was an estimated 210 excess winter deaths in Bolton. As stated earlier 80% of excess winter deaths are due to excess cold giving a figure for Bolton of 173. From the Office for National Statistics public health monthly mortality files, of these 173 deaths, 71(42%) were attributed to Cardio vascular and 78 (46%) to Respiratory. These differed from the predicted figures but this can happen as different years produce different variables linked to excess cold, e.g. variation of temperature, flu epidemic, and immunisation uptake.

For this study the percentage figure for excess winter death due to fuel poverty was linked to the percentage of excess winter deaths due to FP related Cardio vascular and FP related Respiratory.

Hence the total of excess winter deaths due to fuel poverty in Bolton in the winter of 2008-09 was 117. Using the monetary value for death, when linked to QALYs as £50000, this gives a monetary figure of:

117 Excess deaths due to Fuel Poverty = 117 x £50000 = £5,850,000

This monetary figure is the cost in terms of QALYs, as discussed above, and as such is not purely a cost to the NHS. However as also stated above all these deaths are attributable to Cardiovascular and Respiratory conditions linked to fuel poverty, and hence will have a significant effect on NHS finances

Morbidity Results

Living in a cold home can increase the likelihood of ill health, including hypertension, heart disease, stroke, influenza and asthma. There is a concomitant rise in morbidity with worsening asthma and chronic obstructive pulmonary disease rates, increased blood pressure and risk of heart attack and strokes, worsening arthritis, increased accidents at home and impaired mental health. (Faculty of Public Health *Briefing Statement)*

Low indoor temperatures of people's homes are associated with increased vulnerability due to cardiovascular disease. Studies have shown that a lowering of temperature by just 1 degree can result in a rise of blood pressure of 1.3 mm Hg, increasing risk of strokes and heart attacks. Cold air also affects the normal protective function of the respiratory tract, leading to increased vulnerability to respiratory infections. Dampness in the home can increase mould growth, which can cause asthma and respiratory infections. Falls and injuries, particularly in the elderly through worsened symptoms of arthritis and decreased

dexterity, are found to increase in cold homes. Increased mental health problems are also linked to cold, damp housing (Evans GW, Wells N, Moch, A. 2004). Studies have shown that mental health improves when the heat inside a home is increased by improving insulation of the building (Howden Chapmen, et al 2007). In an extreme cold snap, people in poor housing or without adequate heating may also be at risk of hypothermia, although deaths from this are very rare in the UK.

For the purpose of this study we have used the morbidity listed in Table 2 to assign a monetary value to the corresponding conditions. The detailed calculations for these values are shown in Appendix 1.

Conclusions and Recommendations

Conclusions

The purpose of this report was to look at the outcomes, both physically, on the health of the people and economically, with respect to health costs, of fuel poverty in Bolton. We were able to extend the outcome to include Mental Health and Wellbeing due to the development and implementation of the Mental Health and Wellbeing Toolkit.

Although some of the data had to be estimated and / or extrapolated, due to the lack of detailed local data, our economic estimates, when compared to those generated by regional and national organisations, reflect an accurate estimation.

Our report shows the importance of including Mental Health and Wellbeing when dealing with issues allied to health.

The recommendations reached following the work done on the report is listed below.

Recommendations

1. Addressing fuel poverty has traditionally been a Local Authority (LA) 'owned' policy recognised by the government through National Indicator 187(NI.187) and usually driven by the housing department. The recent abandonment of this indicator and the possibility of the merger of public health functions of the PCT with L A provides an opportunity to elevate the health component of fuel poverty onto an equal footing with housing.
Fuel poverty is an important and complex issue and this study and others have highlighted the importance of health as a driver when addressing fuel poverty.

It is therefore recommended that the future fuel poverty agenda be an integrated equal partnership approach between Local Authority and the NHS.

2. Excess Winter Deaths measurement has traditionally been used to measure the extent of the effect of fuel poverty on health; however as discussed within this report, this is often not reflective in other seasonal deaths and is just the tip of the iceberg when looking at overall cost to the NHS. More recent studies have shown that the health effects of cold have a direct impact not just upon excess winter mortality, but also morbidity and hospital admissions. Cold exacerbates many common health conditions including cardiovascular and respiratory diseases, physiological conditions and leads to a deterioration in mental health and wellbeing.

The report shows that the economic costs as well as the physical costs, of morbidity are significant and have to be taken into account when measuring the effect of fuel poverty on health. Also when considering morbidity the importance of mental health and wellbeing as well as physical health, cannot be underestimated as this is also very significant.

It is therefore recommended that both Excess Winter Deaths and Excess Winter Morbidity, including mental health and wellbeing, be used to measure the effect of fuel poverty on health.

3. The current forms of data collection for measuring the effects of fuel poverty on health are mostly based on the data linked to excess winter mortality. This gives an incomplete picture of the effects both physical and economical that fuel poverty is having on health. A more robust and extensive form of data collection, particularly around morbidity and health and wellbeing needs to be adopted. This may well involve the creation of a database that could be interrogated on a regular basis.

It is therefore recommended that new methods of data collection related to fuel poverty and health be investigated and where relevant adopted.

4. The measures taken to address the issues of fuel poverty tends to revolve around the' hardware' components. i.e. the installation of energy efficient home improvements. Although these measures contribute to the alleviation of fuel poverty they will not, in isolation, remove people from fuel poverty. More attention needs to be given to the 'software'

components of behaviour change such as income maximisation, fuel debt, education and advice regarding using heating system, social tariffs. Working with schools and pupils.
It is therefore recommended that all measures linked to fuel poverty be considered in total in order to best get people out of fuel poverty.

5. Traditionally targeting has been focused on older people, i.e. the 60 plus age group, this being due to nearly 90 per cent of all excess winter deaths being of people over the age of 65, and of older people with existing health problems are more at risk. These facts however conflict with more recent studies which have identified equally vulnerable groups that would benefit from interventions.
These vulnerable groups include:

- People with conditions affected by living in cold damp homes: respiratory, cardiovascular, mobility and mental health.
- People with disabilities and Long Term Conditions.
- Families with young children.

It is therefore recommended that targeting is inclusive and proportional to the needs of all vulnerable groups.

6. The measurement of fuel poverty is under review nationally as it is felt the current definition does not reflect the extent of fuel poverty among the population.

It is therefore recommended that a more robust and exact definition comprehensively linked to measurement of fuel poverty, as opposed to overall poverty, is established. This measurement also needs to be easily recognised and understood by the general population so that they can identify if they are living in fuel poverty themselves.

Appendix 1: Calculations for Morbidity

Fuel Poverty Numbers in Bolton

Figures produced by National Energy Action show that in January 2010 (NEA, 2010) the North West Region had 594,000 (21%) households living in Fuel Poverty. This is an increase of 439,000 (16%) since 2003.

This provides a stark indication that fuel poverty remains a significant challenge for the region.

Statistics (ONS) show that in March 2009 there were 120,279 households situated in Bolton. Using the above regional figures, as an indicator, this would give the total number of households in Bolton suffering from Fuel Poverty as:

120,279 215= 25,258

Although this figure may be subject to some local error it is not thought that this will be significant, so for the purposes of this study this is the figure that is used in the calculations below.

Also for this study and the particular calculations shown below the HHSRS method of assigning and the calculating the overall risk has been used. For more details of how the figures were derived for all the hazards please see the Housing Health and Safety Rating System Operating Guidance (HHSRS 2006).

The method of linking QALYs to the calculations and hence assigning monetary values is described on Page 16.

Example of linking data to QALYs

Falls

The HHSRS calculator uses standard data to input. An example for falls on stairs is given below:

For the standard HHSRS assume a sample of 100,000 households lived in by a person aged 60 years and over. Using hospital admissions and other medical records for England the HHSRS estimates that for each year, a fall on the stairs is likely to happen in 245 of these households.

Also from hospital data HHSRS estimates that 1.9% of these falls result in Class 1 harm

(See page 13) , 6.7% result in Class 2 harm, 21.7% in class 3 harm and 69.7% in Class 4 harm.

Of the 245 people who have fallen, this means that:

5 people will suffer class 1 harm (1.9% of 245);

16 will suffer class 2 harm:

53 will suffer class 3 harm:

170 will suffer class 4 harm:

These % likelihood estimates are different for each type of morbidity health effect arising from Fuel Poverty

Applying data to QALYs

Class 1 QALY score = 5 (Class1 QALY = £50,000) = 5 x £50,000 = **£250,000**

Class 2 QALY score = 16 (Class 2 QALY = £20,000) = 16 x £20,000 = **£320,000**

Class 3 QALY score = 53 (Class 3 QALY =£1500) = 53 X £1500 = **£79,500**

Class 4 QALY score = 170 (Class 4 QALY = £100) = 170 x £100 = **£17,000**

TOTAL Health Cost of fall on stairs due to Fuel Poverty £666,500

Calculations for Bolton

By feeding the data for Bolton (See above) into the calculation for falls the results are:

Households in Fuel Poverty = 25,258. From standard calculations (above) for falls on stairs then of the 25,258 households it is likely that 103 people will fall on stairs.

Of these 103 people:

2 people will suffer class 1 harm (1.9% of 103)

7 will suffer class 2 harm:

22 will suffer class 3 harm:

72 will suffer class 4 harm

Applying this data to QALYs

Class 1 QALY score = 2 (Class1 QALY = £50,000) = 2 x £50,000 = **£100,000**

Class 2 QALY score = 7 (Class 2 QALY = £20,000) = 7 x £20,000 = **£140,000**

Class 3 QALY score = 22 (Class 3 QALY =£1500) = 22 X £1500 = **£33,000**

Class 4 QALY score = 72 (Class 4 QALY = £100) = 72 x £100 = **£7,200**

Total Health Cost (Bolton) of falls on stairs due to Fuel Poverty £280,200

Falls on level surfaces

It is estimated that 187 people will fall on level surfaces, of these:

0 people will suffer class 1 harm (sample less than 1)

26 will suffer class 2 harm

51 will suffer class 3 harm:

110 will suffer class 4 harm

Applying this data to QALYs

Class 1 QALY score = 0 (Class1 QALY = £50,000) = 0 x £50,000 = **£0**

Class 2 QALY score = 26 (Class 2 QALY = £20,000) = 26 x £20,000 = **£520,000**

Class 3 QALY score = 51 (Class 3 QALY =£1500) = 51 X £1500 = **£76,500**

Class 4 QALY score = 110 (Class 4 QALY = £100) = 110 x £100 = **£11,000**

Total Health Cost (Bolton) of falls on stairs due to Fuel Poverty = £607,500

Total Health Cost (Bolton) of falls due to Fuel Poverty = £887,500

Damp and Mould growth

The figures from the Bolton Council, Private House Condition Survey show that in 2006 approximately 5.8% of households, in the private sector, were suffering from condensation or dampness problems to varying degrees. The English house survey (English Housing Survey, 2008) reported that 8% of households had damp problems. For this report we have used a figure of 7% taking into account public sector housing in Bolton. Hence of the houses in fuel poverty in Bolton:

1 20,279 x 7% = 8,419 suffering from dampness and mould growth

From HHSRS

0 people will suffer class 1 harm (sample less than 1)

0 people will suffer class 2 harm (sample less than 1)

2 will suffer class 3 harm:

13 will suffer class 4 harm

Class 1 QALY score = 0 (Class1 QALY = £50,000) = 0 x £50,000 = **£0**

Class 2 QALY score = 0 (Class 2 QALY = £20,000) = 0 x £20,000 = **£0**

Class 3 QALY score = 2 (Class 3 QALY =£1500) = 2 X £1500 = **£3,000**

Class 4 QALY score = 13 (Class 4 QALY = £100) = 13 x £100 = **£1,300**

Total Health Cost (Bolton) of Damp and Mould growth = £4,300

Mental Health and Well being

The HHSRS concentrates on threats to health and safety within a property. It is generally not concerned with matters of mental health and wellbeing and hence does not give them a class rating, although it does recognise that these exist. However, as such matters are now known to have a considerable impact on a person's physical or mental health or safety, a Mental Health and Wellbeing impact Assessment was carried out which generated data to inform this study and from this to ascribe class ratings and QALYs as shown below. It should be emphasised that for this study this is an approximation as the method used is based on a measure of population health rather than potential treatment, which will tend to increase the financial health costs.

Also for this particular morbidity category we are looking at the proportion of 60+ persons in fuel poverty. However the study team are satisfied that the figures are a representative comparison.

From the ONS statistics there are 57,700 persons of 60+ living in Bolton.

From data generated by the Bolton Health and Wellbeing Survey 2010 we calculate that 15,400 (26.6%) of these 60+ persons are in fuel poverty which equates to approximately 6,450 households.

Using GHQ 12 from the General Health Questionnaire (Ref Bolton H &WB Survey 2010) which diagnoses possible health problems, the study found of these 15,400 persons in Bolton in fuel poverty 36.8% = 5667 will suffer some mental health and wellbeing problems. The proportion of 60+persons suffering class 3 harm, having been diagnosed with nervous trouble or depression, by a doctor was 14%. The proportion suffering class 4 harm i.e. those who are above the GHQ 12 threshold (possible mental health problems, excluding depression), was 22.8%.

Hence:

0 people will suffer class 1 harm (sample less than 1)

0 people will suffer class 2 harm

793 will suffer class 3 harm

1292 will suffer class 4 harm

Class 1 QALY score = 0 (Class1 QALY = £50,000) = 0 x £50,000 = **£0**

Class 2 QALY score = 181 (Class 2 QALY = £20,000) = 0 x £20,000 = **£0**

Class 3 QALY score = 2278 (Class 3 QALY =£1500) = 793 X £1500 = **£1,189,500**

Class 4 QALY score = 5181 (Class 4 QALY = £100) = 1292 x £100 = **£129.200**

Total Health Cost (Bolton) of Mental Health and Wellbeing Due

To Fuel Poverty = £1,318,700

Cardiovascular or Respiratory Disease

Class 1 harm for Cardiovascular and Respiratory Disease has already been dealt within the section regarding Excess Winter Mortality (Page 17). The other class harms are derived from people suffering Cardiovascular or Respiratory disease due to excess cold.

Of the 25258 households it is likely that 66 will suffer Cardiovascular or Respiratory Disease due to excess cold. Of these:

4 people will suffer class 2 harm:

12 will suffer class 3 harm:

28 will suffer class 4 harm

Class 1 QALY score = 0 (Class1 QALY = £50,000) = 0 x £50,000 = **£0**

Class 2 QALY score = 4 (Class 2 QALY = £20,000) = 4 x £20,000 = **£80,000**

Class 3 QALY score = 12 (Class 3 QALY =£1500) = 12 X £1500 = **£18,000**

Class 4 QALY score = 28 (Class 4 QALY = £100) = 28 x £100 = **£2,800**

Total Health Cost (Bolton) of excess cold = £100,800

Overall Total Health Cost (Bolton) of morbidity due to Fuel Poverty = £2,591,500

Overall Total Health Cost (Bolton) excess deaths due to Fuel Poverty = £5,850,000

Overall Total Health Cost (Bolton) of Fuel Poverty = £ 8,441,500

Alfred V Barker

NHS Bolton

alf.barker@bolton.nhs.uk

References

Alderson MR (1985). Season and Mortality. *Health Trends,* 17, 87-96.

Bambra C. Gibson M, Sowden AJ, Wright K, Whitehead M, Petticrew M. Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews. *J* Epidemiol Community Health. 2010; 64(4):284-91.

Bardsley M. Healthier homes: the role of health authorities. In: Rudge J, Nicol F (eds.) 2000.*Cutting the Cost of Cold*. London: E@FN Spon.

Barker, A. Literature Review Fuel Poverty Interventions. 2011. NHS Bolton.

Barker, A. Wood, J. 2011 Fuel Poverty and Mental Health and Wellbeing: A Mental Health and Wellbeing Impact Assessment. NHS Bolton.

Bolton Health and Wellbeing Survey, 2010. NHS Bolton.

Cooke, A., Friedli, L., Coggins, T., Edmonds, N., Michaelson, J., O'Hara, K., Snowden, L., Stansfield, J., Steuer, N., Scott-Samuel, A. (2011) Mental Health and Wellbeing Impact Assessment. 3rd ed., London: National MWIA Collaborative.

Dahlgren G and Whitehead M (1991): Policies and Strategies to Promote Social Equity in Health. Stockholm: Institute for Futures Studies.

Dahlgren, G. and M. Whitehead, European strategies for tackling social inequities in Health: Levelling up, Part 2. 2007, Copenhagen: WHO Regional Office for Europe.

English Housing Survey 2008. Department for Communities and Local Government. London SW1E 5DU.

Evans GW, Wells N, Moch A. Housing and mental health: a review of the evidence and methodological and conceptual critique. *J Soc Issues*. 2004; 59:475--500.

Frank, D. et al., (2006). Heat or Eat: The low-income energy assistance program and nutritional and health risks among children less than 3 years of age. Paediatrics, *118*, 1293-1302.

Gilbertson, J., Stevens, M., Stiell, B., Thorogood, N. (2006) 'Home is where the hearth is: Grant recipients' views of England's Home Energy Efficiency Scheme (Warm Front)' Social Science and Medicine, 63, 945-956.

Green & Gilbertson (2008). Health Impact Evaluation of the Warm Front Scheme. Centre for Regional Social and Economic Research, Sheffield Hallam University.

Hopton J, Hunt S. The health effects of improvements to housing: a longitudinal study. Housing Studies 1996, 11:271-86.

Housing Health and Safety Rating System Operating Guidance. 2006. The Office of the Deputy Prime Minister. London SW1E 5DU.

Howden-Chapman, P., Matheson, A., Crane, J., Viggers. H., Cunningham, M. & Blakely, T., et al., (2007) Effect of insulating existing houses on health inequality: cluster randomised study in the community. British Medical Journal, 334, 460-464.

Hyndman, S.J., (1990). Housing dampness and Health Amongst British Bengalis in East London. Social Science and Medicine, 1990, Vol. 30, No. 1, pp. 131-141.

Krieger, J., & Higgins, D. L. (2002). Housing and Health: Time Again for Public Health Action. American Journal of Public Health, *92*, 758-768.

Liddell, C and Morris, C, Fuel Poverty and Human Health: A Review of Recent Evidence. (2010) Energy Policy, 38. pp. 2987-2997.

Martin, C.J., Platt, S.D. and Hunt, S.M. 1987. Housing conditions and ill health. British Medical Journal, 294:1125-1127.

Morris, C. (2007). Fuel Poverty, Climate and Mortality in Northern Ireland 1980-2006. Belfast: Department for Social Development In Northern Ireland.

National Energy Action. Fuel Poverty and Health, Energy Action. 2010 Issue. 109 St Andrew's House, 90-92 Pilgrim Street, Newcastle Upon Tyne, NE1 6SG.

Nicol, S. et al. (2010). Quantifying the cost of poor housing.BRE press.

Prieto, L. A Sacristán, J. 2003 Problems and solutions in calculating quality-adjusted life years (QALYs). Health and Quality of Life Outcomes 1:80.

Private Sector House Condition Survey 2006. Bolton Council.

Scott-Samuel A. Health impact assessment. An idea whose time has come. BMJ 1996; 313:183–4.

Sumby P. Ford C. Rodger E. 2009. Alleviating Fuel Poverty in Order to Improve Health in the North East. Final Report for the Economy, Culture and Environment Regional Advisory Group of Public Health North East. National Energy Action.

WHO European Centre for Health Policy. Health impact assessment. Main concepts and suggested approach. Gothenburg Consensus Paper, December 1999. Copenhagen: WHO Regional Office for Europe, 1999.

WHO. Housing, energy and thermal comfort. A review of 10 countries within the WHO European Region. *Copenhagen:* World Health Organization Regional Office for Europe; 2007.

Wilkinson et al 'Cold Comfort: The social and environmental determinants of excess winter death in England, 1986-96' (2001).

Woodhouse PR, Khaw KT, Plummer M. 'Seasonal variation of blood pressure and its relationship to ambient temperature in an elderly population'. J Hypertens. 1993 Nov; 11(11):1267-74.