County Durham and Tees Valley NHS
Public Health Network

Cold Kills

The scale of excess winter deaths in Co Durham & Tees Valley 1993-2003

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Using routinely available data to inform health actions

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Preface

The 'leaves on the line' for Public Health?

Cold weather is killing hundreds of people every year in County Durham & Tees Valley. Older people and people who are seriously ill are at particular risk of death in winter. Many of these deaths could be delayed if more people lived in warmer dwellings and wore warmer clothing outdoors.

The autumnal flutter of leaves dropping onto railway lines has become an excuse for disruption to the national rail network. The equivalent *'leaves on the line'* for Public Health are the cold temperatures in poorly heated dwellings that cause misery; often lead to admission to hospital; and might even cause death. As with the falling leaves, we know that the temperature drops each year and yet we still fail to prepare adequately for the full, biting grip. Many countries with colder climates and a much greater temperature range, have proportionally fewer winter deaths than Britain. For all of our famously British concern with the weather, the predictable annual drop in temperature not only seems to surprise us but also challenges our capacity to respond effectively.

Frozen to death?

We all know that sitting in the cold for even a short time is not pleasant. For many people who are frail, it is thoroughly miserable. For older people and people who are ill, it affects both physical and mental health. In some circumstances, the effects of the cold weather will kill. The local estimate of excess deaths in winter for recent years has ranged between 500 and 1200 deaths. And recent winters have been less cold than for some years in the past. Being old should not mean being cold.

Blowing hot and cold?

We now know the awful truth of what happened in Paris in just a few weeks during the intense summer heat of 2003. The unusually high temperatures (35-40°C) in July and August 2003 claimed an estimated 14,000 lives. There was insufficient capacity to dispose of the dead. Naturally and properly, there was much coverage in the British press. Perhaps it was the relatively short duration of the episode (a few weeks) or the geographical concentration (large numbers in a single city) that so captured attention. But what of the relative lack of the same British press interest in the estimated 20,000 to 40,000 deaths that occur *every winter* in England? These more scattered deaths? These more frequent deaths? And somehow these strangely 'hidden' deaths? Dying from the cold seems to be such an accepted part of the British winter scene.

Of course, it's the total thermal stress on the body that matters: we're affected by the extremes of heat *and* cold. Indeed, if climate change were to lead to locally milder winters and warmer summers as predicted, then future generations might be more concerned with excess summer – rather than winter – deaths.

One bar or two?

The seasonal advertising image of the roaring fire, the crackling logs, and the glass of mulled wine close to hand is a domestic reality for some. But that's not the case for all. The estimate of the number of households in County Durham & Tees Valley that are 'fuel poor' is 45,853 (9.7% of all households). In practice this might mean the difference not between the choice of heating one room or two but the choice between using one bar or two. To those who say, *'But money is made available for fuel bills'*, we might also add *'But what if some people are so needy that they require to spend some of this money on other things?'*

On the other hand, the very good news that emerges from observing the work of local authorities is that great efforts are being made to improve household energy efficiency. More than £145 million has been invested locally since the mid-1990s. Whilst this is encouraging, it should be of concern that there are large variations in investment that cannot be explained by corresponding differences in need. Of even more concern is the observation that those local areas with the lowest investment tend to be the areas with the highest excess winter deaths. This is not proof that low investment causes excess deaths but the two are associated.

A question of latitude?

How far then could we go to make things better? We might go to Yakutsk in Siberia, sometimes described as the 'coldest city on earth' but one where excess winter mortality – in our terms – is unknown. More practically, we should look closer to home. Across the North Sea, the Scandinavian countries experience more severe winters and yet only a fraction of our seasonal mortality. We need to learn more from other countries and from the abundance of international best practice. Why don't we aim to reduce excess winter deaths in County Durham & Tees Valley to Scandinavian levels?

Time to bring excess winter deaths in from the cold?

The Public Health agenda is enjoying another renaissance. Once again, we have no better opportunity to grasp the perennial challenge to inform, educate and secure change. But we should not underestimate the size of the task of reducing excess winter deaths. We need to give more priority to education, prevention and implementation of actions to reduce deaths caused by people living in needlessly cold homes or dressing inadequately to go outdoors in winter weather.

We might still want to believe that ignorance is bliss. But we don't want to be blissfully ignorant of facts if that means hundreds of people could die every year without even leaving their house.

Mark Reilly
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November 2005

Glossary

Cavity Wall Insulation (CWI)
Material used to insulate the walls of homes with cavity wall construction.

Central Heating (CH)
A system designed to heat most or all of a house from a single source. They can be fuelled in a variety of ways including gas, oil and solid fuel.

Energy Saving Trust (EST)
An organisation that offers a range of advice, support and information to local authorities and housing providers.

Excess Winter Deaths (EWD)
This is a measure of how many more people die in the winter period compared with other times of year. In this document the Office for National Statistics (ONS) method is used. This is the number of deaths in December to March minus the average of deaths in the preceding autumn (August to November) and the following summer (April to July).

Excess Winter Deaths Index (EWDI)
The number of excess winter deaths expressed as a percentage of the average number of deaths in the preceding autumn (August-November) and following summer (April to July).

Meteorological Office (Met Office)
National body for recording and forecasting weather conditions.

Home Energy Conservation Act 1995 (HECA)
Legislation which, amongst other things, requires local authorities to monitor and report annually on investment in domestic energy efficiency measures and assess their impact.

Household (HH)
A household is defined as one person living alone, or a group of people (not necessarily related) living at the same address with common housekeeping - that is, sharing either a living room or sitting room or at least one meal a day.

International Statistical Classification of Diseases (ICD)
An internationally agreed way of classifying and coding diseases and related health problems that is used, among other things, for recording causes of death. During the period covered by this report there was a transition from using the 9th revision (ICD-9) to the 10th revision (ICD-10). Therefore underlying causes of death are grouped by ICD-9 codes in the earlier years and by ICD-10 codes in the later years.

Office for National Statistics (ONS)
ONS is the government department that provides UK official statistical and registration services. It is responsible for producing a wide range of key economic and social statistics used by policy makers across government to create evidence-based policies and monitor performance against them.

Public Health Mortality Files (PHMF)
ONS database containing information about deaths within different health authority boundaries, including age, sex, date of death and cause of death, as well as details for those people who died outside the area in which they were normally resident.

Circulatory Diseases
A group of diseases that includes heart disease and strokes.

Respiratory Diseases
A group of diseases affecting the lungs, including asthma, chronic obstructive pulmonary disease, influenza, pneumonia and emphysema.

Underlying Cause of Death
Routine mortality statistics are usually based on identifying a single cause for each death. This is the 'underlying cause of death', defined by the World Health Organisation (WHO) as "the disease or injury which initiated the train of events directly leading to death".

Fuel Poverty
Households are said to be in fuel poverty if they are spending more than 10% of income on energy (gas, electricity, solid fuel and oil). It should be noted that households can fall in and out of fuel poverty rapidly, depending on circumstances such as employment and fuel prices. This, therefore, may be considered quite a volatile indicator.

Summary

What is already known about this subject?

- Thermal stress - hot and cold - is threatening to human health and can cause excess deaths
- Those at greatest risk in the population are older people and people with chronic illnesses particularly affecting the respiratory and circulatory systems
- There are several different but related ways to measure excess winter deaths
- There are various national and local initiatives to combat the health impact of cold including efforts to improve the thermal energy efficiency of homes

What does this analysis add?

- Reports on the absolute and relative scale of excess winter deaths in County Durham and Tees Valley for the first time
- Shows that excess winter deaths for the Strategic Health Authority area are close to the national and regional values in all years but that there are considerable variations between localities
- Shows that the age-related gradient locally is consistent with national experience and that people aged over 85 years are at greatest risk
- Confirms that circulatory and respiratory deaths account for the largest proportions of the total deaths that is also consistent with other populations
- Demonstrates that the average number of daily deaths starts to increase when the minimum temperature falls below 6ºC and that on such days there are proportionally more deaths than expected
- Identifies the extent of fuel poverty and the local response to improve home energy efficiency including the spending of £149 million in recent years
- Considers the relationship between energy efficiency investment and excess deaths that shows that the areas with lower than average spend per household tend to experience the highest excess winter mortality
- Examines the evidence for best practice locally and elsewhere
- Provides locality summaries of the evidence of impact on health and the local initiatives to improve energy efficiency

What can be done to reduce excess winter deaths?

Actions to tackle the impact of cold on health can be grouped in terms of what individuals can do, what communities can do, and what the government can do.

1. What can the individual do?

Be prepared for winter

- If elderly, have a flu jab.
- Eat well. Try to have a balanced diet including hot drinks on cold days.
- Dress well indoors. Wear several thin layers of clothing rather than one thick layer. In the coldest of weather to keep warm in bed, wear additional clothing as required.
- Dress well outdoors. Several thinner layers of clothing under a coat will keep you warmer than one thick layer. Wear something on your head and hands. Wear warm socks, tights and shoes or boots.
- Be physically active. Stay as active as possible in cold weather.
- Claim all benefits to which you are entitled.

Prepare your home for winter

- Heat well. Maintain a constant temperature in all occupied rooms.
- Heat well. Take out energy efficiency measures. Fit draught proofing to seal gaps around windows and doors. Insulate the loft. Lag pipes and water cylinders (especially in the loft). Check your heating system is working properly and serviced at least once a year.
- Apply for all grants to which you are entitled.
- Change energy supplier to get the best available deal.

2. What can local authorities and communities do?

- Provide strategic leadership on energy efficiency at a local level.
- Implement best practice in new build and reconditioned housing stock to improve thermal efficiency.
- Introduce low cost Community Heating and Combined Heat and Power schemes appropriately, providing affordable heat, improving the energy efficiency of housing stock, reducing carbon emissions and making a substantial contribution to HECA and national CO_2 targets and meeting local authority Best Value measures.

3. What more can the government do?

- Standardise methods of calculating improvement in energy efficiency and amount spent for use by local authorities (the current system is not consistent).
- Remove means testing for Warm Front as many of those who need help miss out. Almost a third of all pensioners who are eligible for means tested grants don't claim and many others who miss out on benefits cash are living in poor housing.
- Develop a plan to reduce the current volume of unclaimed benefits of all kinds.
- Further commit to upgrading the quality of housing stock in Britain.
- Continue raising minimum standards of energy efficiency in all housing types.

Why does an understanding of exposure to cold matter to health?

On average in County Durham & Tees Valley, about 800 more people have been dying in the winter (1st December to 31st March) in recent years than would be expected from the death rates during the other months of the year. Few of these excess deaths are from hypothermia or influenza. The vast majority of excess winter deaths are from diseases of the circulatory and respiratory systems exacerbated by exposure to cold both indoors and outdoors. One estimate suggests that the underlying cause of about 80% of excess winter deaths is the cold (Alderson, 1985).

Exposure to the cold not only increases the likelihood of winter deaths (Box 1), but also creates risks to the health of many thousands of people locally living in cold homes (Box 2).

Box 1

Facts about cold-related deaths

- About 50% of excess winter deaths are from cardiovascular disease and about 30% from respiratory disease
- About 20% of excess deaths are related to factors other than cold such as air pollution, lack of exposure to sunlight, influenza and nutrition
- Excess winter deaths vary by cause and will occur at different times after a cold day:
  - After 2 days – heart attacks
  - After 5 days – strokes
  - After 12 days – respiratory illness
- Excess winter deaths are more likely to occur in:
  - Private-rented & owner-occupied homes
  - House built before 1850
  - Damp houses

Source: Adapted from Press V.

'Public health policies to **reduce the burden** of winter death in Britain will need to be **broad based** and to consider measures **additional to those aimed at tackling fuel poverty**'

'**Cold, damp** thermally inefficient houses that people **cannot afford to heat** sufficiently to protect their health are a **peculiarly British public health scandal** and an affront to human rights'

Noel Olsen

Box 2

Impact of cold homes on health

- Increase in many respiratory illnesses including asthma
- Increased blood pressure and risk of heart attack and stroke
- Worsening symptoms of arthritis, particularly pain
- Increased injuries particularly falls of older people
- Impaired mental health and social isolation because of reluctance to invite friends into a cold, damp home
- Adverse effect on children's education where only one room might be properly heated

Source: Adapted from Press V.

How are winter deaths defined and measured?
Excess winter deaths (EWD) are defined as the number of deaths in the four months from December to March minus the average in the preceding autumn (August-November) and the following summer (April-July).

The Excess Winter Deaths Index (EWDI) is the number of excess winter deaths expressed as a percentage of the average of the number of deaths in the autumn and summer periods.

Calculation of excess winter deaths (EWD) and excess winter deaths index (EWDI)

1. **EWD** = number of deaths December to March minus average of preceding Autumn and following Summer

'Autumn'	= Aug - Nov	190
'Winter'	= Dec - Mar	230
'Summer'	= Apr - Jul	210

=30 (i.e. 230-((190+210)/2)

2. **EWDI** = $\frac{230 - ((190+210)/2)}{(190+210)/2} = \frac{30}{200} \times 100 = 15\%$

How many measures of excess winter deaths are there?
There are several measures that have been used to measure and monitor excess winter mortality.

Summary measures of excess winter mortality

Method 1
Deaths in Quarter 1 (January-March) minus quarterly average

Method 2
Deaths in Quarter 1 (January-March) minus deaths in Quarter 3 (July-Septermber)

Method 3
Deaths in December-March minus the average deaths in the preceding August-November and the following April-July

Method 4
Deaths in October-March minus deaths in the preceding July-September and the following April-June

Source: Bowie N and Jackson G

All of the these methods use definitions that attempt to compare a 'winter' period with a 'summer' or non-winter period. Comparison of these methods has shown that the absolute values of the measure vary quite significantly but that the 'winter' peaks – irrespective of method – occur where expected.

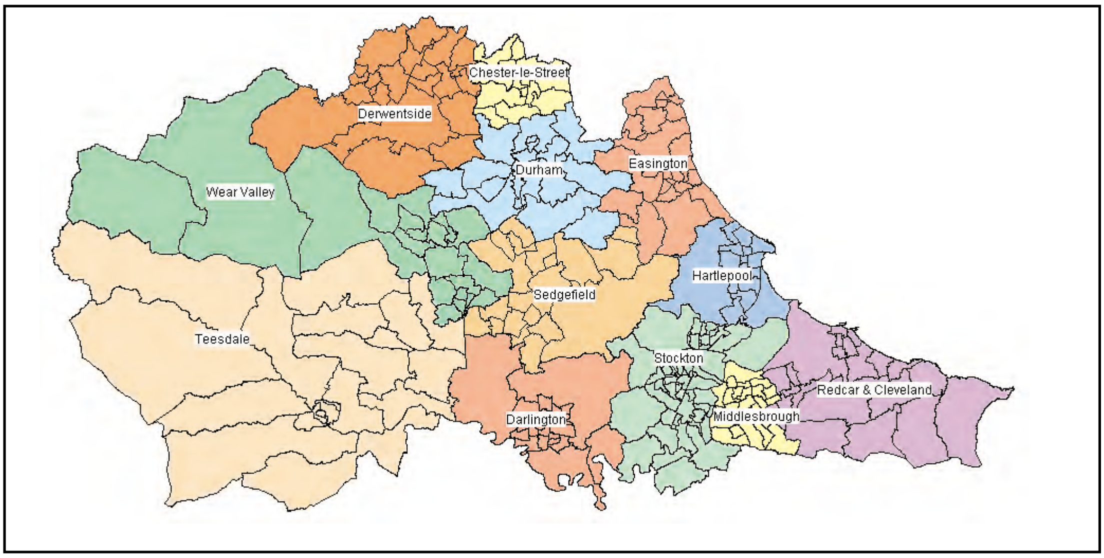
In recent years, the Office for National Statistics has used the Method 3 definition and so, for the purposes of national comparison and consistency, this is the method used in this document.

What's the purpose of this document?
The aim of this document is to provide an overview of the scale of excess winter deaths in County Durham and Tees Valley and to consider how the risks of this avoidable cause of death are being tackled.

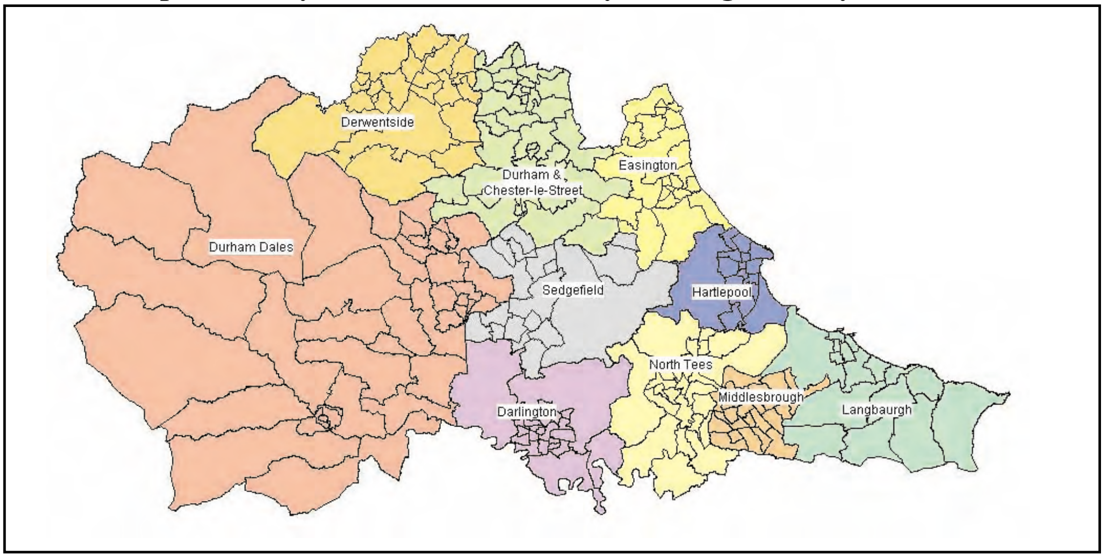
The objectives are to:

- measure the 'footprint' of excess deaths in winter locally and assess what influences its size;
- identify the extent of fuel poverty and the local response to improve home energy efficiency;
- consider the relationship between energy efficiency investment and excess deaths;
- examine the evidence for best practice locally and elsewhere; and
- suggest practical actions to lessen the impact of thermal stress on our health.

Outline map of County Durham & Tees Valley showing local Districts



Outline map of County Durham & Tees Valley showing Primary Care Trusts



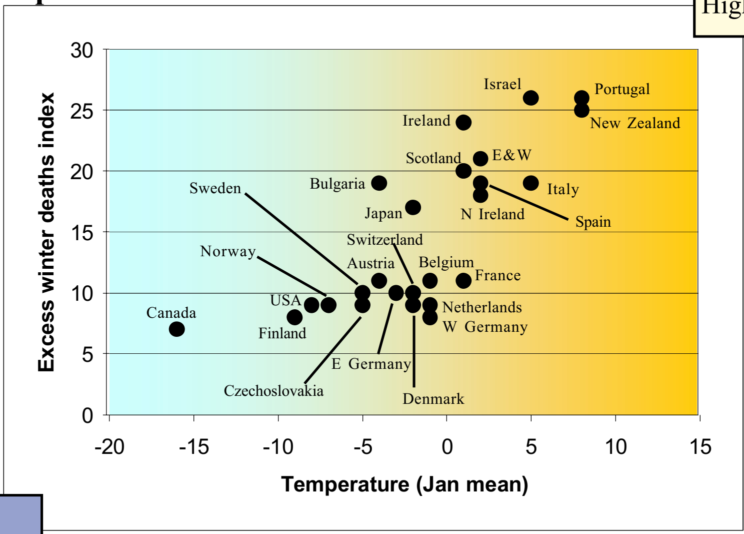
Introduction

How do excess winter deaths in England compare with Europe and elsewhere?

An international comparison of excess winter mortality reveals a phenomenon that could be described as the 'cold paradox'. This is the observation that the countries with the coldest winters have the lowest excess winter deaths (graph below). Conversely, the countries with the mildest winters (including those of the British Isles) have the highest excess winter mortality.

Cold paradox

Mild winters
High excess winter deaths



Cold winters
Low excess winter deaths

What might be the reasons for the 'cold paradox'?

This evidence supports the notion that it's more than just the physical aspects of the cold weather that present a threat to life. Although the reasons for the relationship are not clear, it seems that how we respond to the physiological effect of cold temperatures is vital. The effectiveness of the response in reducing excess deaths will depend on:

1. Knowledge and perceptions of the risks of cold to health *for example, assessing when heating should be turned on or up*
2. Behaviour when exposed to cold *for example, wearing appropriate clothing outdoors*
3. Energy efficiency of homes *for example, fully effective insulation*
4. Support for population sub-groups at greatest risk *for example, older people and people on low incomes*

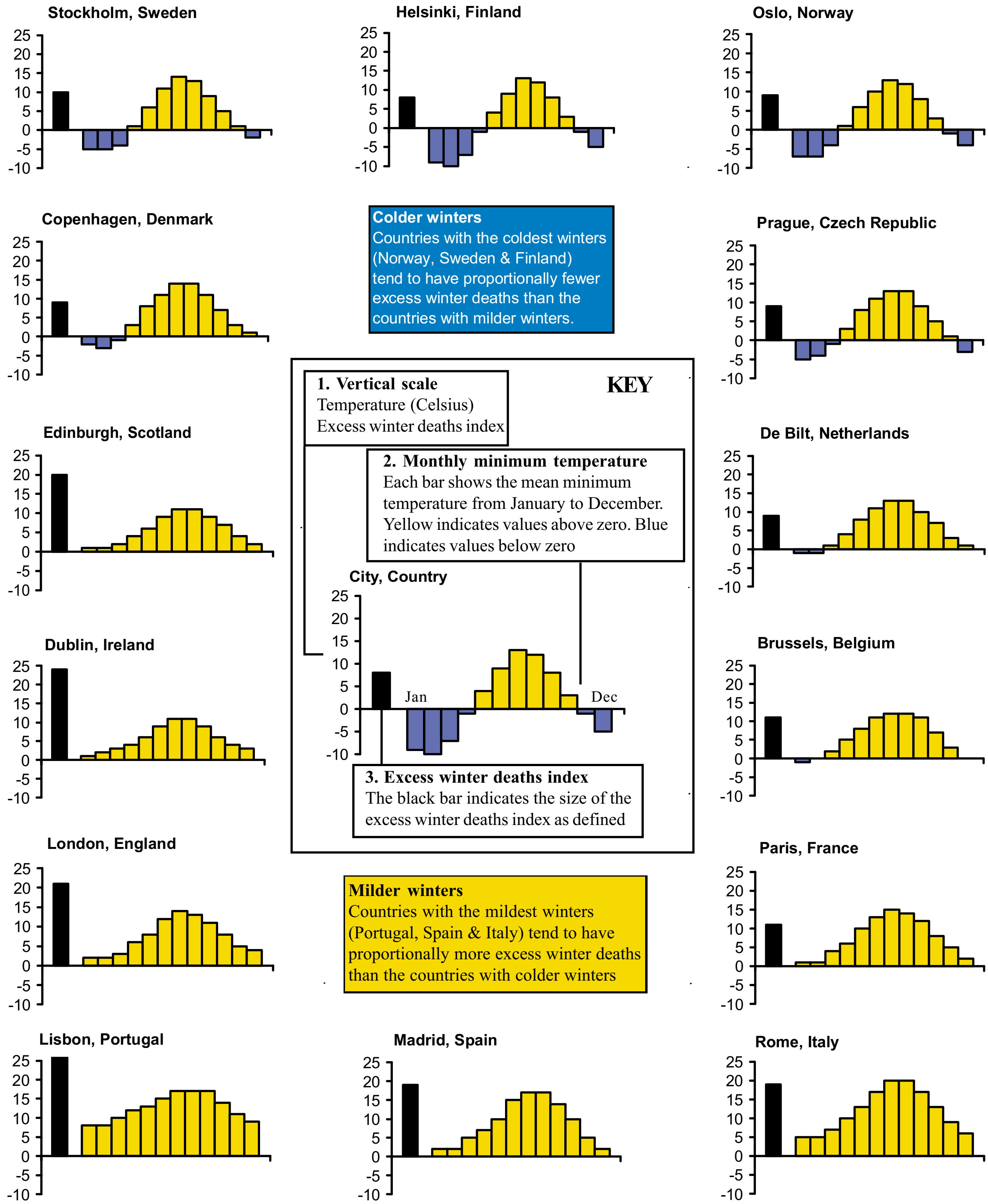
Are some countries more prepared for cold weather?

The countries with the colder winters and the lowest excess deaths are also the countries in the main that appear to have infrastructures that are more prepared to deal with protracted periods of freezing temperatures, frozen ground and snowfall. Perhaps people living in the countries that experience periodic 'dips' into sub-zero conditions, followed by days or weeks of milder conditions, are less conditioned to the risks of cold.

The mean minimum monthly temperatures for some of the large European cities reveal marked differences in the winter-summer temperature range (graphs, opposite page). In the Scandinavian countries, for example, mean temperatures are below zero degrees Celsius for five or six months of the year. This seems likely to influence the state of preparedness for very cold weather than in those countries with milder winters. In the Mediterranean countries shown, for example, the mean monthly minima are always above zero degrees and yet this is where the excess deaths are highest.

The countries that experience periodic 'cold snaps' (a few days or weeks) rather than longer term 'deep freeze' conditions (lasting months) appear to be less conditioned to cold effects and therefore more susceptible to the consequences.

The Cold Paradox



Source: Office for National Statistics and BBC

How is this document organised?
Following a description of the principal methods used (section 2), the document is divided into three main parts:

1. *Part one – describing inequality*

   This section provides a detailed overview of the core epidemiology of excess winter deaths and how these vary over time including consideration of the inequalities (or variations) between age-sex groups, areas of residence, causes of death, and social groups. The analysis focuses on the population in the County Durham & Tees Valley area with reference to the Local Authority and Primary Care Trust (NHS) populations therein.

2. *Part two – measuring response*

   This section gives a description of fuel poverty and the actions to tackle the effects of cold and damp housing with reference to energy efficiency investment and improvement measures. This includes reference to the scale of excess winter deaths in each locality.

3. *Part three – looking locally*

   This section combines the content of the analysis in Parts 1 and 2 into a two-page locality profile for each of the 10 PCT areas.

The appendices contain additional material for reference:

Details of actions to improve energy efficiency and reduce the effects of cold in each local authority area for the period under review are provided.

There is also a summary of the evidence for the effectiveness of actions intended to reduce the harmful effects of thermal stress on health and prevent excess deaths. Consideration is given to three questions:
- what can the individual do?;
- what can the local community do? and
- what more can the government do?

Investigation of excess winter mortality

What are the main sources of data?
The principal source of mortality data is the Public Health Mortality Files (PHMF). These databases contain the records of deaths of all residents of County Durham & Tees Valley including details of age, sex, date of death and cause of death.

Summary measures of excess winter deaths for England were extracted from routinely available publications from the Office of National Statistics.

Data for other countries was obtained from various publications that are cited appropriately.

How is the Excess Winter Deaths Index (EWDI) defined and calculated?
Excess winter deaths (EWD) are defined as the number of deaths in the four months from December to March minus the average in the preceding autumn (August-November) and the following summer (April-July).

The Excess Winter Deaths Index (EWDI) is the number of excess winter deaths expressed as a percentage of the average of the number of deaths in the autumn and summer periods.

How are the EWDI measures reported and summarised?
The EWDI measures are reported for each of the populations in the County Durham & Tees Valley area to include consideration of variations in risk by age, gender, place of residence, cause of death, as well as the effects of poverty and temperature. These variations are also examined over time.

Investigation of temperatures & effects on mortality

What are the main sources of data?
The main source of data is the record of daily maximum and minimum temperatures recorded by the Meteorological Office for a weather station in Durham. The weather station is located at latitude 54.77N and longitude 01.59W at an altitude of 102 metres. The station was selected because it was the only one located within the boundaries of the Strategic Health Authority area.

Time series data were provide for the period 1st January 1997 to 31st December 2003. Missing data from the Durham time series were replaced first by substitution of Newcastle records and, if those were missing, by Leeming records.

What measures are defined and how are they summarised?
Various measures can be used to summarise temperature variations. The ones reported here for given time periods include absolute minima, the number of days below selected temperatures, the number of days consecutively below selected temperatures, and overall mean values.

Investigation of local authority initiatives on energy efficiency

What are the main sources of data?
The principal documentary sources are the Home Energy Conservation Act (HECA) reports. The information from the HECA reports was used as the means of comparing geographical areas. Particular information about local initiatives was obtained from and discussed with appropriate local authority staff.

What measures are used?
The main measures used are the annual spend per household on energy efficiency measures, the annual improvement (%) in energy efficiency, the energy use per household, and the number of fuel poor households.

How are the locality actions reported and summarised?
These measures are reported for each of the twelve local authority areas in the County Durham & Tees Valley area.

Part 1

Describing inequality

- Passage of time
- Influence of age
- Influence of gender
- Influence of place
- Influence of disease
- Influence of temperature
- Temperature and death

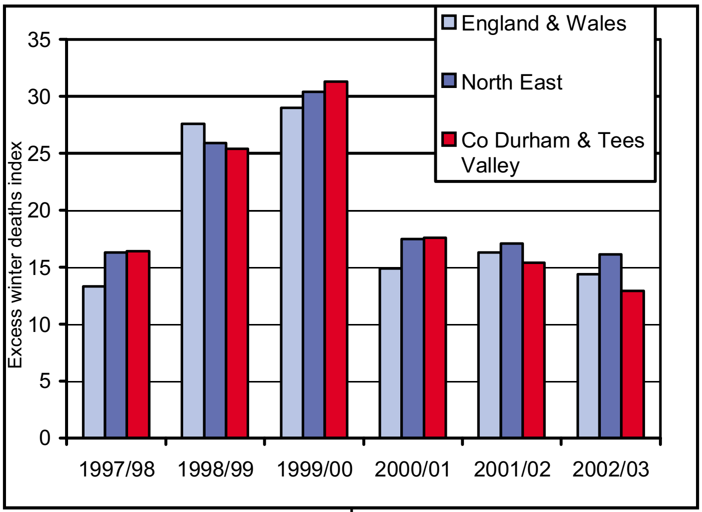
Excess winter deaths have been at lower levels in recent years both locally and nationally

The time period shown (top graph) embraces 4 years when the excess winter deaths index was about 15% both locally and nationally. That level was breached in two consecutive years – 1998/99 and 1999/00 – when the EWDI was about twice as high. The values shown for 1999/00 had not been as high nationally since 1996/97 (EWDI in England & Wales = 27.9).

The EWDI for County Durham & Tees Valley is very close to the national and regional values in all years.

For most of the years shown here, the EWDI for the former Health Authority areas of County Durham & Darlington and Tees were similar (graph below). For two years only – 1998/99 and 2002/03 – the value for the Tees area was substantially lower than County Durham & Darlington.

Excess winter deaths index 1997/98 to 2002/03
National, regional and local comparisons



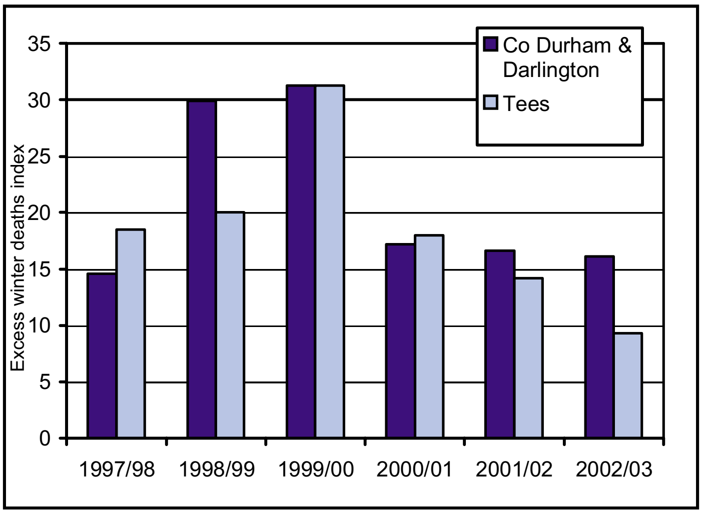
The data for County Durham & Tees Valley above is split below for the former Health Authority areas.

Excess winter mortality varies considerably between localities

The EWDI values for the PCT areas broadly reflect the national profile (graphs opposite page). In all cases, the peak years with the highest values – 1998/99 and 1999/00 – are also evident locally.

Durham & Chester-le-Street had consistently higher figures than England & Wales each year. In the two most recent years, Darlington, Hartlepool and Midlesbrough emerged with excess deaths occurring at about 50% of the national value.

Excess winter deaths index 1997/98 to 2002/03
Former Health Authority areas



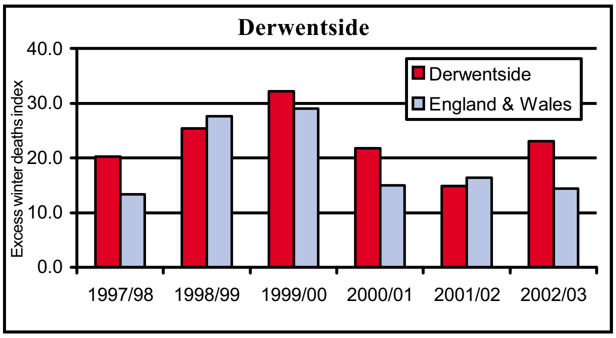
References:
Curwen M. Excess winter mortality in England and Wales with special reference to the effects of temperature and influenza. Chapter 13 in: Charlton J & Murphy M (eds.). The health of adult Britain 1841-1994. London: The Stationery Office, 1997 (ONS Decennial Supplement No. 12)

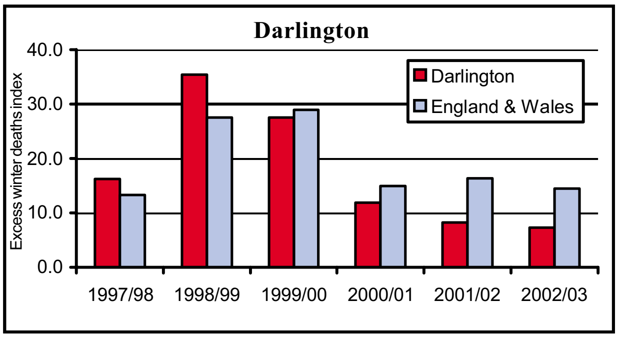
Summary points

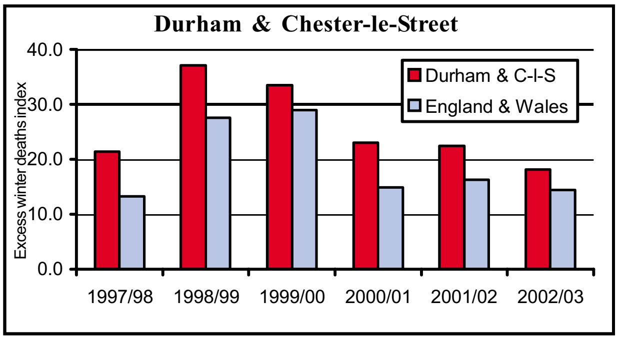
1. The excess winter deaths index for the County Durham & Tees Valley area is very close to the national and regional values in all years

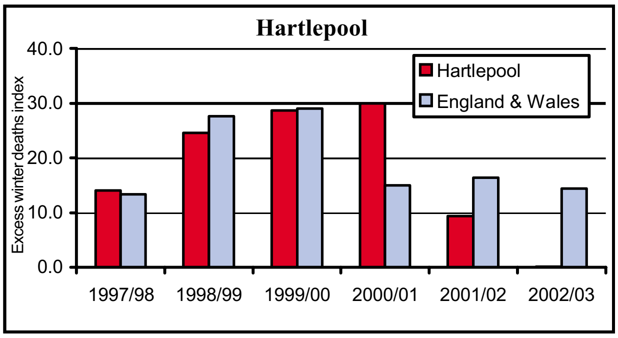
2. Whilst the local PCT profiles are broadly similar, it is evident that some areas in the most recent years have had lower excess death rates than nationally

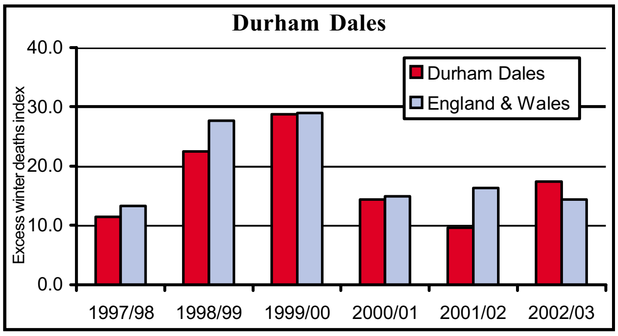
Excess winter deaths index 1997/98 to 2002/03, Primary Care Trusts

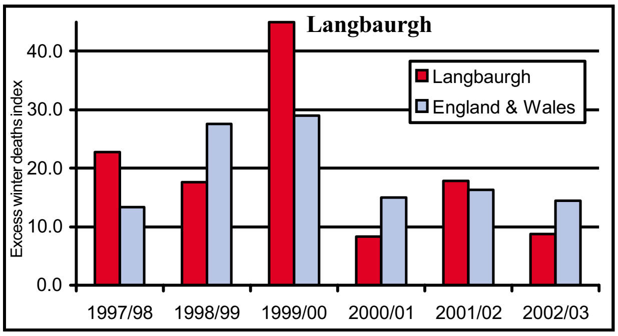


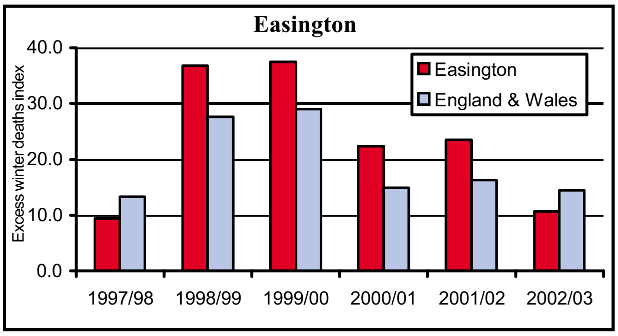


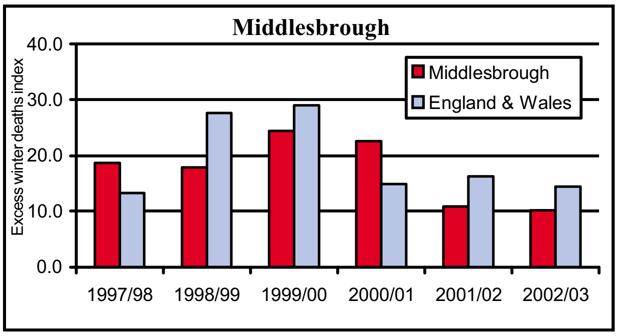


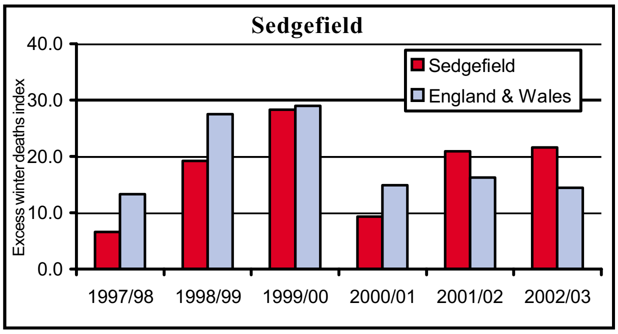


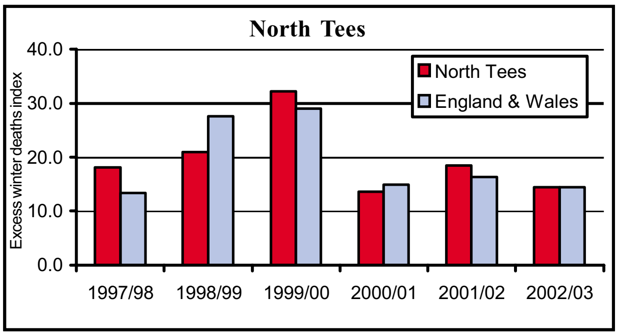












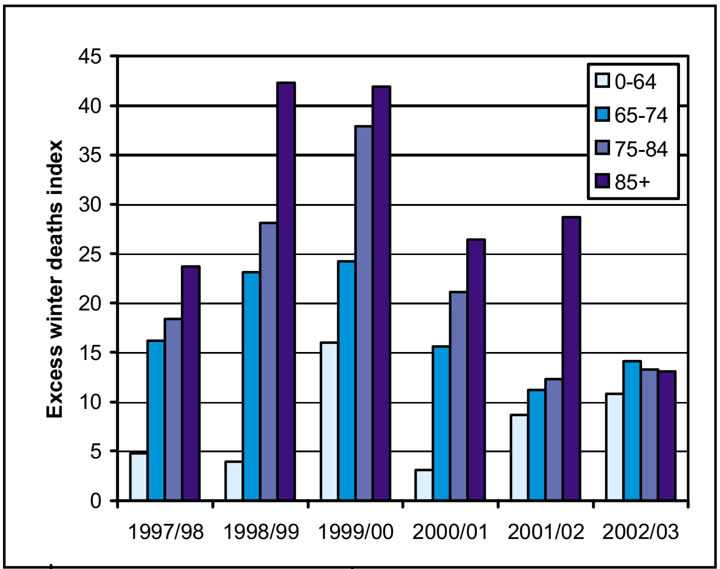
Older people are at much greater risk of death in winter than younger people

The likelihood of excess winter death is influenced greatly by age. Older people, especially those with a chronic illness, are at greater risk than younger people.

For each year shown here (top graph), the EWDI is higher for the over-85s than the under-65s without exception. Moreover, in all winters shown, apart from the last, there is a continuous positive gradient of excess mortality from the youngest to the oldest age group.

Comparison between local and national experience (graphs below) reveals a strikingly similar pattern between age groups and between years. The effects of the winters of 1998/99 and 1999/00 are evident in all age groups at both geographical levels.

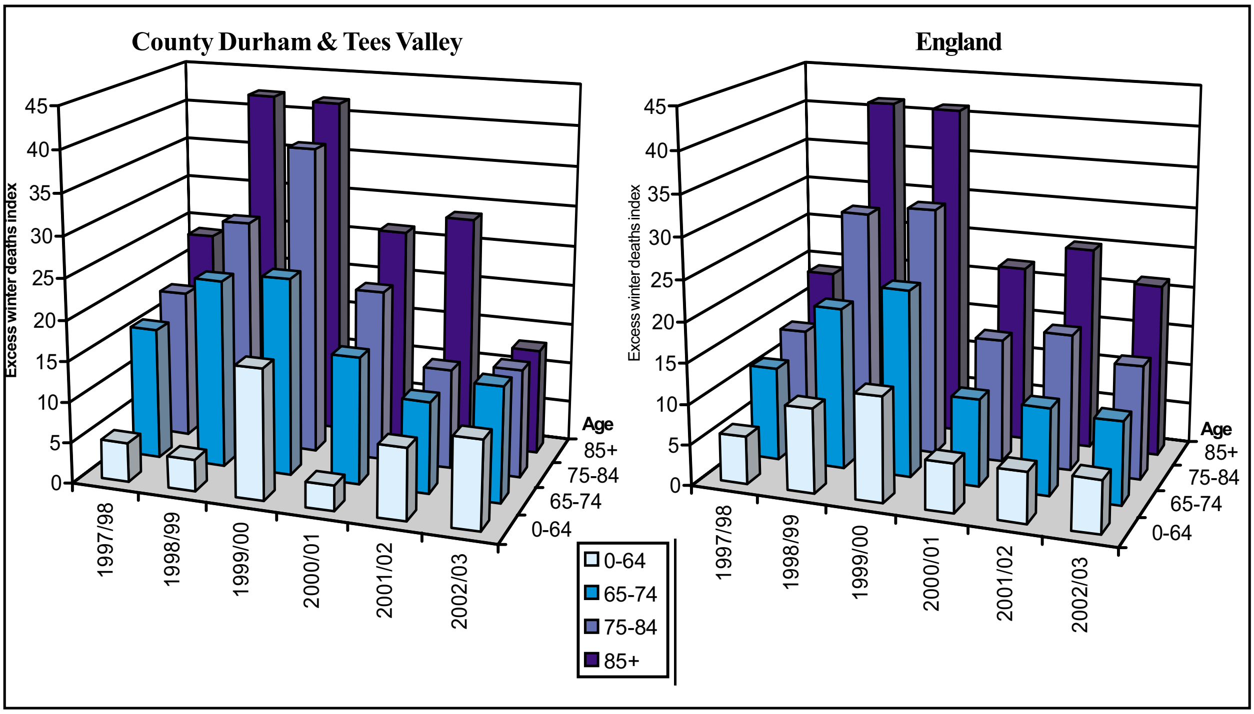
Excess winter deaths index, County Durham & Tees Valley, 1997/98 to 2002/03



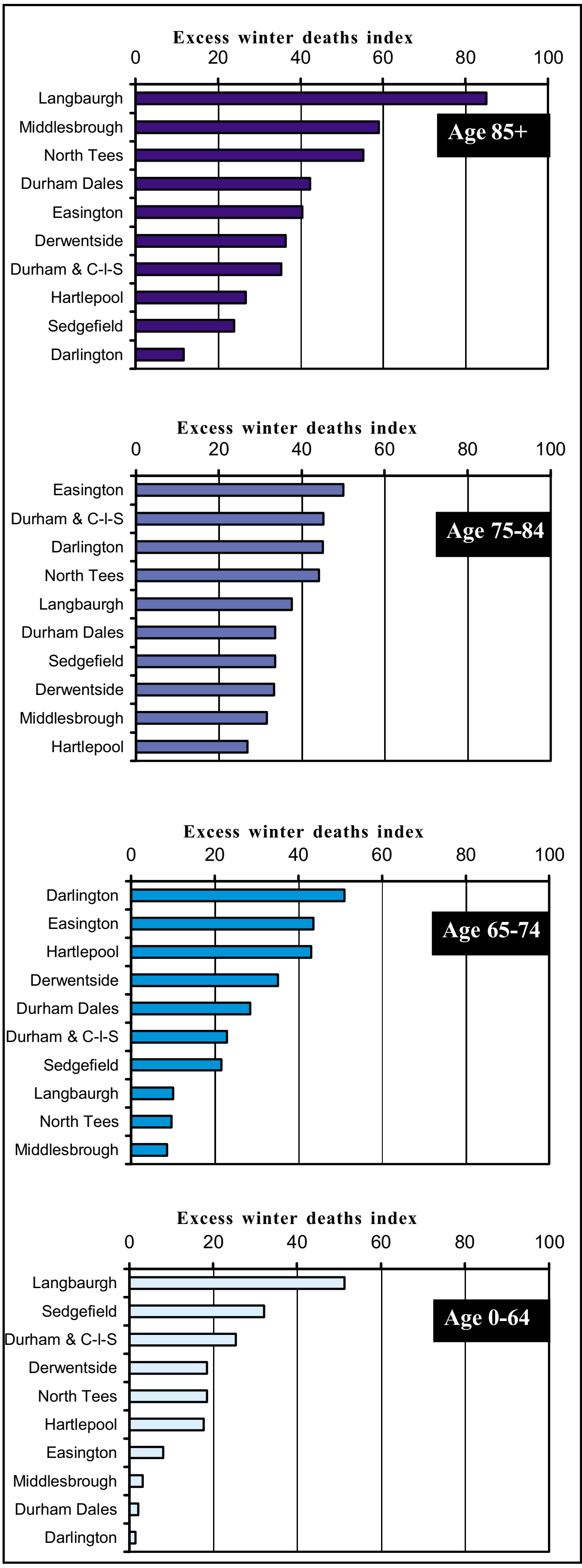
The data for 1999/2000 only is examined at a more detailed geographical level (page opposite)

The data above is shown differently below and compared with data for England

Excess winter deaths index, age groups, County Durham & Tees Valley and England, 1997/98 to 2002/03



Excess winter deaths in 1999/2000



Excess winter mortality varies between localities as well as age groups

The data shown here for the year with the highest excess winter deaths in recent years – 1999/2000 – reveals that the excess winter mortality index varies markedly not just between the four age groups but also between the 10 PCT localities.

But whereas there is an overall gradient of excess mortality, increasing from the younger to the older age groups, there is no such consistency between different geographical areas. Darlington, for example, had the highest EWDI for 65-74 year-olds in this year and yet the lowest value for 0-64 years of age. One of the reasons for these fluctuations in rank position relates partly to the very small numbers in some age groups in some localities in addition to the real effects of cold.

References:

Curwen M. Excess winter mortality in England and Wales with special reference to the effects of temperature and influenza.
Chapter 13 in: Charlton J & Murphy M (eds.). The health of adult Britain 1841-1994. London: The Stationery Office, 1997 (ONS Decennial Supplement No. 12)

'Since at least the time of William Farr, it has been recognised that it is **the elderly** who are particularly **at risk** during **cold weather** '

Curwen M

The value of the EWDI is generally lower in the younger age groups.

Summary points

1. Older people, especially those with an existing illness, are at particular risk of death in winter.
2. There is a continuous gradient in risk from the youngest (at lowest risk) to the oldest age group overall but not in every locality.

Note: Details for all years in the period 1997/98 to 2002/03 are shown in the locality-based sections.

Influence of gender

Excess winter deaths are a bit higher for women than for men in most years

Being female seems to confer a slightly greater risk of excess death in winter than being male (top graph). For each year except 1999/00, the EWDI was higher for women. But for each year too, except 2001/02, the values for men and women were reasonably close.

The likelihood of excess winter death seems to be influenced to a much lesser extent by being male or female than by being old.

Excess winter mortality differs a little between localities as well as between men and women

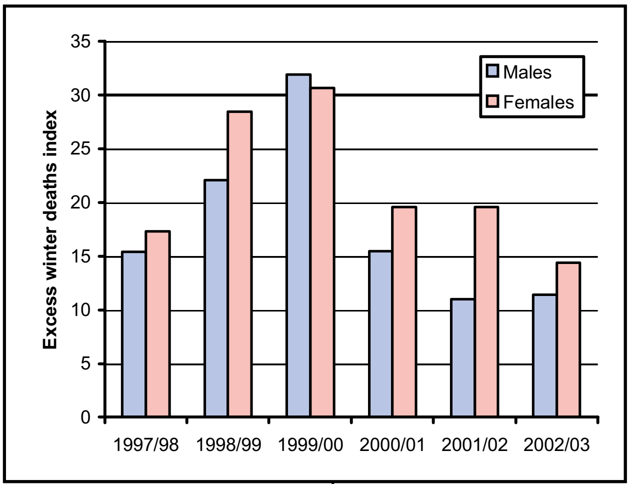
The data shown here (grid below) reveal that the excess winter mortality index differs a little not just between men and women but also between the 10 PCT localities.

In 5 out of 10 areas in the six years shown, the female EWDI was higher and lower than the value for males in equal measure. In three areas – Hartlepool, Middlesbrough and Sedgefield – the female EWDI was higher in 4 out of 6 years. In Derwentside, this was the case in 5 out of 6 years. Darlington differed from all others in being the only area where the male EWDI exceeded the female EWDI and did so in 4 out of the 6 years.

The male/female comparisons shown here relate to all age groups combined. It is possible that there would be greater differences if age-specific comparisons were made.

References:
Curwen M. Excess winter mortality in England and Wales with special reference to the effects of temperature and influenza. Chapter 13 in: Charlton J & Murphy M (eds.). The health of adult Britain 1841-1994. London: The Stationery Office, 1997 (ONS Decennial Supplement No. 12)

Excess winter deaths index, County Durham & Tees Valley, 1997/98 to 2002/03



The data above is shown at a smaller geographical level (page opposite)

Comparison of excess winter deaths index for males and females

	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	No. years EWDI higher for females
Darlington	Female	Female	Male	Male	Male	Male	2
Derwentside	Female	Female	Female	Male	Female	Female	5
Durham & C-I-S	Female	Male	Female	Female	Male	Male	3
Durham Dales	Female	Female	Male	Male	Female	Male	3
Easington	Male	Female	Male	Female	Male	Female	3
Sedgefield	Female	Female	Male	Female	Female	Male	4
Hartlepool	Male	Male	Female	Female	Female	Female	4
Langbaurgh	Male	Female	Male	Female	Female	Male	3
Middlesbrough	Female	Female	Male	Female	Female	Male	4
North Tees	Male	Female	Male	Female	Female	Male	3
No. PCTs EWDI higher for females	6	8	3	7	7	3	34

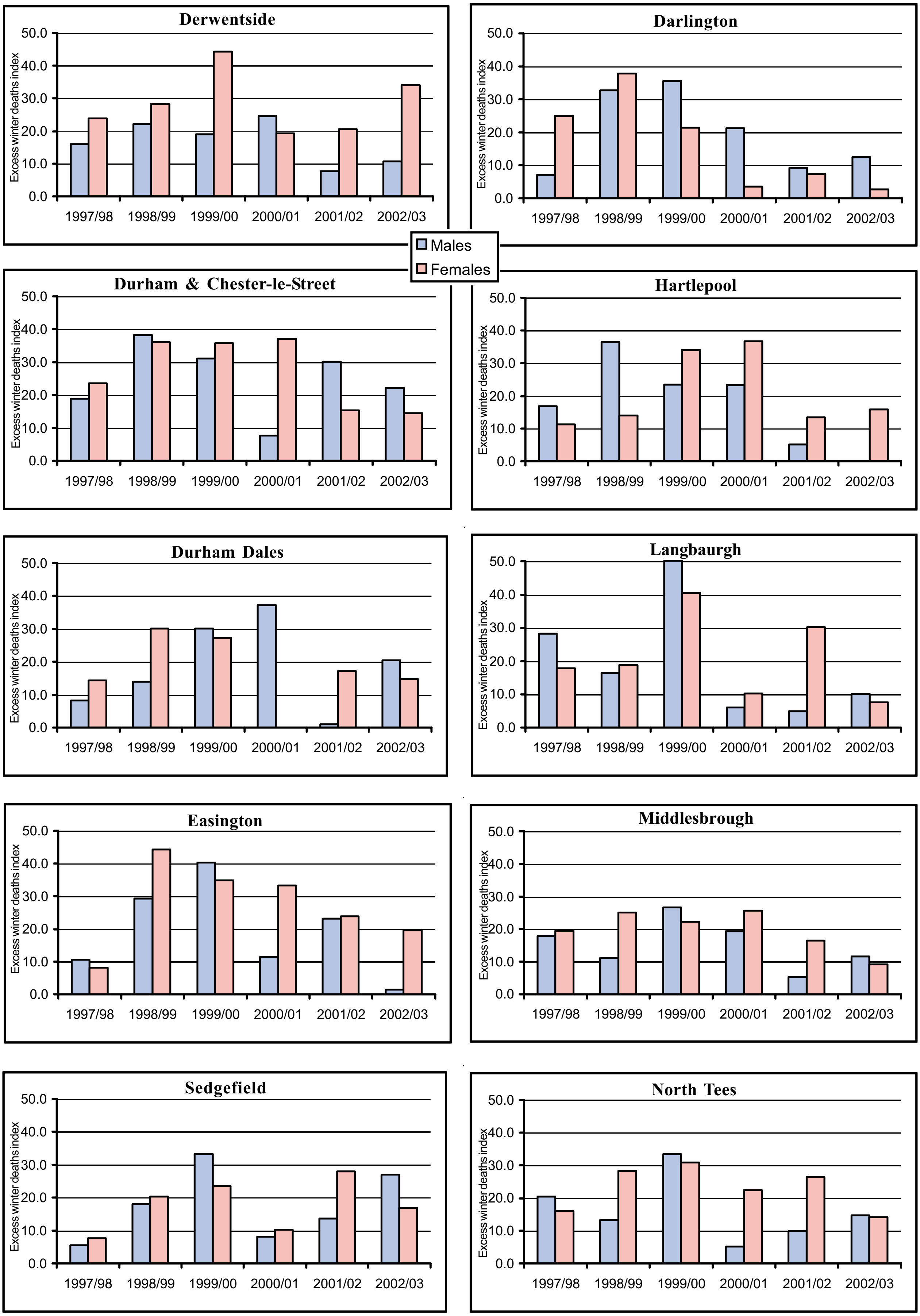
Male EWDI higher
Female EWDI higher

Summary points

1. The excess winter deaths index for women tends to be a bit higher than men for most years but the differences are relatively small

2. Gender seems to be much less important than old age in determining the scale of excess deaths

Excess winter deaths index 1997/98 to 2002/03, Primary Care Trusts



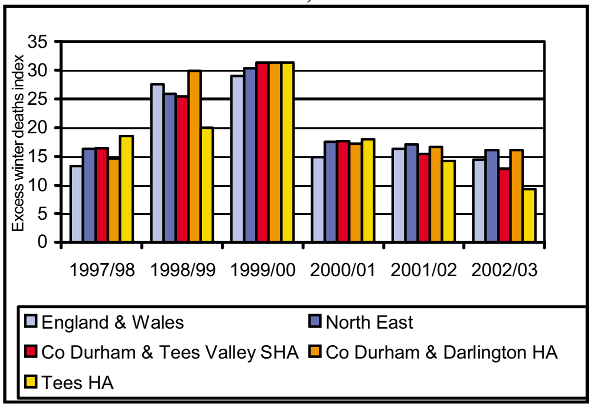
Influence of place

The aggregated level of excess winter deaths locally has been reasonably close to regional and national experience in recent years

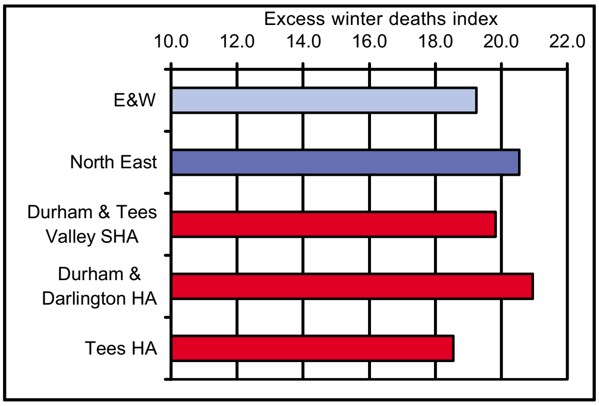
The time period shown (top graph, left) reveals remarkable consistency in excess mortality between national, regional and local experience. But when the values for the Strategic Health Authority (SHA) area (3rd bar in each annual data set) are split into the two former Health Authority (HA) areas (4th and 5th bars in each year), then the range of EWDI values increases. The former Tees HA area had noticeably lower excesses in 1998/99 and 2002/03.

The overall mean EWDI estimates for the whole period (top graph, right) range from 18.6 (Tees HA) to 21.0 (County Durham & Darlington HA).

Excess winter deaths index, 1997/98 - 2002/03



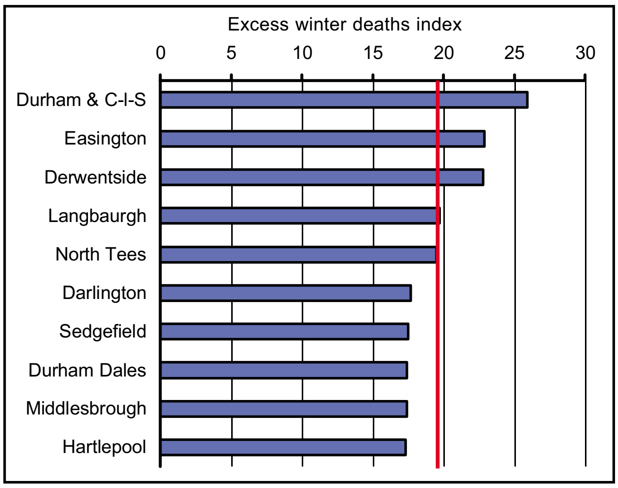
Excess winter deaths index (overall estimate), 1997/98 - 2002/03



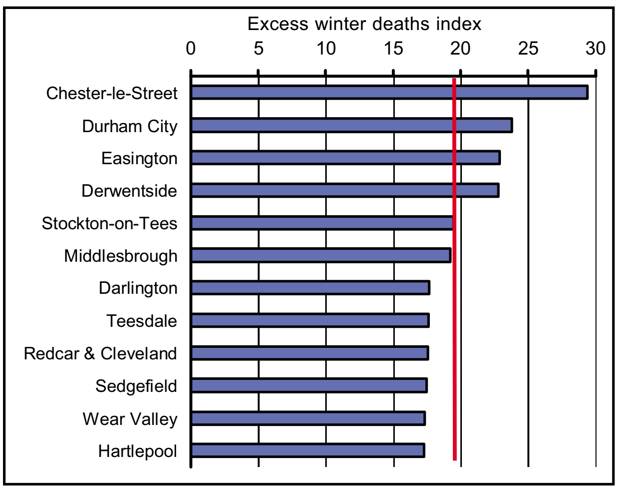
The aggregate level of excess winter mortality conceals marked contrasts between the local authority areas

The EWDI values for the PCT areas (bottom graph, left) and the local authority areas (bottom graph, right) reveal greater differences between these smaller areas than is evident from higher level aggregations. The northernmost areas of County Durham (Chester-le-Street, Durham City, Easington and Derwentside) stand apart from the others. The highest value of all for Chester-le-Street is about 70% above the lowest (Hartlepool).

Excess winter deaths index (overall estimate), PCT areas, 1997/98 - 2002/03

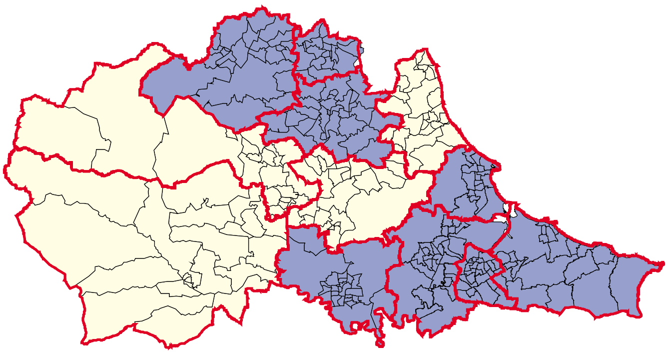


Excess winter deaths index (overall estimate), LA areas, 1997/98 - 2002/03



References:
Curwen M. Excess winter mortality in England and Wales with special reference to the effects of temperature and influenza. Chapter 13 in: Charlton J & Murphy M (eds.). The health of adult Britain 1841-1994. London: The Stationery Office, 1997 (ONS Decennial Supplement No. 12)

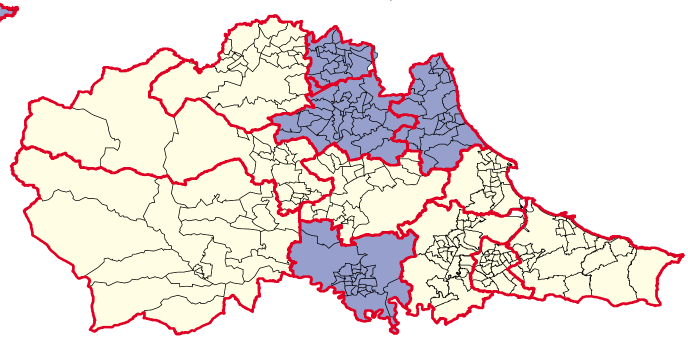
Excess winter deaths, 1997/98



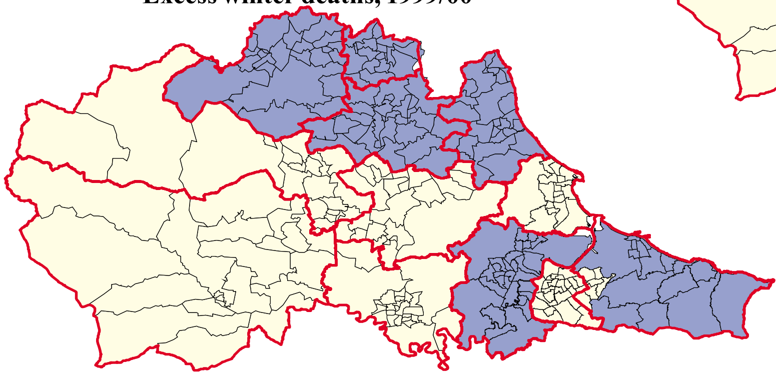
KEY

- Excess winter death above CD&TV average
- Excess winter death below CD&TV average

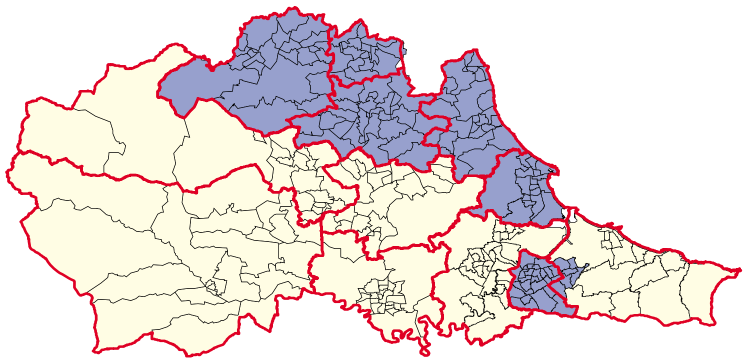
Excess winter deaths, 1998/99



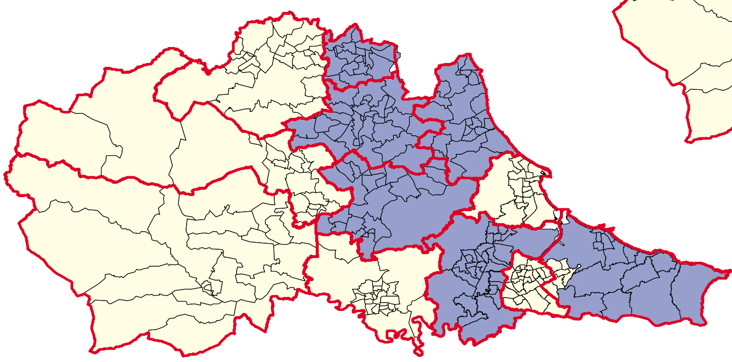
Excess winter deaths, 1999/00



Excess winter deaths, 2000/01



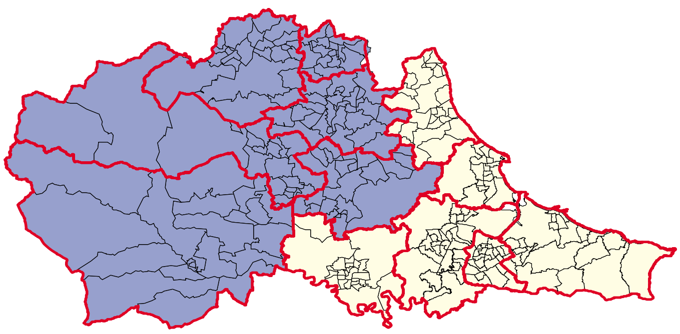
Excess winter deaths, 2001/02



Summary points

1. The excess winter deaths index for the County Durham & Tees Valley area overall is very close to the national and regional values in all years
2. The overall area comparisons mask some marked differences at local level. The highest excess winter deaths occur in the northernmost areas of County Durham

Excess winter deaths, 2002/03



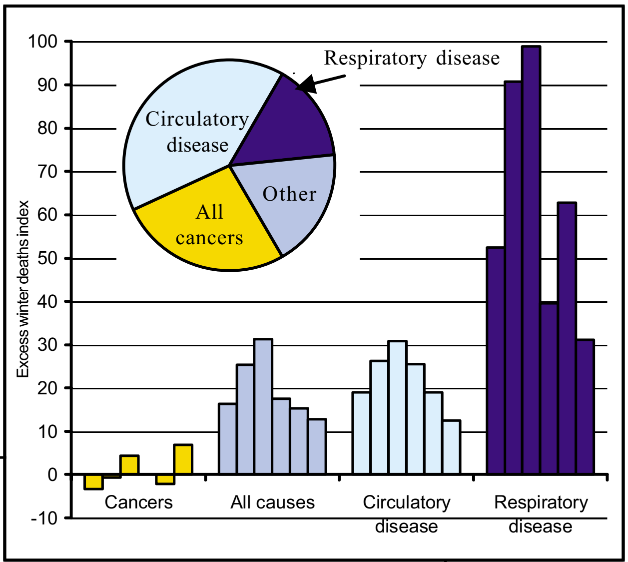
The scale of excess death in winter varies greatly according to the cause of death

The dimensions of excess winter death rates vary for different diseases (top graph). The excess winter deaths profile for circulatory diseases (coronary heart disease and stroke) most closely resembles the profile for all causes of death. This reflects the fact that these deaths account for more than 40% of all deaths and so, numerically, exert the greatest influence on the all cause profile (pie chart inset). By contrast, excess winter death rates for respiratory disease are at least twice as high – often more – each year. These account for about only 15% of all deaths, and so exert less impact on the overall profile. Nevertheless, their impact on 1998/99 and 1999/00 is evident (graph below).

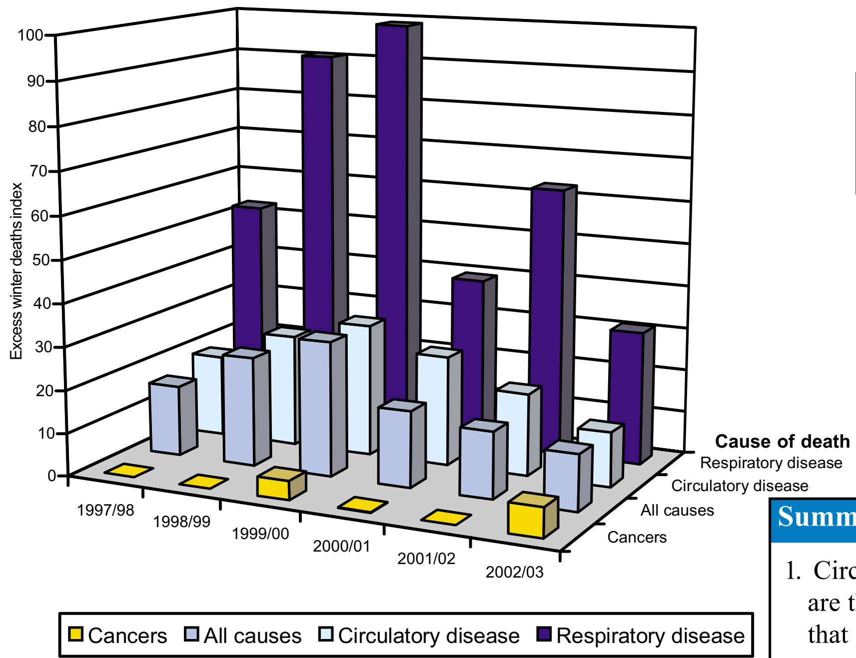
The graph opposite emphasises the disease perspective. The graph below uses the same data to emphasise the time perspective

Some diseases are influenced very little or not at all by season

Deaths from all cancers are not influenced greatly by the winter effect on other major diseases. In some years, the EWDI for cancers is a little above zero, in others below. The net effect is little or no seasonal variation.



The same data is examined at a more detailed geographical level (page opposite)

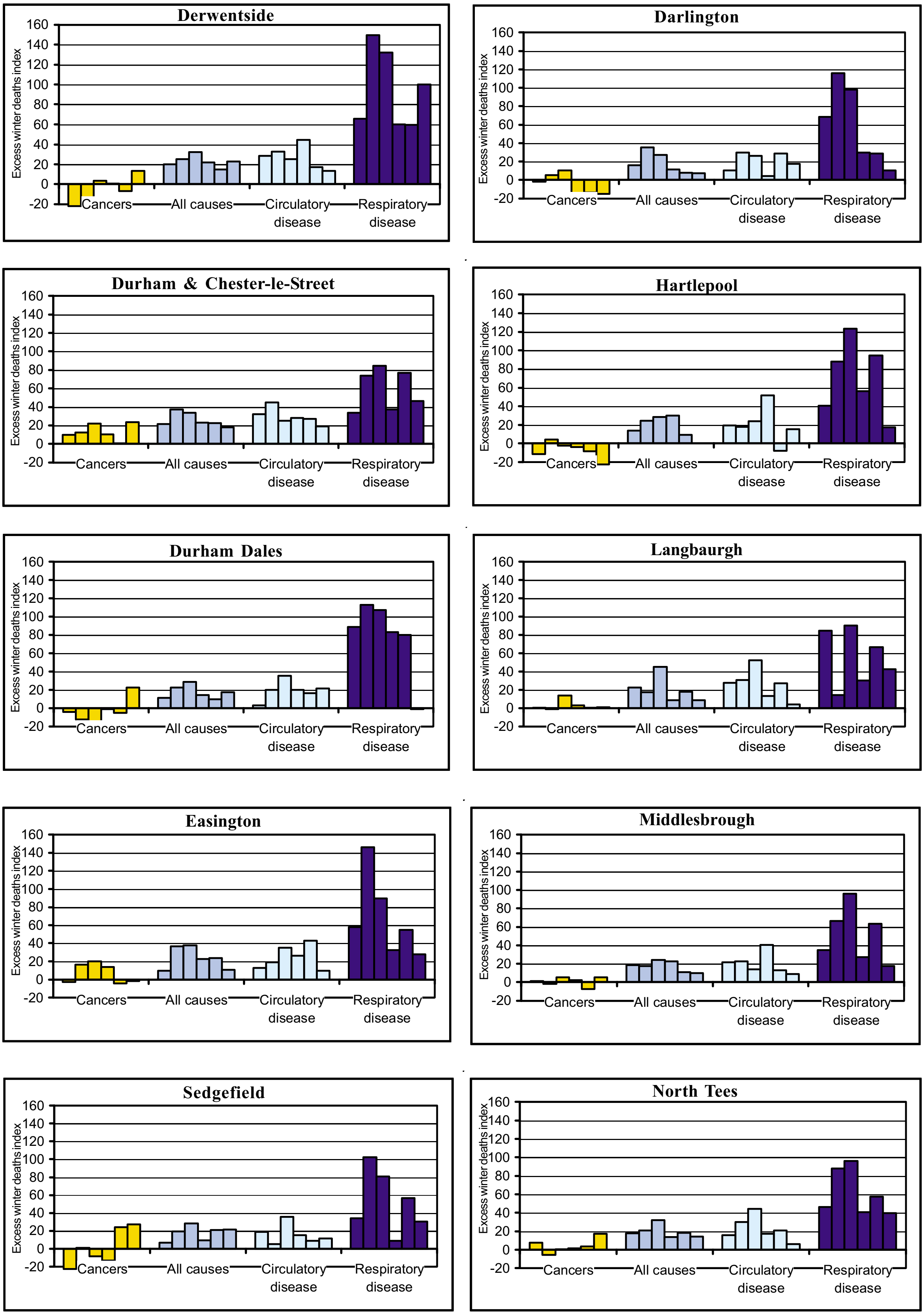


Summary points

1. Circulatory and respiratory diseases are the two principal causes of death that are influenced by seasonal weather effects

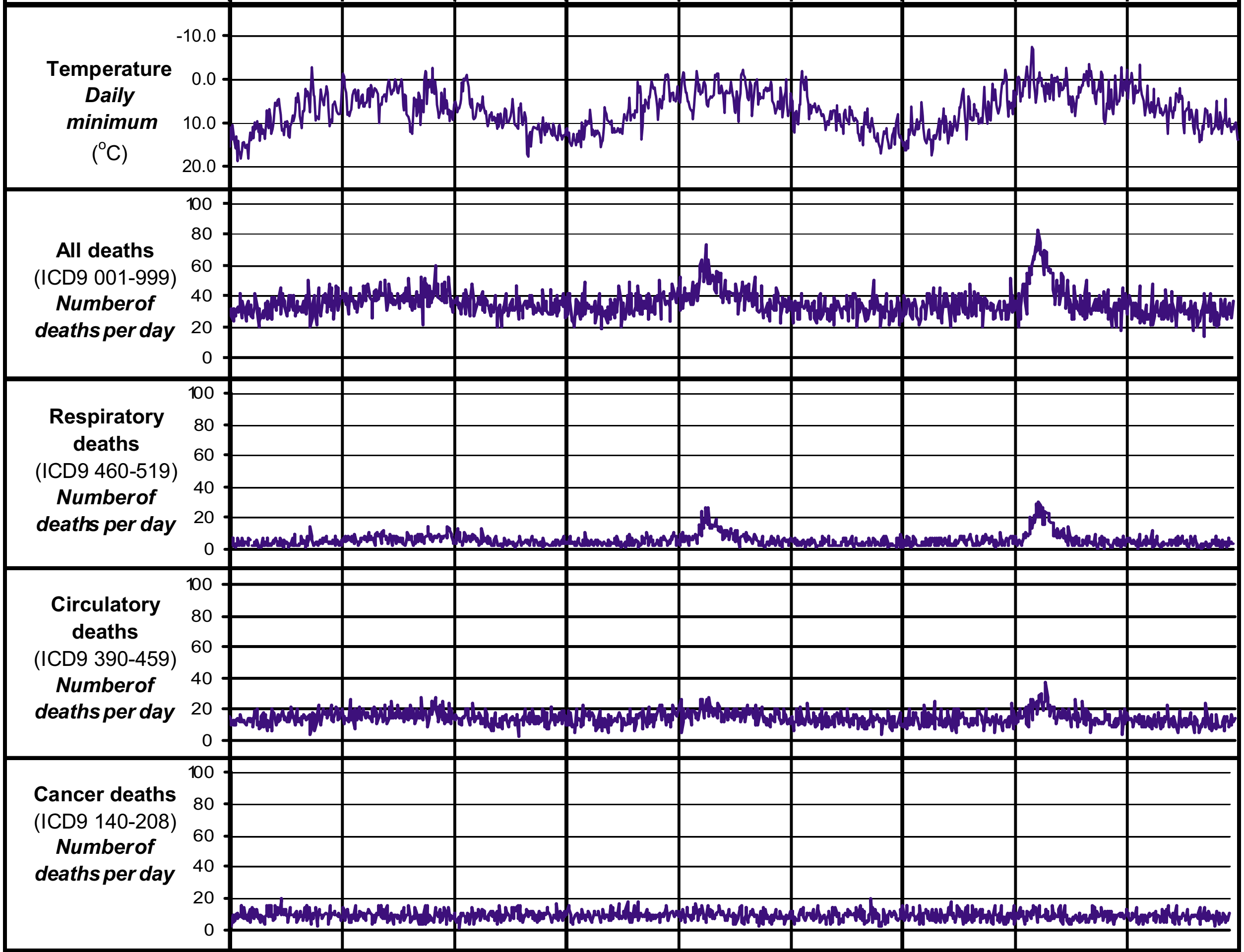
2. The extent to which specific diseases contribute to the scale of overall excess mortality is partly related to the volume of those deaths

Excess winter deaths index 1997/98 to 2002/03, underlying cause of death, Primary Care Trusts



Influence of temperature

Year & Season	1997/1998			1998/1999			1999/2000		
Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su



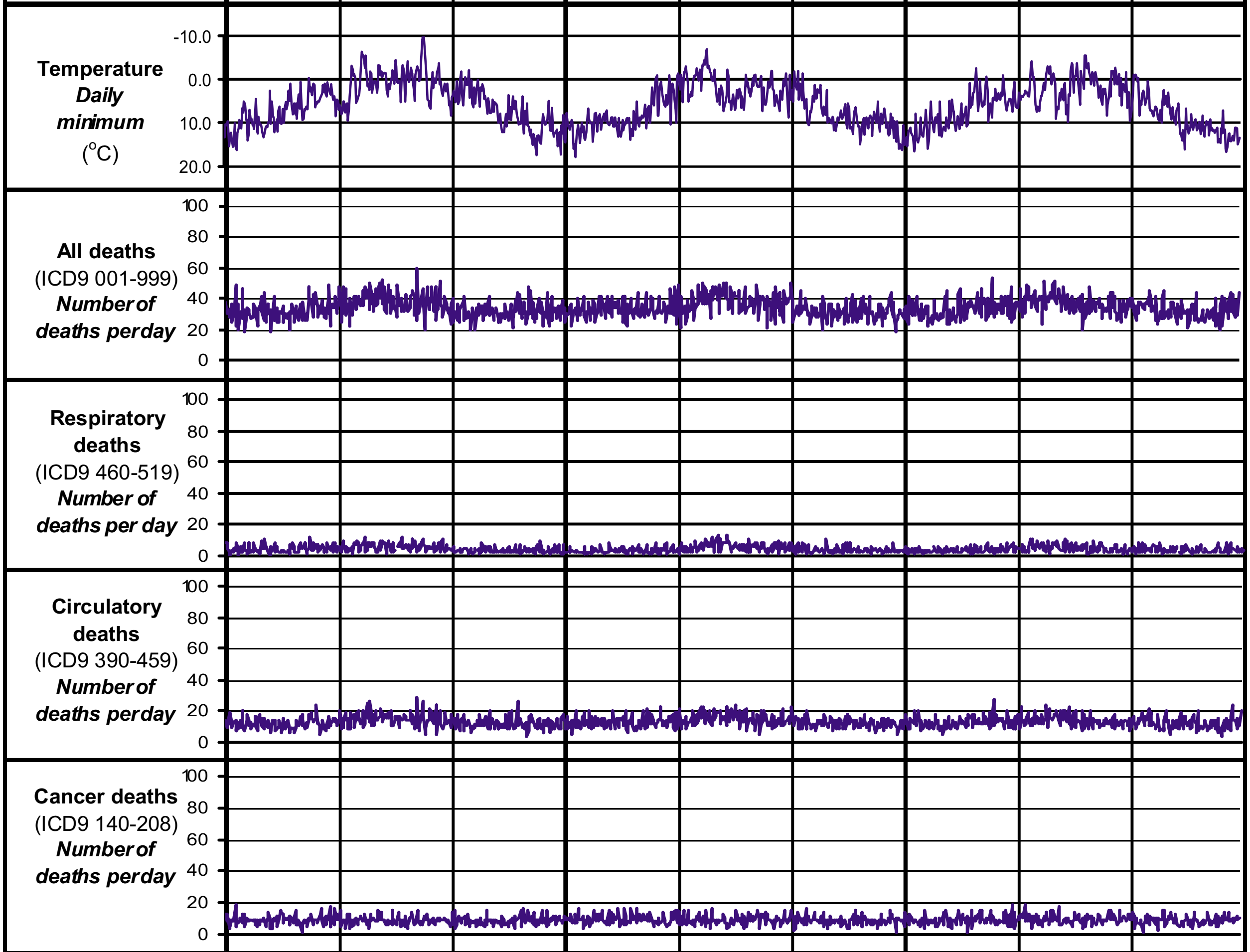
Temperature (°C)									
Absolute minimum	-2.7	-2.6	-1.0	-1.1	-2.1	-1.8	-2.1	-7.4	-3.3
Days < or = 0°C	2	7	3	6	15	2	3	30	5
Longest period < 0°C	2	2	2	4	5	0	3	4	3
Days < +5°C	21	69	13	31	87	10	19	98	28
Deaths									
All deaths	4037	4733	4098	4071	4992	3893	1998	5048	3692
EWDI		16.4			25.4			31.3	
Respiratory deaths	530	877	620	571	1042	522	589	1112	529
EWDI		52.5			90.7			98.9	
Circulatory deaths	1733	2030	1676	1706	2079	1589	1598	2008	1469
EWDI		19.1			26.2			30.9	
Neoplasm deaths	1155	1095	1109	1135	1100	1078	1089	1091	1001
EWDI		-3.3			-0.6			4.4	

Notes

Excess Winter Deaths are defined as the number of deaths in the four months from December to March minus the average of the numbers in the preceding autumn (August-November) and the following summer (April-July)

The Excess Winter Deaths Index is the number of excess winter deaths expressed as a percentage of the average of the number of deaths in the autumn and the summer periods.

Year & Season	2000/2001			2001/2002			2002/2003		
Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su



Variable	2000/2001 Au	2000/2001 Wi	2000/2001 Su	2001/2002 Au	2001/2002 Wi	2001/2002 Su	2002/2003 Au	2002/2003 Wi	2002/2003 Su
Temperature (°C)									
Absolute minimum	-0.3	-10.8	-2.1	-0.9	-6.9	-2.0	-2.5	-5.5	-1.1
Days < or = 0°C	1	53	3	7	37	4	4	41	5
Longest period < 0°C	0	9	0	2	11	0	2	7	4
Days < +5°C	35	102	37	16	94	25	34	99	21
Deaths									
All deaths	3922	4568	3847	4070	4582	3868	3963	4478	3967
EWDI		17.6			15.4			12.9	
Respiratory deaths	565	705	446	422	730	475	469	626	486
EWDI		39.5			62.8			31.1	
Circulatory deaths	1478	1888	1530	1608	1862	1519	1582	1744	1515
EWDI		25.5			19.1			12.6	
Neoplasm deaths	1117	1097	1075	1195	1113	1081	1124	1183	1092
EWDI		0.1			-2.2			6.8	

Notes

Excess Winter Deaths are defined as the number of deaths in the four months from December to March minus the average of the numbers in the preceding autumn (August-November) and the following summer (April-July).

The Excess Winter Deaths Index is the number of excess winter deaths expressed as a percentage of the average of the number of deaths in the autumn and the summer periods.

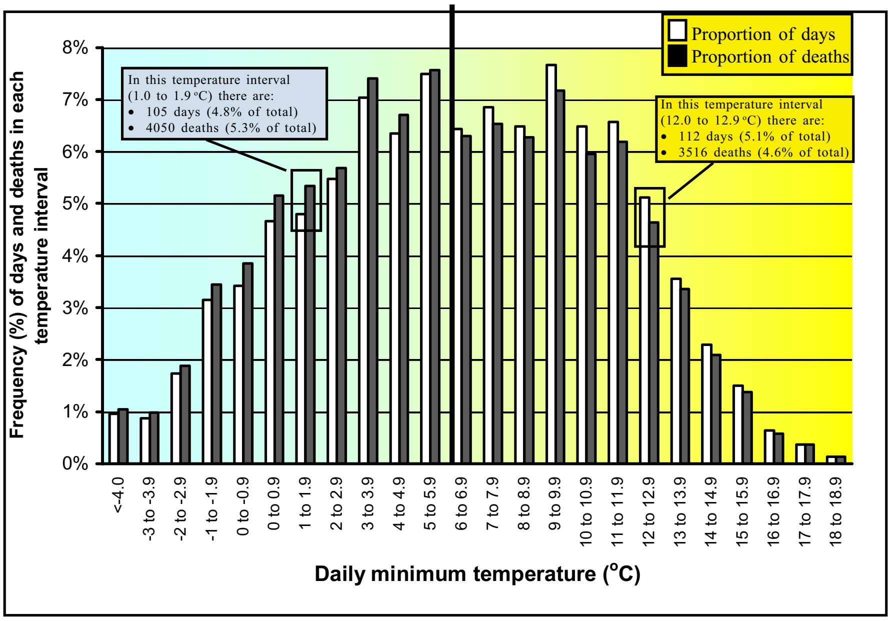
This page displays the distribution of 75,827 deaths (from all causes) for 2,181 consecutive days (from 1st August 1997 to 31st July 2003) and relates these to the minimum temperature (ºC) recorded on the date of death.

Proportion of deaths occurring at each temperature interval

At temperatures **below 6 ºC**, there are proportionally **more deaths** than expected based on the proportion of days.

At temperatures **above 6 ºC**, there are proportionally **fewer deaths** than expected based on the proportion of days.

6ºC



How are deaths influenced by temperature?

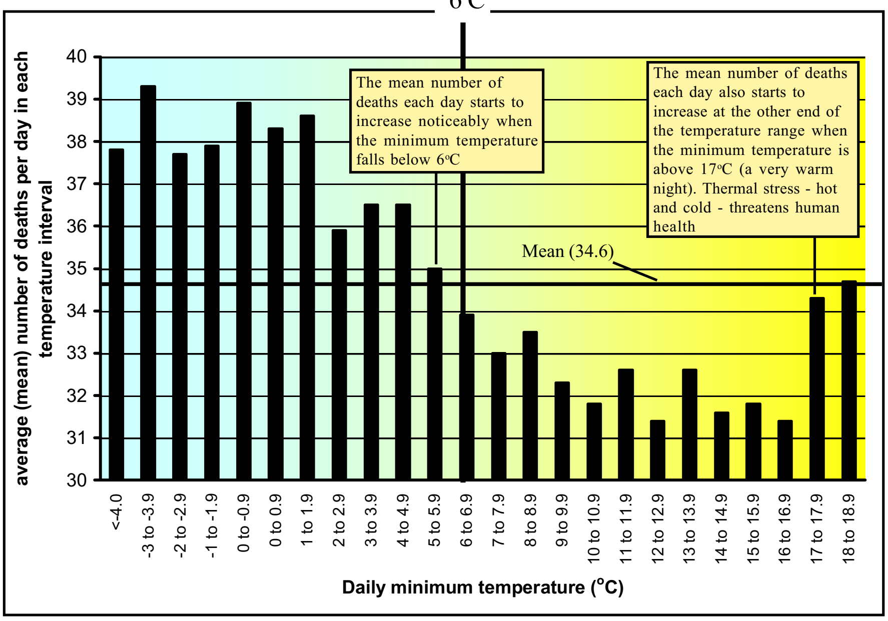
The **top chart** compares the distribution of the proportions of days and deaths occurring at each temperature interval. If temperature had no influence on death, then there ought to be no difference in the size of the bars for days and deaths within intervals. Instead, when the daily minimum temperature is below 6 ºC then there are proportionally more deaths (larger bars) than expected. Conversely, at minimum temperatures above 6º C, there are proportionally fewer deaths.

Number of deaths occurring at each temperature interval

At temperatures **below 6 ºC**, the average number of deaths each day is consistently **higher** than the overall daily average for the period.

At temperatures **above 6 ºC**, the average number of deaths each day is consistently **lower** than the overall daily average for the period.

6ºC



How does the frequency of deaths change with temperature?

The **bottom chart** illustrates the same data in the chart above but in a different way. This shows the average (mean) number of deaths that occurred each day for each temperature interval. This ranged from an average of about 31 deaths per day on days when temperature minima were mild (range from 10 to 17 ºC) up to an average of 38 or 39 deaths on days when minima were very cold (less than 2 ºC).

Don't wait until it freezes

Actions to reduce winter deaths need to start before temperatures reach freezing level.

Part 2

Measuring response

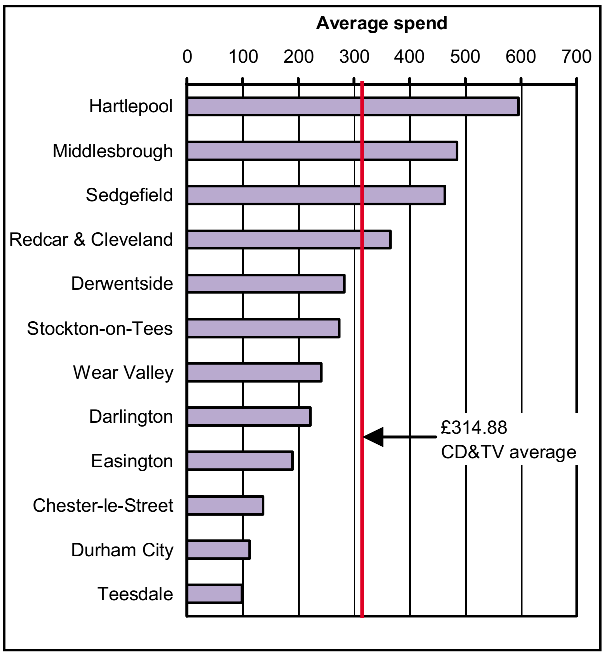
- Energy efficiency investment
- Energy efficiency improvement

Investment in energy efficiency measures is occurring everywhere but there are great variations in average spend per household

About £149 million has been spent in the entire area for the seven years from 1996/97 to 2002/03. Total expenditure and spend per household in each local authority area is shown right (table). The mean spend per household (top graph) ranges from £98 in Teesdale to £596 in Hartlepool representing a 6-fold difference in investment. The pattern of cumulative spend per household and energy efficiency improvements for each of the local areas reveals the differences in more detail (graphs, page opposite).

Local authority	Total spend	Spend per household	Energy use per HH Baseline	Energy use per HH 2002/03
Middlesbrough	£26,751,000	£484.94	138	103
Hartlepool	£22,285,400	£596.11	99	90
Redcar & Cleveland	£20,991,294	£365.44	132	115
Stockton-on-Tees	£19,948,000	£273.44	131	101
Sedgefield	£17,369,000	£463.00	118	106
Derwentside	£10,305,000	£282.47	120	108
Darlington	£9,404,600	£222.28	129	112
Easington	£7,332,000	£189.03	154	126
Wear Valley	£6,382,000	£240.91	107	84
Durham City	£3,923,000	£112.58	102	93
Chester-le-Street	£3,119,000	£136.49	107	97
Teesdale	£1,031,000	£98.54	144	132
All Areas	**£148,841,294**	**£314.88**	**121**	**106**

Average spend (£s) per household, 1996/97-2002/03



There have been improvements in energy efficiency everywhere but these are not necessarily related to investment

Total improvements in energy efficiency over the 7 years range from less than 10% to more that 25% (bottom graph). The size of these improvements may not always be related to the investment and might also be influenced by differences in methods of calculating energy efficiency. The potential for gains in energy efficiency may be influenced by baseline energy consumption however there does not appear to be any relationship between baseline energy use and investment.

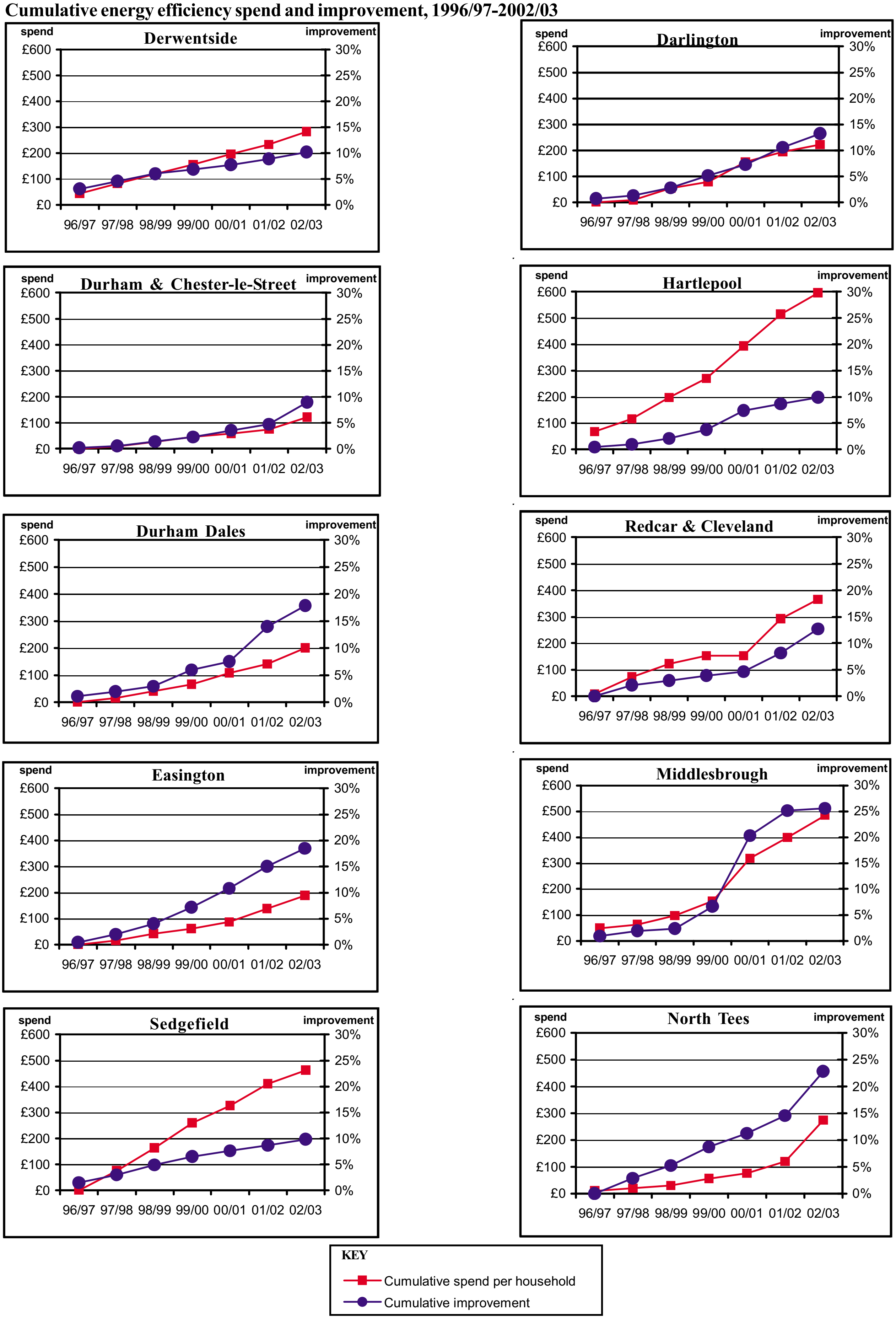
Total improvement in energy efficiency, 1996/97 to 2002/03

Summary points

1. There is a 6-fold difference in investment to improve home energy efficiency
2. Energy improvements vary between areas and are not necessarily directly related to investment

References:
HECA monitoring Reports

Cumulative energy efficiency spend and improvement, 1996/97-2002/03



The areas with the lowest investment in energy efficiency measures tend to be the areas with the highest excess winter deaths

The spending per household and the excess winter deaths index for each local authority area are shown below (table). The mean spend per household ranges from £98 in Teesdale to £596 in Hartlepool representing a 6-fold difference in investment. The EWDI ranges from 17.3 in Hartlepool to 29.4 in Chester-le-Street representing a 1.7-fold difference in excess winter mortality.

When the relationship between these measures is plotted (graph), three groups of localities emerge:

Local authority	Total spend (£)	Spend per household	Excess winter deaths index
Middlesbrough	26,751,000	484.94	19.3
Hartlepool	22,285,400	596.11	17.3
Redcar & Cleveland	20,991,294	365.44	17.6
Stockton-on-Tees	19,948,000	273.44	19.5
Sedgefield	17,369,000	463.00	17.5
Derwentside	10,305,000	282.47	22.8
Darlington	9,404,600	222.28	17.7
Easington	7,332,000	189.03	22.9
Wear Valley	6,382,000	240.91	17.4
Durham City	3,923,000	112.58	23.8
Chester-le-Street	3,119,000	136.49	29.4
Teesdale	1,031,000	98.54	17.7
All areas	**148,841,294**	**314.88**	**20.2**

1. Areas with higher than average spend and lower than average excess deaths
   Hartlepool, Middlesbrough, Sedgefield and Redcar & Cleveland

2. Areas with lower than average spend and lower than average excess deaths
   Stockton-on-Tees, Wear Valley, Darlington and Teesdale

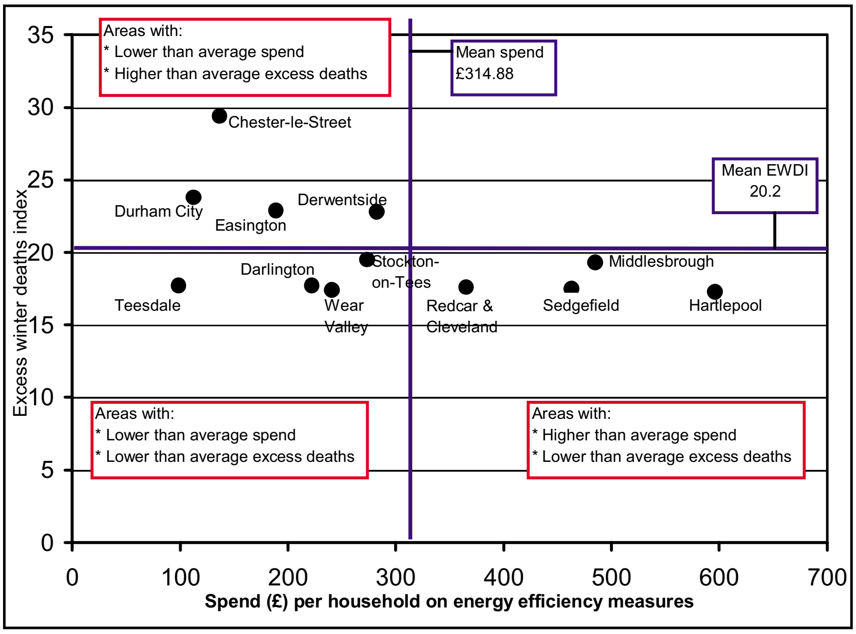
3. Areas with lower than average spend and higher than average excess deaths
   Derwentside, Easington, Chester-le-Street and Durham City

Areas with the lowest excess winter deaths have very different levels of investment in energy efficiency measures

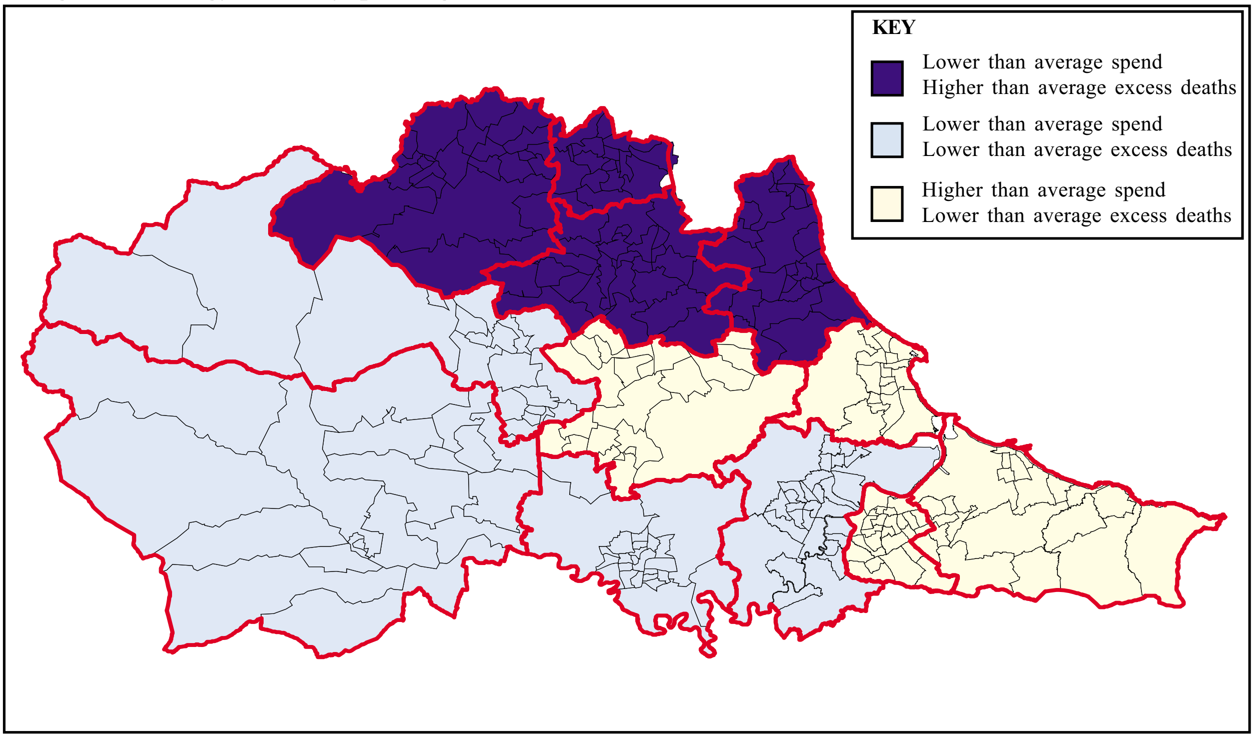
The relationship between investment in energy efficiency and the scale of excess winter deaths is not straightforward. Clearly, there are eight localities all with lower than average EWDI values (in a very narrow range) but with a 6-fold difference in spending per household. This suggests that excess winter mortality is influenced not only by the important matter of household energy efficiency but by several others too.

The local evidence also raises the question as to what might be the 'right' level of investment for any corresponding reduction(s) in mortality.

Relationship between spending on energy efficiency measures and excess winter deaths, County Durham & Tees Valley, 1997/98-2002/03



Categories of energy efficiency spending and excess winter deaths, 1997/98-2002/03



Understanding the geographical expressions of risk might also help to determine how best to reduce risk

The geographical 'zoning' (map) that emerges from the relationship between spending and excess mortality might give more focus to the many efforts intended to reduce inequalities in risk and maximise equitable investment in interventions designed to promote better health.

> 'Researchers have not previously tried to calculate whether these deaths are related to **home temperatures**, **outdoor temperatures** or **temperatures at work**.'

References:
HECA monitoring Reports

Summary points

1. Areas with lower than average investment in home energy efficiency measures tend to have the highest excess winter mortality
2. In areas with lower than average excess winter mortality, there are large differences in investment
3. Household warmth is an important, but not sole, influence on the likelihood of excess winter deaths

Energy efficiency summary

- Energy efficiency is improving in all areas.
- There is no standard method for calculating improvements thus making direct comparison between areas difficult.
- There are wide variations between localities in terms of investment in domestic energy efficiency schemes.
- On average, over £21 million has been invested locally in domestic energy efficiency measures each year, for the 7 years studied.
- Improvements in energy efficiency are not always related to investment.
- Because there are many schemes for improving energy efficiency, these could appear to be confusing and unco-ordinated. Although initiatives to improve energy efficiency are to be encouraged, it might be that these do not benefit those most in need.
- The main focus of many (though not all) energy saving schemes appears to be reduction of carbon emissions to meet targets. HECA annual reports form part of the monitoring system for carbon emissions.
- Areas with lower than average investment in domestic energy efficiency measures tend to have higher excess winter mortality.
- The number of fuel poor households appears to have fallen. However, fuel poverty is dependent on factors such as employment and fuel prices, so rates can vary in short time periods especially when fuel costs rise rapidly.
- At baseline, households in the highest energy using authority were using 54% more energy, on average, than those in the lowest. By 2003 they were using 56% more.
- Improving the warmth of homes is not the only factor in influencing the number of excess winter deaths.

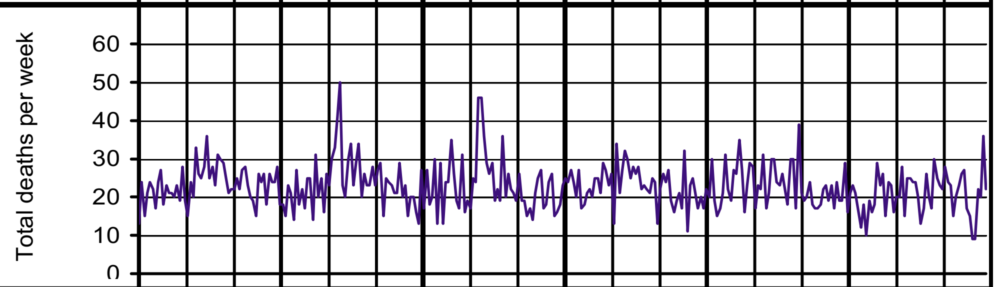
The range of local activities is described in detail in the Appendix.

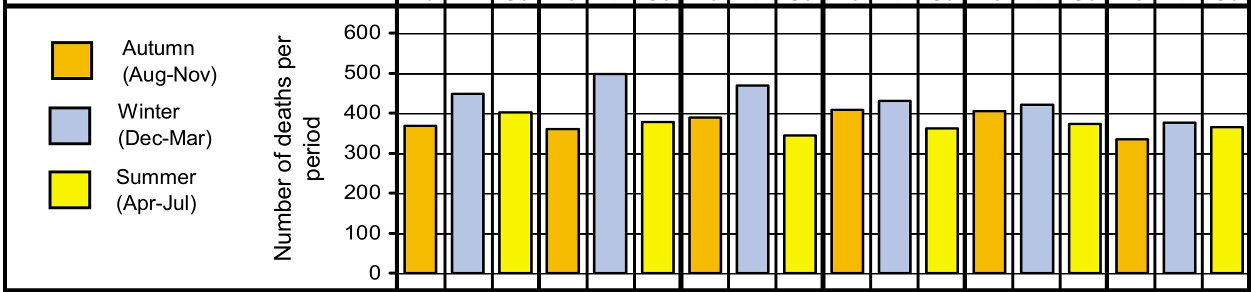
Part 3

Looking locally

- Deaths per week and season
- Excess winter deaths by age, sex, and cause
- Fuel poverty
- Energy efficiency and improvement
    - Darlington
    - Derwentside
    - Durham & Chester-le-Street
    - Durham Dales
    - Easington
    - Sedgefield
    - Hartlepool
    - Langbaurgh
    - Middlesbrough
    - North Tees

Darlington



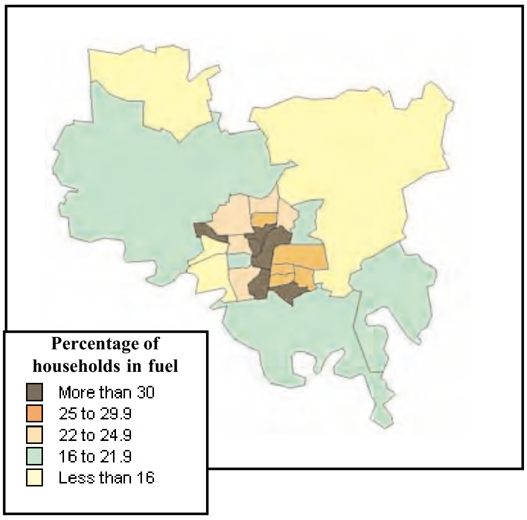


Year & Season		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable		Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)			63			131			102			46			32			26	
Excess winter deaths index (EWDI)			16.2			35.4			27.6			11.8			8.2			7.3	
Sex																			
Males	No. deaths	184	203	195	158	229	187	177	217	143	187	216	169	185	196	174	160	185	169
	EWDI		7.1			32.8			35.6			21.3			9.2			12.5	
Females	No. deaths	184	245	208	202	270	190	213	252	202	222	215	193	220	225	199	175	191	197
	EWDI		25.0			37.8			21.4			3.6			7.4			2.7	
Age																			
0-64	No. deaths	58	78	73	61	57	56	74	69	62	61	81	58	68	66	48	61	71	53
	EWDI		19.1			-2.6			1.5			36.1			13.8			24.6	
65-74	No. deaths	82	92	90	89	96	83	72	102	63	93	66	68	85	97	81	71	69	75
	EWDI		5.7			11.6			51.1			-18.0			16.9			-5.5	
75-84	No. deaths	117	137	133	115	193	133	122	169	111	133	159	136	132	137	130	105	135	137
	EWDI		9.6			55.6			45.1			18.2			4.6			11.6	
85+	No. deaths	111	141	107	95	153	105	122	129	109	122	125	100	120	121	114	98	101	101
	EWDI		29.4			53.0			11.7			12.6			3.4			1.5	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	54	85	47	46	96	43	52	95	44	55	59	36	36	60	57	46	47	39
	EWDI		68.3			115.7			97.9			29.7			29.0			10.6	
Circulatory disease (ICD10 - I00-I99)	No. deaths	162	186	175	169	220	170	149	191	153	170	165	147	168	191	128	123	158	145
	EWDI		10.4			29.8			26.5			4.1			29.1			17.9	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	368	448	403	360	499	377	390	469	345	409	431	362	405	421	373	335	376	366
	EWDI		16.2			35.4			27.6			11.8			8.2			7.3	

1. Characteristics of housing and households

Household Characteristic	*Number*	*Percent*	*Source (notes)*
Owner occupied	30,350	71.73%	2001 Census
Local authority rented	6,048	14.29%	2001 Census
Housing association rented	1,607	3.80%	2001 Census
Other	4,304	10.17%	2001 Census
Total	42,309	100.00%	2001 Census
Underoccupied Households	21,985	51.96%	2001 Census (occupancy rating +2 or more)
People aged 60+	21,789	22.27%	2001 Census
Fuel poor households (1996)	10,205	24.12%	Profile in Tees & Durham LASP
Fuel poor households (2001)	4,451	10.52%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	5,467,963		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	129		derived

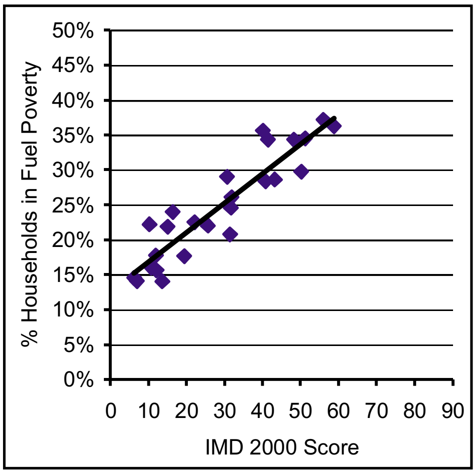
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district.

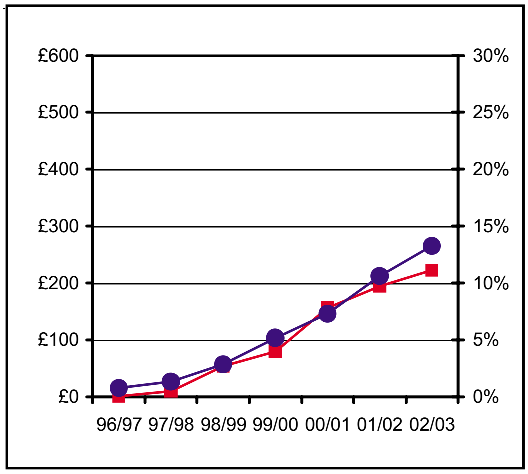
Fuel poverty is strongly linked to material deprivation.

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

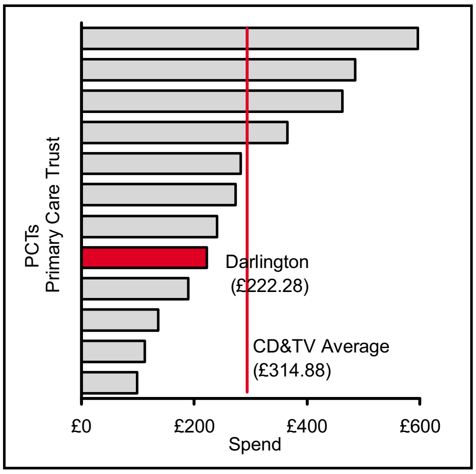
Energy efficiency spend & improvement



The spend in this district amounted to £9.4 million.

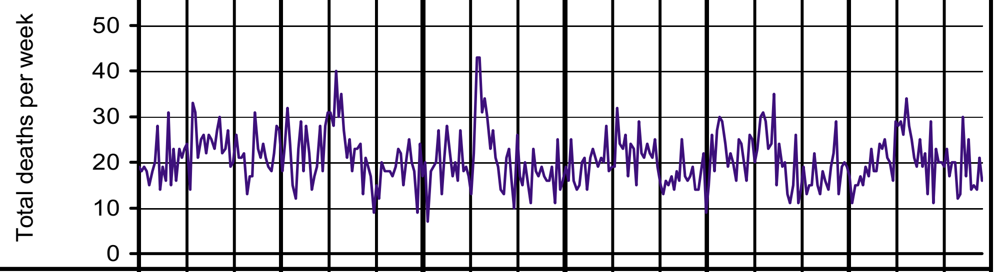
The spend in this district per household is **below** average for the CD&TV area.

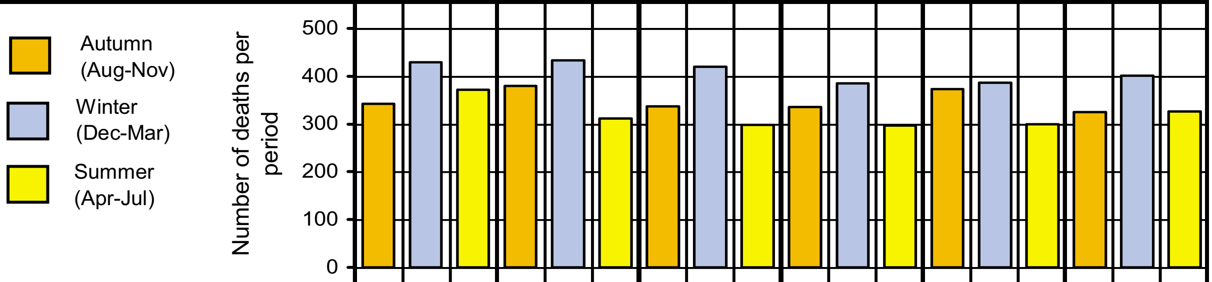
Spend per household



Measure	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*	*Total*
Annual energy efficiency spend per household	£0.69	£8.98	£44.13	£25.73	£76.72	£37.91	£28.13	£222.28
Annual energy efficiency improvement	0.76%	0.57%	1.54%	2.40%	2.23%	3.57%	2.97%	13.26%

Derwentside



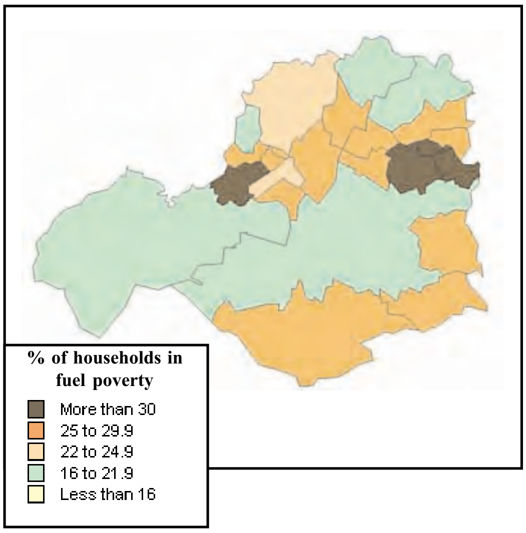


Year & Season		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable		Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)		72			88			102			69			50			75		
Excess winter deaths index (EWDI)		20.2			25.4			32.1			21.8			14.8			23.0		
Sex																			
Males	No. deaths	161	199	182	166	198	158	172	184	137	159	187	141	175	165	131	159	171	150
	EWDI	16.0			22.2			19.1			24.7			7.8			10.7		
Females	No. deaths	181	230	190	214	236	154	165	236	162	177	198	155	199	222	169	166	230	177
	EWDI	24.0			28.3			44.3			19.3			20.7			34.1		
Age																			
0-64	No. deaths	69	64	64	77	68	61	57	64	51	78	64	50	70	52	46	64	71	66
	EWDI	-3.8			-1.4			18.5			0.0			-10.3			9.2		
65-74	No. deaths	70	85	82	78	93	80	84	100	64	69	73	58	70	75	53	68	89	55
	EWDI	11.8			17.7			35.1			15.0			22.0			44.7		
75-84	No. deaths	119	162	128	122	135	78	115	138	92	94	135	111	121	140	97	118	131	108
	EWDI	31.2			35.0			33.3			31.7			28.4			15.9		
85+	No. deaths	84	118	98	103	138	93	81	118	92	95	113	77	113	120	104	75	110	98
	EWDI	29.7			40.8			36.4			31.4			10.6			27.2		
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	50	92	61	42	106	43	48	108	45	47	64	33	46	63	33	35	73	38
	EWDI	65.8			149.4			132.3			60.0			59.5			100.0		
Circulatory disease (ICD10 - I00-I99)	No. deaths	154	202	160	178	202	126	127	162	132	128	174	113	148	156	118	127	149	136
	EWDI	28.7			32.9			25.1			44.4			17.3			13.3		
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	342	429	372	380	434	312	337	420	299	336	385	296	374	387	300	325	401	327
	EWDI	20.2			25.4			32.1			21.8			14.8			23.0		

1. Characteristics of housing and households

Household Characteristic	*Number*	*Percent*	*Source (notes)*
Owner occupied	25,103	68.80%	2001 Census
Local authority rented	8,095	22.20%	2001 Census
Housing association rented	922	2.50%	2001 Census
Other	2,362	6.50%	2001 Census
Total	36,482	100.00%	2001 Census
Underoccupied Households	17,000	46.60%	2001 Census (occupancy rating +2 or more)
People aged 60+	19,408	22.81%	2001 Census
Fuel poor households (1996)	8,749	23.98%	Profile in Tees & Durham LASP
Fuel poor households (2001)	3,865	10.59%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	4,377,840		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	120		derived

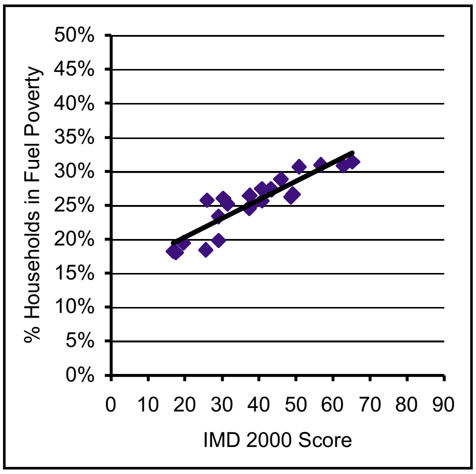
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district.

Fuel poverty is strongly linked to material deprivation.

Fuel poverty and deprivation



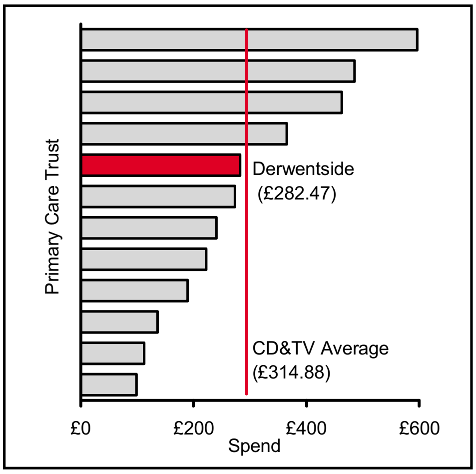
2. Energy efficiency investment and improvement

Energy efficiency spend & improvement

The spend in this district amounted to £10.3 million.

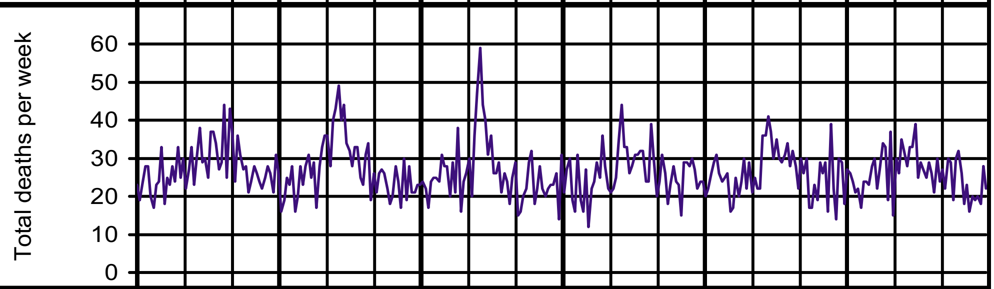
The spend in this district per household is **below** average for the CD&TV area.

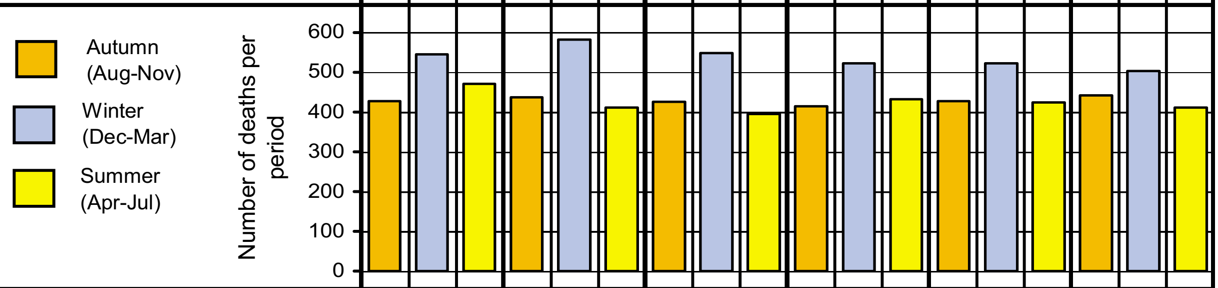
Spend per household



Measure	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*	*Total*
Annual energy efficiency spend per household	£43.69	£39.12	£35.36	£36.48	£40.84	£36.65	£50.33	£282.47
Annual energy efficiency improvement	3.08%	1.50%	1.50%	0.92%	0.92%	1.25%	1.46%	10.17%

Durham & Chester-le-Street



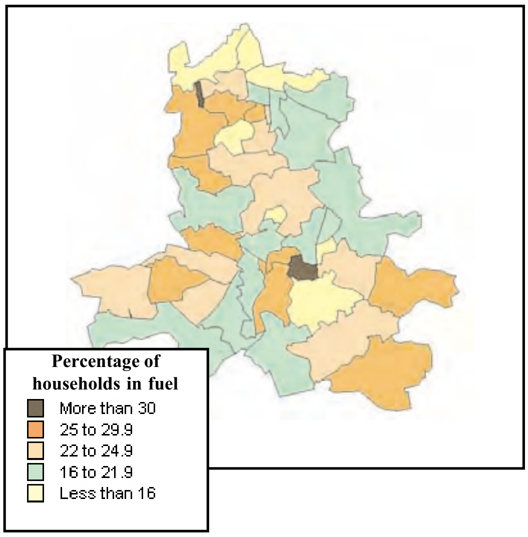


Variable	Year & Season	1997/98 Au	Wi	Su	1998/99 Au	Wi	Su	1999/00 Au	Wi	Su	2000/01 Au	Wi	Su	2001/02 Au	Wi	Su	2002/03 Au	Wi	Su
Excess winter deaths (EWD)			96			158			138			98			96			78	
Excess winter deaths index (EWDI)			21.4			37.1			33.5			23.0			22.4			18.2	
Sex																			
Males	No. deaths	201	258	233	201	275	197	205	269	205	208	220	200	213	263	191	214	248	192
	EWDI		18.9			38.2			31.2			7.8			30.2			22.2	
Females	No. deaths	226	287	238	236	307	215	221	279	190	207	301	232	214	258	233	227	255	218
	EWDI		23.7			36.1			35.8			37.1			15.4			14.6	
Age																			
0-64	No. deaths	89	100	110	76	104	83	84	106	85	75	88	89	85	76	76	70	94	76
	EWDI		0.5			30.8			25.4			7.3			-5.6			28.8	
65-74	No. deaths	114	134	109	100	132	98	91	118	101	94	115	81	87	107	83	89	113	90
	EWDI		20.2			33.3			22.9			31.4			25.9			26.3	
75-84	No. deaths	132	179	136	145	180	135	143	188	116	138	181	151	148	180	152	155	160	136
	EWDI		33.6			28.6			45.2			25.3			20.0			10.0	
85+	No. deaths	92	132	116	116	166	96	108	136	93	108	137	111	107	158	113	127	136	108
	EWDI		26.9			56.6			35.3			25.1			43.6			15.7	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	60	87	70	63	105	58	61	107	55	67	79	48	36	77	51	57	71	40
	EWDI		33.8			73.6			84.5			37.4			77.0			46.4	
Circulatory disease (ICD10 - I00-I99)	No. deaths	181	255	205	183	257	172	180	223	176	154	222	192	174	207	152	172	208	178
	EWDI		32.1			44.8			25.3			28.3			27.0			18.9	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	427	545	471	437	582	412	426	548	395	415	521	432	427	521	424	441	503	410
	EWDI		21.4			37.1			33.5			23.0			22.4			18.2	

1. Characteristics of housing and households

Household Characteristic	Number	Percent	Source (notes)
Owner occupied	40,061	69.43%	2001 Census
Local authority rented	11,263	19.52%	2001 Census
Housing association rented	2,130	3.69%	2001 Census
Other	4,244	7.36%	2001 Census
Total	57,698	100.00%	2001 Census
Underoccupied Households	29,464	51.07%	2001 Census (occupancy rating +2 or more)
People aged 60+	30,732	21.73%	2001 Census
Fuel poor households (1996)	11,270	19.53%	Profile in Tees & Durham LASP
Fuel poor households (2001)	4,998	8.66%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	6,004,316		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	104		derived

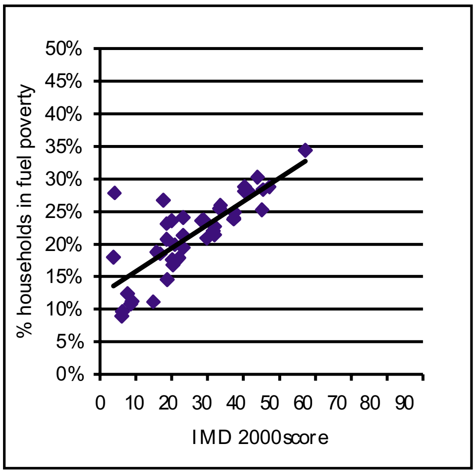
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district.

Fuel poverty is strongly linked to material deprivation.

Fuel poverty and deprivation



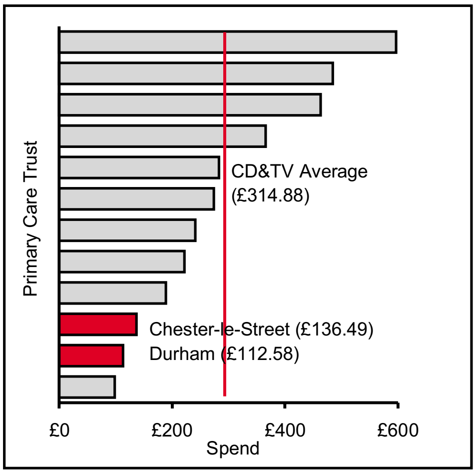
2. Energy efficiency investment and improvement

Energy efficiency spend & improvement

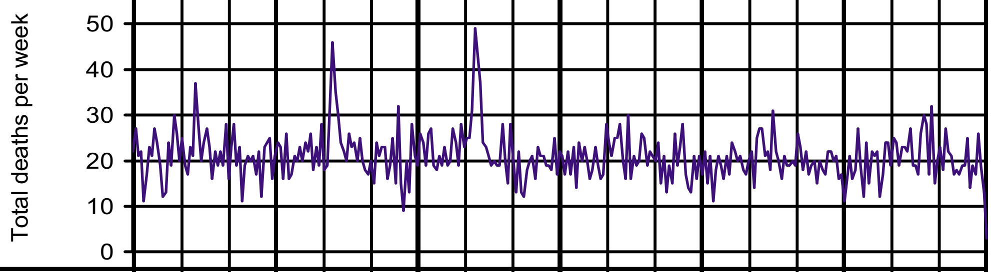
The spend in this district amounted to £7 million.

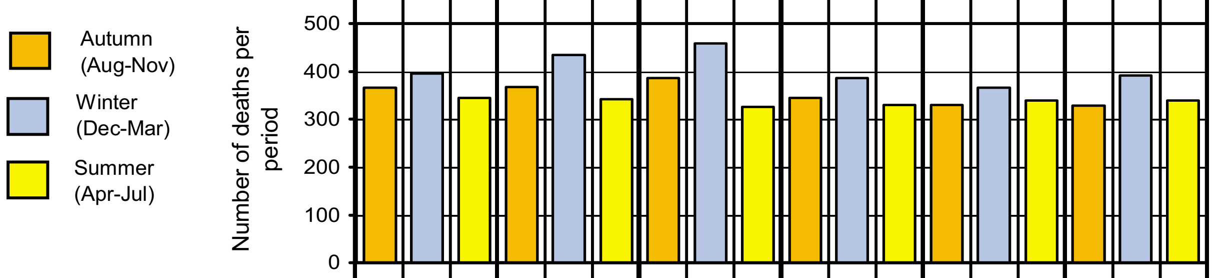
The spend in these districts per household is **below** average for the CD&TV area.

Spend per household



Measure	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	Total
Annual energy efficiency spend per household	£0.42	£8.41	£17.94	£18.30	£13.69	£16.15	£47.14	£122.05
Annual energy efficiency improvement	0.20%	0.38%	0.81%	0.91%	1.35%	1.19%	4.47%	9.00%



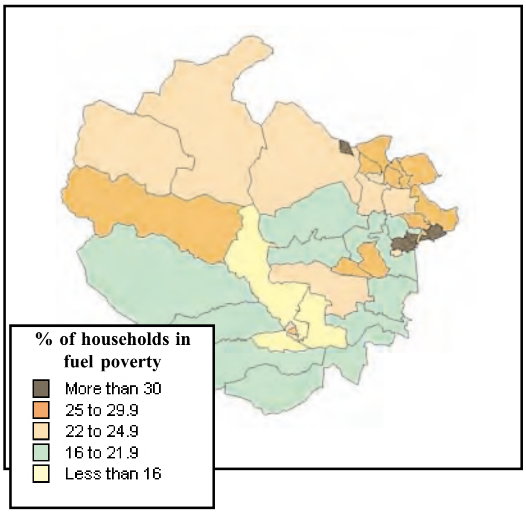


Year & Season		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable		Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)		41			80			102			49			32			58		
Excess winter deaths index (EWDI)		11.4			22.5			28.7			14.4			9.6			17.4		
Sex																			
Males	No. deaths	178	190	173	166	189	166	186	225	160	159	203	137	157	159	158	149	179	148
	EWDI	8.3			13.9			30.1			37.2			1.0			20.5		
Females	No. deaths	188	206	172	202	246	176	200	233	166	186	183	193	173	208	182	179	213	192
	EWDI	14.4			30.2			27.3			-3.4			17.2			14.8		
Age																			
0-64	No. deaths	70	67	54	63	68	68	74	72	67	64	54	63	59	54	63	53	63	67
	EWDI	8.1			3.8			2.1			-15.0			-11.5			5.0		
65-74	No. deaths	89	84	80	71	81	78	86	97	65	61	80	66	77	75	58	60	65	56
	EWDI	-0.6			8.7			28.5			26.0			11.1			12.1		
75-84	No. deaths	120	133	118	123	147	122	129	151	97	113	151	108	103	131	112	117	139	112
	EWDI	11.8			20.0			33.6			36.7			21.9			21.4		
85+	No. deaths	87	112	93	111	139	74	97	138	97	107	101	93	91	107	107	98	125	105
	EWDI	24.4			50.3			42.3			1.0			8.1			3.4		
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	46	84	43	44	97	47	58	112	50	47	65	24	31	63	39	45	50	56
	EWDI	88.8			113.2			107.4			83.1			80.0			-1.0		
Circulatory disease (ICD10 - I00-I99)	No. deaths	174	162	141	165	178	131	151	192	133	131	167	147	129	153	134	131	158	129
	EWDI	2.9			20.3			35.2			20.1			16.3			21.5		
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	366	396	345	368	435	342	386	458	326	345	386	330	330	367	340	328	392	340
	EWDI	11.4			22.5			28.7			14.4			9.6			17.4		

1. Characteristics of housing and households

Household Characteristic	Number	Percent	Source (notes)
Owner occupied	25,114	67.96%	2001 Census
Local authority rented	6,002	16.24%	2001 Census
Housing association rented	1,819	4.92%	2001 Census
Other	4,019	10.88%	2001 Census
Total	36,954	100.00%	2001 Census
Underoccupied Households	18,496	50.05%	2001 Census (occupancy rating +2 or more)
People aged 60+	20,418	23.80%	2001 Census
Fuel poor households (1996)	8,774	23.74%	Profile in Tees & Durham LASP
Fuel poor households (2001)	3,861	10.45%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	4,351,856		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	118		derived

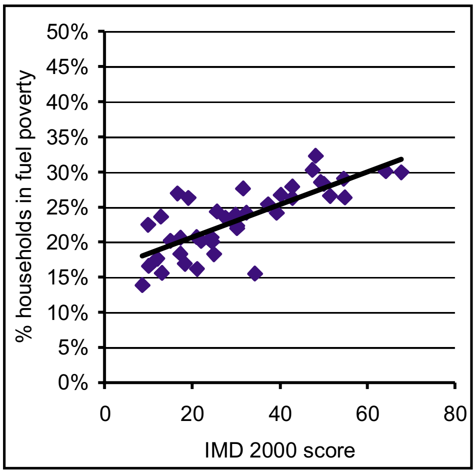
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district. ←

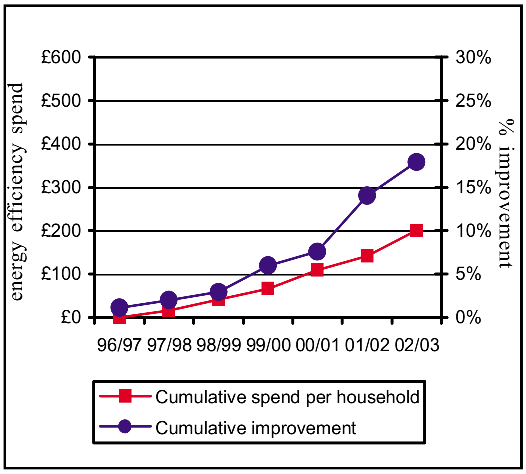
Fuel poverty is strongly linked to material deprivation. →

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

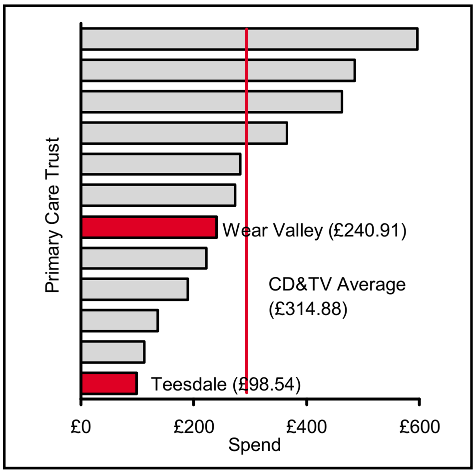
Energy efficiency spend & improvement



The spend in this district amounted to £7.4 million. ←

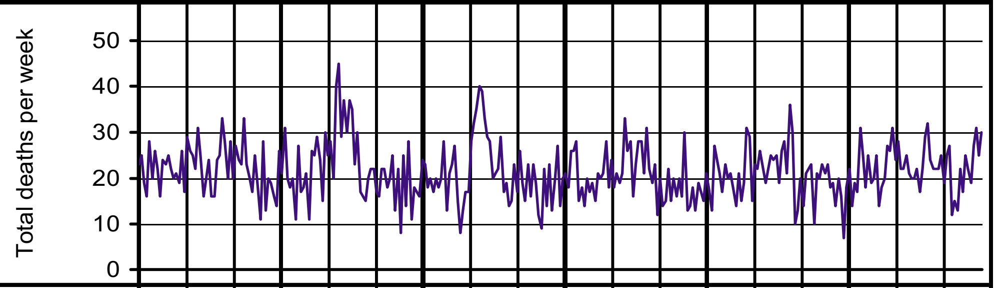
The spend in these districts per household is **below** average for the CD&TV area. →

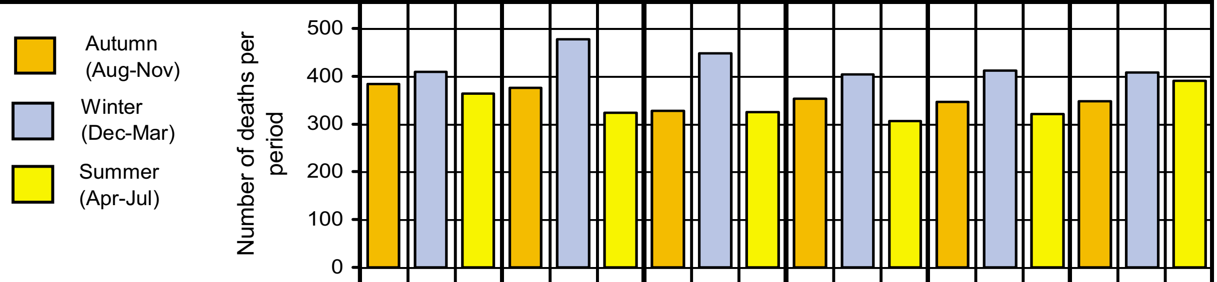
Spend per household



Measure	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	Total
Annual energy efficiency spend per household	£0.00	£15.42	£25.38	£25.38	£42.62	£32.34	£59.45	£200.60
Annual energy efficiency improvement	0.89%	0.75%	0.87%	2.93%	1.54%	6.15%	3.78%	15.44%

Easington



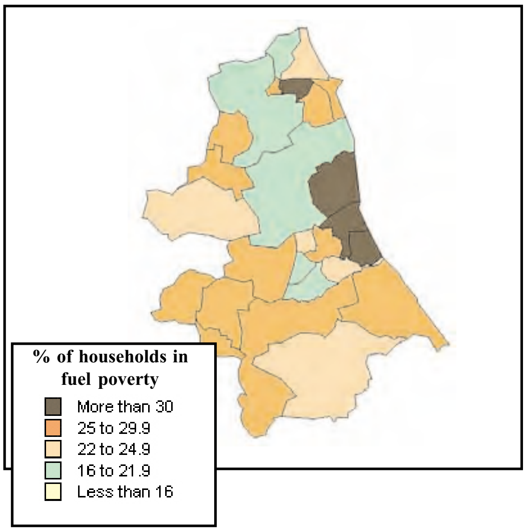


Year & Season	Variable	1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
		Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)			35			129			123			74			79			39	
Excess winter deaths index (EWDI)			9.4			36.8			37.5			22.4			23.5			10.6	
Sex																			
Males	No. deaths	185	203	182	192	231	165	154	221	161	169	184	161	187	210	154	174	186	193
	EWDI		10.6			29.4			40.3			11.5			23.2			1.4	
Females	No. deaths	199	206	182	184	247	158	174	228	164	185	220	145	159	202	167	174	222	197
	EWDI		8.1			44.4			34.9			33.3			23.9			19.7	
Age																			
0-64	No. deaths	91	64	67	69	78	74	60	73	75	67	72	56	74	85	55	70	72	73
	EWDI		-19.0			9.1			8.1			17.1			31.8			0.7	
65-74	No. deaths	115	115	114	100	107	74	88	112	68	74	84	80	90	87	68	80	84	84
	EWDI		0.4			23.0			43.6			9.1			10.1			2.4	
75-84	No. deaths	98	133	111	121	166	89	109	153	95	120	135	115	115	149	117	112	158	129
	EWDI		27.3			58.1			50.0			14.9			28.4			31.1	
85+	No. deaths	80	97	72	86	127	86	71	111	87	93	113	55	67	91	81	86	94	104
	EWDI		27.6			47.7			40.5			52.7			23.0			-1.1	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	36	72	55	56	117	39	51	93	47	50	57	36	42	62	38	33	60	61
	EWDI		58.2			146.3			89.8			32.6			55.0			27.7	
Circulatory disease (ICD10 - I00-I99)	No. deaths	180	189	155	170	188	146	135	182	135	128	165	134	135	187	127	131	144	131
	EWDI		12.8			19.0			34.8			26.0			42.7			9.9	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	384	409	364	376	478	323	328	449	325	354	404	306	346	412	321	348	408	390
	EWDI		9.4			36.8			37.5			22.4			23.5			10.5	

1. Characteristics of housing and households

Household Characteristic	***Number***	***Percent***	***Source (notes)***
Owner occupied	24,282	62.60%	2001 Census
Local authority rented	9,941	25.63%	2001 Census
Housing association rented	1,479	3.81%	2001 Census
Other	3,086	7.96%	2001 Census
Total	38,788	100.00%	2001 Census
Underoccupied Households	15,092	38.91%	2001 Census (occupancy rating +2 or more)
People aged 60+	21,056	22.40%	2001 Census
Fuel poor households (1996)	10,182	26.25%	Profile in Tees & Durham LASP
Fuel poor households (2001)	4,283	11.04%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	5,976,327		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	154		derived

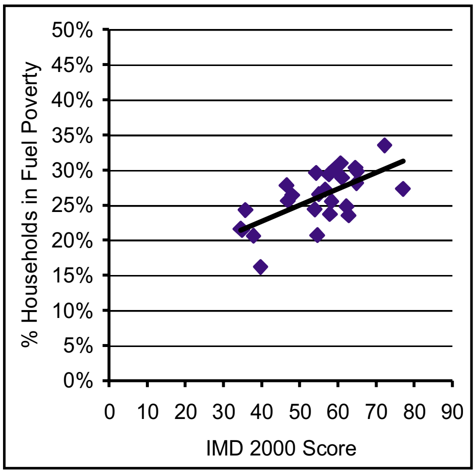
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district.

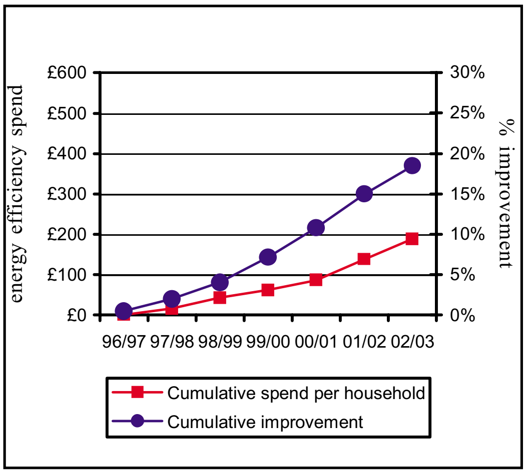
Fuel poverty is strongly linked to material deprivation.

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

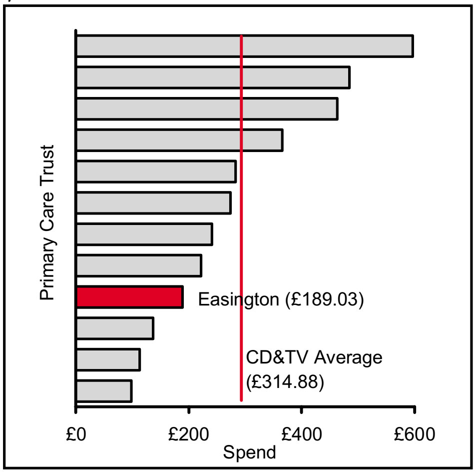
Energy efficiency spend & improvement



The spend in this district amounted to £7.3 million.

The spend in this district per household is **below** average for the CD&TV area.

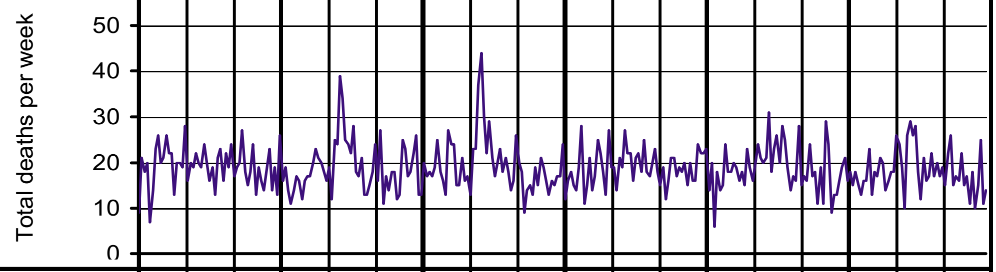
Spend per household

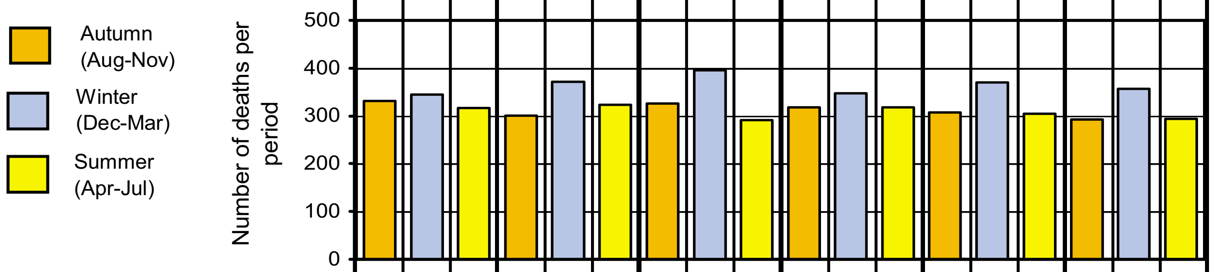


Measure	***1996/97***	***1997/98***	***1998/99***	***1999/00***	***2000/01***	***2001/02***	***2002/03***	***Total***
Annual energy efficiency spend per household	£0.00	£16.68	£26.27	£19.08	£25.01	£51.59	£50.40	£189.03
Annual energy efficiency improvement	0.50%	1.50%	2.10%	3.26%	3.90%	4.75%	4.07%	20.08%

Sedgefield

Year & Season	1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su



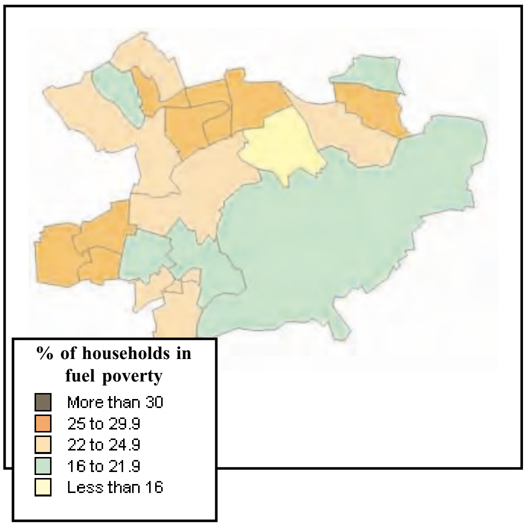


Variable		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Excess winter deaths (EWD)			22			60			88			30			64			64	
Excess winter deaths index (EWDI)			6.6			19.2			28.4			9.3			20.9			21.6	
Sex																			
Males	No. deaths	180	171	144	140	180	165	159	200	141	154	166	153	153	174	153	142	171	127
	EWDI		5.6			18.0			33.3			8.1			13.7			27.1	
Females	No. deaths	151	174	172	161	192	158	167	196	150	164	182	166	154	196	152	151	186	167
	EWDI		7.7			20.4			23.7			10.3			28.1			17.0	
Age																			
0-64	No. deaths	74	58	71	56	69	68	62	78	56	60	69	67	74	70	51	62	76	59
	EWDI		-20.0			11.3			32.2			8.7			12.0			25.6	
65-74	No. deaths	90	71	69	80	98	84	68	90	80	85	80	70	58	80	73	64	69	57
	EWDI		-10.7			19.5			21.6			3.2			22.1			14.0	
75-84	No. deaths	106	136	113	105	112	106	120	145	97	109	115	113	116	127	115	105	122	114
	EWDI		24.2			6.2			33.6			3.6			10.0			11.4	
85+	No. deaths	61	80	63	60	93	65	76	83	58	64	84	69	59	93	66	62	90	64
	EWDI		29.0			48.8			23.9			26.3			48.8			42.9	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	51	71	55	44	83	38	47	75	36	44	50	48	29	54	40	28	41	35
	EWDI		34.0			102.4			80.7			8.7			56.5			30.2	
Circulatory disease (ICD10 - I00-I99)	No. deaths	136	144	106	126	135	130	130	173	125	128	143	120	141	139	114	133	139	116
	EWDI		19.0			5.5			35.7			15.3			9.0			11.6	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	331	345	316	301	372	323	326	396	291	318	348	319	307	370	305	293	357	294
	EWDI		6.6			19.2			28.4			9.3			20.9			21.6	

1. Characteristics of housing and households

Household Characteristic	*Number*	*Percent*	*Source (notes)*
Owner occupied	24,294	64.76%	2001 Census
Local authority rented	9,901	26.39%	2001 Census
Housing association rented	1,205	3.21%	2001 Census
Other	2,114	5.64%	2001 Census
Total	37,514	100.00%	2001 Census
Underoccupied Households	17,125	45.65%	2001 Census (occupancy rating +2 or more)
People aged 60+	18,987	21.77%	2001 Census
Fuel poor households (1996)	8,149	21.72%	Profile in Tees & Durham LASP
Fuel poor households (2001)	3,525	9.40%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	4,412,375		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	118		derived

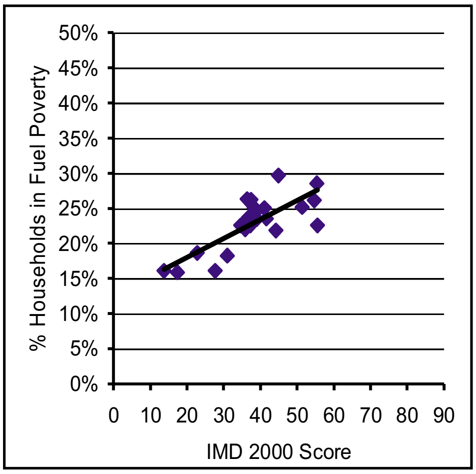
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district. ←

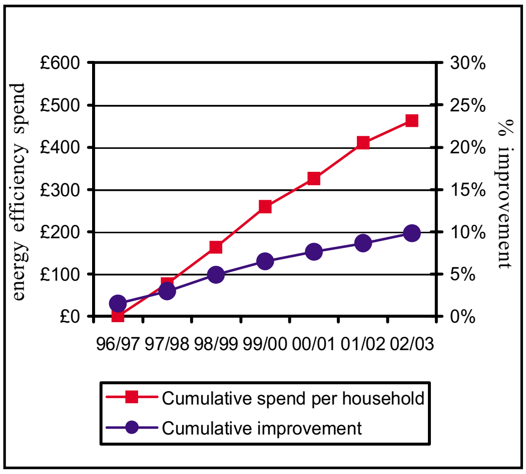
Fuel poverty is strongly linked to material deprivation. →

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

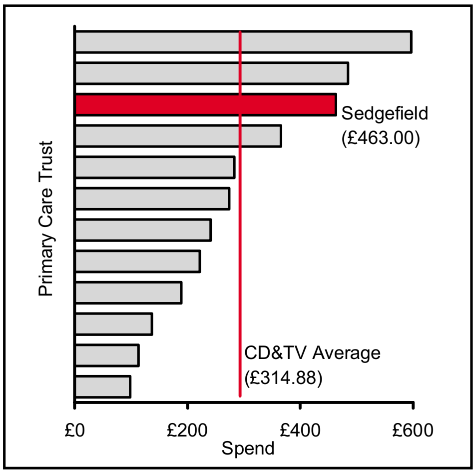
Energy efficiency spend & improvement



The spend in this district amounted to £17.4 million. ←

The spend in this district per household is **above** average for the CD&TV area. →

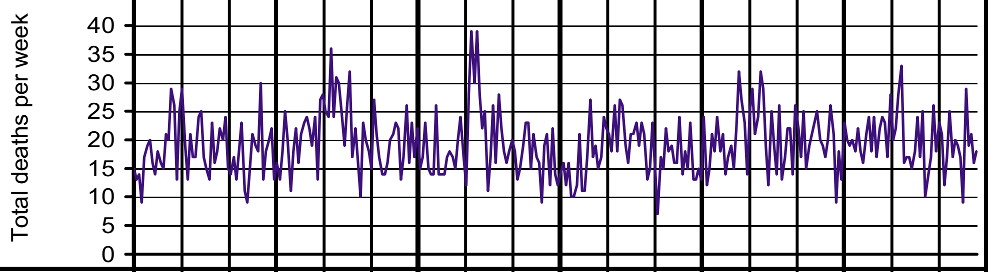
Spend per household

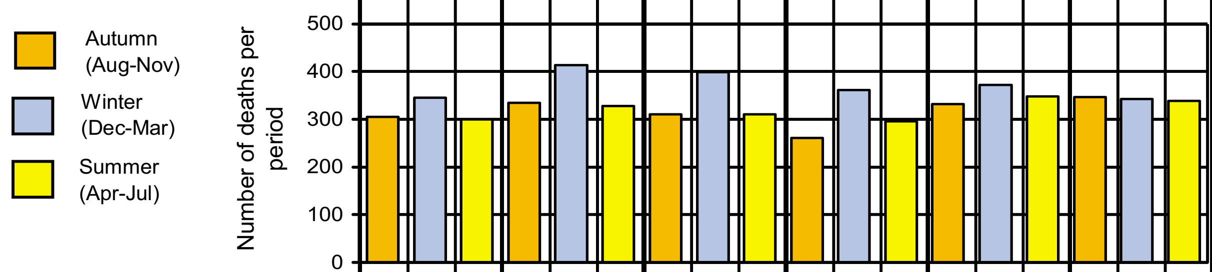


Measure	*1996/97*	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*2002/03*	*Total*
Annual energy efficiency spend per household	£0.00	£76.77	£87.09	£95.96	£66.08	£85.03	£52.06	£463.00
Annual energy efficiency improvement	1.50%	1.51%	1.98%	1.70%	1.20%	1.11%	1.29%	9.85%

Hartlepool

Year & Season	1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su



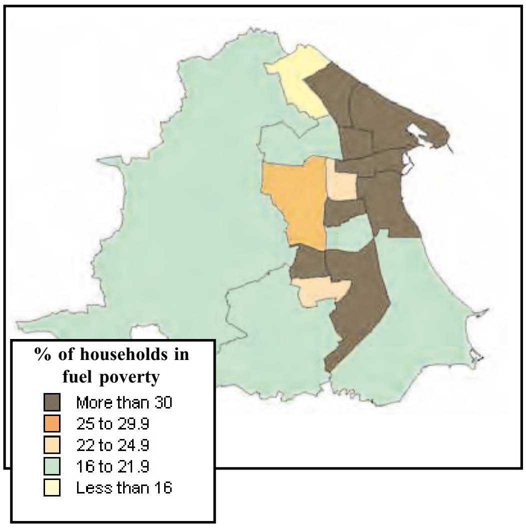


Variable		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
		Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)			43			82			89			84			32			1	
Excess winter deaths index (EWDI)			14.0			24.6			28.7			30.0			9.4			0.1	
Sex																			
Males	No. deaths	147	177	156	163	213	149	146	192	165	133	172	146	184	175	149	185	157	179
	EWDI		16.8			36.5			23.5			23.3			5.1			-13.7	
Females	No. deaths	158	168	144	172	200	179	164	207	145	128	190	150	148	197	199	161	186	160
	EWDI		11.3			14.0			34.0			36.7			13.5			15.9	
Age																			
0-64	No. deaths	58	82	65	66	72	75	58	76	71	58	64	75	61	76	61	70	58	78
	EWDI		33.3			2.1			17.8			-3.8			24.6			-21.6	
65-74	No. deaths	77	98	71	76	105	71	82	103	62	53	87	67	77	83	86	95	80	67
	EWDI		32.4			42.9			43.1			45.0			1.8			-1.2	
75-84	No. deaths	85	89	102	111	139	98	99	125	98	91	117	86	121	120	126	121	116	119
	EWDI		-4.8			33.0			26.9			32.2			-2.8			-3.3	
85+	No. deaths	85	76	62	82	97	84	71	95	79	59	94	68	73	93	75	60	89	75
	EWDI		3.4			16.9			26.7			48.0			25.7			31.9	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	40	57	41	52	92	46	43	95	42	27	43	28	46	69	25	44	47	36
	EWDI		40.7			87.8			123.5			56.4			94.4			17.5	
Circulatory disease (ICD10 - I00-I99)	No. deaths	132	144	109	129	157	137	114	140	112	102	154	101	138	139	163	130	138	109
	EWDI		19.5			18.0			23.9			51.7			-7.6			15.5	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	305	345	300	335	413	328	310	399	310	261	362	296	332	372	348	346	343	339
	EWDI		14.0			24.6			28.7			30.0			9.4			0.1	

1. Characteristics of housing and households

Household Characteristic	***Number***	***Percent***	***Source (notes)***
Owner occupied	23,558	63.01%	2001 Census
Local authority rented	7,389	19.76%	2001 Census
Housing association rented	2,562	6.85%	2001 Census
Other	3,876	10.37%	2001 Census
Total	37,385	100.00%	2001 Census
Underoccupied Households	18,144	48.53%	2001 Census (occupancy rating +2 or more)
People aged 60+	19,043	21.49%	2001 Census
Fuel poor households (1996)	10,436	27.91%	Profile in Tees & Durham LASP
Fuel poor households (2001)	4,625	12.37%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	3,717,149		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	99		derived

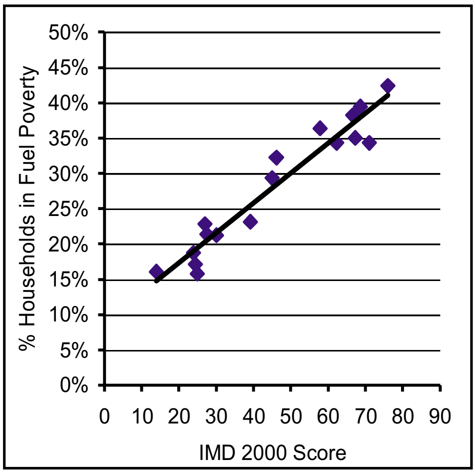
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district.

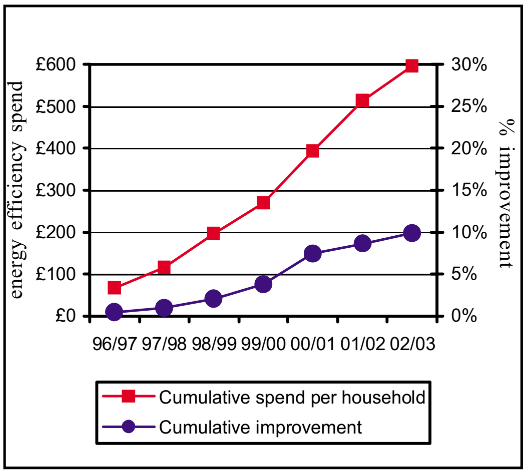
Fuel poverty is strongly linked to material deprivation.

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

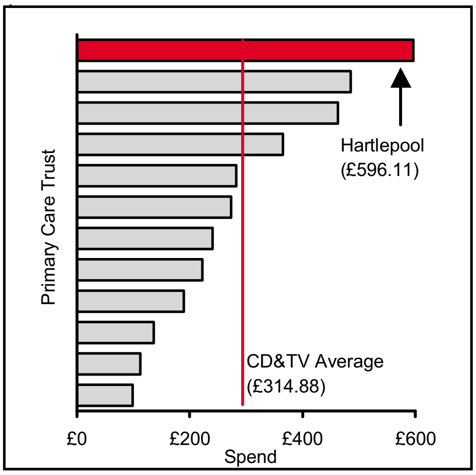
Energy efficiency spend & improvement



The spend in this district amounted to £22.3 million.

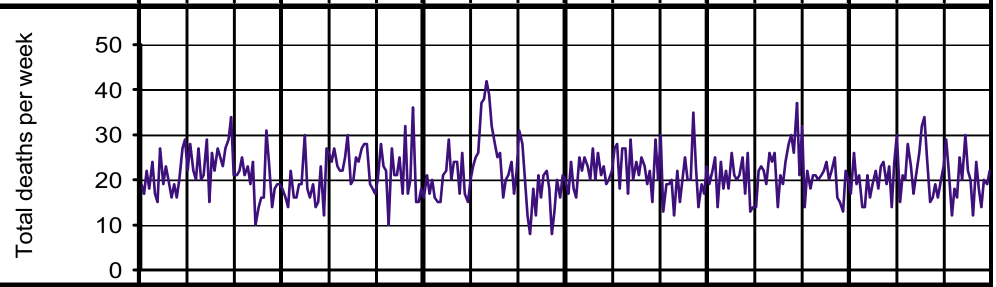
The spend in this district per household is **above** average for the CD&TV area.

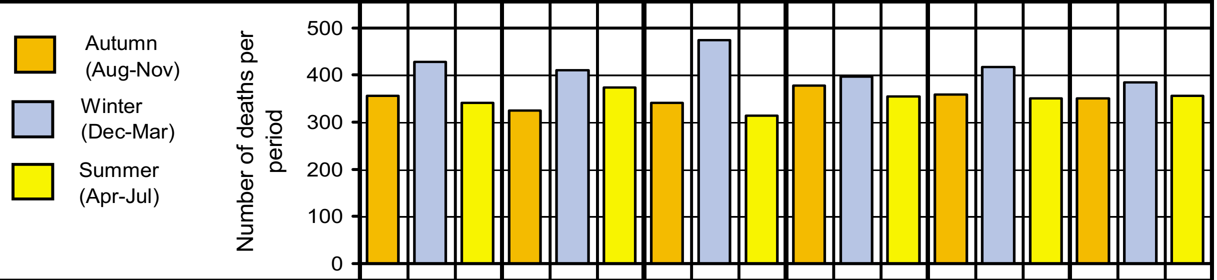
Spend per household



Measure	***1996/97***	***1997/98***	***1998/99***	***1999/00***	***2000/01***	***2001/02***	***2002/03***	***Total***
Annual energy efficiency spend per household	£67.17	£48.29	£81.56	£72.86	£123.58	£120.88	£81.77	£596.11
Annual energy efficiency improvement	0.45%	0.51%	1.11%	1.76%	3.77%	1.33%	1.38%	9.91%

Langbaurgh





Year & Season	Variable	1997/98 Au	1997/98 Wi	1997/98 Su	1998/99 Au	1998/99 Wi	1998/99 Su	1999/00 Au	1999/00 Wi	1999/00 Su	2000/01 Au	2000/01 Wi	2000/01 Su	2001/02 Au	2001/02 Wi	2001/02 Su	2002/03 Au	2002/03 Wi	2002/03 Su
Excess winter deaths (EWD)		80			62			147			31			63			31		
Excess winter deaths index (EWDI)		22.8			17.6			45.0			8.3			17.8			8.8		
Sex																			
Males	No. deaths	167	213	165	162	195	173	144	226	157	184	176	148	177	182	170	160	185	176
	EWDI	28.3			16.4			50.2			6.0			4.9			10.1		
Females	No. deaths	189	215	176	162	215	200	196	248	157	193	220	206	181	235	180	190	199	180
	EWDI	17.8			18.8			40.5			10.3			30.2			7.6		
Age																			
0-64	No. deaths	78	80	56	65	67	67	56	87	59	69	58	62	65	72	86	68	69	62
	EWDI	19.4			1.5			51.3			-11.5			-4.6			6.2		
65-74	No. deaths	70	87	72	65	92	76	81	87	77	81	87	59	70	71	61	59	75	68
	EWDI	22.5			30.5			10.1			24.3			8.4			18.1		
75-84	No. deaths	113	146	131	124	142	130	118	152	103	124	126	123	140	139	119	128	138	122
	EWDI	19.7			11.8			37.6			2.0			7.3			10.4		
85+	No. deaths	95	115	82	70	109	100	85	148	75	103	125	110	83	135	84	95	102	104
	EWDI	29.9			28.2			85.0			17.4			61.7			2.5		
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	48	85	44	53	60	52	54	96	47	46	62	49	35	70	49	40	57	40
	EWDI	84.8			14.3			90.1			30.5			66.7			42.5		
Circulatory disease (ICD10 - I00-I99)	No. deaths	138	185	151	126	180	149	153	204	115	143	157	134	132	168	132	134	150	155
	EWDI	28.0			30.9			52.2			13.4			27.3			3.8		
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	356	428	341	324	410	373	340	474	314	377	396	354	358	417	350	350	384	356
	EWDI	22.8			17.6			45.0			8.3			17.8			8.8		

1. Characteristics of housing and households

* data on this page relates to Redcar & Cleveland LA

Household Characteristic	***Number***	***Percent***	***Source (notes)***
Owner occupied	39,993	69.62%	2001 Census
Local authority rented	11,234	19.56%	2001 Census
Housing association rented	1,929	3.36%	2001 Census
Other	4,285	7.46%	2001 Census
Total	57,441	100.00%	2001 Census
Underoccupied Households	28,031	48.80%	2001 Census (occupancy rating +2 or more)
People aged 60+	31,281	22.48%	2001 Census
Fuel poor households (1996)	13,971	24.32%	Profile in Tees & Durham LASP
Fuel poor households (2001)	5,680	9.89%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	7,560,000		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	132		derived

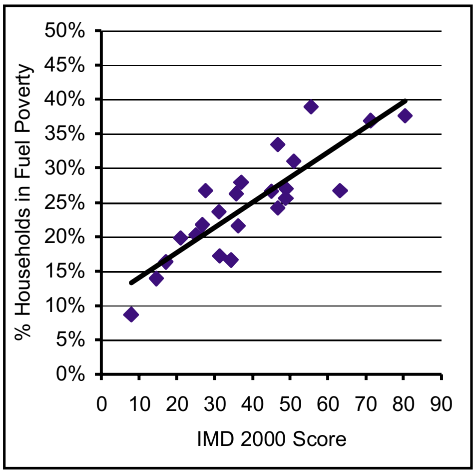
Fuel poor households, 1996

No Map Available

The extent of fuel poverty varies greatly within this district. ←

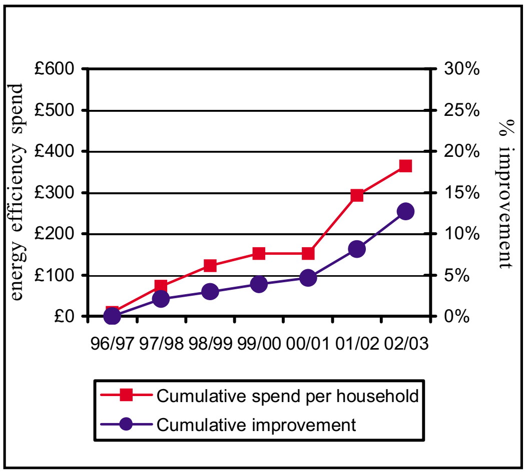
Fuel poverty is strongly linked to material deprivation. →

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

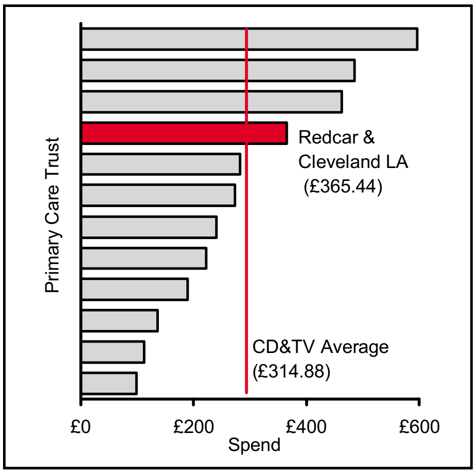
Energy efficiency spend & improvement



The spend in this district amounted to £21 million. ←

The spend in this district per household is **above** average for the CD&TV area. →

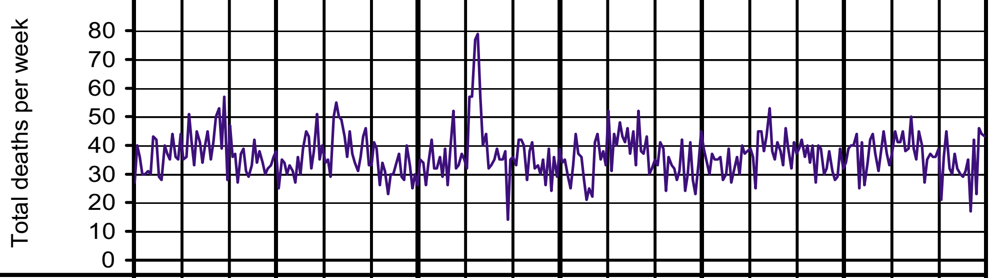
Spend per household

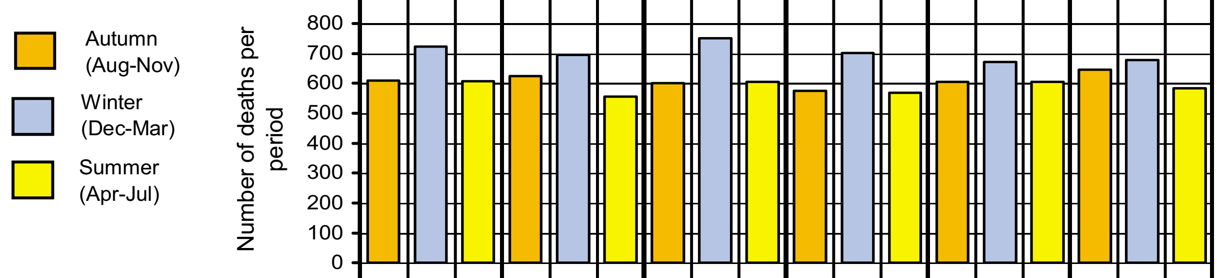


Measure	***1996/97***	***1997/98***	***1998/99***	***1999/00***	***2000/01***	***2001/02***	***2002/03***	***Total***
Annual energy efficiency spend per household	£8.70	£64.43	£49.09	£29.77	unknown	£140.84	£72.60	£365.44
Annual energy efficiency improvement	0.00%	2.10%	0.89%	0.95%	0.76%	3.70%	4.95%	12.69%

Middlesbrough

Year & Season		1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
	Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)			114			106			148			130			66			63	
Excess winter deaths index (EWDI)			18.7			17.9			24.4			22.6			10.9			10.2	
Sex																			
Males	No. deaths	311	365	308	308	339	302	286	376	308	293	338	273	313	312	280	313	335	288
	EWDI		17.9			11.1			26.6			19.4			5.2			11.5	
Females	No. deaths	299	358	300	316	356	253	315	375	298	283	364	296	292	359	325	333	343	296
	EWDI		19.5			25.1			22.3			25.7			16.4			9.1	
Age																			
0-64	No. deaths	131	136	130	133	135	152	151	143	126	147	153	138	130	140	117	143	133	110
	EWDI		4.2			-5.3			3.2			7.4			13.4			5.1	
65-74	No. deaths	184	223	163	159	180	132	157	170	156	132	161	133	150	149	148	129	157	133
	EWDI		28.5			23.7			8.6			21.5			0.0			19.8	
75-84	No. deaths	177	213	198	216	233	178	178	252	205	186	239	191	201	206	210	231	241	184
	EWDI		13.6			18.3			31.6			26.8			0.2			16.1	
85+	No. deaths	118	151	117	116	147	93	115	186	119	111	149	107	124	176	130	143	147	157
	EWDI		28.5			40.7			59.0			36.7			38.6			-2.0	
Cause of death																			
Respiratory diseases (ICD10 - J00-J99)	No. deaths	81	133	116	106	162	89	98	187	93	98	105	67	62	116	80	78	90	75
	EWDI		35.0			66.2			95.8			27.3			63.4			17.6	
Circulatory disease (ICD10 - I00-I99)	No. deaths	233	279	226	226	268	210	242	263	219	209	305	225	219	268	255	263	255	204
	EWDI		21.6			22.9			14.1			40.6			13.1			9.2	
All persons, all ages, all causes (including those above)																			
All causes of death	No. deaths	610	723	608	624	695	555	601	751	606	576	702	569	605	671	605	646	678	584
	EWDI		18.7			17.9			24.4			22.6			10.9			10.2	



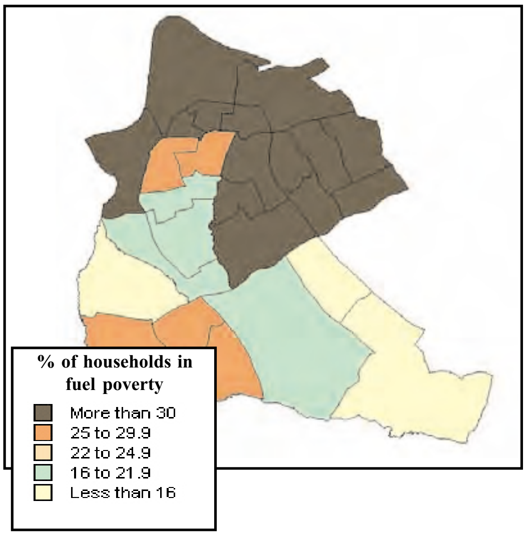


* data on this page relates to Middlesbrough LA

1. Characteristics of housing and households

Household Characteristic	Number	Percent	Source (notes)
Owner occupied	33,877	61.41%	2001 Census
Local authority rented	11,572	20.98%	2001 Census
Housing association rented	3,964	7.19%	2001 Census
Other	5,751	10.43%	2001 Census
Total	55,164	100.00%	2001 Census
Underoccupied Households	25,596	46.40%	2001 Census (occupancy rating +2 or more)
People aged 60+	26,431	19.60%	2001 Census
Fuel poor households (1996)	15,836	28.71%	Profile in Tees & Durham LASP
Fuel poor households (2001)	6,887	12.48%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	7,635,100		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	138		derived

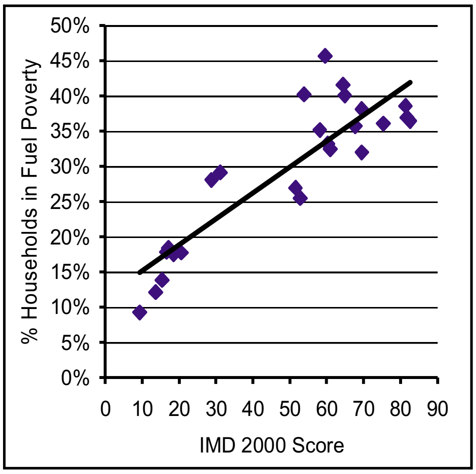
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district. ←

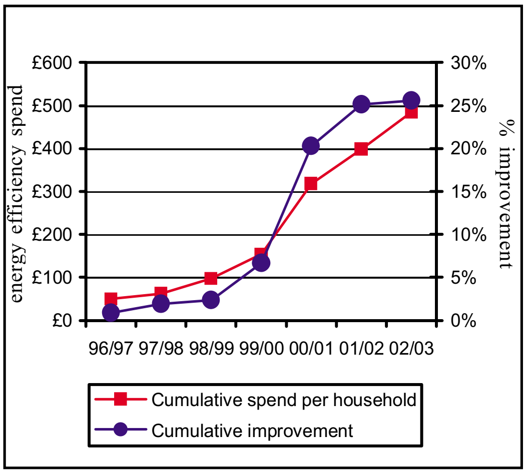
Fuel poverty is strongly linked to material deprivation. →

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

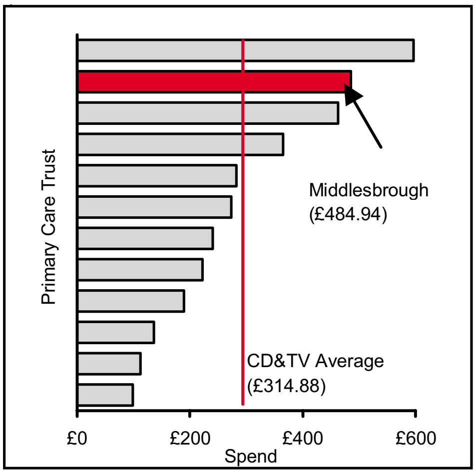
Energy efficiency spend & improvement



The spend in this district amounted to £26.8 million. ←

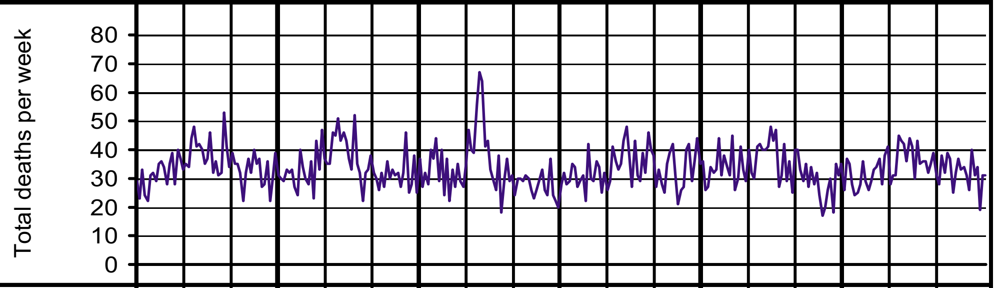
The spend in this district per household is **above** average for the CD&TV area. →

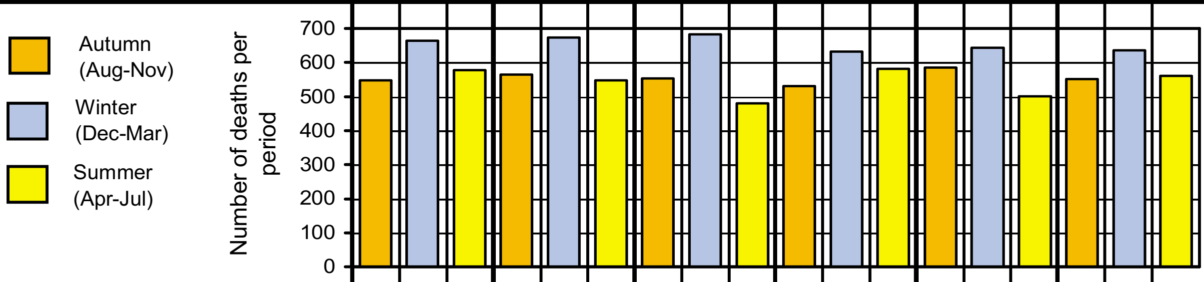
Spend per household



Measure	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	Total
Annual energy efficiency spend per household	£49.36	£13.29	£34.70	£55.94	£164.89	£80.34	£86.42	£484.94
Annual energy efficiency improvement	0.90%	1.05%	0.43%	4.40%	14.60%	6.10%	0.60%	26.50%

North Tees



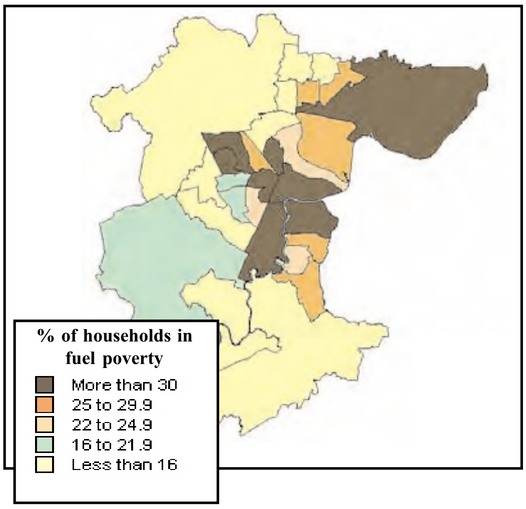


Year & Season	1997/98			1998/99			1999/00			2000/01			2001/02			2002/03		
Variable	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su	Au	Wi	Su
Excess winter deaths (EWD)		102			117			167			76			100			80	
Excess winter deaths index (EWDI)		18.1			21.0			32.2			13.6			18.4			14.4	
Sex																		
Males — No. deaths	277	321	256	279	307	263	284	341	227	268	301	304	290	293	243	267	313	279
Males — EWDI		20.5			13.3			33.5			5.2			9.9			14.7	
Females — No. deaths	271	344	322	287	367	285	270	343	254	263	332	279	296	351	259	284	323	282
Females — EWDI		16.0			28.3			30.9			22.5			26.5			14.4	
Age																		
0-64 — No. deaths	110	125	112	125	116	111	112	125	99	108	106	124	113	128	105	98	133	113
0-64 — EWDI		12.6			-1.7			18.5			-8.6			17.4			26.1	
65-74 — No. deaths	155	193	138	137	172	147	141	147	127	136	150	140	130	128	108	123	128	105
65-74 — EWDI		31.7			21.1			9.7			8.7			7.6			12.3	
75-84 — No. deaths	175	203	174	198	230	169	180	225	135	160	218	200	208	214	164	192	219	207
75-84 — EWDI		16.3			25.3			44.2			21.1			15.1			9.8	
85+ — No. deaths	108	144	154	106	156	121	121	187	120	127	159	119	135	174	125	138	156	136
85+ — EWDI		9.9			37.4			55.2			29.3			33.8			13.9	
Cause of death																		
Respiratory diseases (ICD10 - J00-J99) — No. deaths	64	111	88	65	124	67	77	144	70	84	113	77	59	96	63	63	90	66
Respiratory diseases — EWDI		46.1			87.9			95.9			40.4			57.4			39.5	
Circulatory disease (ICD10 - I00-I99) — No. deaths	243	284	248	234	294	218	217	278	169	185	236	217	224	254	196	238	239	212
Circulatory disease — EWDI		15.7			30.1			44.0			17.4			21.0			6.2	
All persons, all ages, all causes (including those above)																		
All causes of death — No. deaths	548	665	578	566	674	548	554	684	481	531	633	583	586	644	502	551	636	561
All causes of death — EWDI		18.1			21.0			32.2			13.6			18.4			14.4	

1. Characteristics of housing and households

Household Characteristic	Number	Percent	Source (notes)
Owner occupied	52,216	71.57%	2001 Census
Local authority rented	12,535	17.18%	2001 Census
Housing association rented	3,151	4.32%	2001 Census
Other	5,051	6.92%	2001 Census
Total	72,953	100.00%	2001 Census
Underoccupied Households	38,248	52.43%	2001 Census (occupancy rating +2 or more)
People aged 60+	35,166	19.71%	2001 Census
Fuel poor households (1996)	15,625	21.42%	Profile in Tees & Durham LASP
Fuel poor households (2001)	3,678	5.04%	NE regional affordable warmth study
Modified baseline energy consumption (GJ)	9,537,509		NE HECA research final report (Table B)
Baseline energy consumption per household (GJ)	131		derived

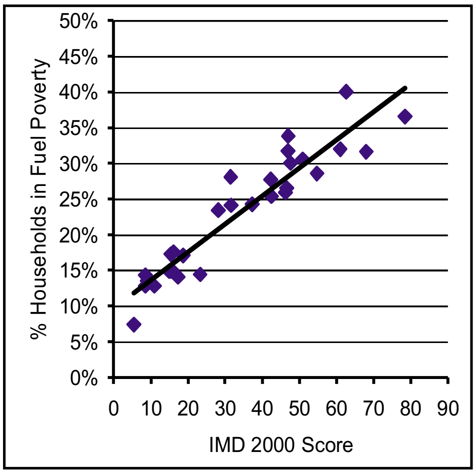
Fuel poor households, 1996



The extent of fuel poverty varies greatly within this district. ←

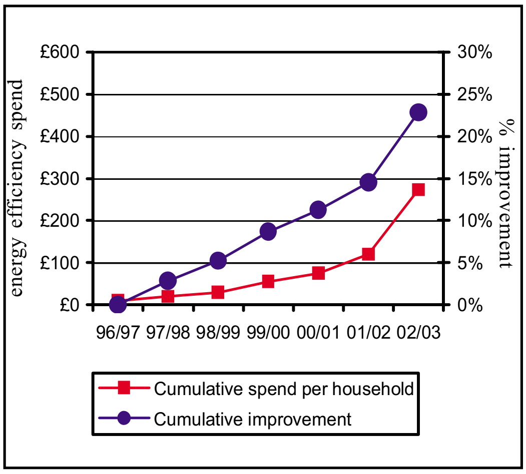
Fuel poverty is strongly linked to material deprivation. →

Fuel poverty and deprivation



2. Energy efficiency investment and improvement

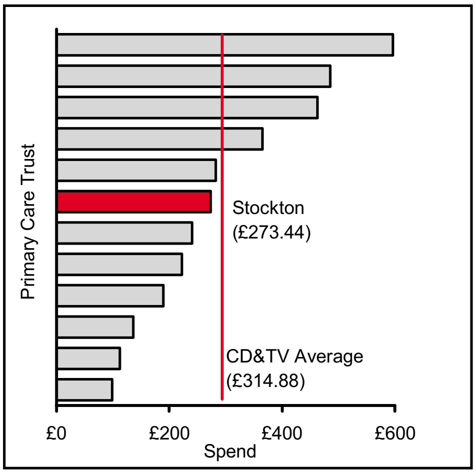
Energy efficiency spend & improvement



The spend in this district amounted to £19.9 million. ←

The spend in this district per household is **below** average for the CD&TV area. →

Spend per household



Measure	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	Total
Annual energy efficiency spend per household	£9.87	£9.73	£10.05	£25.98	£19.19	£45.37	£153.25	£273.44
Annual energy efficiency improvement	0.00%	2.83%	2.46%	3.67%	2.80%	3.70%	9.70%	20.40%

Conclusions

1. Describing inequality
The pattern of excess winter deaths in the population reflects the variation in exposure to the risks of cold weather and especially for vulnerable groups such as very elderly people.

The level of excess winter deaths
- Excess winter deaths in County Durham & Tees Valley are close to national and regional values in all years but there are considerable variations between local authority areas.

The trend in excess winter deaths
- There is no discernible trend (up or down) in the pattern of excess winter deaths for the short period under review but the national levels in recent years have been generally lower than 20 or 30 years ago.

The risks for excess winter deaths
- Excess winter deaths are more likely to occur
  - with increasing age
  - when someone already has a chronic chest or heart illness
  - when outdoor minimum temperature falls below 6°C
  - when homes are inadequately insulated and heated

2. Measuring response
A large range of local work has improved the energy efficiency of homes in all areas but there are wide variations between localities in terms of investment in domestic energy efficiency schemes.

- On average, over £21 million has been invested locally in domestic energy efficiency measures each year

- Areas with lower than average investment in domestic energy efficiency measures tend to have higher than average excess winter mortality

- The number of fuel poor households appears to have reduced but as fuel poverty is dependent on factors such as employment and fuel prices, rates can vary in short time periods especially when fuel costs rise rapidly

- Improving the warmth of homes is important but is not the only factor influencing the number of excess winter deaths

3. Planning locally
The continuing task to reduce the impact of cold on health depends not only on helping individuals to heed advice but also ensuring that recommended best practice is followed by organisations with responsibility for action.

- The implementation of methods to reduce winter deaths is likely to have most impact where priorities are assessed locally using evidence of risk and need as well as consideration of the effectiveness of potentially many interventions.

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Wilkinson P, Armstrong B, Landon M et al. Cold comfort: the social and environmental determinants of excess winter deaths in England, 1986-1996. London: The Policy Press, 2001.

Wilkinson P, Pattenden S, Armstrong B et al. Vulnerability to winter mortality in elderly people in Britain: a population based study. *BMJ* 2004; 329: 647-51.

An extensive list of evidence, policy and practice source material is available in Appendix 2.

Appendix

Appendix 1

- Area characteristics
- Energy efficiency
- Activity detail from HECA Progress Reports
    - Chester-le-Street
    - Darlington
    - Derwentside
    - Durham
    - Easington
    - Sedgefield
    - Teesdale
    - Wear Valley
    - Hartlepool
    - Middlesbrough
    - Redcar & Cleveland
    - Stockton

Appendix 2

- Selection of policies
- Best practice guidelines
- Energy efficiency best practice
- Evidence of effects of cold stress

Chester-le-Street

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		2,439,358	NE HECA Research Final Report Table B
Number of Households		22,851	2001 Census
(%) Number Owner Occupied	72.20%	16,500	2001 Census
(%) Number Local Authority Rented	18.80%	4,291	2001 Census
(%) Number Housing Association Rented	4.20%	967	2001 Census
(%) Number Other	4.80%	1,093	2001 Census
(%) Number Occupancy Rating +2 or more	50.62%	11,568	2001 Census
(%) Number people aged 60+	21.09%	11,324	2001 Census
Average Household Size (persons)		2.33	2001 Census
Number of Fuel Poor Households (1996)		4,379	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		1,911	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£24,000	0.50%
1997/98	£485,000	0.96%
1998/99	£140,000	0.88%
1999/00	£296,000	0.84%
2000/01	£410,000	1.22%
2001/02	£340,000	1.29%
2002/03	£1,424,000	3.62%
1996-2003	£3,119,000	8.98%

Source: HECA Progress Reports

Energy improvement calculation method: EST Co-efficients

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Cosy Grant (ex CRISP)	Vulnerable HH	£264,280
	LA Housing Improvements	CWI / loft / CH systems	£1,140,700
	Warm Front	Vulnerable People	£128,255
	Durham Energy Savers	Discount for Private HH	£249,380
	Domestic Solar Hot Water		£10,000
	High Efficiency Boiler Trial	124 Households	£265, 360
	Home Improvement Grants		£42,771
2001/02	CRISP	Vulnerable HH	£96,500
	LA Housing Improvements	CWI / loft / CH systems	£42,000
2000/01	CRISP	Vulnerable HH	£146,000
	LA Housing Improvements	CWI / loft / CH systems	£140,900
	DEAL	Bulk discount	£100,000
	N Elec & Gas partnership	Cavity wall & loft	£11,200
1999/2000	CRISP	Vulnerable HH	£100,000
	LA Housing Improvements	CWI / loft / CH systems	£100,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		5,467,963	NE HECA Research Final Report Table B
Number of Households		42,309	2001 Census
(%) Number Owner Occupied	71.73%	30,350	2001 Census
(%) Number Local Authority Rented	14.29%	6,048	2001 Census
(%) Number Housing Association Rented	3.80%	1,607	2001 Census
(%) Number Other	10.17%	4,304	2001 Census
(%) Number Occupancy Rating +2 or more	51.96%	21,985	2001 Census
(%) Number people aged 60+	22.27%	21,789	2001 Census
Average Household Size (persons)		2.27	2001 Census
Number of Fuel Poor Households (1996)		10,205	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		4,451	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£29,000	0.76%
1997/98	£380,000	0.57%
1998/99	£1,867,000	1.54%
1999/00	£1,088,600	2.40%
2000/01	£3,246,000	2.23%
2001/02	£1,604,000	3.57%
2002/03	£1,190,000	2.97%
1996-2003	£9,404,600	13.26%

Energy improvement calculation method: HECAMON

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	CHOICES	Bulk discount (Fuel rich)	£38,000
	LA Housing Improvements	CWI / loft /CH	£900,000
2001/02	CHOICES	Bulk discount (Fuel rich)	£38,000
	LA Housing Improvements	CWI / loft /CH	£1,100,000
	Private Sector Measures		£70,000
2000/01	CHOICES	Bulk discount (Fuel rich)	£35,368
1999/2000	CHOICES	Bulk discount (Fuel rich)	£52,500
	LA Housing Improvements	CWI / loft /CH	£850,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Derwentside

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		4,377,840	NE HECA Research Final Report Table B
Number of Households		36,482	2001 Census
(%) Number Owner Occupied	68.80%	25,103	2001 Census
(%) Number Local Authority Rented	22.20%	8,095	2001 Census
(%) Number Housing Association Rented	2.50%	922	2001 Census
(%) Number Other	6.50%	2,362	2001 Census
(%) Number Occupancy Rating +2 or more	46.60%	17,000	2001 Census
(%) Number people aged 60+	22.81%	19,408	2001 Census
Average Household Size (persons)		2.30	2001 Census
Number of Fuel Poor Households (1996)		8,749	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		3,865	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£1,594,000	3.08%
1997/98	£1,427,000	1.50%
1998/99	£1,290,000	1.50%
1999/00	£1,331,000	0.92%
2000/01	£1,490,000	0.92%
2001/02	£1,337,000	1.25%
2002/03	£1,836,000	1.46%
1996-2003	£10,305,000	9.60%

Energy improvement calculation method:
Stock Condition Surveys

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	LA Housing Improvements	Insulation / CH systems	£2,195,000
	Derwentside Energy Service	1050 Units	£402,000
	EAGA (Warm Front?)	1390 Households	£229,000
2001/02	Warm Front	Vulnerable HH	£385,820
	LA Housing Improvements	CWI / loft/ CH systems	£1,014,000
	D'side Replace fire scheme		£90,000
	D'side Energy Efficiency		£150,000
2000/01	NO INFORMATION	HECA report not seen	
1999/2000	HEES		£90,166

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		3,564,958	NE HECA Research Final Report Table B
Number of Households		34,847	2001 Census
(%) Number Owner Occupied	67.61%	23,561	2001 Census
(%) Number Local Authority Rented	20.01%	6,972	2001 Census
(%) Number Housing Association Rented	3.34%	1,163	2001 Census
(%) Number Other	9.04%	3,151	2001 Census
(%) Number Occupancy Rating +2 or more	51.36%	17,896	2001 Census
(%) Number people aged 60+	22.81%	19,408	2001 Census
Average Household Size (persons)		2.32	2001 Census
Number of Fuel Poor Households (1996)		6,891	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		3,087	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£0	0.00%
1997/98	£0	0.00%
1998/99	£895,000	0.76%
1999/00	£760,000	0.95%
2000/01	£380,000	1.43%
2001/02	£592,000	1.13%
2002/03	£1,296,000	5.02%
1996-2003	£3,923,000	9.01%

Energy improvement calculation method: HECAMON

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Durham Energy Savers	Discount for private HH	£106,937
	LA Housing Improvements	CWI / loft insulation	£217,218
	Warm Front	Vulnerable people	£125,857
2001/02	Warm Front	Vulnerable HH	unknown
2000/01	Warm Front	Vulnerable HH	unknown
	HECAction		£105,000
	Cold related Ill Health pgm	Ill people	£30,000
1999/2000	Cold related Ill Health pgm	Ill people	£30,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Easington

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		5,976,327	NE HECA Research Final Report Table B
Number of Households		38,788	2001 Census
(%) Number Owner Occupied	62.60%	24,282	2001 Census
(%) Number Local Authority Rented	25.63%	9,941	2001 Census
(%) Number Housing Association Rented	3.81%	1,479	2001 Census
(%) Number Other	7.96%	3,086	2001 Census
(%) Number Occupancy Rating +2 or more	38.91%	15,092	2001 Census
(%) Number people aged 60+	22.40%	21,056	2001 Census
Average Household Size (persons)		2.40	2001 Census
Number of Fuel Poor Households (1996)		10,182	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		4,283	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£0	0.50%
1997/98	£647,000	1.50%
1998/99	£1,019,000	2.10%
1999/00	£740,000	3.26%
2000/01	£970,000	3.90%
2001/02	£2,001,000	4.75%
2002/03	£1,955,000	4.07%
1996-2003	£7,332,000	20.08%

Energy improvement calculation method: MAXIM, whole stock database

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Durham Energy Savers	Discount for private HH	£93,302
	LA Housing Improvements	Insulate / CH / glaze	£1,200,000
	Warm Front	Vulnerable people	£416,000
	Warm Homes Prescription	Vulnerable people	£20,000
	Scottish Power Social H'ng		£75,000
2001/02	Warm Front	Vulnerable people	£295,000
	LA Housing Improvements	Insulate / CH / glaze	£1,906,000
	Br Gas Social Housing pgm		£18,000
	Powergen Soc Housing pgm		£37,000
2000/01	HEES	With GPs	£32,000
	En Cons on prescription	Vulnerable people	£36,000
	Br Gas Social Housing pgm		£11,500
	HECAction		£100,000
1999/2000	HECAction		£100,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		4,412,375	NE HECA Research Final Report Table B
Number of Households		37,514	2001 Census
(%) Number Owner Occupied	64.76%	24,294	2001 Census
(%) Number Local Authority Rented	26.39%	9,901	2001 Census
(%) Number Housing Association Rented	3.21%	1,205	2001 Census
(%) Number Other	5.64%	2,114	2001 Census
(%) Number Occupancy Rating +2 or more	45.65%	17,125	2001 Census
(%) Number people aged 60+	21.77%	18,987	2001 Census
Average Household Size (persons)		2.31	2001 Census
Number of Fuel Poor Households (1996)		8,149	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		3,525	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£0	1.50%
1997/98	£2,880,000	1.51%
1998/99	£3,267,000	1.98%
1999/00	£3,600,000	1.70%
2000/01	£2,479,000	1.20%
2001/02	£3,190,000	1.11%
2002/03	£1,953,000	1.29%
1996-2003	£17,369,000	9.85%

Energy improvement calculation method:
EST method

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Durham Energy Savers	Discount for private HH	£72,493
	LA Housing Improvements	Condensing boilers	£116,446
	CHOICES	Condensing boilers	£60,000
2001/02	Warm Front	Vulnerable people	£138,545
	CHOICES		£50,000
	Durham Energy Savers	Discount for private HH	£53,000
2000/01	CHOICES		£50,000
	EAGA integrated pgm		£500,000
	LA Housing Improvements	CH upgrades	£10,000
1999/2000	CHOICES		£52,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Teesdale

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		1,508,400	NE HECA Research Final Report Table B
Number of Households		10,463	2001 Census
(%) Number Owner Occupied	69.21%	7,241	2001 Census
(%) Number Local Authority Rented	8.82%	923	2001 Census
(%) Number Housing Association Rented	5.14%	538	2001 Census
(%) Number Other	16.83%	1,761	2001 Census
(%) Number Occupancy Rating +2 or more	57.84%	6,052	2001 Census
(%) Number people aged 60+	25.34%	6,197	2001 Census
Average Household Size (persons)		2.26	2001 Census
Number of Fuel Poor Households (1996)		2,125	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		957	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£0	0.75%
1997/98	£43,000	0.47%
1998/99	£38,000	0.38%
1999/00	£104,000	0.81%
2000/01	£620,000	0.52%
2001/02	£96,000	3.29%
2002/03	£130,000	2.79%
1996-2003	£1,031,000	8.71%

Energy improvement calculation method: MAXIM

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Durham Energy Savers	Discount for private HH	£45,947
	Warm Front	Vulnerable people	£16,241
2001/02	Warm Front	Vulnerable people	unknown
	Grant Assistance	Fuel poor areas	£34,000
2000/01	EAGA & HEES		£13,766
	LA Housing Improvements	CWI / loft / CH systems	£39,000
1999/2000	No Activity Recorded		£0

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		2,843,456	NE HECA Research Final Report Table B
Number of Households		26,491	2001 Census
(%) Number Owner Occupied	67.47%	17,873	2001 Census
(%) Number Local Authority Rented	19.17%	5,079	2001 Census
(%) Number Housing Association Rented	4.84%	1,281	2001 Census
(%) Number Other	8.52%	2,258	2001 Census
(%) Number Occupancy Rating +2 or more	46.97%	12,444	2001 Census
(%) Number people aged 60+	23.18%	14,221	2001 Census
Average Household Size (persons)		2.29	2001 Census
Number of Fuel Poor Households (1996)		6,649	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		2,904	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£0	1.24%
1997/98	£527,000	1.04%
1998/99	£900,000	1.21%
1999/00	£834,000	4.08%
2000/01	£955,000	2.14%
2001/02	£1,099,000	8.57%
2002/03	£2,067,000	5.26%
1996-2003	£6,382,000	21.50%

Energy improvement calculation method: MAXIM and HECAMON

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	Durham Energy Savers	Discount for private HH	£1,000,000
	Energy Alliance Social H'ng	50% funding	£50,864
	Warm Front	Vulnerable people	£156,273
	Fuel Switching (Solid to Gas)		£51,325
	External Wall Insulation	Social housing	£4,511
	LA Housing Improvements	Heating upgrade	£803,231
2001/02	Warm Front	Vulnerable people	unknown
	LA Housing Improvements	Insulate / CH / glaze	
	DEAL Scheme	Interest free loans	£100,000
	Northern Elec EEC Scheme		Match Funding
	Br Gas Lof Top-up		£15,000
2000/01	Warm Front	Vulnerable people	unknown
	DEAL Scheme		£100,000
	Transco EESOP		unknown
	Northern Elec EESOP		unknown
1999/2000	SoP2	Solid fuel heated homes	£24,100
	LA Housing Improvements	CWI / CH / external ins	unknown

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Hartlepool

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		3,717,149	NE HECA Research Final Report Table B
Number of Households		37,385	2001 Census
(%) Number Owner Occupied	63.01%	23,558	2001 Census
(%) Number Local Authority Rented	19.76%	7,389	2001 Census
(%) Number Housing Association Rented	6.85%	2,562	2001 Census
(%) Number Other	10.37%	3,876	2001 Census
(%) Number Occupancy Rating +2 or more	48.53%	18,144	2001 Census
(%) Number people aged 60+	21.49%	19,043	2001 Census
Average Household Size (persons)		2.35	2001 Census
Number of Fuel Poor Households (1996)		10,436	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		4,625	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£2,511,000	0.45%
1997/98	£1,805,400	0.51%
1998/99	£3,049,000	1.11%
1999/00	£2,724,000	1.76%
2000/01	£4,620,000	3.77%
2001/02	£4,519,000	1.33%
2002/03	£3,057,000	1.38%
1996-2003	£22,285,400	9.91%

Energy improvement calculation method:
1996/97 unknown
1997/98 EST Co-efficients
1998/99 MAXIM / MVM
1999/00 MAXIM / MVM
2000/01 HECAMON
2001/02 MAXIM / MVM
2002/03 MAXIM / MVM

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	CHOICES	Discount for private HH	£35,000
	Warm Front		£283,031
	Hartwarmers		£30,000
	LA Housing Improvements	Insulation / cond. Boilers	£20,606
2001/02	CHOICES	Discount for private HH	£35,000
	Warm Front		£375,948
2000/01	CHOICES	Discount for private HH	£72,239
	Warm Front		£261,690
	N Elec Grant Scheme		£8,938
1999/2000	HECAction	Discount for private HH	£192,500
	Warm Front		£259,870

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		7,635,100	NE HECA Research Final Report Table B
Number of Households		55,164	2001 Census
(%) Number Owner Occupied	61.41%	33,877	2001 Census
(%) Number Local Authority Rented	20.98%	11,572	2001 Census
(%) Number Housing Association Rented	7.19%	3,964	2001 Census
(%) Number Other	10.43%	5,751	2001 Census
(%) Number Occupancy Rating +2 or more	46.40%	25,596	2001 Census
(%) Number people aged 60+	19.60%	26,431	2001 Census
Average Household Size (persons)		2.41	2001 Census
Number of Fuel Poor Households (1996)		15,836	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		6,887	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£2,723,000	0.90%
1997/98	£733,000	1.05%
1998/99	£1,914,000	0.43%
1999/00	£3,086,000	4.40%
2000/01	£9,096,000	14.60%
2001/02	£4,432,000	6.10%
2002/03	£4,767,000	0.60%
1996-2003	£26,751,000	25.60%

Energy improvement calculation method:
HECAMON with MAXIM / MVM to validate

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	CHOICES	Discount for private HH	£58,429
	Health through Warmth	Vulnerable people	£50,000
	LA Housing Improvements	CWI / loft / CH systems	£3,784,543
	LA Housing Improvements	High rise flate	£808,060
2001/02	Warm Front	Vulnerable people	£743,205
	LA Housing Improvements	CWI / loft / CH systems	£3,150,311
	LA Housing Improvements	High rise flate	£225,000
2000/01	Warm Front	Vulnerable people	£375,313
	EAGA Integrated program		£166,000
1999/2000	HEES		£196,000

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Redcar & Cleveland

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		7,560,000	NE HECA Research Final Report Table B
Number of Households		57,441	2001 Census
(%) Number Owner Occupied	69.62%	39,993	2001 Census
(%) Number Local Authority Rented	19.56%	11,234	2001 Census
(%) Number Housing Association Rented	3.36%	1,929	2001 Census
(%) Number Other	7.46%	4,285	2001 Census
(%) Number Occupancy Rating +2 or more	48.80%	28,031	2001 Census
(%) Number people aged 60+	22.48%	31,281	2001 Census
Average Household Size (persons)		2.40	2001 Census
Number of Fuel Poor Households (1996)		13,971	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		5,680	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£500,000	0.00%
1997/98	£3,701,000	2.10%
1998/99	£2,820,000	0.89%
1999/00	£1,710,000	0.95%
2000/01	unknown	0.76%
2001/02	£8,090,000	3.70%
2002/03	£4,170,294	4.95%
1996-2003	£20,991,294	12.69%

Energy improvement calculation method:
EST Co-efficients (except 01/02: HECAMON)

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	CHOICES	Discount for private HH	£60,000
	Warm Zone		unknown
2001/02	CHOICES	Discount for private HH	£50,000
	Warm Front	Vulnerable people	£483,516
2000/01	NO INFORMATION	HECA report not seen	
1999/2000	CHOICES	Discount for private HH	£52,491

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Area characteristics

	Percentage	Number	Source
Modified Baseline Energy Consumption (GJ):		9,537,509	NE HECA Research Final Report Table B
Number of Households		72,953	2001 Census
(%) Number Owner Occupied	71.57%	52,216	2001 Census
(%) Number Local Authority Rented	17.18%	12,535	2001 Census
(%) Number Housing Association Rented	4.32%	3,151	2001 Census
(%) Number Other	6.92%	5,051	2001 Census
(%) Number Occupancy Rating +2 or more	52.43%	38,248	2001 Census
(%) Number people aged 60+	19.71%	35,166	2001 Census
Average Household Size (persons)		2.41	2001 Census
Number of Fuel Poor Households (1996)		15,625	Profile of fuel poverty in Tees & Durham LASP
Number of Fuel Poor Households (2001)		3,678	NE Regional Affordable Warmth Scoping Study

Energy efficiency

Year	Spend on measures	Total improvement
1996/97	£720,000	0.00%
1997/98	£710,000	2.83%
1998/99	£733,000	2.46%
1999/00	£1,895,000	3.67%
2000/01	£1,400,000	2.80%
2001/02	£3,310,000	3.70%
2002/03	£11,180,000	9.70%
1996-2003	£19,948,000	20.40%

Energy improvement calculation method: MVM Starpoint (MAXIM)

Activity detail from HECA Progress Reports*

Year	Activity	Target	Cost
2002/03	CHOICES	Discount for private HH	£60,000
	Affordable Warmth	Fuel poor not in warm zone	£682,000
	LA Housing Improvements	Replace heating systems	£3,770,000
	Warm Front	Vulnerable people	£2,000,000
	EESOP3		£442,935
	EEC4		£2,140,904
	Descent Standard		£3,715,000
	Able to pay	Discount for fuel rich	£21,900
2001/02	CHOICES	Discount for private HH	£60,000
	Affordable Warmth	Fuel poor not in warm zone	£10,000
	LA Housing Improvements	Replace heating systems	£1,530,000
	Warm Zone		£1,374,000
2000/01	CHOICES	Discount for private HH	£69,000
	Stockton Warm Homes	Vulnerable fuel poor	£30,000
	LA Housing Improvements	Replace heating systems	£665,000
	HEES iii / EESOPS		£370,000
1999/2000	New HEES / EESPOS (?)		unknown

* Includes: heating and insulation activity
Excludes: overheads, promotional activity, low energy bulbs, training, information etc

Selection of policies

Local Agenda 21	1992	The process of developing local policies for sustainable development and building partnerships between local authorities and other sectors to implement them. Central toward achieving sustainability.
Home Energy Conservation Act	1995	Encourages UK housing authorities to plan to reduce domestic energy use for all households by 30% over a 10 year period.
Acheson Report; Independent Inquiry into Health Inequalities	1998	Contains policy recommendations for the alleviation of fuel poverty
New Deal for Communities	1998	A programme to tackle multiple deprivation in the poorest areas.
Saving Lives: Our Healthier Nation	1999	Introduced the concept of local health inequality targets. Also acknowledged that good quality housing is important for health and that cold homes are one of the factors responsible for excess winter mortality.
A Better Quality of Life. A Strategy for Sustainable Development for the UK.	1999	Reflecting Agenda 21. One of the guiding principles iscombating poverty and social exclusion, which includes access to decent, energy efficient housing.
Warm Homes and Energy Conservation Act	2000	Required the government to implemet a strategy to eliminate fuel poverty in England & Wales within a period of no more than 15 years. Led to the UK Fuel Poverty Strategy.
The NHS Plan	2000	The ninth of ten priorities is 'The NHS will help keep people healthy and work to reduce inequalities'. The paper recognised that good health also depends on social, environmental and economic factors (such as housing) and requires the NHS to work with other public services to intervene not just after but also before ill health. Introduced the concept of national targets on health inequalities.
National Service Framework for CHD	2000	Standards 1,3,4,11,and 12
Utilities Act	2000	Brings together the regulation of the gas and electricity industries. Focused on consumer interests, including the needs of those on low incomes, the disabled, people suffering from a long-term sickness and those living in rural areas. At least 50% of the energy savings suppliers are required to make must be among households in reciept of benefit and tax credits.
National Service Framework for Older People	2001	Standards 3,6,7 and 8

The UK Fuel Poverty Strategy	2001	Focuses on measures to improve energy efficiency and reduce the cost of fuel for households which are in fuel poverty. The goal is to end fuel poverty for vulnerable households by 2010.
Tackling Health Inequalities: Summary of the 2002 Cross-cutting Review	2002	Identifies the most significant interventions to deliver the governemnt's inequalities targets. Interventions include improving housing quality to tackle cold and dampness in housing conditions for children in disadvantaged areas.
Energy Efficiency Commitment	2002	An obligation on licensed gas and electricity suppliers to encourage or assist domestic customers to take up energy efficiency measures.
Tackling Health Inequalities: A Programme for Action	2003	Introduced plans to tackle health inequalities over three years. It established the foundations required to achieve the challenging national target for 2010 to reduce the gap in infant mortality across social groups, and raise life expectancy in the most disadvantaged areas faster than elsewhere and specifically refers to the need to end fuel poverty for vulnerable groups.
Fuel Poverty in England: The Government's Plan for Action	2004	Sets out how the government plans to eradicate fuel poverty in vulnerable households by 2010.
Sure Start		Aims to deliver the best start in life for every child by bringing together: early education, childcare, health and family support in less advantaged areas.
Keep Well Keep Warm	2004	Annual DH campaign which provides advice on Keeping warm and healthy, home improvement grants, heating your home and help with bills. **Winter Warmth advice line** 0800 085 7000 (lines open 8AM - 8PM Monday - Friday). Textphone 0800 085 7857. Lines open October - March

Best Practice

Author	Organisation	Year	Title	Outline	Reference
	Department of Health	2004	Keep Well Keep Warm	Annual DH campaign which provides advice on Keeping warm and healthy, home improvement grants, heating your home and help with bills. **Winter Warmth advice line** 0800 085 7000 (lines open 8AM - 8PM Monday - Friday). Textphone 0800 085 7857. Lines open October - March	http://www.dh.gov.uk/assetRoot/04/09/02/35/04090235.pdf
Press V	Health sub group of the Fuel Poverty Strategy Group	2004	Strategic review of the health sector	The report outlines the structure and policies of the health sector in the UK and suggests how to raise awareness of fuel poverty as a health issue in England.	http://www.est.org.uk/partnership/uploads/documents/ACFYPA1IaijU.pdf
Wade R et al	Health sub group of the Fuel Poverty Strategy Group	2004	Review of energy efficiency and health initiatives for the energy efficiency partnership for homes	The report details the results of a study into best practice amongst existing energy efficiency and health initiatives	http://www.est.org.uk/partnership/uploads/documents/ACFTRAKJaijU.pdf
	National Energy Action (NEA)	2004	Affordable warmth and sustainable energy: a guidance note for local authorities and social housing providers	This guidance note is designed to promote the role of sustainable technology in providing adequately and affordably heated homes.	http://www.nea.org.uk/downloads/publications/affordable_warmth_and_sustainable_energy.pdf
	National Energy Action (NEA)	2004	Warming the private sector	The aim of this guidance note is to set out for local authorities how objectives to achieve affordable warmth for private sector householders can, and should, form a central part of their Private Sector Housing Renewal Strategies.	http://www.nea.org.uk/downloads/publications/warming_the_private_sector.pdf
Press V	National Heart Forum	2003	Fuel poverty and health toolkit: a guide for primary care organisations, and public health abd primary care professionals	The aim of the toolkit is to improve the quality of life, to reduce morbidity and avoidable winter deaths, and to reduce winter strain on the NHS, by encouraging strategic planners and health professionals, in partnership with local authorities, to devise and implement well targetted local strategies to reduce fuel poverty.	http://www.heartforum.org.uk/pdfs/book.pdf

	National Energy Action (NEA)	2003	Tackling fuel poverty: a beacon council toolkit for local authorities	It is intended that this toolkit will allow local authorities to examine the different approaches the Beacon councils have taken in tackling fuel poverty in their communities, taking account of local circumstances and priorities, demographics, social characteristics and housing conditions.	http://www.eaga.co.uk/Charitable/beacon%20toolkit%20Final.pdf
	National Energy Action (NEA)	2003	The dead of winter: the final report of the primary care trust energy champion award scheme	The project aimed to assist the development of both policy and practice within PCTs; to tackle local fuel poverty and establish systematic links between energy service providers, local authoritiesand those suffering from cold and damp related illness.	http://www.nea.org.uk/downloads/publications/pct_energy_champion_final_report.pdf
	BMA	2003	Housing and health: building for the future	The report examines evidence in relation to health and housing. It suggests strategies for ensuring that all individuals can benefit from good quality housing and discusses ways in which governement housing policy can be taken forward. Intended for practitioners and policy makers in the field of housing, and as means of helping health professionals to understand how housing conditions can influence peoples health.	http://www.bma.org.uk/ap.nsf/Content/housinghealth
	Age Concern		A Strategy to define and prevent the disconnection of vulnerable customers		http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/7487_Age_concern.pdf

Energy Efficiency Best Practice in Housing

Energy Saving Trust	2004	Energy efficient refurbishment of existing housing - case studies	This guide provides a wide range of case studies and practical examples of work undertaken by housing associations across the UK. Find out how to improve the energy performance of your housing stock through simple but effective measures	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE104%20-%20Refurbishment%20of%20existing%20houses%20case%20studies.pdf
Energy Saving Trust	2004	Community Heating - Aberdeen City Council Case Study	This Case Study shows how Aberdeen City Council developed a strategic approach to community heating for existing property upgrades. It also shows how the feasibility and funding issues were addressed, and then sets out the lessons learnt. The Study will be of special interest to local authorities and housing associations.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE65%20-%20Case%20Study%20-%20Hard%20to%20Treat.pdf

Energy Saving Trust	2004	Newark and Sherwood District Council Case Study	This case study explores the approach, strategies and decisions that have contributed to Newark and Sherwood District Council's exemplary status as sustainable energy champions. It demonstrates how Newark and Sherwood have developed successful policies, strategies and partnerships and shows how they have secured corporate support during the last 20 years	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE96%20-%20Newark%20and%20Sherwood.pdf
Energy Saving Trust	2003	Innovative Social Housing: Alpine Close, Maidenhead, Berkshire.	This case study looks at a recent example of innovative social housing. It examines the environmental, design and construction aspects of the project. Most importantly it shares the lessons learnt - providing information and inspiration to housing associations, local authorities and designers.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE37%20-%20Housing%20Association%20Case%20Study.pdf
Energy Saving Trust	2003	Domestic Condensing Boilers – 'The Benefits and the Myths'	This publication provides information on the benefits associated with condensing boilers and the myths surrounding them. This should help those (particularly within local authorities and housing associations) who have to respond to critics and others as yet unconvinced by condensing technology. Condensing boilers offer tangible benefits by reducing carbon dioxide emissions to help combat global warming, and improving household efficiency thus reducing fuel bills. In dispelling the myths, it is hoped that the barriers to specifying and installing condensing boilers will be finally removed	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE52.pdf
Energy Saving Trust	2003	Hard to Trreat Homes and Fuel Poverty: Briefing for Social Landlords	The average SAP rating for UK dwellings is just over 50% Contributing to this relatively low figure is a stock of Hard to Treat (HTT) homes. This briefing note provides a formal definition of (HTT) and explains the likely dwellings to fit into the category. The consequences of HTT are also outlined and the range of measures to combat it are also detailed.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE21%20-%20Briefing%20note%20-%20Hard%20to%20Treat%20-%20Final.pdf

Energy Saving Trust	2003	Benefits of Best Practice : Heating and Insulation	This factsheet explains why you should go beyond the basic minimum requirements of the Building Regulations for heating and insulation. Incorporating insulation levels and heating systems recommended by Best Practice standards can yield economic, environmental and social benefits to your organisation, your tenants and to the wider community.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE11%20-%20Cost%20Benefit%20Analysis%20-%20Heating%20+%20Insulation.pdf
Energy Saving Trust	2003	Benefits of Best Practice: Glazing	The negative impact of poor single glazing can be felt in terms of loss of comfort and higher heating bills. This guide details the U value recommendations to help overcome these problems. In addition, it outlines the benefits of improved security, sound insulation, thermal comfort and minimising condensation.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE14%20glazing%20cba.pdf
Energy Saving Trust	2003	Benefits of Best Practice: Community Heating	Incorporating community heating where appropriate can yield far-reaching benefits. This guide outlines what a community heating scheme is and the multiple advantages of implementing a scheme. The guide also details the use of whole life costing with a live example of how community heating compares to other forms of heating. Information is also provided on further sources of information.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE13%20Cost%20Benefit%20Analysis%20-%20Community%20Heating%20-%20Final.pdf
Energy Saving Trust	2002	Central heating system specification (CHeSS)	This leaflet gives basic and best practice specifications for the components of domestic wet central heating systems that are critical to energy efficiency.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/CE51.pdf
Energy Saving Trust	1996	Good housekeeping in nursing and residential homes	A practical guide for owners and managers of residential and nursing homes. Find out how good housekeeping can help save up to 15% off energy bills, whilst reducing maintenance costs and improving comfort for residents. This guide contains useful checklists for assessing where and how you can save energy and ideas about low cost improvements that can make a real difference.	http://www.est.org.uk/bestpractice/uploads/publications/pdfs/Gpg193.pdf

Evidence of Effects of Cold Stress

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Deprivation						
Shah S, Peacock J	Journal of Epidemiology & Community Health	1999	Deprivation & EWM	EWM or temperature dependent variations in mortality not associated with deprivation. No relationship between central heating availability and seasonal mortality. Deprivation and fuel poverty do not predispose to EWM as outdoor exposure to cold or responses to cold indoor temperatures, not related to deprivation, are more important determinants.	There is no evidence of an effect of deprivation on EWM or temperature dependent variations in mortality. The findings question simple assumptions about the relationship between deprivation and EWM and highlight the need for further study to guide interventions.	Journal of Epidemiology and Community Health; 1999; 53:499-502
Lawlor D et al	Journal of Public Health Medicine	2000	Investigation of the association between excess winter mortality and socio-economic deprivation	EWM not associated with deprivation	Further research to identify the important aetiological factors and appropriate interventions to reduce EWM is needed.	Journal of Public Health Medicine; June 2000; 22,2; Proquest Medical Library, pg 176
Lawlor D et al	Journal of Epidemiology & Community Health	2002	Rurality, deprivation & EWM: an ecological study	EWM not associated with area deprivation or rurality	EWM is just one (extreme) health consequence that may be related to fuel poverty and action to combat any kind of poverty should not be undertaken purely on health grounds.	Journal of Epidemiology and Community Health; 2003; 57: 790-791
Donaldson GC, Keatinge WR.	Journal of Epidemiology & Community Health	2003	Cold Related Mortality in E&W; influence of social class in working & Retired age groups	CRM generally low in class 5 men of working age (50-59) only, compared with men in other classes, & significantly compared with class 5 women or housewives. Implies a beneficial effect of work related factors, independent of home environment and income. Internal heat production from manual work protected against daytime cold stress.	Physical exertion & other daytime protection against cold stress need emphasis in campaigns to prevent EWM.	Journal of Epidemiology and Community Health; 2002; 56:373-375

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Mahereswaran R et al	Journal of the Royal Institute of Public Health	2003	Socio-economic deprivation & EWM & emergency admissions in the South Yorkshire Coalfields HAZ	No significant increase in EWM with increasing socio-economic deprivation. Significant increases in EWM were found with increasing age	Measures to reduce EWM should be implemented on a population-wide basis and not limited to socio-economically deprived areas. There may also be a case for tailoring interventions to specifically meet the needs of older people.	Public-Health 2004;118 (3): 167-76
Wilkinson P et al			Cold Comfort - the social and environmental determinants of EWD in England 1986-1996	No evidence suggesting that EWM vaired with socio-economic deprivation either at the individual or small area level. EWM related to outdoor and indoor temperature, and the lack of central heating and poor thermal efficiency ratings. The relationship between home ownership and home heating not simple, as some non-owner occupied housing was well heated while some owner occupied housing was not.	Measures to reduce EWM, such as improving indoor heating and dressing appropriately whilst outdoors, are implemented on a population wide basis and not specifically limited to deprived areas. There may also be a case for tailoring interventions to specifically meet the needs of older people.	
Wilkinson P et al	British Medical Journal	2004	Vulnerability to winter mortality in elderly people in Britain: population based study	No evidence of a trend of increasing risk of EWD with socioeconomic group, housing tenure, reported difficulty in keeping the house warm or living alone.	The lack of socioeconomic gradient suggests that policies aimed at relief of fuel poverty may need to be supplemented by additional measures to tackle the burden of EWDs in elderly people.	BMJ, doi:10.1136/bmj.38167.58907.55
Howieson & Hogan M	Energy Action Scotland & University of Strathclyde Research Paper	2004	Multiple Deprivation and EWDs in Scotland	EWDs are easy to measure and may be considered the acute outcome of cold, damp housing. Mortality is at the tip of this morbidity iceberg. Although some EWDs have been ascribed by the Eurowinter group as being due to external exposure - exacerbated by inappropriate clothing levels or culturally determined behaviour - there remains an acceptance that the majority of these deaths are essentially preventable, if the elderly can be kept warm in their homes during the winter months.		Journal Of Epidemiology and Community Health; 2004; 58:468-475

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Temperature Stress						
The Eurowinter Group	The Lancet	1997	Cold exposure and winter mortality from ischaemic heart disease, respiratory disease, and all causes in warm and cold regions of Europe.	% increases in all cause mortality per 1°C fall in temperature below 18°C were greater, and that protective measures against a given degree of cold were fewer, in regions with mild winters. Direct associations between mortality indices and protective measures against the cold were seen. Evidence linking mortality with home heating independently of outdoor cold stress, and outdoor cold stress independently of home heating were found.	The associations shown between mortality and protection against cold suggest that excess winter mortality could be reduced substantially by improved protection from cold, particularly in countries with warmer winters where the need for cold-avoidance was less obvious and measures taken against it less effective.	Lancet 1997;349:1341-1346
Donaldson GC, Keatinge WR.	British Medical Journal	2004	Winter mortality in elderly people in Britain: Action on outdoor cold stress is needed to reduce winter mortality (letters)	EWM in Britain is now not primarily caused by deprivation and the failure to heat homes[1]. A recent study on younger people provides positive indications that cold exposure outside the home causes winter mortality regardless of economic status[2]. [1] - Wilkinson P et al. Vulnerability to winter mortality in elderly people in Britian: population based study. [2] - Donaldson GC et al. Cold related mortality in England & Wales; influence of social class in working and retired age groups.		BMJ 2004;329:976-977
Mercer JB	Environmental Research	2003	Cold - an underrated risk factor	The reasons behind EWM are complex and involve many different factors, which span a variety of medical and nonmedical disciplines including gerontology, physiology, cardiology, pharmacology, epidemiology, climatology, toxicology, housing quality, energy usage, and socioeconomic factors. Very often studies have been restricted to one or another of these disciplines and there has been rather little effort to try to connect them together, for example indoor climate and heart disease. Despite the enormity of the problem on a worldwide scale, for example, in Europe alone, there are about one-quarter of a million EWD each year, there is surprisingly little research being conducted in this field.		Environmental Research 2003 Vol 92 pt1 pp167-176

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Donaldson GC, Keatinge WR et al	British Medical Journal	1998	Cold related mortalities and protection against cold in Yakutsk, eastern Siberia: observation and interview study.	People in Yakutsk wore very warm clothing, and in extremely cold weather stayed indoors in warm housing, preventing the increases in mortality seen in winter in milder regions of the world. Only respiratory mortality rose, perhaps because of breathing cold air. **Key Messages**: **1** Death rates from Ischaemic heart, cerebrovascular, and respiratory disease and all causes have been shown to increase as air temperature falls. **2** In Yakutsk, mortality from cerebrovascular and ischaemic heart disease and all causes among people aged 50-59 and 60-64 was unchanged as temperature fell to -48^{o}C. **3** Mortality from respiratory diasease increased as temperatures fell below -20^{o}C but this was more than offset by a decrease in deaths from accidents. **4** Exceptionally warm clothing, with reduction of outdoor excursions at temperatures below -20^{o}C, prevented overall outdoor cold stress.	Results show that a combination of warm clothing and warm housing can eliminate overall cold related mortality at outdoor temperatures down to -20^{o}C despite a high level of outdoor excursions. High winter mortality in such areas is largely preventable by warm clothing and housing. They also suggest other measures to prevent cooling of respiratory tract, and possibly to prevent the spread of infection during crowding indoors, may be needed to prevent all excess respiratory mortality in the coldest weather.	BMJ; 1998: 317: 978-982
Donaldson GC, Keatinge WR et al	British Medical Journal	1998	Winter mortality and cold stress in Yekaterinburg, Russia: interview study	Outdoor cold stress and mortality in Yekaterinburg increased only when the mean daily temperature dropped below 0^{o}C. At temperatures down to 0^{o}C cold stress and and excess mortality were prevented by increasing the number of items of clothing worn and the amount of physical activity outdoors in combination with maintaining warmth in houses.General cold stress and mortality realted to cold seen at temperatures below 0^{o}c in Yekaterinburg, and their absence at temperatures above can be most easily explained by a causal relationship between mortality and cold stress.	The results reinforce those of earlier studies (showing an association between cold stress and mortality among different populations of western Europe and time series analysis which showed the close temporal association between cold weather and cause specific mortalities in England). These results suggest that most of the increase in mortality associated with cold weather in western Europe - which occurs mainly at temperatures above 0^{o}c - could be prevented by combination of simple protective measures against outdoor cold and ensuring houses are warm.	BMJ 1998; 316:514-518

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Pettenden S et al	Journal of Epidemiology & Community Health	2003	Mortality and temperature in Sofia and London	Heat and cold had harmful effects in both cities, heat worse in Sofia, cold worse in London. Average temperatures over short periods do not adequately model cold, and may be inadequate for heat if they ignore harvesting effects. Cold temperatures in London, particularly, seem to harm the general population and the effects are not concentrated among persons close to death.		Journal of Epidemiology and Community Health 2003;57:628-633
Hajat S et al	Journal of Epidemiology & Community Health	2002	Impact of hot temperatures on death in London: a time series approach	The results suggest that heat related deaths in London may begin at relatively low temperatures. Hot days occuring in the early part of any year may have a larger effect than those occuring later on; and analysis of separate heatwave periods suggest that episodes of long duration and of highest temperature have the largest mortality effect. The results suggest the average temperature above which point heat related deaths occur in London is about 19^{o}C.	By the summer 2050 it is expected that the mean summer temperature of central England will have risen by 1.6^{o}C. There have been suggestions that Weather Watch warning systems, which alert vulnerable populations to impending 'heatwaves', may prevent deaths in urban centres which, because of the heat island effect, are likey to experience the adverse effect of heat. These results suggest the trigger for activating such a system in London should be a predicted temperature of 21.5^{o}C, or possiblty even earlier at 19^{o}C when some heat effect	Journal of Epidemiology and Community Health 2002; 56: 367-372
Olsen NDL	British Medical Journal	2001	Prescribing warmer, healthier homes (editorial)			
Evans CJ et al	Communicable Disease and Public Health	2004	Do real time 'flu spotter rates warn us about impending emergency admissions and deaths?			

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Keatinge WR	British Medical Journal	2003	Death in heat waves (editorial)	Climatic warming is not continuous but is interrupted by unpredictable fluctuations which can present populations with temperatures they have not encountered before and aren't prepared for.The most important measures are preventative ones. Air conditioning can allow people to continue to work effectively in hot weather and may become necessary to prevent mortality, but it uses a large amount of energy, which can itself accelerate global warming. Simpler measures can be very effective in protecting elderly and other vulnerable people from levels of heat likely to occur in Britain over the next decade. **1** Continue to eat regular meals and drink enough water normally prevents dehydration during heat stress. **2** An open window, fan, light and loose fitting clothing, avoidance of unnecessary exertion, and if necessary sprinkling water on clothing, can prevent the heat stress.	Preventative action is only effective if taken in time, and needs to be taken by the general public as well as those working in homes caring for elderly people. The time to check that a window can be opened and that a fan is available is when hot weather is forecast, not when it occurs. Elderly people unable to do this for themselves, or get help from relatives or neighbours, need to be given a number to call for help. Brief messages, giving simple advice on these lines in news broadcasts and daily press when hot weather is forecast, could be the most effective way to reduce illness and death in heat waves.	BMJ 2003;327;512-513
Donaldson GC, Keatinge WR	British Medical Journal	2001	Winter deaths: warm housing is not enough (letters)	Large scale international surveys have shown an independent association of outdoor, as well as indoor, cold with excess mortality in cold weather[1]. A population of elderly people living in fully insulated housing experienced similar excess winter mortality to the general elderly population[2]. This is not surprising when people spend substantial time outdoors, since cold stress to people waiting at a bus stop in a cold wind can exceed anything experienced indoors. [1] - Eurowinter Group. Cold exposure and winter mortality from ischaemic heart disease, cerebrovascular disease, respiratory disease, and all causes in warm and cold regions of Europe. *Lancet* 1997;349:1341-1346 [2] - Keatinge WR. Seasonal mortality among people with unrestricted home heating. BMJ 1986;293:732-733	Age Concern & other charities have responded by giving advice on avoidance of cold stress outdoors, but campaigns by government departments have remained fixated on indoor cold. Apart from personal measures such as warm clothing and exercise when outdoors in cold weather, there is scope for official action on physical measures such as windproof bus shelters, and in some cases heated waiting rooms.	BMJ 2001;323:166

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Ballester F et al	Journal of Epidemiology & Community Health	2003	Weather, climate, and public health (editorial)		The definition of public health programmes to prevent heat and cold related mortality needs further research to clarify: **1** the population at risk; **2** the lag of time of the effect; **3** the effect on cardiovascular and respiratory morbidity; **4** the role of respiratory infections; **5** the significance of other meteorological variables (humidity, wind etc). Future research that focuses on these specific questions will provide a more accurate measure of the full health impact and will assist in improving public health measures to prevent heat and cold related health effects.	Journal of Epidemiology and Community Health 2003;57:759-760
Aylin P et al	International Journal of Epidemiology	2001	Temperature, housing, deprivation and the relationship to excess winter mortality in Great Britain, 1986-1996	EWM contiues to be an important public health problem in Great Britain. There was a strong inverse association with temperature. Lack of central heating was associated with higher excess winter mortality. **Key Points: 1** EWM continues to be a major public health problem in GB and accounted in excess of 40,000 extra deaths in the winter of 1995/96. **2** It occurs to a lesser extent in other countries, particularly Scandanavia. **3** There is a strong inverse association with mean seasonal temperature. **4** There is little association between deprivation and EWM. **5** Lack of central heating was associated with higher EWM.	Further work is needed to disentangle the complex relationships between different indicators of housing quality and other measures of socioeconomic deprivation and their relationship to the higher numbers of EWDs in Great Britain.	International Journal of Epidemiology 2001;30:1100-1108
Wilmhurst P	British Medical Journal	1994	Temperature and cardiovascular mortality (Editorial)			BMJ 1994; 309: 1029-1030

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Keatinge WR et al	British Medical Journal	2000	Heat related mortality in warm and cold regions of Europe: observational study	Populations in Europe have adjusted succesfully to mean summer temperatures ranging from 13.5^{o}C to 24.1^{o}C, and can be expected to adjust to global warming predicted for the next century with little sustained increase in heat related mortality. Active measures to accelerate adjustment to hot weather could minimise temporary rises in heat related mortality, and measures to maintain protection against the cold in winter could permit substantial reductions in overall mortality as temperatures rise.	Pre-emptive measures against heat stress in advance of global warming is required. The most obvious of these are to improve ventilation in homes and institutions that house vulnerable people and installation of air conditioning in hotter regions. The predicted adjustment to warmer weather would, briefly, reduce both winter and total mortality. A larger more sustained reduction in winter mortality could be achieved if additional action is taken to prevent relaxation of preventative measures against outdoor and indoor cold stress as winters become milder.	BMJ 2000;321:670-673
Donaldson GC, Keatinge WR	British Medical Journal	2002	Excess winter mortality: influenza or cold stress?	Of 1265 EWDs per million over the past 10 years, 2.4% were due to influenza either directly or indirectly. The decline in influenza related deaths is probably due to immunisation and to a reduction in the number of new viral strains. With influenza causing such a small proportion of EWDs, measures to reduce cold stress offer the greatest opportunity to reduce current levels of winter mortality.	Warm housing is important but it can co-exist with high winter mortality[1] and outdoor cold stress had been indepedently associated with high EWM[2]. Campaigns to reduce exposure to cold outdoors provide obvious scope for future preventative action. 1 - Keatinge WR. Seasonal mortality among elderly people with unrestricted home heating. BMJ 1986;293:732-733. 2 - Eurowinter Group.Cold exposure andwinter mortality from ischaemic heart, cerebrovascular, respiratory disease, and all causes in warm and cold regions of Europe. Lancet 1997;349:1341-1346.	BMJ 2002;324:89-90

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Kysely J and Huth R	Climate Research	2004	Heat related mortality in the Czech Republic examined throug synoptic and 'traditional' approaches.	Most everywhere in the world, the number of heat-related deaths generally cannot hold a candle to the number of cold related deaths; and the case of the Czech Republic is no different. Not only are overall numbers of deaths smaller in the warmest part of the year than in the coldest part, approximately half of the heat-related excess deaths typically would have occured anyway, merely being hastened by a few days to a few weeks by the unseasonably warm temperatures that caused them. Hence, as is evident in study after study, cold (both seasonal and unseasonable) kills far more people than heat.		
Danet et al	Circulation	1999	Unhealthy effects of atmospheric temperature and pressure on the occurrence of myocardial infarction and coronary deaths	This longitudinal study is the first to estimate the attributable effect of meteorological variables on MI morbidity in population and strongly argues for a systematic fight against cold in cardiovascular disease prevention, particularly in older ages and after a first MI.	Further population studies in different countries should be developed to further confirm and detail the meteorological variables on coronary heart disease occurrence. These reports should emphasize the importance of adequate temperature conditions as prevention.	Circulation; July 1999.
Donaldson GC, Keatinge WR, Nayha S	Environmental Research	2002	Changes in summer temperature and heat-related mortality since 1971 in North Carolina, South Finalnd, and Southeast England.	The findings are reassuring when considering the likely impact global warming on mortality in relatively prosperous coutries. Apart from declines in heat-related mortality with time, summer heat causes much less mortality than winter cold in all these regions. The declines in heat-related mortality mirror the decline in cold-related mortality that we have reported for England, which is probably due to improved protection against cold.		Environmental Research 2003 91;1-7

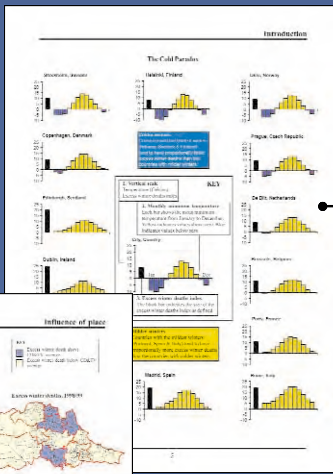
Author	Journal	Year	Title	Conclusions	Recommendations	Reference
EWD - General Risk						
Healy JD	Journal of Epidemiology & Community Health	2002	EWM in Europe: a cross country analysis identifying key risk factors		High seasonal mortality in southern and western Europe could be reduced through improved protection from cold indoors, increased public spending on health care, and improved socioeconomic circumstances resulting in more equitable income distribution.	
Keatinge WR	International Journal of Circumpolar Health	2002	Winter mortality and its causes			International Journal of Circumpolar Health 2002; 61: 292-299
van Rossum C et al	International Journal of Epidemiology	2001	Seasonal variation in cause specific mortlality: Are there high risk groups? 25 year follow up of civil servants from the first Whitehall study	Seasonal mortality differences were greater among those with prevalent ischaemic heart disease and at older ages, but were not greater in individuals of lower socio-economic status or with a high multivariate risk score.	Since seasonal differences showed no evidence of declining over time, elucidating their causes and preventive strategies remains a public health challenge.	International Journal of Epidemiology 2001;30:5: 1109-1118
Lawlor D	British Journal of General Practice	2001	The health consequences of fuel poverty: what should the role of primary care be? (Editorial)	Although fuel poverty is associated with low income, it arises from the combination of of low household income with inadequate and expensive forms of heating and energy efficiency in the home. The solution lies as much in captial investment to improve the quality of housing as it does in increasing income. This distinction from poverty in general may explain why excess winter mortality in England has not been found to be associated with standard measures of deprivation.	Committed political interventions, such as capital investment to sytematically renew the UK's old and poor quality housing stock, abolition of of VAT on fuel, and changes to housing legislation that makes energy efficincy a priority, are likely to be the most effective meansof reducing the consequences of fuel poverty.	British Journal of General Practice June 2001; 435

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Housing						
Wilkinson P et al	JRF Findings	2001	The impact of housing conditions on excess winter deaths	The results suggest a credible chain of causation which links poor housing and poverty to low indoor temperatures to cold-related deaths. **1** seasonal excess of mortality is greatest in dwellings whose chatracteristics are likely to be associated with poor space heating. **2** temperature measurements confirm that these same dwelling characteristics are indeed associated with low internal temperatures. **3** There is evidence that specifically cold-related mortality is greatest in the coldest homes. **4** One counter-intuitive finding is the absence of a clear socio-economic gradient in risk of EWD. Cardio-vascular and all cause mortality are known to have a strong association with poverty, but this appears not to be shown by EWD.	Findings suggest that indoor temperature and factors associated with poor thermal efficiency of dwellings are associated with increased vulnerability to winter death from diseases of the heart and circulation. It is likely that substantial health benefits could be achieved by measures aimed at improving the thermal efficiency of homes and the affordability of heating them.	JRF Findings November 2001
Blane D et al	Journal of Epidemiology & Community Health	2000	The 'inverse housing law' and respiratory health	Geographical mapping showed a mismatch in Britain between climate severity and housing quality. Individual level anaysis shows that lung function is associated with climate and housing, and their interaction, independently of smoking status. The physical quality of the housing seems to be most important in areas with harsh climate. There does appear to be an 'inverse housing law' - some of the worst quality housing is found in areas with severe climate and, on the balance of probabilities, this inverse housing law affects respiratory health.	Targetting poor quality housing in areas of harsh climate is likely to be an effective means of improving respiratory health and narrowing health inequalities.	Journal of Epidemiology and Community Health. 200;54:745-749
I Gemmell	Journal of Epidemiology & Community Health	2001	Indoor heating, house conditions and health	Over and above socioeconomic factors and house conditions inadequate home heating is associated with poor health in those aged 55-60. Although the observed association between ill health and home heating is not necessarily causal, living in a cold house will almost certainly exacerbate existing conditions and may lead to early mortality. Moreover, people living with a limiting condition may require relatively warmer housing because they are likely to be inactive for long periods of time.	Cold and dampness in homes are related and increased awareness of the importance of adequate affordable efficient methods of home heating could help reduce the number of people living in homes that are detrimental to their health. Further analysis in this area using objective measures of cold and damp housing would be beneficial	Journal of Epidemiology and Community Health 2001;12:928

Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Howden-Chapman P	Journal of Epidemiology & Community Health	2004	Housing standards: a glossary of housing and health	This glossary has been designed to provide definitions that take account of different disciplinary and policy traditions and to consider the aspects of housing that provide scope for possible concerted research and action		Journal of Epidemiology and Community Health 2004;58:162-168
Clinch JP, Healy JD	Journal of Epidemiology & Community Health	2000	Housing standards and excess winter mortality in Ireland	This study shows that, while Norway and Ireland exhibit similar rates of mortality from cardiovascular and respiratory disease, relative excess winter mortality from cardiovascular disease in Ireland is 2.1 times that in Norway and for respiratory disease it is 1.4 times the Norwegian figure. A significant explanation for this is that Irish housing standards are considerably poorer than those in Norway, allowing falls in outdoor temperature to have a far greater impact on internal temperatures.	Further research to test the hypothesis that there is a link between housing standards and excess winter mortality would be beneficial. Such research would help to establish whether improved energy efficiency in housing might be an effective preventative intervention to reduce EWM.	Journal of Epidemiology and Community Health. 2000;54:719-720
Thomson H et al	Journal of Epidemiology & Community Health	2003	Health impact assessment of housing improvements: incorporating research evidence			Journal of Epidemiology and Community health 2003;57:11-16
The Scottish Office Central Research Unit		1999	Poor Housing and ill health: a summary of research evidence	**1** There is a correlation between poor housing and ill health but attempts to prove that poor housing actually causes ill health have often failed. **2** The highest risks to health in housing are attached to cold, damp and mouldy conditions. **3** Cold is statistically associated with an excess of winter deaths and Scotland has a disproportionate number of excess deaths compared with the rest of the UK. **4** The number of excess deaths has been falling but the relationship with improved heating and housing conditions is speculative.		

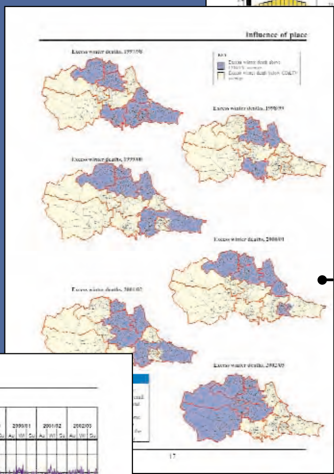
Author	Journal	Year	Title	Conclusions	Recommendations	Reference
Mitchell R et al	International Journal of Epidemiology	2002	Elevated risk of high blood pressure: climate and the inverse housing law	There appears to be an 'inverse housing law' in Britain, whereby longer term residents of relatively cold areas are also more likely to live in worse quality housing and this combination of circumstances is associated with significantly higher risk of diastolic hypertension. The findings provide an example of how long term exposure to an adverse environment, which may stem from material disadvantage, can damage health.	Britain's climate cannot be intentionally altered such that it gets warmer in areas of poor quality housing, but investment in housing where its protective role is most needed might yield considerable health benefits.	International Journal of Epidemiology. 2002;31:831-838

Designed to reveal what many documents conceal......



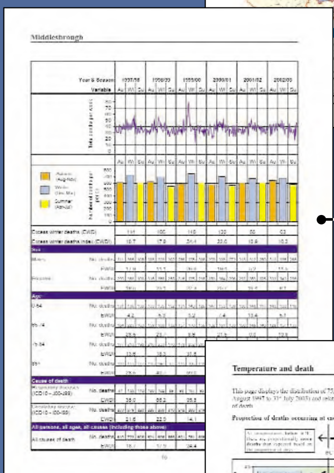
Bar charts and tables

summarise the variations in excess winter deaths and temperatures for 14 counries in Western Europe & Scandinavia



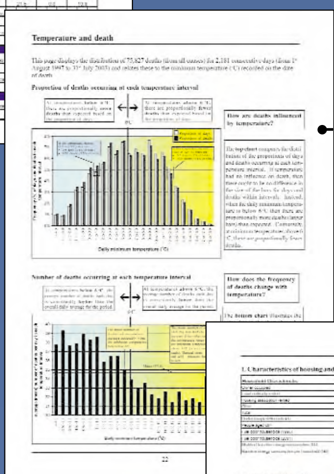
Maps and scatterplots

reveal the distribution of excess winter deaths for the local authority areas of County Durham & Tees Valley



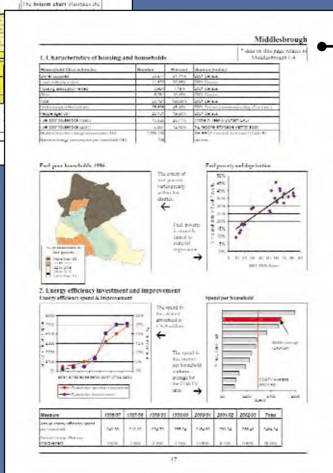
Indices of excess winter deaths

quantify the impact of the cold on different causes of death and different age groups over a peirod of 6years



Single view visualisation

illustrates the daily distribution of deaths in relation to temperature showing how much deaths increase as temperatures decrease



Area profiles at a glance

contain maps, bar charts, scatterplots and key facts that demonstrate the burden of excess winter deaths and the association with temperature, the extent of fuel poverty, energy efficiency spend & improvement, and the changes over time

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