

**Home is where the hearth is: grant recipients' views of  
England's home energy efficiency scheme (Warm Front)**

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# Home is where the hearth is: Grant recipients' views of England's Home Energy Efficiency Scheme (Warm Front)

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## Abstract

This paper reports the results of research carried out as part of the national health impact evaluation of the *Warm Front Scheme*, a government initiative aimed at alleviating fuel poverty in England. Semi-structured interviews were carried out in a purposive sample of 49 households which received home energy improvements under the Scheme from five urban areas (Birmingham, Liverpool, Manchester, Newcastle, Southampton). Each household had received installation, replacement or refurbishment of the heating system and, in some cases, also insulation of the cavity wall or loft or both, and draught-proofing measures.

Most householders reported improved and more controllable warmth and hot water. Many also reported perceptions of improved physical health and comfort, especially of mental health and emotional well-being and, in several cases, the easing of symptoms of chronic illness. There were reports of improved family relations, an expansion of the domestic space used during cold months, greater use of kitchens and improved nutrition, increased privacy, improved social interaction, and an increase in comfort and atmosphere within the home. Greater warmth and comfort also enhanced emotional security, and recipients were more content and at ease in their homes. However there was little evidence of substantially lower heating bills.

These results provide evidence that Warm Front home energy improvements are accompanied by appreciable benefits in terms of use of living space, comfort and quality of life, physical and mental well-being, although there is only limited evidence of change in health behaviour.

**Keywords:** Heating; Fuel poverty; Housing; Inequalities in health; Emotional well-being; UK

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## Introduction

In 1999, an Inter-Ministerial Group on Fuel Poverty was established to develop a Fuel Poverty Strategy. The strategy outlined actions to address the main causes of fuel poverty: poor energy efficiency of homes, the cost of energy and low incomes; the first target being to reduce cold-related ill-health by 2010 for the most vulnerable households, namely older people, disabled householders and families with children (Department of Trade and Industry, 2001). A major part of strategy implementation was the new Home Energy Efficiency Scheme launched in June 2000 to tackle fuel

### **The Warm Front Scheme**

Warm Front provides packages of insulation and heating measures depending upon the needs of the householder and the construction of the property.

The scheme offers:

1. Grants of up to **£1,500** – offering packages of insulation such as loft and/or cavity wall insulation, draught proofing, gas wall heaters, dual element foam insulated immersion tank, heating repairs and replacements. The grant is available to:

- Households, with children under the age of 16, in receipt of an income-related benefit;
- Pregnant women, who receive an income-related benefit and have a MAT B1 certificate provided by their doctor;
- Households who receive a disability benefit.

2. Grants of up to **£2,500** - are available to households who are over 60 and receive an income-related benefit. The grant provides insulation measures and, for those who do not have an existing heating system, a central heating system for the main living areas of the household.

Source: <http://www.defra.gov.uk/environment/energy/hees/01.htm> (last accessed 5th July 2005)

Figure 1: Eligibility for the *Warm Front Scheme* (refers to the *Warm Front Scheme* at the time of the national evaluation).

poverty and to improve Winter indoor temperatures ‘to ensure that by 2010 no [vulnerable household] need risk ill-health due to a cold home’ (Department of Trade and Industry, 2001, p. 10), and now marketed as the *Warm Front Scheme*. The Scheme was recently upgraded in 2005 (Department for Environment, Food and Rural Affairs, 2004).

Much English housing stock is in poor condition and is energy inefficient. Around a third of all properties fail to provide a decent home,<sup>1</sup> with failure to meet the thermal comfort criterion (26% of total stock) the most common cause. Poorest households are twice as likely to live in non-decent housing as the wealthiest households (English House Conditions Survey, 2001). The *Warm Front Scheme* is targeted at low income households and provides grants for the improvement of home insulation and heating in the owner occupier and private rented sector. Householders may

<sup>1</sup> It meets the current statutory minimum standard for housing; is in a reasonable state of repair; has reasonably modern facilities and services; provides a reasonable degree of thermal comfort.

apply for grants of up to £2500 depending on their eligibility (Fig. 1). Households assisted in 2002 received, on average, a grant of £445 (National Audit Office, 2003).

In England a household is defined as being in fuel poverty if it needs to spend more than 10% of its gross income (including all benefits) on fuel to maintain adequate indoor temperatures. At the last official estimates (for 2003), some 1.2 million households in England (approximately 6% of all households) were classified as fuel poor (Department for Environment, Food and Rural Affairs/ Department of Trade and Industry 2005). This is of concern because of recent evidence which suggests that vulnerability to cold-related death may in part be caused by inadequate home heating (Wilkinson, Landon, Armstrong, Stevenson, & McKee, 2001). Hence, fuel poverty may contribute to the large burden of excess Winter deaths in the UK which number 20,000–50,000 a year (Curwen, 1990/91; McKee, 1989; Wilkinson et al., 2004).

Studies specifically assessing the health impacts of energy efficiency measures suggest they may improve self reported health (Green, Ormandy, Brazier, & Gilbertson, 2000) and ease respiratory symptoms in children (Somerville, Mackenzie, Owen, & Miles, 2000) but evidence tends to be mixed (see Thomson, Petticrew, & Morrison, 2001). Few studies have explored experiences of coping with fuel poverty (Harrington et al., 2005).

The *Warm Front Scheme* has been the focus of a national health impact evaluation entailing a survey of some 3000 participating dwellings/households. Its main aim, to quantify the impact of the *Warm Front Scheme* on homes, and householders' mental and physical health and quality of life. Here we report the results of in-depth interviews with a sample of 49 of these households, all of which had recently (within the past year or so) received grant funded home energy improvements. Designed to record the change in householders' perceptions and behaviours following Warm Front improvements, our focus was on satisfaction with the Scheme, perceived changes in health and well-being, use of living space and social interactions. Other themes to emerge included enhanced feelings of emotional or ontological security, a greater sense of control over the living environment but some powerlessness during the installation process, and a more positive sense of home. This emergent finding perhaps lends support to work which points toward a link between ontological security and the home (Hiscock, Kearns, Macintyre, & Ellaway 2001; Kearns, Hiscock, Ellaway, & Macintyre, 2000) and to the emotional significance of home to health and illness (Nettleton & Burrows, 1998, 2000).

## Methods

The national evaluation included dwellings undergoing Warm Front improvements over the Winters of 2001–2002 and 2002–2003 in five urban areas: Birmingham, Liverpool, Manchester, Newcastle and Southampton. A purposive sample of 50 of the 3000 study dwellings stratified by area, household type and period since intervention (recent installation or installation in the preceding Winter) was randomly selected on a first come basis (Table 1). Although the vast majority of properties under the Scheme received insulation measures alone, this study selected households that had received installation, replacement or refurbishment of the heating system and, in some cases, cavity wall or loft insulation and/or draught-

proofing measures (Table 2), as it was anticipated these interventions were likely to have the greatest health impact. Of the originally selected interviewees 16 refused and were substituted by a replacement matched on the key sample characteristics outlined above. In total, 49 interviews were completed as one respondent was ill. A matched replacement was not available for interview within the project timeframe. Background information about the respondents who are quoted in this paper is detailed in Table 3.

By varying the time period since installation, interviews attempted to pick up any immediate changes in respondents' quality of life, as well as of any changes that may occur over longer periods. In practice however, the distinction was difficult to make as households receiving more than one measure may have had them installed over a period of weeks or months. Some changes, e.g. in healthcare utilisation or fuel costs, may have occurred outside the time-frame of the project.

Semi-structured interviews were conducted during Spring 2003 by four experienced interviewers using a topic guide. The guide covered conditions in the home before, during and after Warm Front intervention, and probed issues around how lifestyle and health were affected including: household activities and use of the home; family life and social relations; the health and well-being of household members; cost and convenience; views of the Scheme and experiences of the installation process. Interviewers did not have to raise topics in any particular order and had flexibility to explore respondents' perceptions and behaviour in response to Warm Front improvements. Interviews took place in participants' homes, were tape-recorded and transcribed in full. Transcripts of the first two interviews from each researcher were exchanged to ensure consistency of approach among interviewers. All transcriptions were read by interviewers who recorded topics and issues relevant to the research

Table 1  
Households selected for in-depth interviews

<b>City</b>	<b>Households with family member over 60 years</b>	<b>Households with children under 16</b>	<b>Total</b>
<b>Birmingham</b>	5	5	10
<b>Liverpool</b>	5	5	10
<b>Manchester</b>	5	5 (6)	10 (11)
<b>Newcastle</b>	5	5 (4)	10 (9)
<b>Southampton</b>	5	5 (4)	10 (9)
<b>Total</b>	25	25 (4)	10 (49)

Table 2  
Characteristics of study sample

	<b>N</b>	<b>Mean (range) or number (percent)</b>
<b>Age</b>	49	59 (31-89)
<b>Proportion men</b>	49	20 (40.8%)
<b><i>Type of improvement</i></b>		
<b>Any heating system up-grade</b>	49	40 (81.6%)
<b>Gas central heating</b>	49	12 (24.5%)
<b>Gas balanced flue</b>	49	3 (6.1%)
<b>Boiler replacement</b>	49	15 (30.6%)
<b>Heating system repair</b>	49	18 (36.7%)
<b>Electric storage heater</b>	49	1 (2%)
<b>Electric heater pack</b>	49	0 (0%)
<b>Solid fuel burner repair</b>	49	0 (0%)
<b>Any insulation measure</b>	49	28 (57.1%)
<b>Cavity wall insulation</b>	49	14 (28.6%)
<b>Loft insulation</b>	49	15 (30.6%)
<b>Draft proofing</b>	49	14 (28.6%)
<b>Fitting of hot water jacket</b>	49	5 (10.2%)
<b>Security measures</b>	49	1 (2%)

Includes responses at time of interview. Information presented in this table is based on intervention data from EAGA and household interview data. Where not available, information is supplemented with data collected from qualitative interviews.

Table 3  
Details of respondents quoted

<b>Reference</b>	<b>Sex</b>	<b>WF eligibility</b>	<b>Household composition</b>	<b>Ages</b>
147810	M/F	Over 60	Couple	75/72
9819	M	Under 60 (disability)	One adult	53
137455	F	Under 16	One adult, two children	31, 12, 7
34304	F/F	Over 60	Three adults	86/85, 61
136789	M	Over 60	Couple	76, 72
216378	M/F	Over 60	Couple, adult	80/74, 45
164907	M	Under 60 (disability)	Couple	59, 59
154050	M/F	Over 60	Couple	78/75
443583	F	Over 60	One adult	89
145503	M/F	Under 60 (disability)	Couple, two adults	46/47, 24, 22
293067	F	Under 60 (disability)	Couple	45, 53
435504	F	Under 16	One adult, eight children	39, 4-19

M/F indicates couple interviewed together.

F/F indicates elderly mother and adult daughter interviewed together.

recorded topics and issues relevant to the research focus and policy agenda, plus any others of note. Interviewers met to discuss themes and develop codes; transcripts were then annotated accordingly.

Data were assigned to a category then further analysed to refine themes into sub-categories. Data were also compared and contrasted within and between categories, a process similar to the constant comparative method used in the 'grounded theory' of Glaser and Strauss (see Sapsford & Jupp, 1996), to clarify categories and re-assign data if necessary. Transcripts were then reread to check data, and (re)coded as necessary in light of these refinements.

## Results

The main findings are summarised in Table 4, and presented below under key themes: feelings about the *Warm Front Scheme*; experiences of the installation process; costs; alleviation of physical health symptoms; improvements to mental health and increased emotional security.

### ***General feelings about the Scheme***

Overall, participants were very satisfied with the Scheme in terms of the home environment. Almost all householders reported improved and more controllable warmth and hot water. Approximately half mentioned either the unexpected impact of the smaller interventions, such as draught proofing, or the considerable benefits of insulation as opposed to heating measures. Over a fifth were surprised that it was possible to get government money for such improvements—it seemed like a “private” cost to homeowners—and most thought it an excellent scheme. When

Table 4  
Summary of key responses

	N	Percent
<b>Installation process</b>		
Process tolerable	33	(67.3%)
Some disappointment with quality of work	14	(28.6%)
Little choice/lack of control/inconvenience	11	(22.4%)
<b>Costs</b>		
Difficulty assessing whether bills lower	13	(26.5%)
Time adjusting to new heating system	10	(20.4%)
Some savings	13	(26.5%)
<b>Physical health</b>		
Improved comfort	33	(67.3%)
Easing of chronic conditions	12	(25.5%)
Less minor illness	10	(20.4%)
<b>Mental health</b>		
More relaxed and content	12	(24.5%)
Feeling better	27	(55.1%)
Mood and temperature	13	(26.5%)

asked what they would have done if they had just been given cash instead of a grant eight out of ten said they would have spent it on heating.

### ***Experiences of installation process***

Over two thirds of residents involved in the study found the installation of energy efficiency measures a quite tolerable process. Approximately a third of these commented that the contractors were “friendly”, “polite”, whilst a similar proportion reported little or no mess and that workmen “cleaned up afterwards”. Over a quarter of participants were impressed with the efficiency and speed of the contractors and with the quality of the equipment installed. For these the disruption caused by the installers was minimal and to a certain extent residents were prepared for this; one or two commented that it was less disruption than they had expected.

There were, however, a few cases where work was not completed or was carried out poorly and not to the residents’ satisfaction. Approximately a quarter of all participants were disappointed to some degree with the quality of the work or were critical of the level of expertise employed by the contractors’ workers. Just over a fifth of those interviewed described some level of inconvenience. In a similar proportion of cases, participants explicitly felt they had little power to exercise any choice about the type of intervention, as they were not paying for the work. There was also a sense that interviewees simply accepted the kind of installation undertaken in their homes because it was free. The lack of choice over what was being offered and the lack of power over exactly how the work was undertaken on their property was an important issue. While some quickly forgot the discomfort or saw it as an unpleasant part of getting “something for nothing”, others were almost offended that they had had to undergo this kind of ‘invasion’:

I think I’ve felt really bad, I’ve felt like I’m asking for something, do you know, like begging? I’ve felt like I was begging, and I didn’t want to be in that situation at all, do you know what I mean? 145503, Birmingham

For this same couple, the application and installation process was so stressful they still felt angry about it more than a year later. Overall, however, over three quarters of all participants were delighted with the results and rationalised the negative elements as being unpleasant at the time, but an unavoidable (and acceptable) part of a large government scheme.

### ***Costs***

The *Warm Front Scheme* is the government’s main programme for tackling fuel poverty, and whilst a quarter of participants thought that they had saved some money, a similar proportion had difficulty assessing whether their heating bills were lower. Some felt it was too soon after the intervention to tell and for others a different fuel supplier (over half of these cases) or a different payment method made it impossible to make an accurate comparison. Around a fifth of all participants took time adjusting to their new heating systems - having heating on longer or higher than usual - and commented it would take some time before there was a ‘true’ indication of a typical bill, however, these participants felt that future bills were likely to be about the same or cheaper.

In only a few cases were savings on fuel bills sufficient to be appreciated on a monthly basis. One couple in their mid-70s had changed from night storage heaters



to a combination boiler. Their first bill since the installation was about a third of their previous bill:

Oh it's better, and so far, the first quarter, it's turned out to be cheapy and we found this is much nicer, primarily because you can get the heat when you want it, see!  
154050, Southampton

In a tenth of cases the money saved by using less electricity to heat water was spent on using more gas, so although participants were not financially any better off, they felt the benefits of having more warmth, more control and unlimited hot water for a similar, or slightly higher cost, was worth it.

Whilst estimating energy bill savings may have been difficult, the *Warm Front Scheme* provided other financial benefits. A quarter of all participants would have experienced difficulty finding the money for a new boiler or central heating system without the Scheme and one householder said the Warm Front grant to replace his boiler had enabled him to use some of his own savings to pay for other energy saving improvements:

Participant: Well it would have made a big hole in our savings. What we've got left we've had to use that for different things, you know, and more or less what we paid for the windows and doors we had done last summer was more or less the last of what we had, you know.

I: So you are saying you would have had to spend some of that on the boiler?

P: Yes, oh yes, so in a way it helped us to get the double glazing finished off you know. 164907, Liverpool

An easing of household budgets was also detected in the national survey. A substantially smaller proportion of post intervention cases reported having difficulty paying other household bills than pre intervention households (The Warm Front Study Group, 2005).

### ***Alleviation of physical health symptoms***

The *Warm Front Scheme* has significantly raised recipients' average indoor temperatures (Oreszczyn, Hong, Ridley, Wilkinson, & the Warm Front Study Group, 2006). Improvements in comfort were reported by over two thirds of the qualitative participants and those with limited mobility universally acknowledged the warmer home environment as beneficial. For example, one participant who had suffered for years with asthma and angina reported a better quality of life:

I have a lot of pain, sometimes in my wrists, my muscles. I have a heart problem. I have angina sometimes as well butyl've a better quality of life than sitting freezing.  
9819, Liverpool

Interviewees with chronic conditions which they felt were affected by the cold (being on anticoagulants or because of poor circulation) were appreciative of a warmer living space. Almost a quarter experienced an easing of the symptoms of chronic conditions such as arthritis:

I used to suffer from aches and pains in my shoulder because during the night you know it was cold, but now its very much warmer [and] I don't seem to suffer. 34304, Manchester.

A fifth of participants reported fewer minor illnesses during the Winter:

... and the kids have hardly had any flu this year. I mean they get coughs and stuff... they seem to get it a lot but, touch wood, this year they haven't... 137455, Birmingham

She used to get a lot of colds, didn't she, and a lot wheezing. She's been marvellous for the last year or more, hasn't she, wonderful... 34304, Manchester

One mother of a child who had a history of chest problems reported a clear improvement in her daughter's respiratory health since the intervention over a year before. Another believed the drier air had alleviated his symptoms of bronchitis. Three participants also felt their new heating enabled them to breathe more easily as there were fewer fumes than when electric or gas fires were the main heating source. However, three others felt that the new heating systems aggravated their chest conditions; one of these felt that the increased warmth was beneficial during the day, but made her asthma and bronchitis worse at night.

Potentially, there could also be physical health benefits from improvements in cooking and nutrition. Almost a tenth of cases felt more and better quality food could be purchased because of cost savings:

Its just makes the shopping a little bit easier... We used to get a big chicken on a Sunday and make it last 3 days. But I can now get a big chicken on Sunday and get some pork chops mid week... it does make a big difference. 435504, Southampton

Whilst a fifth reported improved cooking since previously cold kitchens were now comfortable to work in.

### ***Reported improvements to mental health***

Participants reported a lessening of anxiety directly attributed to having a reliable, controllable source of heat and hot water, in some cases after a prolonged period of anxiety and worry:

It's nice because I have no anxiety that the boiler's going to stop working... And I have confidence in it. The house is warm all the time; the house is never cold now, which is lovely. And I can wander from room to room quite happily. 293067

Almost half described particularly harsh home conditions pre-intervention, including broken down heating and no hot water, damp rooms with mould and condensation. One participant had worried constantly about the old system breaking down and described the daily struggle, pre-intervention, of washing and drying all the clothing and bed linen for her large family. Such conditions affected participants' mental well-being and their quality of life:

I shiver even thinking back to what I call the bad old days... I mean sitting here, I've got my telly going... and the [pre-intervention] heating's on and I'm dreading going to the toilet, and I'm dying for a cup of tea, and I'm praying I hear the door opening and [its] one of my sons or my daughter so they can make me a cup of tea, cause that's how bad it was, it was so cold, so cold. 9819, Liverpool

For older interviewees particularly, Winter represented an unpleasant and stressful time when keeping warm and well was hard work. Almost two thirds of all participants used coping strategies in order to survive the cold conditions in their homes. These entailed daily compromises: wearing more clothing, including coats, indoors or sometimes going back to bed and using fewer rooms.

Post intervention, improved warmth and control of heating enabled a third of householders to use more of their rooms. For several participants with children living at home, the use of bedrooms for activities like homework, watching television and playing on computers had greatly increased. A mother of eight children aged between 4 and 19 and all living at home, reported that since the installation of a new combination-boiler, the family was more relaxed. There was considerably less conflict regarding the use of the bath and shower as the hot water supply could now be relied upon, and the use of the whole house had increased. Before the improvements the house had been too cold for the family to eat meals at the dining-room table and although the whole family still sometimes sat together to watch television, this was now choice rather than necessity. This expansion of space was felt by the respondent to be healthy for everyone in her family, and while the practical benefits may have been anticipated, the psychological benefits were unexpected:

Cos we're not screaming at each other to get a move on. We're not moaning at each other because the bloody water's cold. We're not grumpy because we can't get warm. You know it's amazing how one little thing like that can affect a whole family. And the kids bicker at each other therefore I'm shouting at the kids saying - leave each other alone,... I mean that's all gone now. We don't have to worry about that.  
435504, Southampton

Not everyone benefited from the expansion of living space. A newly divorced mother, for example, felt lonelier as now her teenage children spent evenings in their warmer bedrooms. But generally a larger, more comfortable and flexible living space had clear beneficial effects on the participants' sense of well-being.

Overall, a quarter of our participants' reported feeling more relaxed and content, and one woman reported an easing of her symptoms of depression. Supporting evidence from the national evaluation found the proportion of respondents with adverse (4+) scores on the GHQ-12 which measures common mental disorder, was appreciably lower among respondents in post intervention properties (Wilkinson, Armstrong, Oreszczyn, Green, for the Warm Front Study Group, 2005).

### ***Increase in emotional security—feeling more at home***

Although symptoms of mental disorder were alleviated for some, participants did not say they felt healthier but that they simply felt 'better':

Well, you don't feel as well, do you, like I mean, it's obvious, I mean you feel now with the heating on, you feel more relaxed and warm sort of thing. Before, when you got up and you were shivering, not so goody 216378, Liverpool

In ourselves I think we've felt better... maybe more content, put it that way, and we are warmer, it does make a difference... 164907, Liverpool

One couple who, between them, had a combination of conditions including angina, poor circulation, osteoporosis and high blood pressure, were clear about the benefits of their improved heating. While they did not say they felt less ill, they clearly felt more content:

During the daytime it's lovely and warm, it's a great improvement... well, it makes you more relaxed... 154050, Southampton

Around a quarter of respondents made an explicit link between mood and temperature:

If you're cold, you feel grumpy. 34304, Manchester

Feeling better was often elaborated as feeling happier, more secure, more at home, more comfortable; essentially, more themselves:

If you're cold you're miserable and I'm not a miserable person. I'd rather make anybody laugh than cry but as you get older you do appreciate the little things that you've taken for granted, you see, like a warm room, a warm bed, a warm heart. 443583, Manchester

Oh yeah, erm, I think it makes you feel comfortable to live in your house as you wish... it is a big improvement from that point of view. 145503, Birmingham.

Increased feelings of contentment and relaxation in the home as reported by participants may have positive effects on health. The home has been identified by Saunders (1990) as an important source of 'ontological security' Giddens (1990, 1991), primarily because it provides a secure base around which identities are constructed and is a place where people feel most in control of their lives. Kearns and colleagues (Kearns et al., 2000) identify three main psycho-social benefits of the home, namely the home as a 'haven', a site of autonomy and providing social status. Giddens (1991) argues personal autonomy and status are bound up with feelings about the home and suggests that unless one feels safe and in control of the home, one cannot obtain status from it. As a 'haven' the home provides the environment in which individuals are 'free to be themselves' and derive 'emotional security'.

Our findings suggest that the emotional significance of such feelings may be enhanced by the warm and comfortable environment experienced after Warm Front improvements. A key part of feeling 'more at home' may be the expansion of 'useable' space within homes. Before improvements a third of householders reported using fewer rooms during the cold months, often with detrimental effects on both their mental and physical well being. Post intervention participants' enjoyed greater 'autonomy' as their activities were not restricted by cold conditions and they were able to use their homes as wished. Also, as respondents reported greater confidence in their heating after Warm Front interventions it appears that the alleviation of anxiety and worry resulting from having new and reliable heating and hot water systems further enhanced participants' sense of emotional security and autonomy.

However, as reported earlier, around a fifth of participants experienced a sense of powerlessness during the installation process of the *Warm Front Scheme*, in part because the householders did not have the sense of authority over decisions that a 'paying customer' would have (Thorogood, 1992). Such lack of authority and the feelings of 'invasion' reported may undermine security and temporarily reduce the psycho-social benefits derived from the home as they seem to reduce householders' autonomy, and may therefore affect the status derived from the home environment. Of those respondents who mentioned that lack of control or choice was a problem, half commented that they were disappointed with the expertise of contractors and a similar proportion had experienced inconvenience during the installation process. Interestingly although nearly half experienced symptomatic relief, none mentioned that they felt happier or more relaxed in their homes.

## Discussion

This study provides insights into the perceived benefits for householders of the *Warm Front Scheme*, a major policy initiative for the relief of fuel poverty in England. Its findings are that most grant recipients appeared to view the Scheme positively, feeling that it delivered appreciable advantages in terms of thermal comfort, sense of well-being and use of indoor space at a generally acceptable level of inconvenience during the installation process.

It is perhaps unsurprising that most interviewees reported warmer homes, which suggests they took much of the benefit of improved energy efficiency as increased indoor temperature rather than as savings in energy consumption or cost, a finding that is consistent with other studies (Milne, 1995; Milne & Boardman, 1997). It is worth noting, however, that many householders were unable to say even at one year what difference, if any, Warm Front improvements had made to their fuel bills, though a minority clearly identified some cost savings. In terms of health benefits, it is possible that these savings could contribute substantially to improved health through such routes as allowing greater choice and options in food and nutrition, with benefits to both physical and mental well-being.

Participants' responses showed that a warmer indoor environment alleviated physical symptoms of some chronic illnesses, but the improvement in well-being may be ascribed as much to mental factors as to direct physical effects. Householders talked about being more relaxed, less anxious, more themselves after the Warm Front installations, suggesting a more positive sense of personal identity. This increase in being at ease was also associated with ideas about being and feeling more at home—a sense of 'living' rather than just 'surviving' there. Material improvements to the home have been found to enhance "autonomy in the use of the home" (Hiscock et al., 2001, p. 58). In this study warmth and comfort brought about by energy improvements seemed to enhance the psycho-social benefits derived from the home, whilst unreliable heating, daily struggles related to cold conditions and limited use of domestic space seemed to detract from them.

The emotional significance of the home has been linked to health outcomes. Research on the effects of mortgage arrears (Nettleton & Burrows, 1998, 2000) suggests that the stress of marginal homeownership creates insecurity and undermines health. A similar sense of insecurity and stress may be created by living in cold homes with unreliable boilers and poor heating systems, especially if compounded by other problems, such as low income, illness or disability. Whilst most in our study managed to cope with the installation of Warm Front measures some found it a difficult, frustrating and sometimes disempowering process. Such reports are of concern since many eligible for the Scheme are already vulnerable in terms of their health. The lack of authority experienced may also result in undue stress and may undermine mental well-being. The connection between feelings of control and health is well documented elsewhere (Chandola, Kuper, Singh-Manoux, Bartley, & Marmot, 2004; Elstad, 1998; Steptoe & Appels, 1989; Syme, 1991; Wilkinson, 1996; ) and forms part of current debates on social capital, mental health and well-being and resilience. Findings have been reported in relation to other refurbishment schemes, (Allen, 2000) the level of control having a clear relationship to health, usually through reducing stress (Elstad, 1998; Steptoe & Appels, 1989; Syme, 1991; Wilkinson, 1996).

## Conclusion

In summary, this study suggests that high level energy efficiency improvements, which include new heating systems or significant heating repairs installed as part of the *Warm Front Scheme*, have substantial, if unintended, benefits. This finding lends support for the recent enhancement of the Scheme in 2005 which extends the installation of central heating to all eligible households (Department for Environment & Food and Rural Affairs, 2004).

Increased emotional security (resulting from the relief of feelings of tension and anxiety about the home environment), and the improvement in warmth were key to both physical and mental well-being. Householders appeared to have an increased sense of control, self esteem and a more positive sense of their home—effects best explained not simply as a consequence of the removal of negative conditions but rather of the introduction of positive changes at both a material and a psychosocial level. While research has pointed to the link between negative socio-economic conditions, including cold and poor physical health, and others have posited a link between poor living conditions and poor psycho-social outcomes (Hopton & Hunt, 1996; Khanom, 2000; Platt, Martin, Hunt, & Lewis, 1989), our findings suggest that relatively simple improvements to material circumstances have a positive impact not only on physical but also mental well-being. Beneficiaries of home energy improvements felt happier, more comfortable and more in control of their environment.

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