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Psychosocial routes from housing investment to health: Evidence from England's home energy efficiency scheme

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ABSTRACT

Over the past decade the *Warm Front Scheme* has been the English Government's principal programme for improving domestic energy efficiency and reducing fuel poverty. This paper reports on a cross-sectional survey of low income householders participating in the *Warm Front Scheme* in five urban areas of England. Surveys were conducted of 2685 individuals, before and or after intervention. Pathways to self reported health were modelled by logistic regression. Of all the dimensions of health examined, only self reported mental health is directly associated with *Warm Front* measures. Intermediary variables associated with *Warm Front* intervention were shown to be significantly correlated with more dimensions of self reported health status. Higher temperatures, satisfaction with the heating system, greater thermal comfort, reductions in fuel poverty and lower stress were significantly correlated with improved health. Alleviating fuel poverty and reducing stress appeared to be the main route to health. We conclude there are complex and indirect relationships linking energy efficiency measures to outcomes on all dimensions of health which contribute to significant material and psychosocial benefits. The impact of the *Warm Front Scheme* cannot be fully understood by a limited analysis which merely relates indoor temperature and property characteristics to physiological health outcomes.

1. Introduction

This paper reports findings from a health impact evaluation of the English *Warm Front Scheme* undertaken between 2001 and 2005. At the time of the evaluation the *Warm Front Scheme* provided grants of up to UK£2500 for improving home insulation and heating systems in the owner occupier and private rented sector. Eligible households received on average a grant of UK£445 in 2002 (National Audit Office, 2003).

Over the past decade the *Warm Front Scheme* has been the English Government's principal programme for improving domestic energy efficiency and reducing fuel poverty. Between March 2008 and 2011 the scheme benefited from around UK£1billion in Government funding, receiving an annual budget of UK£345 million for 2010–2011 (Energy Action, 2010). Post-recession adjustments to United Kingdom Government finances will see funding cut to UK£110 million in 2011–2012 and UK£100 million in the following year (Energy Action, 2010), before the Coalition Government's Green Deal and the Energy Company Obligation take over as the main means of implementing energy efficiency measures and supporting disadvantaged fuel poor households.

In England a household is defined as being in fuel poverty if it needs to spend more than 10% of gross income (including all benefits) on fuel to maintain adequate indoor temperatures (DEFRA, 2001). During the early life of the *Warm Front Scheme* levels of fuel poverty fell because of improved domestic energy efficiency and then increased because of rising fuel prices. Official Government estimates for 2003 show some 1.2 million households in England were classified as fuel poor. Between 2007 and 2008 levels rose from 2.8 million to 3.3 million in England, and latest Government estimates for 2009 suggest that there were around 4 million fuel poor households in England, or about 18% of all households (DECC, 2011). Of particular concern is evidence which shows the most vulnerable households are disproportionately affected and hardest hit by fuel poverty (Preston et al., 2010). Around 3.2 million or 80% of the fuel poor households in England were vulnerable in 2009. This represented over a fifth of all the vulnerable households in the country (DECC, 2011).

Warm Front has received criticism for being poorly targeted at the fuel poor, mainly because eligibility criteria for the scheme includes non-means tested benefits (National Audit Office, 2009). However, there is evidence too that a sizeable proportion of fuel poor households don't claim means tested benefits (Preston et al., 2010), and of *Warm Front* applicants either withdrawing from the

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scheme or not progressing their application if the grant available does not cover the cost of work required (National Audit Office, 2009). Given that the average contribution required in 2007–2008 was £581 and customers are not able to obtain other quotes from an alternative supplier (National Audit Office, 2009), it seems likely those who do not continue with their application come from vulnerable households.

One of the main aims of the *Warm Front Scheme* outlined in the UK's 2001 Fuel Poverty Strategy is to improve winter indoor temperatures 'to ensure that the most vulnerable households need no longer risk ill-health due to a cold home' (DEFRA, 2001, p.10). Whilst the relation between poor housing and poor health may seem self evident, there has been a lack of good evidence on the health improvements that result specifically from investment in housing (Thomson et al., 2001). A more recent review of studies over the last decade (Liddell and Morris, 2010) suggests overall the health impacts of tackling fuel poverty result in relatively modest physical health impacts (apart from in infants) and, more commonly, significant impacts on the mental health of adults. It concludes that to date few studies have examined the mental health effects on children. Another recent report examining health, mental health and housing conditions in England using the Adult Psychiatric Morbidity Survey 2007 (Harris et al., 2010) also found those with a common mental disorder were more likely to experience fuel poverty. Factors such as being unable to adequately heat the home in winter, having a combination of fuel and other types of problem debt, having mould in the home and using less fuel because of worry about costs were all found to be predictors of common mental disorder.

Here we report on previously unpublished material from the health impact evaluation of the *Warm Front Scheme* which explores in detail the routes from *Warm Front* intervention to health. It provides further evidence of the strong association between fuel poverty and mental health and shows that poor health outcomes increase with the intensity of difficulty in paying fuel bills. Especially relevant in an era of austerity, is evidence of how better health status is linked to lower utilisation of health services.

The UK Governments' *Fuel Poverty Strategy* assumes that material improvements in living conditions will lead to better health, referring to scientific evidence of a biological link between cold conditions and increased risk of both heart and respiratory disease. The *Strategy* acquires political salience via epidemiological evidence of excess but avoidable winter deaths (Wilkinson et al., 2001) and the corrosive effect of poverty (Wilkinson, 1996) on health. However, these material influences may be masked or muted both by variations in living conditions and by complicated social processes associated with physical improvements. Health changes associated with *Warm Front* measures may take more complex pathways illustrated in the schematic model (Fig. 1).

Reflecting concepts of 'ontological security' (Giddens, 1992; Wilkinson, 1996) and 'home as a haven' (Saunders, 1990; Hiscock et al., 2001) Fig. 1 hypothesises two distinct routes to health: (1) via living conditions $(a^1)>(b)>(h)>(j)$ and (2) via financial security $(a^1)>(c)>(e)>(k)$. *Warm Front* seeks *first* to reverse the aetiology identified by Kearns and colleagues (Kearns et al., 2000) who suggest that more than any other feature, housing problems such as dampness and lack of warmth detract from the psychosocial benefits derived from the home. An earlier paper by the *Warm Front Study Group* (Critchley et al., 2007) confirms this route to health via the improved living conditions of raised temperatures and thermal comfort. *Second, Warm Front* seeks to alleviate financial insecurities identified by Nettleton and Burrows (1998) and Taylor et al. (2006). These studies focus on the contribution of mortgage debt to distress, anxiety and depression. If the financial insecurities of fuel poverty contribute a similar aetiology, then *Warm Front* seeks to counter the decline in health via the route $(a^1)>(c)>(e)>(k)$.

'Stress,' pivotal in the *Warm Front* study, is also a key variable in psychosocial explanations of social inequalities in both mental and physical health (Cairney and Boyle, 2004; Taylor et al., 2006) though the primacy of psychosocial explanations over material circumstances is contested (Elstad, 1998). The objectives of this paper are first, to utilise quantitative data from the *Warm Front* evaluation model to elaborate psychosocial pathways to health and second, to gauge the relative impact of improved living conditions compared with the alleviation of fuel poverty.

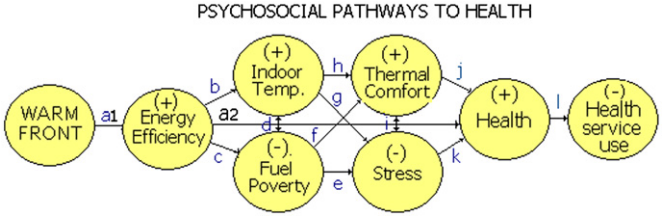

Fig. 1. Psychosocial pathways.

2. Methods

The study entailed the survey of 3489 dwellings and households participating in the *Warm Front Scheme* in five urban areas of England: Birmingham, Liverpool, Manchester, Newcastle and Southampton. First wave surveys were conducted in the winter of 2001/02, the second wave in the winter of 2002/03. Selected dwellings were either scheduled for, or in receipt of, new heating systems or significant heating repairs under the *Warm Front Scheme*. A proportion of dwellings surveyed before improvements in 2001/02 were surveyed again in 2002/3 after improvements. A number of research instruments were employed to gather data including a property survey, electronic data loggers to measure temperature and humidity, a household questionnaire, and a householder diary. Logistical constraints imposed by the *Warm Front* application process limited the set of combined property and household data to 2685 and restricted the number of properties with a confirmed level of *Warm Front* intervention to 1987.

2.1. Measurement

Data relating to the property was collected by specialist surveyors recording age, type and condition including levels of damp and condensation. Heating systems and insulation levels were also recorded and a measure of energy efficiency was derived using a Standard Assessment Procedure (BRECSU, 2001). Detailed measurements of temperature were made in a subset of 1604 study dwellings using Gemini Tiny Tag data loggers. Measurements were recorded at half-hourly intervals for periods of two to four weeks, yielding on average around a thousand points in both living rooms and bedrooms. To ensure comparability between dwellings, indoor temperatures were standardized by regression on outdoor temperature to obtain estimates at outdoor temperature of 5 °C. At the same time some 2000 households completed diaries for one or two weeks, recording their living conditions and thermal comfort levels and recording indoor temperatures.

Data relating to the household and home were collected by a household questionnaire using a computer assisted interview system. One person per household, usually the head of household or his or her spouse, was invited to complete an interview.