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

Capturing the Multiple Benefits of Energy Efficiency Roundtable on Health & Well-being Impacts
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Introduction

- Analysis undertaken as part of health impact evaluation of Warm Front
- Detailed study of processes by which occupant health might be improved through fuel poverty interventions
- Demonstrates the importance of psychosocial pathways to health – two pathways
- Energy efficiency most likely to improve health by reducing stress associated with struggle to afford adequate heating
Background: Fuel poverty and health

• Recognition of links between energy efficiency, fuel poverty and health
  – Marmot Review, 2011
  – Hills Review of Fuel Poverty 2011/2012,
  – UK Fuel Poverty Strategy 2001

• Often studies demonstrate modest health impacts of tackling fuel poverty, more commonly impacts on mental health (Liddell and Morris, 2010)

• Evidence on how fuel poverty interventions actually improve health unclear
The Warm Front Scheme

Before *Warm Front* : spatial shrink

- Insulation: c£1500 max
- Heating repair or replacement: c£2500 max

After *Warm Front* package

- Draught proofing: c£100
Warm Front Health Impact Evaluation

- Commissioned by UK Government - scale of study to add to scientific evidence
- Property and household data for 2685 households in five urban areas of England: two waves winters 2001/02 and 2002/03
- Dwellings were scheduled for, or in receipt of, new heating systems or significant heating repairs under the Warm Front Scheme.
- Variety of research instruments
Health Measurement

- General Health Questionnaire (GHQ-12)
- Five item European Quality of Life Questionnaire (EuroQuol 5D, EQ-5D)
- 36 item Short Form Questionnaire (SF-36)
- Pathways to health explored in detail
Hypothesis: Two distinct routes to health?
Direct health impact limited

Figure 18: Pathways to stress
Warm Front intervention and intermediary variables FP, temperature, comfort, stress

- Complex interplay between these intermediary variables
- Significant association with respondents' living conditions and moderate to high stress levels
- Reporting difficulty paying fuel bills, co-varied with stress levels, with those in greatest difficulty reporting the highest levels.
- Greater comfort, significantly associated with lower stress levels, (pathway (a₁)> (b)>(h)>(i)). Respondents whose living room and/or bedroom was much too cool reported higher stress levels; those very dissatisfied with heating reported higher stress levels.
Fuel Poverty > More Stress

Figure 20: Fuel poverty and stress

- Very easy
- Fairly easy
- Fairly difficult
- Very difficult

Moderate or high stress
Intermediary variables and self reported health

• Those living in cold or draughty homes score on average significantly higher on the GHQ-12 index, as do those reporting problems with condensation.

• Those reporting the most difficulty paying fuel bills are on average four times more likely to have poorer mental health than those who find it easy, a consistent pattern revealed by the three mental health indices, GHQ-12, EuroQuol 5D and SF-36. **Fuel poverty increases depression!**

• Payment difficulties strongly associated with the three indicators of general health
Fuel poverty > Depression

Figure 22: Fuel poverty increases depression
Intermediary variables and self reported health: Stress and Comfort

• Of all the four hypothesised intermediate determinants (i.e., indoor temperature, thermal comfort, fuel poverty and stress), stress has much the strongest association with poor health, with a clear gradient running up from no to high stress, through low and moderate levels.

• Comfort displays a similar pattern. Again the strongest links are with mental health.
Routes to Self Reported Health

- Financial security/lower stress route to health (c)>(e)>(k) is much more significant than the living conditions/thermal comfort route (b)>(h)>(j).

- Poor health outcomes increase with the intensity of fuel poverty and stress.

- Those with low stress are 36 per cent more likely to report a low SF-36 General Health score with moderate stress levels over three times more likely and with high levels over four times more likely.

- There tends to be stronger association between fuel poverty/stress and SF-36 dimensions which include an element of mental health.
The impact of energy efficiency improvements on City Populations: Triangulating the evidence

• 43,000 households in the City of Leeds in Fuel Poverty (source; Leeds stock condition survey. LSCS. 2007)

• Proposed combination of energy efficiency improvements will reduce households in fuel poverty to 39,200. (LSCS + Warm Front Study).

• Estimated prevalence of common mental disorder between 2199 - 3959 individuals (Housing, Health and Safety Rating System, 2004/Health, Mental Health and Housing, NatCen, 2010)

• Estimated reduction in common mental disorder, 1760 annually, 26,400 over 15 year life of investment.
The impact of improvements on city populations: Triangulating the evidence

Figure 3.10: Leeds private sector stock: reduced likelihood of harm from fuel poverty

<table>
<thead>
<tr>
<th>Likelihood of an occurrence of harm in 43,600 households</th>
<th>No. of dwellings where a person suffers harm</th>
<th>Spread of health outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Class I</td>
</tr>
<tr>
<td>Fuel poverty before improvement</td>
<td>1 in 10–18 of 43,600 households</td>
<td>2422–4360</td>
</tr>
<tr>
<td>Reduction 1 year</td>
<td></td>
<td>0–2183</td>
</tr>
<tr>
<td>15 years</td>
<td></td>
<td>0–32,745</td>
</tr>
</tbody>
</table>
Investment Costs and Social Benefits of reducing households in fuel poverty

• Applying QALYs for individual health gains
• Monetising QALYs
• Estimate of cost of working days lost via report of Home Office (2005)
• Utilising HHSRS and NHS reference costs.

Figure 6.3: Warmth Programme: Social costs and benefits

<table>
<thead>
<tr>
<th>Energy efficiency measures</th>
<th>Costs £ million</th>
<th>Discounted present value of lifetime benefits (15 years) £ million</th>
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<tbody>
<tr>
<td>Improved heating systems plus insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced cold</td>
<td>£31.8</td>
<td></td>
</tr>
<tr>
<td>Health gains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in working days lost</td>
<td>£16.9</td>
<td></td>
</tr>
<tr>
<td>Reduction in NHS costs</td>
<td>£10.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>£58.9</td>
<td></td>
</tr>
<tr>
<td>Reduced damp and mould</td>
<td>£7.9</td>
<td></td>
</tr>
<tr>
<td>Health gains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in working days lost</td>
<td>£0.06</td>
<td></td>
</tr>
<tr>
<td>Reduction in NHS costs</td>
<td>£1.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>£9.5</td>
<td></td>
</tr>
<tr>
<td>Reduced fuel poverty</td>
<td>£25.7</td>
<td></td>
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<tr>
<td>Health gains</td>
<td></td>
<td></td>
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<tr>
<td>Reduction in working days lost</td>
<td>£0.2</td>
<td></td>
</tr>
<tr>
<td>Reduction in NHS costs</td>
<td>£0.9</td>
<td></td>
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<tr>
<td>Total</td>
<td>£26.8</td>
<td></td>
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</tbody>
</table>

Total | £74.0 | Total | £95.2 |
Key Messages

• Analysis shows possible pathways via which FP interventions may help alleviate mental health problems particularly, and promote well being. **Stress emerges as the key variable** strongly associated with poor mental health but also with physical dimensions of health.

• **Alleviation of fuel poverty and the reduction of stress associated with greater financial security most likely route to health.**

• Monetised benefits to health and wider society of investing in energy efficiency measures are greater than the costs.

• **UK Government’s Warm Front Scheme is more successful than implied by a limited analysis relating indoor temperature and property characteristics to physiological health outcomes.**