Fuel Poverty Social Impact Bonds: Their potential role and associated challenges

Research for the eaga Charitable Trust by the Centre for Sustainable Energy
June 2013

Prepared by: Ian Preston, Nick Banks and Emma Sturtevant, all Centre for Sustainable Energy

Funded by eaga Charitable Trust

eaga Charitable Trust is a grant-giving trust that was founded by Eaga (now Carillion Energy Services) in 1993. It currently supports projects and research that contribute to combating fuel poverty and ensuring that energy services are fair and accessible for all groups in society.
## List of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRE</td>
<td>Building Research Establishment</td>
</tr>
<tr>
<td>CB</td>
<td>Commissioning Board</td>
</tr>
<tr>
<td>CCG</td>
<td>Clinical Commissioning Group</td>
</tr>
<tr>
<td>DALY</td>
<td>Disability Adjusted Life Year</td>
</tr>
<tr>
<td>DCLG</td>
<td>Department for Communities and Local Government</td>
</tr>
<tr>
<td>DECC</td>
<td>Department of Energy and Climate Change</td>
</tr>
<tr>
<td>DH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>DNO</td>
<td>District Network Operator</td>
</tr>
<tr>
<td>ECO</td>
<td>Energy Company Obligation</td>
</tr>
<tr>
<td>EWA</td>
<td>Excess Winter Admissions</td>
</tr>
<tr>
<td>EWD</td>
<td>Excess Winter Deaths</td>
</tr>
<tr>
<td>FPA</td>
<td>Fuel Poverty Alleviation</td>
</tr>
<tr>
<td>HES</td>
<td>Hospital Episode Statistics</td>
</tr>
<tr>
<td>HHSRS</td>
<td>Housing Health and Safety Rating System</td>
</tr>
<tr>
<td>HWB</td>
<td>Health and Wellbeing Board</td>
</tr>
<tr>
<td>JHWS</td>
<td>Joint Health and Wellbeing Strategy</td>
</tr>
<tr>
<td>JSNA</td>
<td>Joint Strategic Needs Assessment</td>
</tr>
<tr>
<td>MOJ</td>
<td>Ministry of Justice</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and Care Excellence</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>PCT</td>
<td>Primary Care Trust</td>
</tr>
<tr>
<td>PHO</td>
<td>Public Health Observatory</td>
</tr>
<tr>
<td>QALY</td>
<td>Quality Adjusted Life Year</td>
</tr>
<tr>
<td>SAP</td>
<td>Standard Assessment Procedure</td>
</tr>
<tr>
<td>SHA</td>
<td>Strategic Health Authority</td>
</tr>
<tr>
<td>SIB</td>
<td>Social Impact Bond</td>
</tr>
</tbody>
</table>
Acknowledgements

With due thanks and acknowledgement to the project steering group for their time and support, including:

Derek Lickorish, Chair of the Fuel Poverty Advisory Group
Jim Metcalfe, Carnegie UK
William Baker, Consumer Focus
Viv Mason, Building Research Establishment
Christine Liddell, University of Belfast
Angela Raffle, Bristol NHS
Andrew Griffiths, Chartered Institute of Environmental Health
James Vaccaro, Triodos Bank
Simon Roberts, Centre for Sustainable Energy
Daniel Miodovnik, Social Finance
Contents

Practitioners Guide .................................................................................................................. 5
1 Introduction .......................................................................................................................... 14
  1.1 Aims .................................................................................................................................. 14
  1.2 Objectives ........................................................................................................................ 15
2 Background: the SIB concept ............................................................................................. 16
3 Evidence Review ................................................................................................................... 19
  3.1 Health and Fuel Poverty .................................................................................................... 19
  3.2 Testing delivery .................................................................................................................. 23
  3.3 The health outcomes for consideration .......................................................................... 26
4 Understanding the NHS ...................................................................................................... 28
  4.1 The structure of the Health Sector .................................................................................. 28
  4.2 NHS Procurement .......................................................................................................... 32
5 Scoping the Fuel Poverty Social Impact Bond ....................................................................... 34
  5.1 Defining the social issue ................................................................................................. 34
  5.2 Development of the social intervention strategy ............................................................. 35
  5.3 Developing the business case ......................................................................................... 40
6 Designing the Fuel Poverty Social Impact Bond .................................................................. 47
7 Interview findings ................................................................................................................. 52
8 Conclusions and next steps ............................................................................................... 54
Annex I – Further literature review ....................................................................................... 55
  Health and fuel poverty ....................................................................................................... 55
  Testing delivery ................................................................................................................... 65
Annex II – Detailed interview findings .................................................................................. 71
Practitioners Guide

This project set out to determine the feasibility and desirability of a social impact bond (SIB) as a funding instrument for fuel poverty alleviation (FPA) activities, exploring the required technical, financial and institutional arrangements. Whilst the project has successfully mapped the landscape for a SIB, there remains a need for a health economist to perform a full economic appraisal of the health benefits associated with fuel poverty based interventions.

There are a number of guides and toolkits that identify the steps needed to establish a local health related FPA project. Eaga Charitable Trust has funded the previous National Heart Forum Fuel Poverty and Health Toolkit1 and the Housing Health and Fuel Poverty Forum (HHFPF) also developed a toolkit which includes some of the learning from the AWARM project in Manchester. The following guide complements these toolkits by setting out some of the key considerations for each stage in the development of a scheme following the reformation of the NHS. It also draws out some of the issues identified in assessing the potential for a Fuel Poverty SIB which are also relevant for the design of any fuel poverty intervention seeking direct funding from the health sector.

The guide should not be read as an executive summary and as such is not designed to summarise the full material contained in the report.

The SIB concept

SIBs offer an innovative and powerful new mechanism for leveraging private sector investment into social welfare programmes. Widespread interest in SIBs has resulted from a government agenda focussed on reducing public spending, reforming public services and growing the social enterprise sector. The SIB concept can be defined as: a commitment from a public authority (e.g. an NHS Trust) to use a proportion of the savings that result from improved social outcomes (e.g. reduced hospital admissions) to reward non-government investors (e.g. a charitable trust) that fund early intervention activities to achieve these outcomes (e.g. a FPA programme).

This approach removes the need for the public authority to use public funds to pay for the intervention ‘up front’ or to take the risk that the interventions will not work. However, it does require the authority to capture the resulting savings (if any) and pay them across to the SIB provider so that its investors can make a return on their investment if it works.

Key health outcomes

The negative health impacts of living in a cold and/or damp home, although not always exclusively linked to the dwelling, have been identified by multiple studies as being related primarily to both cardiovascular (e.g. stroke) and respiratory (e.g. asthma) ill health. As these conditions often cause frequent (and sometimes life threatening) attacks, the majority of sufferers are likely to present directly to the NHS and as such, any reduction in these patients’ presentations should be relatively easy to track (subject to agreements to access sensitive health data). Those aged under 5 and over


Centre for Sustainable Energy
70 are particularly susceptible to these health risks (although cardiovascular is primarily linked with adults and the elderly) and, as such, can be considered as the key groups vulnerable to poor health arising from cold homes.

Poor mental health, in the form of depression and anxiety, is another key impact of dealing with a cold and/or damp home and unaffordable fuel bills. However, the majority of householders affected by this condition are unlikely to present to the NHS and as such will prove much harder to identify and track.

Although being in fuel poverty is not perfectly correlated with living in a cold / damp home, it is a strong indicator, irrespective of the variety of proposed definitions of fuel poverty that currently exist. Indeed, the Housing Health and Safety Rating System (HHSRS) deemed both ‘excess cold’ and ‘damp and mould’ as category I hazards which rule the property unfit for occupation. Thus we can determine that there is a link between being in fuel poverty and having a higher risk of ill health related as a result of cold/damp homes. In response to this issue, the National Institute for Health and Care Excellence (NICE) are currently putting together public health guidance on the link between cold weather, cold housing and ill health.²

The new NHS

The Health and Social Care Act 2012 attempts to modernise the health service to avoid a future crisis in funding and delivery. It aims to achieve this by placing clinicians at the centre of commissioning health services, which will hopefully allow health care providers to innovate, empower patients and give a new focus to public health.³ There will therefore be new statutory bodies with responsibilities for commissioning health services, namely the NHS Commissioning Board (NHS CB), Clinical Commissioning Groups (CCGs) and commissioning services within the Local Authority; all of which operate under the new Health and Wellbeing Boards (HWB) – see Figure A repeated here from the main report for an illustrative diagram.

³ Please note that this is only relevant to the NHS in England and Wales.
Although the government have promised to increase the NHS budget over the life of this parliament, David Nicholson has issued the “Nicholson Challenge” to make £20billion of productivity savings by 2015 to help cope with demand for services increasing faster than funding. The challenge to deliver productivity savings results in a number of key challenges for Fuel Poverty Alleviation (FPA) schemes that seek to gain funding from a health provider on the basis that the resulting investment will deliver savings. If these savings are captured for the FPA scheme provider under an SIB, then this means they can’t be diverted to other health services which face budget cuts. In this situation, the perceived value to the NHS of this ‘invest to save’ approach may be low, relative to other cost-saving measures (such as reducing staffing or closing facilities) which leave the savings achieved available for redirection.

In addition, the NHS is currently focussed on the delivery of short-term savings which may themselves be subsumed by the following year’s budget limitations. If a scheme is focused on the health outcomes identified in this study, it may therefore gain more support from health providers if it targets those outcomes that reduce costs in the near term (see Table 5 the Matrix of health outcomes). For example, CCGs will pay hospitals directly for their services and as such Excess Winter Admissions (EWAs) represent a significant short term cost (as discussed in section 6.1.3, approximately 25% of winter admissions for childhood asthma can be attributed to indoor mould and dampness).
Laying the foundations

Identifying needs locally

If you are thinking of setting up a fuel poverty related alleviation project, it is important to understand the local health needs and priorities, regardless of the future funding source. The priorities for health care and public health delivery will be defined and managed by the local Health and Well Being Board (HWB). Each HWB is required to produce an annual Joint Strategic Needs Assessment (JSNA), which enables health and social care commissioning groups to set their priorities for the year based on the health and wellbeing issues of the local community. This will be written up in the Joint Health and Wellbeing Strategy (JHWS).

If you want to work with health providers to deliver interventions to help deliver affordable warmth, then you need to know which health issues are important in your area. For example, a FPA SIB targeting childhood asthma is unlikely to gain support if rates for this condition are very low in your area. Start by reviewing the latest JSNA to see if cold-related health issues are a local priority. If you want further information or data then contact the JSNA co-ordinator, who is likely to work for your local authority.

Unfortunately, so far it seems that the majority of published JHWS overlook fuel poverty and its impact on their local community (in terms of excess winter death): more than half are side-lining issues surrounding fuel poverty, 42% exclude mention of either, and only 4% appear to be doing as much as possible to impact upon it\(^4\). It may be harder to gain support for a fuel poverty based intervention project in areas where it is not mentioned as a priority or quantified.

Making links locally

Some local authorities and energy agencies already have strong links with the local health sector through local affordable warmth partnerships. These partnerships typically featured someone from the Primary Care Trust (PCT) with responsibility for fuel poverty. The creation of the HWB and the transference of public health responsibilities to local authorities should make it easier to identify the right contact, and also then make cross-linkages to the private sector housing teams.

We would recommend trying to contact the following if you are trying to establish a local project in an area without any existing partnerships or forums:

- NHS CB, Area Team, Local Area Director
- HWB Members: e.g. Public Health Director, a representative from each local CCG
- CCG: various members, e.g. Locality Managers, Chair, Financial Officers
- Local Authority: e.g. Directors of Public Health, Adult & Social Care, Children’s Services, Private Housing Manager, Environmental Health Officer, Strategic Housing Manager, JSNA Project Manager
- The local Mental Health Trust\(^5\)

---


\(^5\) [www.nhs.uk/ServiceDirectories/Pages/MentalHealthTrustListing.aspx](http://www.nhs.uk/ServiceDirectories/Pages/MentalHealthTrustListing.aspx)
• The local hospital trust which will be either a Care or Foundation Trust depending on the management structure\(^6\)
• The regional contact for energy supplier funded energy efficiency schemes i.e. the Energy Company Obligation (ECO)
• Local debt advice agencies, Citizens Advice Bureaus and Credit Unions

One way to increase engagement is to identify and link with interventions already in existence. For example in Bristol, Home Action Zones is a rolling programme that recognises the link between housing standards and poor health – deprived areas of the city are targeted for home improvements based on the risk of health issues arising from poor housing standards using the HHSRS as a tool to identify need.

Setting up a local project

Identifying funding sources

As mentioned previously there are numerous guides and toolkits to help people and organisations establish a successful energy efficiency related intervention project. However, establishing the right partnerships with organisations that hold the correct skills and knowledge is the key to success. If you are delivering health services or interventions then you should seek to work with an agency with some prior experience of delivering energy efficiency measures, and vice versa if you aren’t working in the health sector. Similarly you will also need to involve an organisation that is able to deliver benefits advice to help maximise a householder’s income.

Irrespective of the FPA using a SIB to finance measures, the scheme will almost certainly need to access more traditional funding routes for interventions, i.e. via energy suppliers or trust funds. The PlanLoCaL resource for Energy Efficiency and the Green Deal has a selection of downloads to help identify useful sources of funding.\(^7\) However, for the purposes of this guide the following summarises the most important existing sources of advice provision (to provide some infrastructure support) or funding that may be relevant:

• Energy Company Obligation funding for Affordable Warmth customers
• Energy Company Obligation funding for customers in Communities Carbon Saving areas (generally those in the lowest 15% of areas on the Index of Multiple Deprivation)
• Home Energy Efficiency Programme which includes the Energy Assistance Scheme, Scotland
• NEST, Wales
• Arbed, Wales
• The Big Lottery Fund
• Warm Homes Healthy People fund, Department of Health (DH)\(^8\)
• Trust funders e.g. Scottish Power Energy People Trust and The Nationwide Foundation have funded work in this area

---

\(^6\) [www.nhs.uk/NHSEngland/thenhs/about/Pages/authoritiesandtrusts.aspx](www.nhs.uk/NHSEngland/thenhs/about/Pages/authoritiesandtrusts.aspx)

\(^7\) See [www.planlocal.org.uk/pages/energy-efficiency-and-the-green-deal](www.planlocal.org.uk/pages/energy-efficiency-and-the-green-deal)

\(^8\) See the recent positive review of WHHP fund by Age UK: Maddox, P. for Age UK, 2013. The Warm Homes Healthy People Fund: A Valuable Resource?
Establishing a single referral route

To be successful, a local FPA scheme working with the health sector needs to offer a 'Single Local Clearing House', i.e. one contact number that provides access to access all local and national FPA interventions. This makes the referral process simple (and avoids the need for health professionals to understand all of the programmes and their eligibility). It also builds confidence amongst health professionals that their patient will not be passed around between agencies. And it enables the orchestration (by the clearing house or ‘hub’) of a tailored set of available interventions to meet each household’s specific needs.

The AWARM project in Manchester identified the possibility of creating automated transferral systems by making relatively simple changes to the NHS patient data management systems. In this instance, GPs can get an on-screen prompt if the patient they are seeing is vulnerable to fuel poverty. With the consent of the patient they can refer them to the local affordable warmth scheme at the touch of a button. The key challenge for any project seeking to replicate this simple but effective approach will be engaging the CCG and / or local GPs sufficiently for them to invest time and potentially resources in making these changes to their system and understanding the benefits available to their patients from them making a referral.

The key differentiator for a FPA SIB rather than a scheme targeting general cold-related health outcomes is the more specific focus on health outcomes and / or target groups (see below). The identification of a strong and consistent referral route is essential to generate a target population that is responsive to the offered intervention. For example, a project targeting slips and falls would need to work with agencies delivering social care, whereas a project targeting childhood asthma may need to work with the local hospital trust paediatric unit administering services for asthma.

Establish a pilot scheme

The following section is more specific to those interested in setting up a FPA SIB. It draws upon findings from the more detailed research project.

Define measurable intended outcomes for the project

Households living in fuel poverty are likely to be more expensive and resource-intensive to the NHS. Bringing down the level of fuel poverty by improving incomes and / or the thermal efficiency of a property is therefore likely to result in cost savings to the NHS. However, despite the wealth of evidence linking cold homes to ill-health, there is still a lack of detailed evidence on the observed impact of interventions on health outcomes and, most relevantly for this ‘invest to save’ funding mechanism, their impact on health service usage and associated costs. As a result any FPA SIB is likely to need a pilot phase whereby a health economist works with a health provider and the delivery agent to map out the potential cost savings.

The provision of sensitive health data is another key challenge to any health related FPA project that wishes to track the impact of interventions. To develop the rationale for funding a pilot phase of a SIB the delivery agent is likely to need to access historical data on health outcomes. This would require the delivery agent to gain clearance to access data from Hospital Episode Statistics (HES) and / or local CCGs (i.e. for patient data). Following our interviews with health providers and researchers we would recommend working in partnership with the regional Public Health Observatory (PHO) or
health care providers, who themselves either hold patient data and/or are able to access the HES interrogation system to perform ad hoc analyses of the data. However, as discussed below, to monitor a functioning SIB’s performance the delivery agent and the independent auditor would need access to detailed information on a patient’s treatment, i.e. requiring them to undergo a lengthy clearance and permissions process to gain access to sensitive health data. An application would need to be made via the Integrated Research Application System for approval by the NHS Research Ethics Committee (REC).

Identify the target cohort and measuring health outcomes

Developing a cohort to receive the intervention will be dependent upon a variety of factors. Typically the amount of available funding and the level of evidence and monitoring required are likely to define the size of the target group. Our interviews with stakeholders suggest a varying level of evidence depending on the health outcome targeted. For example, the delivery of public health and social care objectives such as improvements to mental well-being may require less evidence than a reduction in visits to hospital or GP practices. However, it may also be harder to identify and capture associated financial savings which could justify funding the interventions.

As discussed above, one of the key challenges facing a FPA SIB will be the link between the intervention and the outcome. To provide a satisfactory level of evidence to both acute health providers (such as hospital trusts providing primary care services) and financial investors the SIB is likely to need to use a technique called propensity score matching (PSM) to develop a Comparison Group.

The objective of the Comparison Group is to provide a measure of the incidence of the negative health impacts experienced by the wider cohort who did not receive the SIB intervention (the ‘control group’). For example, in a FPA SIB targeting childhood asthma, the actual measure under comparison would be the ‘frequency of health events’ (which have an explicit associated cost), which is defined as the number of times a patient uses their inhaler, reports to the GP, or is admitted to hospital. The NHS Prescription Services can also provide CCGs and Hospital Trusts with data on the costs of prescriptions and as such savings; however, a lower level of granularity is available for Hospital Trusts i.e. the individual writing the prescription cannot be identified.

The FPA SIB would need to work with the local public health authority and the local health service providers (i.e. depending on the targeted outcome) to ensure the data is both available and of sufficient quality. During the set-up phase, the SIB would need to review a historic dataset to select the necessary match variables for the Comparison Group. The technique uses logistic regression to create the PSM model, i.e. first testing a series of variables for inclusion in the model. Variables that are statistically significant at the p<.20 level would be included in the model. For example, the successful Peterborough Prison SIB used the following five variables to create the Comparison Group: age; date of release sentence; time in custody; prison type; and data availability.

---

9 This is a single system for applying for the permissions and approvals for health and social care / community care research in the UK.
10 As used by the successful Peterborough Prison rehabilitation SIB
11 Note that these measures are not directly related to the actual health of the child but to the extent to which s/he makes use of health services. To the extent that these are correlated (i.e. more healthy children use the health service less), this is a reasonable (but not perfect) proxy for the health outcome.
The match variables for a FPA SIB themselves are likely to vary depending on the health condition targeted. For example, childhood asthma may require the SIB to allow for factors such as age, ethnicity\textsuperscript{12}, if the parent(s) smoke, whereas adult heart disease may require the evaluation of factors that are entirely related to the patient only.

**Define the financial outcomes of the project**

The emerging nature of the new NHS structure poses significant challenges to a FPA SIB in the short term. For example, many of the health professionals we interviewed as part of this project weren’t fully aware of the final details of the relationships between themselves and other actors in the new NHS structure. Funding streams, commissioning responsibilities, and the strength of the evidence required, were all key aspects that took time and patience to comprehend. Figure A above provides a useful map for the overall organisational structure.

Local authorities and CCGs are currently developing contracts for services, many of which are the first of their kind. It is therefore difficult to fully appraise the opportunities for a FPA SIB. However, a number of health providers have identified potential difficulties with the form of these contracts. In particular it may only be possible to capture savings to the health service, if contracts between commissioners and healthcare providers allow savings to accrue. The contracts may be designed to protect either party from excessive costs, i.e. the extent to which an under-spend or over-spend occurs may already be limited to protect both parties from unforeseen circumstances, e.g. a flu epidemic.

Despite the identified challenges, both health professionals and financiers felt that a future SIB could capture savings to the health service. However, as identified previously, there is a lack of evidence with regard to the scale of observed reductions from health outcomes as a result of FPA interventions. The SIB would therefore need to work with a health economist and service provider to identify the scale of the potential savings. Critically, unlike much of the work to date, these savings need to reflect reduced service use and treatment provision, rather than improved quality of life, i.e. measured as Quality Adjusted Life Years (QALYs).

**Identifying and working with potential investors**

A FPA SIB would need to attract a significant amount of initial investment to facilitate a pilot phase. The initial pilot phase would carry a significant amount of risk as the potential impacts of interventions on health are unknown. The FPA SIB would therefore need to be served by a range of different investors, e.g. private sector (both equitable and non equitable), Trust funders, etc. Different types of investors are likely to have a different rationale for their involvement and the pilot would need to try and capture these, e.g. a private sector investor may be able to use the FPA SIB to reduce their tax liability.

Many of the potential investors for a FPA SIB project have investments in stocks, currencies and/or commodities which may currently be devaluing. Ideally a FPA SIB would make a 5-7% return on investment (similar to the Peterborough Prison Project); however, investors may be prepared to accept a slightly lower rate of return given the current market conditions.

Charitable Trust funders could prove to be ideal investors in the early stages of a SIB’s deployment, as they may be able to match the investment with a socially progressive mission statement. However, investing in SIBs represents a new form of investment and may require them to undergo a review of their criteria for investment of their endowment. Despite their charitable aims, the ultimate priority of the charitable funders’ Trustees will be ensuring the charities endowment doesn’t devalue, i.e. meaning the SIB will still need to prove it is a financially credible investment.

Before approaching investors it is important to have a clear idea of the feasibility of the scheme, particularly the level of financial risk involved, in order to answer any questions they will have. The full report contains a draft financial model for a childhood asthma related SIB; whilst this provides a good starting case for investment, as discussed previously, further detailed work is required.

**SIB management**

**Monitoring performance**

The auditors played a crucial role in the success of the Peterborough Prison project. The SIB’s performance was evaluated by Her Majesty’s Prison Service (HMP) (the overall service provider), Social Finance (the delivery agent) and the independent auditor. This triangulation of analysis provided investors with confidence in the agreed level of performance for the SIB and as such the associated financial outputs.

FPA programmes often seek to integrate the provision of services to ensure vulnerable householders receive a holistic set of measures to meet their wider needs. If the SIB aimed to capture the savings associated with the identification and improvement of secondary health, social and financial needs of householders, then it would also need to monitor a set of wider non health indicators. The additional monitoring cost would need to be outweighed by the savings accrued and these savings themselves would also need to be captured by a formal contract with the public sector body making savings as a result. Whilst a suite of indicators seems attractive to the SIB delivery agent, it is important that this dashboard adds to the overall schemes viability.

**Management structure**

The FPA SIB delivery agent will also need to consider the amount of involvement which investors desire and / or expect. If the FPA SIB project becomes an important source of revenue and the liability associated with the investment increases, they could potentially want more influence on the delivery of the FPA programme. The delivery agent may therefore want to develop a barrier (e.g. a trading subsidiary) between potential funders of an SIB and the operation of its wider activities.

In delivering this study and developing this guide, we have identified a range of relevant stakeholders to interview whose knowledge helped to shape our view of the NHS in its current state of redevelopment. Any FPA project would need to identify a network of people to endorse and help develop the project strategy e.g. a range of local healthcare professionals, health economists and project managers of similar interventions in other areas.
1 Introduction

Social Impact Bonds (SIBs) offer an innovative and powerful new mechanism for leveraging private sector investment into social welfare programmes. Through a SIB, private investment is used to pay for prevention and early intervention services, aimed at delivering improved social outcomes that result in public sector savings. It is these expected public sector savings that form the basis for encouraging and rewarding private investors. The public sector pays if (and only if) the intervention is successful. In this way, SIBs enable a re-allocation of risk between the two sectors. If improvements in social welfare are not delivered, and thus financial savings not realised, then investors do not recover their investment.

Widespread interest in SIBs has resulted from a government agenda focussed on reducing public spending, reforming public services and growing the social enterprise sector.

The promise of SIBs is that they can deliver on all these counts:

- Stimulating early prevention programmes which cut public sector costs;
- Encouraging innovative performance-based approaches to welfare provision; and
- Creating new opportunities for social enterprise.

As a result, they seem perfectly tuned to ‘Big Society’ and ‘localism’ thinking and consequently look set to take an increasingly prominent role in policy making and planning. A number of pilot projects are already underway: Peterborough prison has set up a six year £4million SIB trial to tackle reoffending in short stay prisoners. The Department for Communities and Local Government (DCLG) worked with NHS Leeds to develop plans for using SIBs to reduce health and social care costs among older people.\(^1\)

However, SIBs are not an appropriate funding source for all early intervention programmes. They also raise interesting ethical questions about the role of return-seeking private investment in improving public services.

This research project, grant funded by the eaga Charitable Trust, seeks to explore the extent to which fuel poverty alleviation (FPA) programmes may align with SIB requirements. In so doing, it also exposes how the public sector might establish a more general case for investment in ‘problem prevention’ interventions which can be shown to lead to cost savings in ‘problem treatment’ budgets.

1.1 Aims

The main aim of this project is to assess the feasibility and desirability of SIBs as a significant new source of funding for FPA, and specifically:

- To identify the financial, technical and institutional arrangements under which a SIB-funded programme of FPA measures could be feasible;
- To assess the potential positive and negative implications of using SIBs to fund FPA;

To assist policy makers working in the public health and housing sectors to integrate FPA when designing outcome-based schemes to deliver social welfare programmes.

1.2 Objectives

The project’s key objective is to produce a report that provides policy-makers, investors, public sector commissioners and other practitioners with clear and insightful analysis which can underpin design, implementation and other key considerations for a SIB-funded FPA programme.
## 2 Background: the SIB concept

The SIB concept can be defined as: a commitment from a public authority (e.g. an NHS Trust) to use a proportion of the savings that result from improved social outcomes (e.g. reduced hospital admissions) to reward non-government investors (e.g. a charitable trust) that fund early intervention activities (e.g. a FPA programme). Critically, the savings resulting from the intervention must be sufficient enough to enable the public authority to repay the investors at a sufficient rate of return whilst still making savings itself. A further feature is that the public authority will only be required to repay the bond if agreed performance targets are met – i.e. improvements in social welfare are delivered. These arrangements ensure that much of the risk is transferred to the investors in the bond: the public authority will either make real savings through the effects of the intervention or, if the intervention is unsuccessful, then no payment is provided. A diagram explaining the SIB structure is shown below.

![Social Impact Bond Structure](image)

**Figure 1: Social Impact Bond structure. Source: Social Finance**

SIBs are not an appropriate funding source for all early intervention programmes. Therefore, in the context of this research project, it is important to first explore whether FPA programmes have the

---

14 See: [www.socialfinance.org.uk/work/sibs](http://www.socialfinance.org.uk/work/sibs)
requisite characteristics suited to the SIB model.\textsuperscript{15} Criteria for a successful use of SIBs when applied to funding a FPA programme are shown below.

a) **Interventions must have high net benefits**

There is a growing evidence base indicating that FPA schemes may have high net financial benefits. For example, the Building Research Establishment (BRE) recently reported that the Housing Health and Safety Rating System’s (HHSRS) Category 1 excess cold hazards resulting from housing with very low energy efficiency ratings (<SAP35>)\textsuperscript{16} cost the NHS £192 million per annum in admissions and treatment of acute conditions. The report concludes that the average payback period from avoided health costs, as a result of investing in energy efficiency in the poorest performing homes, can be as low as five years.\textsuperscript{17} This suggests that a SIB which invests in the prevention of excess cold at a particular target group and maturing in 5-10 years should be viable. Health benefits are amongst the most exhaustively documented of FPA impacts, though there are many other associated social benefits which could theoretically be allocated to a SIB, including educational benefits,\textsuperscript{18} community stability benefits and environmental clean-up costs.\textsuperscript{19} The key for a SIB is to have a commissioning party (or parties) which can capture some or all of those benefits and subsequently pay for their achievement.

b) **Interventions must be plausibly linked to measurable outcomes**

Performance-based payment schemes can only work for early intervention programmes with outcomes that can be clearly measured, and where the causal linkage between the scheme and the outcome are accepted and contractually documented for both investor and commissioner. Key research questions will be: (a) what performance indicators could be acceptable and measurable; and (b) what level of certainty in the relationship between cause and effect is needed by the various participants in a SIB in order to be satisfied that contractual obligations have been fulfilled. This might prove to be as simple as measuring GP surgery visits or hospital admittances for members of the treatment population with illnesses linked to cold and damp housing, such as strokes and respiratory diseases.

c) **The treatment population must be well defined up front**

Evaluation of programme impacts is much easier for a SIB if the treatment group is clearly defined and readily targeted by the intervention. In the case of FPA, many GPs maintain lists of ‘at risk’ patients for cold-related illnesses (though currently typically fail to link this risk status to the energy performance of their housing). These could provide a targetable treatment population which is likely to have a high incidence of fuel poverty.


\textsuperscript{16} Standard Assessment Procedure which describes the thermal efficiency of a dwelling.

\textsuperscript{17} “The Health Costs of Cold Dwellings”. Building Research Establishment report number ED2792, Report to Chartered Institute of Environmental Health, February, 2011. The 5 year payback is found in the private rented sector and derives from a scenario assuming Category 1 health impacts are likely to occur. Depending on assumed likelihood, payback periods range from 5 to 142 years in the private rented sector.

\textsuperscript{18} See evaluation of the Beacon Community Regeneration Project in Falmouth at http://www.healthcomplexity.net/files/beacon.pdf

\textsuperscript{19} See “Good Housing Leads to Good Health”. Chartered Institute for Environmental Health. September 2008.
d) Impact assessments must be credible

To evaluate the effects of a FPA programme, a means of assessing outcomes in the absence of the programme must be found – i.e. there should be a control. A variety of methods are available to do this which can deliver varying degrees of statistical certainty. For acute health impacts it may be possible to use the Hospital Episode Statistics (HES) database to create a control group of patients with similar conditions and backgrounds (similar propensity).\(^{20}\) The course of their treatment, particularly the number and length of hospital stays, can be compared to the participants in the SIB, in order to give a clear idea of any cost savings delivered.

e) Unsuccessful performance must not result in excessive harm

Bondholders could have an incentive to shut down operations if it becomes clear that they will not meet performance targets and get paid. Consequently a shutdown in the intervention should not result in excessive harm to the target population. Therefore all FPA programmes funded by a SIB should include contingency planning. This aspect also suggests that the SIB-funded interventions should not form part of “core” or acute programmes. However, FPA seems well suited to this criterion: the extended nature of fuel poverty impacts allows time for contingency measures to be developed, should support be removed.

This brief review suggests that FPA programmes have the potential to meet these basic SIB feasibility criteria. The next section presents a review of literature and case studies to date to help inform how FPA programmes might best be designed and implemented in the context of a SIB.

---

\(^{20}\) Hospital Episode Statistics (HES) is the national statistical data warehouse for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. HES is the data source for a wide range of healthcare analysis for the NHS, Government and many other organisations and individuals.
3 Evidence Review

In keeping with the aims of this research project - to examine the feasibility and desirability of SIBs as a funding instrument for FPA activities, with particular focus on using savings from improvements to public health (or, more specifically, reduced costs to the health service) as the primary revenue flow - this review has focussed on the following areas:

1. Fuel poverty and cold homes related health research;
2. The delivery of measures and SIBs; and
3. The real impacts of interventions.

A number of key publications and schemes have been reviewed and summarised in the following sections. A more detailed discussion of the evidence reviewed and summarised in section 3.1.2 and 3.1.3 can be found in Annex I.

3.1 Health and Fuel Poverty

3.1.1 Fuel poverty and cold homes

Back in 2000 Parliament passed the Warm Homes and Energy Conservation Act (WHECA)\(^{21}\) with a Fuel Poverty Strategy to be implemented the following year.\(^{22}\) This strategy included a target to eliminate fuel poverty in ‘vulnerable’ households by 2010 and in all households by 2016. The strategy defined a fuel poor household as one that would need to spend more than 10% of its income to maintain a ‘satisfactory’ heating regime and meet its other energy needs.

In March 2011, with the 2010 target missed and the 2016 target looking unlikely to be achieved, the then Secretary of State for Energy and Climate Change, Chris Huhne MP, announced the appointment of Professor John Hills to lead an independent review of the fuel poverty definition and target.\(^{23}\) Professor Hills reported back in October that year with an interim report, following up with a final report in March 2012.\(^{24}\)

Hills’s Low Income High Costs (LIHC) measure of fuel poverty defines a household as fuel poor if both its income and energy costs breach a threshold. Regarding income, the threshold is proposed to be 60% of the median after housing costs equivalised income plus the individual household’s adjusted modelled energy bill. For energy costs, the threshold is proposed as the median modelled energy bill, after adjustment for household type.

Under the WHECA, “a person is to be regarded as living ‘in fuel poverty’ if he is a member of a household living on a lower income in a home which cannot be kept warm at reasonable cost”. The Hills report states that “it is unreasonable for low-income households to have to pay more to keep warm than typical households on much higher incomes.” Professor Hills therefore defines ‘unreasonable’ as having to spend more than the median household.

\(^{21}\) www.legislation.gov.uk/ukpga/2000/31/contents
\(^{22}\) www.decc.gov.uk/en/content/cms/funding/fuel_poverty/strategy/strategy.aspx#
\(^{23}\) www.decc.gov.uk/en/content/cms/news/pn11_044/
3.1.2 The Fuel Poverty Advisory Group make it clear that although they are happy that health authorities and professionals are becoming involved in housing and fuel poverty issues, this is partly damage limitation – more needs to be done to cement the two and address the physical aspects of cold homes, as detailed below.\textsuperscript{25} Health impacts of cold homes

The number and distribution of excess winter deaths (EWDs) and excess winter admissions (EWAs) can be one way to determine the impact of cold temperatures on health. In households that struggle to heat their homes to an adequate temperature (for example, those in fuel poverty), cold indoor temperatures, particularly in winter, can be a significant variable contributing to mortality and morbidity levels or EWDs and EWAs, respectively. However, morbidity data is harder to access than mortality data, and so a thorough evaluation of cold-related health effects can be problematic. There have been an average 26,700 EWDs a year in England and Wales,\textsuperscript{26} of which it has been estimated that 30-50% can be attributed to cold housing.\textsuperscript{27}

With this in mind, it is useful to look at previous studies that have attempted to evaluate the health benefits of energy efficiency improvements to homes (see chapter 3.1.3) that, in essence, should make it easier and cheaper to raise indoor temperatures and improve the thermal comfort of the home. Where the health of occupants has improved following these changes, and accounting for other factors, it is clear that indoor temperatures and subsequent effects on housing conditions do have an impact on the health status of those living in inadequately heated properties.

### Table 1: Health effect of indoor temperatures (reproduced from DH 2007, p.2)

<table>
<thead>
<tr>
<th>Indoor Temperature</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 °C</td>
<td>Recommended living room temperature</td>
</tr>
<tr>
<td>18 °C</td>
<td>Minimum temperature with no health risk, though may feel cold</td>
</tr>
<tr>
<td>&lt; 16 °C</td>
<td>Resistance to respiratory diseases may be diminished</td>
</tr>
<tr>
<td>9-12 °C</td>
<td>Increases blood pressure and risk of cardiovascular disease</td>
</tr>
<tr>
<td>5 °C</td>
<td>High risk of hypothermia</td>
</tr>
</tbody>
</table>

Multiple studies and reviews recognise cardiovascular and respiratory as the most common physical health issues associated with living in a cold home (see Table 1).\textsuperscript{28}

and Care Excellence (NICE) have used many of these studies to develop their forthcoming public health guidance on the link between cold housing and ill health.  

Respiratory infections become more likely following low indoor temperatures in two ways: (1) cold air lowers the resistance to these infections; and (2) dampness causes mould which can irritate the respiratory system. Asthma is the most prevalent chronic respiratory condition among children, which can lead to further morbidity, increased use of health services and absence from school, all of which may result in a lower quality of life. Approximately one third of EWDs in England are due to respiratory disease.  

Increased risks of cardiovascular disease and stroke are also a result of cold homes, primarily affecting adults and the elderly as a result of increased blood pressure in cold temperatures – the effect of cold weather on cardiovascular mortality decreased by 0.15% for each degree increase in indoor temperature. Approximately half of EWDs in England are due to cardiovascular disease.

Taking both the EWD figures for respiratory and cardiovascular conditions as well as the proportion attributable to cold housing, it can be estimated that nearly half of all EWDs in England are linked to cold indoor temperatures in the home.

In addition to physical health, the improvements to a household’s thermal comfort and a reduction in the stress associated with energy debt can yield significant mental health benefits. This finding was supported by the Warm Front Study Group, operating from 2001-2006, who revealed that better living conditions and lower energy costs can have a significant impact on mental health. In particular, levels of anxiety and depression reduced by almost 50% following Warm Front improvements.

**3.1.3 Improvements to cold homes**

Energy efficiency improvement schemes are often not designed with health issues in mind, which can make it hard to assess their true impact on health. Only one research group in New Zealand has explicitly done this, with promising results for both the general health of householders and the

---


30 See 27.


32 University College London, Sheffield Hallam University, London School of Hygiene and Tropical Medicine, 2006. *Health impact evaluation of England’s home energy efficiency scheme (Warm Front). Headline Results.* Report to the Department of the Environment Food and Rural Affairs. London.

33 See footnote 31.

34 For example, Harris et al., 2010. *Health, mental health and housing conditions in England.* Research for the eaga Charitable Trust by the National Centre for Social Research.

35 Green, G. and J. Gilbertson, 2008. *Warm Front Better Health: Health Impact Evaluation of the Warm Front Scheme.* Published by the Centre for Regional, Economic and Social Research, Sheffield Hallam University.

36 See also: Gilbertson et al., 2012. *Psychosocial routes from housing investment to health: Evidence from England’s home energy efficiency scheme.* *Energy Policy,* 49, pp.122-133.
quality of life of childhood asthma sufferers in terms of self-reported health and use of the health services.\(^{37}\)

A number of reviews have attempted to explore the health benefits of a selection of fuel poverty schemes where the thermal efficiency of homes has been improved; the main points of which are discussed briefly below.\(^{38}\)

The World Health Organisation (WHO) published a report last year on the burden of cold homes on disease, which gave improving domestic insulation as the key recommendation for reducing the number of EWDs and cold-related diseases.\(^{39}\) This is based on European-wide evidence, and as such indicates a clear link between cold homes and EWDs that is experienced on a relatively large geographic scale.

Other findings of these reviews include the health impacts of various energy efficiency interventions (not targeted to achieve positive health outcomes):

- Only a modest improvement to adult physical health has been recorded, often made difficult by the existence of long-term health issues and a reliance on self-assessed general health.
- Children are more readily susceptible to changes, which has made it easier to measure the health impacts of these interventions. For example, children in cold and damp homes are one and a half to three times more likely to develop asthma symptoms than children living in dry homes. Improving insulation and heating can reduce the number of sick days children take off school by up to 80%, as well as reducing the number of hospital admissions of asthmatic children.
- The elderly are also more susceptible to changes, particularly in terms of life-threatening conditions such as those related to cardiovascular diseases. Although they are also more likely to have pre-existing conditions, they are not necessarily at a higher risk of suffering fatal complications from cold and damp housing than those in lower risk groups.
- Improvements to mental health, which can be as much as 50-70% following energy efficiency schemes, are much better documented than those to physical health. This includes reduced anxiety and depression as a result from living in a more comfortable home and/or worrying less about paying fuel bills.

There are various issues surrounding indicators of fuel poverty and/or cold homes that identify those eligible for intervention schemes. The following pointers will be useful to consider for a FPA SIB:


• Although cold and mould are both used as indicators of fuel poverty, there is a much clearer and direct association between each of them and poor physical and poor mental health;
• The presence of a respiratory illness can also predict fuel poverty and/or poor housing conditions, e.g. the presence of cold and mould;
• A lot of people in fuel poverty are excluded from schemes due to the official definition of fuel poverty and the strict criteria for eligibility for the schemes. For example, only 35% of those eligible for the targeted portion of the Carbon Emissions Reduction Target (CERT) (the so called ‘Super Priority Group’) were actually fuel poor - it might thus be simpler to use the presence of respiratory illnesses as an indicator;
• A lot of single parents struggle to heat their home on a low income, which suggests children in these households may be more at risk of developing respiratory illnesses – because this group are not normally excluded under typical fuel poverty indicators, they should be relatively easy to identify for an intervention;
• Eligible groups can also be identified by Primary Care Trusts (PCT) and GPs on a referral basis;
• SAP housing energy performance bands F and G broadly correlate with homes that constitute a Category 1 hazard under the HHSRS.  

There are some methodological issues that make it hard to compare evaluations of schemes:

• Analysis of different intervention schemes is made harder by the fact that different methodologies and evaluation styles are applied, such as how long after improvements are benefits or impacts measured, seasonal influences on outcomes, the presence or absence of a control group, etc.;
• Strict and incomplete criteria for eligibility on schemes will limit their potential to produce relevant results;
• Although general overall fuel use may increase on certain schemes, this is dependent upon the indoor temperature pre-improvement: i.e. <16.5 °C will typically lead to a 30% increase in fuel use; <14 °C a 50% increase; ≥20 °C a 0% increase.
• “Downward mobility” is an issue recognising that one result of becoming ill may be to move into cheaper housing with potentially poorer living conditions, such as low thermal efficiency and hence cold and damp.

For further discussion see Annex 1.

3.2 Testing delivery

3.2.1 Key findings from other SIBs and health intervention schemes

The findings from the reviewed intervention studies identified the need for clearly defined social and economic benefits. To secure funding the SIB may need to focus on investment from mission-focussed charitable trusts whose objectives align with the identified benefits. Where necessary the SIB may need to identify an appropriate intermediary body to negotiate with specific stakeholders; this is particularly relevant for areas of specific expertise, i.e. contractual negotiations.

40 These are currently undergoing restructuring – see chapter 4 for more detail
41 SAP 35 is used as a threshold for the identification of homes at risk from cold and damp
The contractual and legal relationships that underpin a future SIB are likely to end up being relatively complex. However, this is likely to be necessary given the novelty of the financial mechanism and the assurance needed by funders for investment in the bond. To ensure the SIB succeeds it is therefore important to ensure that there is clear understanding of how the outcome-related payments may be shared across different stakeholders.

Furthermore, to measure the SIB’s success and build the case for further investment the project will need a clear evidenced evaluation of the results of the project. The health-related SIB would need to take a similar approach to the Peterborough Prisons project whereby a statistically robust technique was applied to determine the SIB’s success, i.e. the use of a control group (see section 6.1.1 for further details). To ensure that both the health provider and the delivery agent are satisfied that the results and associated payment provided a fair representation of the SIB’s performance, the SIB needs an accompanying independent monitoring body to oversee the process of data capture and monitoring.

Health data is itself extremely sensitive in nature and as such the health-related SIB needs to be realistic about the availability of different datasets. This will be of relevance to the creation of the financial model that underpins the rationale for a SIB’s creation and also the ongoing monitoring of its performance. For example, tackling childhood asthma may require the SIB to access the medical records of children and their parents or carers, which would require a further level of agreement to access information, i.e. obtaining data from a person who’s not exhibiting the targeted health outcome.

The previously identified and reviewed energy efficiency schemes that targeted areas of poor housing and low income or health needs via referrals have typically used quality adjusted life years (QALYs) to demonstrate the benefit to the NHS. A QALY gives an idea of how many extra months or years of life of a reasonable quality a person might gain as a result of treatment, particularly relevant when considering treatments for chronic conditions. NICE uses QALYs as a method to compare the merits of funding different treatments that may have very different outcomes.

For the purpose of a fuel poverty health-related SIB, QALYs are likely to be useful in making a wider case for NHS investment; however, they do not allow the SIB to quantify the savings that are delivered locally, i.e. in the form of reduced EWAs or specific treatment costs and their associated cost savings. The evidence to date linking cold homes to health doesn’t provide sufficient detail to determine the level of impact on health service costs associated with an intervention.

Of course, this lack of evidence regarding the financial benefits to the health service of FPA interventions (as opposed to health benefits to the patients) undermines any attempt to build a case for preventive investment in FPA by the health service. This makes it unlikely that the SIB provider will be able to convince the health sector and the investors that the existing evidence on linkages between FPA interventions and health service cost outcomes is sufficient to justify investment.

There may therefore need to be a primary phase of carefully evaluated pilots that enables (a) the FPA intervention provider to determine the actual costs and benefits associated with delivering the scheme for the targeted health outcomes and (b) the health service to understand what impact it has on use of the health service (and associated costs) by the target cohort of patients (compared with the control group).
Such a primary phase may also act as a useful platform to overcome some of the challenges associated with data collection, e.g. the absence of systematic recording of cold housing and GP or hospital visits.

The transference of public health delivery to the local authority (see chapter 4) offers the opportunity for the SIB to secure engagement and funding, e.g. by linking to housing and environmental health policy via the HHSRS to assess the danger to the health of private householders, where energy efficiency improvements and other interventions may be required. There may also be opportunities for the SIB to provide aftercare to existing intervention schemes, for example to provide advice on the appropriate use of heating and ventilation to enhance the impact of the measures.

3.2.2 Real impacts of interventions

Despite an overall 30% reduction in domestic heat loss and a 30% improvement in the efficiency of domestic heating systems, energy delivered to UK dwellings has increased by 30% over the last 30 years (N.B. this is an aggregate figure and as such includes trends towards smaller households). This is because the demand for heat, light and other electricity in dwellings has doubled over the same time period. Whereas the average temperature maintained in dwellings 30 years ago is thought to have been 13°C, it is now 18°C and could easily rise to 21°C over the next decade. It is important to note that this increase in energy demand relates to heating behaviours, but it has been included because the overall improvement in efficiency sets the context for this change.

It is now recognised that the theoretical energy savings resulting from the installation of measures very rarely materialise as a result of improved comfort and other changes in occupant behaviour. This is often called the "comfort factor" or "take back effect". Energy economists refer to the phenomenon, first recognised by Jevons in the late 19th Century, as the Brookes-Khazzoom effect.

The relative impact of the take-back effect and householder behaviours has not been quantified accurately. The 1996 English House Condition Survey was the last survey to record internal and external temperatures. In its quantification of CO₂ savings from the Warm Front programme, the BRE applies both a comfort factor and underperformance factor in estimating CO₂ reductions achieved by measures. The comfort factor accounts for the theoretical energy savings that are taken as improved comfort (i.e. warmth) by the householder. BRE applies a factor of 40% in calculating savings from all measures (heating and insulation). The latter allows for other factors which could impact on the energy savings realised in practice (e.g. inadequate installation of measures), which BRE applies at 41% for insulation measures. Combining the two therefore gives a total reduction factor of approximately 65% for insulation.

However, it is important to remember the overall goal of Warm Front and other FPA schemes in the context of the savings, i.e. the scheme was targeted at fuel poor households and aims to make them warmer and reduce fuel bills. Indeed, the analysis of Warm Front data has shown that more rather

---

43 UCL, 2008. Select Committee on Science and Technology Minutes of Evidence.
45 Hulme, J., 2008. Carbon dioxide emissions savings from the Warm Front programme. Report by BRE to DECC.
than less comfort-taking would often be needed to ensure householders reached the WHO levels of thermal safety after intervention.

The AWARM study\textsuperscript{46} and CSE’s recent evaluation of the ‘Freedom from Fuel Poverty’ solid wall insulation scheme\textsuperscript{47} found that many householders took virtually all of the savings as comfort. The householder’s propensity to take savings as comfort is crucial for economic models, as the assumed benefits from lower fuel use (lower carbon emissions and fuel bills) are replaced with the benefits of living in a warmer house. This is particularly important for policies such as the Green Deal that use the savings from measures to repay the costs of a loan. The Affordable Warmth aspect of the Energy Company Obligation is meant to compliment the Green Deal for low income households; therefore any subsidy will need to account for the householder’s initial under-consumption.\textsuperscript{48}

The Department for Energy and Climate Change’s (DECC) Annual Energy Statement analyses the distributional impacts of UK climate change policies.\textsuperscript{49} The research applies a comfort taking factor of 15\% for any heat consumption reduction measure, renewable heat pump or insulation measure. However, the final DECC Green Deal and Energy Company Obligation (ECO) consultation included additional in-use factors for measuring performance and installation quality. The additional factors increase comfort taking to approximately 50\%. The factors are based on an analysis of measures performance data by Sanders and Phillipson.\textsuperscript{50}

3.3 The health outcomes for consideration

Table 2 below outlines the health outcomes which previous research suggests a FPA SIB may be able to influence, i.e. a linkage or statistically robust relationship has been identified between improvements in energy efficiency, reductions in fuel poverty and a positive health outcome. Based on our interviews with health practitioners and academics we have included some possible intervention points and additional secondary intervention requirements. For example, adults who smoke increase their risk of developing coronary heart disease by 24\%.\textsuperscript{51}

<table>
<thead>
<tr>
<th>Health outcome</th>
<th>Population</th>
<th>Intervention points</th>
<th>Secondary needs</th>
</tr>
</thead>
</table>

\textsuperscript{46} Threlfall, A., 2011. \textit{Understanding the costs and benefits of fuel poverty interventions: A pragmatic economic evaluation from Greater Manchester}. Report by Greater Manchester Public Health Practice Unit, commissioned by UK Public Health Association

\textsuperscript{47} Banks, N. and White, V., 2011. \textit{Evaluation of solid wall insulation in fuel poor households in the private sector}. Interim report by the Centre for Sustainable Energy to eaga Charitable Trust. Available at: \url{http://www.cse.org.uk/downloads/file/solid-wall_insulation_in_fuel_poor_households_in_the_private_sector.pdf}

\textsuperscript{48} Hirsh, D., Preston, I., and White, V., 2011. \textit{Fuel poverty and understanding energy consumption}, Consumer Focus

\textsuperscript{49} DECC, 2011. \textit{Estimated impacts of energy and climate change policies on energy prices and bills}, November 2011


\textsuperscript{51} \url{http://www.nhs.uk/Conditions/Coronary-heart-disease/Pages/Causes.aspx}
| Stroke & Cardiovascular disease | Elderly & Adults | • Visits to GP for early intervention related symptoms i.e. blood pressure, diabetes and high cholesterol (depending on stroke type)  
• Visits to home at high risk of cold by community practitioners e.g. poor thermal efficiency or lack of heating  
• Diagnoses of obesity  
• Application for a quick kit for smoking addiction  
• Admission to hospital | • Dietary advice  
• Support for smoking cessation  
• Alcohol advice |
| --- | --- | --- | --- |
| Depression & anxiety | Adults & adolescent children 12 to 16 years | • Visits to GP for depression related symptoms  
• Early diagnoses of postnatal depression by community health practitioners  
• Self referral for bullying with schools  
• Persistent exclusion or suspension from school | • Cognitive behavioural therapy (CBT) |
| COPD & Asthma | Adults & Children 0 to 16 years | • Visits to GP for more than one of the following symptoms: wheeze, cough, difficulty breathing and chest tightness (particularly if they are frequent and recurrent and are worse at night and in the early morning)  
• Visits to GP for difficulty breathing in response to exercise, exposure to pets and / or cold damp air  
• Family history of atopic disorder and/or asthma  
• Admission to hospital | • Advice on avoiding allergens, particularly reducing occurrence of mould |

NB. The secondary needs shown above are purely for illustration and need further refinement
4 Understanding the NHS

4.1 The structure of the Health Sector

The NHS is the nation’s largest employer with a budget of £80 billion. Although the government have promised to increase the NHS budget over the life of this parliament, David Nicholson has issued the “Nicholson Challenge” of making £20 billion productivity savings by 2015 in order to cope with the challenge of demand rising faster than funding.

The FPA SIB will need to reduce costs within the health sector to help fund all or part of the interventions. However, it is worth noting that the costs associated with delivering health care continue to rise each year with new treatments and an aging population. The FPA SIB therefore faces the key challenge that the savings to efficiency will generally be needed elsewhere.

On March 27th 2012 ‘The Health and Social Care Act’ reached Royal assent. This Act is designed to safeguard the future of the NHS by modernising the health service to avoid a future crisis in funding and delivery. There are three key rationales that underpin the need for the Act: an aging population, which led to a rising demand for treatment costs; the need to improve treatment to ensure the NHS is world-leading; and the state of the public finances.

---

52 Revised NHS organisational structure based on discussions with health providers, CSE 2013
The Act aims to achieve this by placing clinicians at the centre of commissioning health services, which will hopefully allow health care providers to innovate, empowers patients and give a new focus to public health. It establishes new statutory bodies with responsibilities for commissioning health services, namely the NHS Commissioning Board (NHS CB), Clinical Commissioning Groups (CCGs) and commissioning services within the Local Authority; all of which operate under the new Health and Wellbeing Boards (HWB).

The priorities for health care and public health delivery will be defined and managed by the local HWB (see box 1 below). The HWB will oversee an annual Joint Strategic Needs Assessment (JSNA) to determine the local health needs and priorities. The JSNA then underpins the joint Health & Wellbeing Strategy (JHWS), which provides the context for the commissioning of all local health services. The JHWS is designed to promote an integrated approach to working between local government and NHS, and other service providers and commissioners.

The introduction of HWBs represents a significant change in how health and public services are structured and delivered, and thus, an important opportunity to influence local decision-making in tackling fuel poverty. However, demands on funding are likely to be even more competitive and hence the need to make the economic case for action will be all the more important.

Box 1: Health and Wellbeing Boards (HWB)

The Health and Social Care Act has introduced HWBs as a route for establishing local targets and aims. HWBs represent a statutory requirement in every upper-tier local authority. They will be a forum for local commissioners across the NHS (the NHS CB, CCGs and Public Health commissioners in the local authority), social care, elected representatives, and representatives of Health Watch to discuss how to work together to better the health and wellbeing outcomes of people in their area. In doing so, the aim is to create a more democratic approach in commissioning decisions and provide opportunity for open discussion involving local people.

The NHS Future Forum’s report on patient involvement and public accountability fully supports the principles and development of HWBs. They are viewed as fundamental to delivering improved services, by ensuring patients are “at the heart of decision-making” and local commissioners are taken to task on this. The report called for the Health and Social Care Bill (as it then was) to be strengthened in this regard, to ensure HWBs are truly the focal point for collaborative decision-making about health and wellbeing, with agreed commissioning consortia tasked with setting the priorities for health and care for a community, in line with the JHWS.

Although fuel poverty is recognised as a priority in the DH, it seems that the majority of HWBs so far have not taken this into account for their local JHWS. Only 4% have made fuel poverty and EWDs

---

54 The NHS Future Forum was launched on 6 April 2011 as part of the Government’s “listening” exercise on the current Health and Social Care Bill. Following much consultation and significant responses, the Forum has made a number of recommendations to Government through a series of reports, available at: [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_127443](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_127443)
clear priorities in terms of improving local health and wellbeing, whereas 46% have made no mention to them at all.

4.1.1 Primary & secondary health care

Figure 2 above shows the new proposed structure for the health service (in this case in Bristol). The NHS CB will be responsible for primary care contracts and it will have a duty to commission services in ways that improve quality, reduce inequalities, promote patient involvement, and promote more integrated care. The NHS CB will also have responsibility for specialised services, prison health care and some services for the armed forces.

The current statutory bodies of Strategic Health Authorities (SHAs) and primary care trusts (PCTs) will be abolished with a transition to new regional and local outposts of the NHS CB. It will have 27 Area Teams that work with the CCGs; however, unlike SHAs and PCTs there will be one single organisation operating to a common model with one board. CCGs will be responsible for the commissioning of secondary healthcare services delivered in the community. The box below provides more detail on the relationship between the NHS CB and CCGs.

Box 2: The NHS Commissioning Board & Clinical Commissioning Groups

CCGs (consisting of local GP and healthcare representatives) will take statutory responsibility for commissioning local secondary healthcare services (e.g. general hospital services, accident and emergency) with the exception of specialised services commissioned directly by the NHS CB (see above).57 The local Area Team of the NHS CB will commission primary healthcare services (GPs, pharmacists, community dentists and opticians).

Members of each of the three main commissioning groups (NHS CB, CCG & those integrated in the council) will sit on the local HWB, and will help assess the local health needs and set strategic priorities for their area as set out in the JHWS. These priorities should help set the context for commissioners in their areas with the key aim of delivering integrated care and reducing health inequalities.

There will be some services that CCGs commission for their geographic area (e.g. A&E services) where the costs for an individual patient may be charged to another CCG (i.e. in an area where the patient is registered or, if unregistered, where they live).

Local GPs, as both healthcare commissioners and providers, may potentially have a conflict of interest where they are themselves bidding for work which is being commissioned by CCGs. The NHS CB has set out a series of guidelines to address this potential conflict of interest.

Under the new structure a CCG will directly pay for elective hospital care or urgent and emergency treatment i.e. the hospital will charge the CCGs. NHS Hospital Trust’s were previously commissioned to provide these services by NHS PCTs. CCGs will therefore be motivated to reduce the costs they experience from NHS Hospital Trust’s by encouraging programmes that meet the needs of their local population.

57 [www.commissioningboard.nhs.uk/resources/resources-for-ccgs/](http://www.commissioningboard.nhs.uk/resources/resources-for-ccgs/)
4.1.2 Public health delivery

The commissioning of public health and social care services will be undertaken by local Authorities and Public Health England (PHE; see Figure 2). Local public health initiatives were previously funded by the PCT but this health service is now undergoing integration into the relevant local authority. Alongside the Adult & Social Care and Children’s Services, Public Health is responsible for commissioning their respective healthcare services to the local area using a more integrated community-based approach.

The White Paper ‘Healthy Lives, Healthy People: Our strategy for public health in England’ set out a bold vision for a reformed public health system in England. The strategy is designed to ensure that the delivery of public health addresses the issues raised in Professor Sir Michael Marmot’s Report ‘Fair Society, Healthy Lives’ and best meets the needs of local people in the future. These new public health responsibilities include a proposed action to deliver “local initiatives to reduce excess deaths as a result of seasonal mortality”. 58

The local delivery of public health will be supported by PHE who provides a national direction for public health. PHE will do this by working with key delivery partners including local government (i.e. the new Public Health departments), the NHS CB and their Area Team, and Police and Crime Commissioners, to provide expert advice and services for the public health system, i.e. cost-benefit analysis to ensure effective investment in the prevention of poor health.

4.1.3 The role of clinical guidance

The NHS CB and PHE will use the Quality Standards developed by NICE to drive its commissioning processes. 59 The standards will provide evidence-based summaries of what high quality care looks like for particular service areas. NICE Quality Standards and agreed standards produced by other groups, such as the Royal Colleges, will underpin the commissioning guidance provided to clinical commissioning groups and the NHS CB’s own direct commissioning functions. The Quality Standards will help inform the development of new payment mechanisms and underpin the commissioning system, i.e. supporting consistent improvement in all parts of the country. Figure 3 below shows the proposed system and its links with the NHS Outcomes Framework.

In addition to the set of Quality Standards that are currently being developed by NICE, they also issue guidance documents which sets the standards for high quality healthcare and healthy living. The guidance is designed to be used by the NHS, Local Authorities, employers, voluntary groups and anyone else involved in delivering care or promoting wellbeing. NICE guidance is:

- designed to promote good health and prevent ill health;
- produced by the people affected by our work, including health and social care professionals, patients and the public;
- based on the best evidence;
- transparent in its development, consistent, reliable and based on a rigorous development process;
- good value for money, weighing up the cost and benefits of treatments;

59 www.nice.org.uk/guidance/qualitystandards/qualitystandards.jsp
Internationally recognised for its excellence.

NICE publishes a number of guidance documents which relate to the treatment of the health outcomes that a FPA SIB may seek to target. For example, NICE Clinical Guideline (CG) 21 covers ‘The assessment and prevention of falls in older people’ and CG 90 covers ‘Depression in adults’; however, despite the growing body of evidence, both guidance documents fails to mention low indoor temperature as a potential risk factor.

NICE has now been tasked with developing a guidance document entitled ‘EWD and cold-related illnesses: identifying and supporting vulnerable children and older people’. To support this guidance NICE are commissioning a review of the quantitative and qualitative evidence with respect to EWD and a subsequent full economic analysis. The reviews and model will be considered by the Public Health Advisory Committee appointed to advise on and oversee the development of this guidance. The role of Committee is to draft recommendations, supported by the NICE CPHE team.

![Quality framework for NHS services](image)

Figure 3: Quality framework for NHS services

### 4.2 NHS Procurement

#### 4.2.1 Types of NHS contract

NHS spending and procurement spans a huge range of services and activities with a complex set of organisational responsibilities and relationships. Historically the NHS has paid poor attention to the detailed evaluation of expenditure and as such achieving the required productivity savings represents a huge challenge. For example, at an NHS Procurement conference, Lord Hunt of Kings

---

60 Diagram taken from NHS CB, Designing the NHS Commissioning Board: post-listening

61 A New Strategy for NHS Procurement: Maximising Benefits and Opportunities, April 2012
Heath, President, Health Care Supply Association, talked about the limited number (approximately 20%) of purchases with purchase orders that contain sufficient detail to develop a clear audit trail.

The future flow of funding to health provision will fall into the following categories:

- **The NHS Standard Contract** – negotiated by the NHS CB and used for GP contracts that cover non-CCG responsibilities and additional services such as: prison health care, armed forces health care, dental care, dispensing costs associated with pharmacies and some national public health programmes.
- **NHS Tariffs** – provide a set of standard tariffs for hospital-based treatments. Tariffs were introduced as a way of reducing the variation in treatment costs across regions. The NHS is moving to a system of Best Practice Tariffs (BPT), which encourages providers to follow clinical best practice therefore incentivising and adequately reimbursing providers for the costs of high quality care.
- **Quality and Outcomes Framework (QOF)** – the annual reward and incentive programme detailing GP practice achievement results. QOF awards surgeries achievement points for managing some of the most common chronic diseases, how well the practice is organised, how patients view their experience at the surgery and the amount of extra services offered.
- **Commissioning for Quality and Innovation (CQUIN)** – the payment framework enables commissioners to reward excellence by linking a proportion of English healthcare providers’ income to the achievement of local quality improvement goals.
- **CCG Contracts** – the CCGs themselves will negotiate contracts with secondary health service providers. The NHS CB is currently developing a set of governance and guidance documents outlining the necessary approach to future procurement.

In addition to the above funding routes there is also a programme called Quality, Innovation, Productivity and Prevention (QIPP). QIPP is designed to maximise the clinical and cost effectiveness of care for populations; the process is predicated on transferring care out of hospital and into primary and community settings. The NHS, through QIPP, is expected to deliver procurement savings of £1.2billion by 2014/15.

QIPP operates under a number of work streams that aim to deliver efficiency savings across the health service.\(^62\) For example, the QIPP programme for urgent care aims to maximise the number of instances when the right care is given by the right person at the right place and right time for patients. The work stream starts from a perspective where, rather than 'educating' patients about where it is appropriate for them to go, we should focus on designing a simple system that guides them where they should go. This is directly relevant for slips and falls associated with cold homes as it aims to achieve a 10% reduction in the number of patients attending Accident and Emergency (with associated reductions in ambulance journeys).

---

5 Scoping the Fuel Poverty Social Impact Bond

The ‘Social Finance Technical Guide to Developing Social Impact Bonds’ provides a useful structure that can be used to assess the opportunities for health-linked FPA programmes. The guide identifies four key stages for assessing the feasibility of a particular SIB, namely:

1. Defining the social issue
2. Development of the social intervention strategy
3. Developing the business case

In this section we apply Social Finance’s overall assessment process to the concept of a FPA SIB.

5.1 Defining the social issue

The social issue has been defined as:

**To reduce fuel poverty and the associated health impacts of living in a cold damp home.**

5.1.1 Our understanding of fuel poverty

The current definition of fuel poverty defines a household as being in fuel poverty if it ‘needs’ to spend more than 10% of its income on energy bills. Using a theoretical measure of this type, rather than the amount people actually do spend, provides a valuable measure of a household’s resources relative to need (an indicator of “capabilities”). This definition does not provide a useful measure of a household’s actual experience of energy use, i.e. whether they are adequately warm as they have chosen to prioritise heating their home rather than spending money on food or services.

Following a review process, in March 2012 Professor John Hills proposed a new ‘low income high cost’ (LIHC) method. The new proposed definition includes an estimate of the total number of people in fuel poverty and the ‘fuel poverty gap’ – the total amount of money that would be required to remove people from fuel poverty (see Box 3).

**Box 3: Redefining Fuel Poverty**

In 2011 the Government commissioned Professor John Hills to undertake an independent review of the definition of fuel poverty (hence coined the ‘Hills’ Review’). The review (published in March 2012) concluded with a proposed new definition of fuel poverty and methodology for calculating this. The proposal for a new ‘LIHC’ definition of fuel poverty adopts wording from the Warm Homes Act (2000), stating that “a person is to be regarded as living in fuel poverty if he is a member of a household living on a lower income in a home which cannot be kept warm at reasonable cost.”

The LIHC indicator of fuel poverty applies two thresholds in calculating a households fuel poor

---


64 The definition of fuel poverty is based on a theoretical requirement for a household to spend more than 10% of its income on all fuel to heat its home to an adequate standard of warmth. This is generally defined as 21°C in the living room and 18°C in other occupied rooms.

Centre for Sustainable Energy
status:

1. The **low income threshold** which defines those households who are in income poverty, after accounting for their required fuel costs.\(^{65}\)
2. The **energy cost threshold** which is set at the median of total energy costs (equivalised for household composition).

If a household has an income less than the income threshold and fuel costs greater than the median equivalised fuel costs, then that household is deemed to be in fuel poverty, hence the 'low income, high cost' reference.

The LIHC definition includes an additional method of measuring fuel poverty – the **‘fuel poverty gap’**. This provides a measure of severity of fuel poverty. It assesses the extent to which a household falls below the energy cost threshold or, if near the income threshold, has costs below the latter.

The proposal for the new definition is still under consideration at the time of writing (September 2012) but has important implications for both the resulting estimates of the number of households defined as fuel poor and the types of households appearing as fuel poor.

If the FP SIB were to apply either the existing or the proposed LIHC definitions of fuel poverty to the eligibility criteria then the administration cost would become prohibitive. Previous schemes have used combinations of means tested benefits as proxy’s for targeting; however, as shown by the ‘Improving Hills’ study\(^{66}\) neither provide a particularly good overlap with CERT Priority Group, CERT Super Priority Group or Warm Front’s target group. The FP SIB could therefore choose to focus on inefficient homes that are occupied by people on low incomes rather than use a precise definition of fuel poverty. The programme would then be targeting people whose experience of actual fuel expenditure relative to their income is likely to result in a cold home.

### 5.2 Development of the social intervention strategy

#### 5.2.1 Household vs. area-based approach

In terms of the target audience:

```
The programme of work associated with a FPA SIB would need to target ‘people with health’ or ‘areas with high levels of health inequalities’.
```

The needs of the primary objectives of the FPA SIB and the needs of the target population are derivable from the outcomes shown in Table 1, i.e. improved internal temperatures, and, where possible, higher incomes to pay for their energy costs. The initial desk based review and our discussions with key stakeholders suggest the need for a FPA SIB which focuses on the health outcome(s) that generate the highest possible savings to the health service. However, the current climate of efficiency savings that pervades throughout the NHS may indicate the need for a FPA SIB that focuses on the most immediate priorities for cost reduction.

\(^{65}\) The most commonly used threshold of income poverty is household income that is 60% or less of the average (median) British household income in that year. An after fuel costs poverty approach takes the fuel poverty line as 60% of median income after deducting both fuel and housing costs.

\(^{66}\) Consumer Focus, 2012. Improving Hills (CSE, ACE and Dr Richard Moore).
The scheme design may vary subtly depending on the area- or household-based approach, namely:

- **Area-based** – the targeting of areas with high prevalence of a target condition represents a form of early intervention in itself, i.e. a form of strategic health planning that focuses on a General Practice or geographical area.
- **Household-based** – the identification of patients with a specific condition at an early stage of their diagnosis represents an intervention that is complementary to their treatment.
- **Area-based with household focus** – the two ideas could of course be blended whereby specific areas of high incidence are targeted and then the intervention is focused on identified households. The non-health targeted households could be referred to local schemes or offered funded measures (where funding exists); i.e. combining prevention and treatment.

If the SIB were to fund an area-based intervention whereby thousands of homes are targeted with insulation, this would suggest the prevention of a small number of hospital admissions, i.e. the savings would not be significant enough to make the SIB viable or of interest to the health sector. The SIB could potentially focus on the low-cost interventions shown in Table 2, i.e. administration of referrals, but the scheme would only be health related as a result of the tracking of health outcomes.

The household-specific approach would overcome a number of the issues identified by Liddell and Morris (2010). They found that health outcomes resulting from improvements in energy efficiency and a reduction in fuel poverty were difficult to detect in schemes that targeted low income households without specific health needs. However, the targeting of individual households would require the FPA SIB programme to gain access to relatively sensitive health data. HES is the national statistical data warehouse for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. Use of the HES dataset is governed by both the Data Protection Act and guidelines decided by the DH, both of which are designed to protect not only the individual patient but also the individual practitioner or care provider.

The area-based approach could overcome the data protection issues associated with targeting individual households. For example, to identify an area of interest the programme manager could choose to work with a specific CCG or GP practice. The online Association of Public Health Observatories (APHO) General Practice Profiles tool provides practice-level indicators to enable effective commissioning and appropriate healthcare services for the local population.

Northern Ireland’s Fuel Poverty Review argues that an area-based approach to delivering a strategy will best fulfil the four key objectives: targeting of resources; improving energy efficiency; affordable energy; and building strong partnerships.

The Liverpool City Council Healthy Homes Programme successfully identified target areas by working with the Council’s regeneration team to examine maps of deprivation indices, distribution of private

---

70 University of Ulster, Defining Fuel Poverty in Northern Ireland: Preliminary Review, 2011
rented properties, health inequalities and accident statistics by neighbourhood to pinpoint the areas in greatest need of intervention. Once the areas were identified, neighbourhood managers, community leaders and local resident groups were contacted to identify needs and potential barriers in the area.

There may also be ‘economies of scale’ and benefits of improved take-up rates in implementing an area-based approach, as recognised by a number of fuel poverty schemes, such as the Community Energy Saving Programme (CESP). CESP imposed strict criteria to target only the areas of lowest income in Great Britain – defined as the poorest 10% Lower Super Output Areas (LSOAs) according to the Income Domain of the Index of Multiple Deprivation in England and the lowest 15% of Data Zones in Wales and Scotland. CESP also strongly promoted a “whole house” approach to the installation of measures and a community-based partnership delivery mechanism, involving Local Authorities (LAs), community groups and energy companies, via a house-by-house, street-by-street approach. The aim of the partnership and strictly-defined area-based targeting was to drive engagement with every household in the area. DECC expected take-up rates of up to 65% of households in a CESP area.71

The evaluation of CESP showed that many stakeholders concurred that the area-based approach was cost-effective, led to economies of scale and efficiency of delivery, and also offered potential wider benefits for the area, for example: regeneration and aesthetic improvements; local economic benefits through local employment and training, the use of local trades of other businesses, as well as knock-on benefits for local shops in the areas concerned. However, in practice, take-up rates were not always on a par with those first envisaged by DECC and some encountered significant challenges in adhering to the very tightly defined area-based approach of using LSOA’s and Data Zones, the boundaries of which did not necessarily align with natural ‘community’ boundaries (e.g. housing estates). To overcome this, stakeholders suggested up to 10% of properties in the CESP scheme should be allowed to lie within a neighbouring area, or local authorities or housing associations should be permitted to self-certify CESP-eligible areas (e.g. through demonstrating that a certain percentage of households are housing benefit claimants).

5.2.2 Single health outcome vs. many

Table 2 shows the potential health outcomes that the FPA SIB could target and the secondary benefits they could then deliver. As discussed in section 5.2.1 the current climate of efficiency savings that pervades throughout the NHS may indicate the need for a FPA SIB that focuses on the health outcome(s) which link to the most immediate priorities for cost reduction.

The most viable option for the FPA SIB would therefore seem to be an intervention(s) targeted at individuals either at risk of cold-related health impacts, or already presenting to GPs or hospitals with cold-related illnesses. To manage the scheme and ensure health sector buy-in, this would need to be within a pre-defined area, i.e. to correspond with a CCG area or a local NHS Hospital Trust. In this way, the choice of areas also lends itself to building political capital for a scheme. Poor quality, thermally inefficient housing, social deprivation and attendant health issues are often found in the

same geographical areas. It therefore seems sensible to focus a FPA SIB on identifying at risk households within specific areas.

The example of the Manchester AWARM is instructive in this respect. Through various disparate agencies working together, thousands of referrals to a fuel poverty alleviation scheme were generated. The FPA SIB could therefore construct the necessary referral networks if the correct partnerships and data sharing agreements can be established.

The North West Public Health Observatory’s (NWPHO) previous work on EWAs demonstrated a cost to the NHS of £86million in the North West. Slips and falls and diseases of the respiratory and circulatory system are shown to contribute most to EWAs. The admissions for respiratory and circulatory conditions are particularly relevant for childhood asthma. The NWPHO’s analysis demonstrated a high proportion of all EWAs for a respiratory condition being among children aged less than five years (43.5%). Table 2 shows that childhood asthma and slips and falls are both possible FPA SIB health outcomes. If a FPA SIB were to be designed around EWAs, which will be a key budgetary concern for CCGs, then the project would potentially need to target more than one health outcome in a locality, e.g. asthma, respiratory conditions and falls.

5.2.3 Integrating services and meeting secondary targets and objectives

In terms of wider drivers for fuel poverty interventions, the Government has a national target to eradicate fuel poverty, where reasonably practicable, in all homes by 2016. The local indicator to target fuel poverty, National Indicator 187 (NI 187), has been removed by the current Government. NI 187 was designed to tackle fuel poverty by reducing the proportion of people receiving income based benefits and living in homes with a low energy efficiency rating. Critics felt the NI 187 survey didn’t measure fuel poverty accurately and “imposed a significant burden on local authorities”. As such the indicator was discontinued, and the Government has instead “developed a methodology that more accurately measures fuel poverty at a local authority level, and which doesn’t impose any burden on local authorities”.

FPA programmes often seek to integrate the provision of services to ensure vulnerable householders receive a holistic set of measures. For example, the Somerset-based Warm Streets scheme offers householders energy efficiency measures whilst cross-referring them to other services via the Home Safety Action Group (HSAG). HSAG is managed by Age UK and allows partners to cross-refer to other necessary services, e.g. to the fire service for smoke alarms or Care and Repair for hand rails. The secondary needs in Table 2 therefore highlight the potential ‘dashboard’ of activities that a cross-referral network would need to link to as part of the FPA SIB.

The FP SIB will also need to track the interventions’ success in terms of a discernible trend in improved health outcomes. The Social Finance feasibility study in Leeds has demonstrated the availability of health data at both area and condition level. However, the health outcomes typically associated with fuel poverty are often associated with: longer term health conditions that may not be influenced by improving thermal comfort; and/or a variety of contributory factors, e.g. diet, smoking, alcohol consumption, levels of exercise.

---

72 The Government’s original target of eradicating fuel poverty in all vulnerable households by 2010, where reasonably practical, was not achieved.
The BRE costed the health outcomes associated with the Liverpool City Council Healthy Homes programme using HHSRS published evidence based data.\textsuperscript{74} The estimates themselves are relatively conservative and importantly the PCT were prepared to use this as a rationale for funding, i.e. without additional evidence. As mentioned elsewhere in this report, the key issue for making the case for health sector funding of an FPA scheme is the evidence (or lack of it) of the reduction in health service cost resulting from a reduced demand for services, rather than specific evidence of an improvement in health.

5.2.4 Ethical considerations

The FPA SIB could be developed to accrue the highest financial savings from a particular cohort, i.e. focussing on areas with optimal conditions. For example, targeting the SIB on vulnerable households within an area could conceivably lead to a situation where the SIB cherry-picks households at risk of developing cold-related conditions which are the most expensive to treat in hospital.

On the other hand, area-based approaches risk overlooking some of the most vulnerable households if these happen to fall out of areas identified for targeting. The Northern Ireland Preliminary Fuel Poverty Review recommends combining an area- and household-based approach, in order to maximise cost-effectiveness (through the former) whilst ensuring measures reach those most in need (through the latter).\textsuperscript{75} It thus proposes developing an area-based index for the purpose of guiding the targeting of FPA schemes (avoiding the complexities and costs associated with household-level indices) and overlaying this with additional targeting tools to identify individual households within an area that are most likely to be low income and low SAP. Area-based interventions to address fuel poverty should be focused specifically on these households. However, to ensure the full potential of the area-based approach is maximised and households beyond those identified as the most in need may also benefit from measures, it also suggests that an integrated package of area-based assistance could be developed through a range of additional policies, such as Green New Deal,\textsuperscript{76} stamp duty rebates, and rate rebates.

There could also be an argument for a regional dimension to a FPA SIB, which would make them more viable in colder climates, e.g. focusing on the North East rather than the South West. Consequently, there may be a mismatch between the activities encouraged by the financial logic of the SIB in maximising return, and the actual needs of the community it is supposedly serving, e.g. preventing the most expensive illnesses and / or running the intervention as cost-effectively as possible.

The scheme may no longer be called preventative if we are only selecting people for the SIB scheme once they have contracted some form of cold-related illness (and therefore present themselves to the GP/hospital and are subsequently referred to the scheme). In this instance the scheme will only prevent further deterioration in the client’s health and therefore prevent further cost to NHS rather than avoiding costs altogether. If financially viable, the scheme should aim to identify vulnerable

\textsuperscript{74} See ODPM: Statistical Evidence to Support the Housing Health and Safety Rating System: Volume I, II and III
\textsuperscript{76} http://www.greennewdealgroup.org/?page_id=19
households as early as possible (perhaps using the non-health related proxy indicators) thereby capturing as many savings as possible through preventing illness developing in the first place.

Once a client has presented themselves to a GP with a cold-related illness and been referred to the SIB scheme, there is a further question of how quickly and effectively a program of work (e.g. installing insulation) can improve their health and thereby generate financial savings. For example, once an individual has already contracted bronchitis or suffered a stroke, the primary health incident has already happened. Whilst the FPA SIB intervention may conceivably prevent re-occurrences over a long period of time, the initial illness may still require treatment and therefore incur costs.

5.3 Developing the business case

5.3.1 Fuel Poverty Programmes

There are a number of different ‘actions and interventions’ (referred to as ‘activities’ in the remainder of this document) that could be funded as part of a FPA SIB. FPA programmes tend to fund a number of activities to help provide a holistic service. Table 3 and Table 4 below show the typical costs associated with the delivery of these activities (based on the delivery and experience of CSE’s own schemes).

Table 3: Typical fuel poverty scheme costs (simple measures)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost per year</th>
<th>Cost per measure installed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of scheme (lead partner)</td>
<td>£120,000</td>
<td>£40</td>
</tr>
<tr>
<td>Surveying properties</td>
<td>£60,000</td>
<td>£20</td>
</tr>
<tr>
<td>Installing loft insulation</td>
<td>£450,000</td>
<td>£300</td>
</tr>
<tr>
<td>Installing cavity wall insulation</td>
<td>£600,000</td>
<td>£400</td>
</tr>
<tr>
<td>Providing in home advice on energy efficiency</td>
<td>£240,000</td>
<td>£80</td>
</tr>
<tr>
<td>Providing a benefits check</td>
<td>5% customers = £6000</td>
<td>£40</td>
</tr>
<tr>
<td>Remediating debt with a fuel supplier</td>
<td>1% customers = £3500</td>
<td>£120</td>
</tr>
</tbody>
</table>

* - Please note that administration and survey costs include the burden of unsuccessful installs

Table 4: Typical fuel poverty scheme costs hard to treat (HTT)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost per year</th>
<th>Cost per measure installed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of scheme (lead partner)</td>
<td>£35,000 - £100,000</td>
<td>£700 - £2000</td>
</tr>
<tr>
<td>Surveying properties</td>
<td>£15,000 - £100,000</td>
<td>£300- £2000</td>
</tr>
<tr>
<td>Installing solid wall insulation</td>
<td>£350,000 - £1,000,000</td>
<td>£7,000 - £20,000</td>
</tr>
<tr>
<td>Providing in home advice on energy efficiency</td>
<td>£2,000</td>
<td>£40</td>
</tr>
<tr>
<td>Providing a benefits check</td>
<td>5% customers = £120</td>
<td>£40</td>
</tr>
<tr>
<td>Remediating debt with a fuel supplier</td>
<td>1% customers = £120</td>
<td>£120</td>
</tr>
</tbody>
</table>

* - Please note that administration and survey costs include the burden of unsuccessful installs

Table 3 shows the typical costs associated with low cost energy efficiency measures, such as cavity wall insulation and loft insulation. The complexity of these measures and their delivery is significantly lower than those for so called ‘hard to treat’ measures, i.e. for solid wall insulation, as shown in Table 4. The cost of administration and surveying properties may be an activity that a FPA SIB could support for a loft and cavity scheme, whereas such costs for solid wall insulation are comparable to cavity wall insulation itself. It should be noted that some of these costs may be able
to be met from other sources (e.g. energy company obligations to invest in energy saving measures, charitable sources etc), so these represent the full costs rather than only those that might need to be covered by a SIB.

The FPA SIB will also need to rank the interventions in order of their ability to improve affordable warmth. The External Evaluation of the Warm Zones Pilot found that benefits advice work was recognised as increasingly important in lifting households out of fuel poverty, and much more cost effective than most energy efficiency (i.e. physical) measures; with an estimated cost of £250 per household removed from fuel poverty for the former, compared to £1,110 for the latter.77

The FPA SIB could also help reduce fuel costs by helping householders to switch tariffs and/or change payment methods. The Hills Fuel Poverty Review (2011) found that the difference between prepayment meter and standard credit costs had narrowed since 2004, but those on low incomes remain least likely to be on the cheapest, direct debit, tariffs. In theory, there are opportunities to switch payment method, tariff or supplier, but in practice only a small proportion of consumers are taking advantage of this opportunity. Difficulties in accessing the best deals (e.g. because of lack of internet access) are exacerbated by the complexity of the market which can make it difficult to navigate. The evidence suggests that these barriers disproportionately affect those on the lowest incomes. Where customers on prepayment meters have switched supplier as a result of a doorstep sale, almost as many have switched to a worse as to a better tariff.

Programmes do exist to promote public understanding of the energy market and the potential to switch supplier/tariff (e.g. CAB’s ‘Energy Best Deal’ programme).78 The existence of such schemes and assistance is a further consideration for a FPA SIB scheme. Consideration needs to be given to which measures and forms of assistance are funded by the SIB, such that these complement but avoid duplicating existing support available through current energy policy. A FPA SIB could, for example, be ring-fenced to specifically target households not currently eligible for support under existing schemes, offer a form of top-up funding for measures not fully funded, or focus on funding measures for which no financial support is currently available.

At the time of writing, the main gaps in funding for FPA lie in the provision of free insulation measures to fuel poor households on marginal incomes, i.e. they do not qualify for means tested benefits. However, the end to the Warm Front programme in 2013 means there will be no grant assistance for central heating. The Green Deal and ECO will replace the current energy efficiency programmes, although the extent to which low income households will receive support through subsidised measures is unclear.

5.3.2 Profiling SIB investors

The FPA SIB will need to attract a significant amount of initial investment to facilitate its pilot phase. In the next stage of a FPA SIB’s development there is likely to be a phase whereby the concept is tested in practice. The concept will still carry a significant amount of risk as the findings of the feasibility study will be further refined and tested. The FPA SIB may therefore need to be served by a range of different investors, e.g. private sector, Trust funders, etc. Different types of investors are

78 http://www.citizensadvice.org.uk/fsfl_projects_energybestdeal
likely to have a different rationale for their involvement and the study must try to capture these, e.g. a private sector investor may be able to use the FPA SIB to reduce their tax liability.

Despite the uncertainty around the FPA SIB’s ability to deliver financial savings, the concept is well timed as the UK and USA stock markets are currently in decline. The FTSE 100 lost 10% of its value in August 2011 with significant ongoing volatility, i.e. dipping below 5,000 points at a low of 4,944. Many of the potential investors for a FPA SIB project have investments in stocks, currencies and/or commodities which may currently be devaluing. Ideally a FPA SIB would make a 7% return on investment (similar to the Peterborough Prison Project); however, investors may be prepared to accept a slightly lower rate of return given the current market conditions.

Charitable Trust funders could prove to be ideal investors in the early stages of a SIB’s deployment, as they may be able to match the investment with a socially progressive mission statement. However, investing in SIBs represents a new form of investment and may require them to undergo a review of their criteria for investment of their endowment. Despite their charitable aims, the ultimate priority of the charitable funders’ Trustees will be ensuring the charities endowment doesn’t devalue, i.e. meaning the SIB will still need to prove it is a financially credible investment.

Charitable Trusts typically have a portfolio of investments with a range of risks and potential returns. The investment in the next phase of the FPA SIB could therefore be positioned as requiring a relatively small amount of money from a large number of investors, i.e. spreading the risk and aligning the investment with mission-related investment rather than core financial activity. As an indication of scale, a medium-size charitable trust with an annual turnover of approximately £2.5 million is unlikely to invest more than 4% of revenue in a single project (i.e. £100,000).

The FPA SIB delivery agent will also need to consider the amount of involvement investor’s desire and/or expect. If the FPA SIB project becomes an important source of revenue and the liability associated with the investment increases, they could potentially want more influence on the delivery of the programme and the delivery agent’s performance.

The delivery agent may therefore want to develop a barrier (such as a trading subsidiary) between potential funders and the operation of their wider activities. For example, a social philanthropy vehicle that coordinates crowd funding, such as ‘Inspiring Scotland’, could be used to fund a SIB. In this instance the funders would be one step removed from the project’s delivery, leaving the delivery partner to operate without too much intervention from funders.

The pilot phase will need to explore the locus for financial risk within the FPA SIB. Where does the overall financial liability rest, i.e. with the delivery agent, the health care provider or the funder? If the liability rests solely with a delivery agent, such as CSE, then the organisation may need to establish a separate body to provide the services, e.g. a new company limited by guarantee.

### 5.3.3 Health Sector engagement and funding

The team reviewed the evidence base for the six health outcomes identified in Table 2 and summarise their viability for the FPA SIB via a scoring matrix shown in table 5. The matrix captures information along a variety of dimensions for each health outcome, these include:

- The strength of the link between cold and damp homes and the health outcome itself;
• The number of additional confounding factors which would need to controlled for;
• The probable time frame for a health outcome to demonstrate improvement;
• The potential scale of the cost savings associated with each in relation to NHS and social care services.
The ability to deliver short term savings is an important factor in the overall health outcome targeting decision. Whilst a health outcome may clearly respond to the proposed intervention, for example childhood asthma, the focus on this outcome may not overlap with the NHS or CCGs.

<table>
<thead>
<tr>
<th>Health Outcomes</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Childhood Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence base (empirical)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Evidence base (anecdotal)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ability to influence (lack of add. confounding factors)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ability to deliver short-term savings</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost saving to NHS (treatments)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Potential cost saving to NHS (services)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost savings to social care services</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Slips and falls - the elderly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence base (empirical)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Evidence base (anecdotal)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ability to influence (lack of add. confounding factors)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ability to deliver short-term savings</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost saving to NHS (treatments)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Potential cost saving to NHS (services)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost savings to social care services</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Adult respiratory health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence base (empirical)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Evidence base (anecdotal)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ability to influence (lack of add. confounding factors)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ability to deliver short-term savings</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost saving to NHS (treatments)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost saving to NHS (services)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Potential cost savings to social care services</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Adult and adolescent mental health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence base (empirical)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Evidence base (anecdotal)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ability to influence (lack of add. confounding factors)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ability to deliver short-term savings</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Potential cost saving to NHS (treatments)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Potential cost saving to NHS (services)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Potential cost savings to social care services</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Strokes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence base (empirical)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Evidence base (anecdotal)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ability to influence (lack of add. confounding factors)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ability to deliver short-term savings</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Potential cost saving to NHS (treatments)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Potential cost saving to NHS (services)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Potential cost savings to social care services</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The ability to deliver short term savings is an important factor in the overall health outcome targeting decision. Whilst a health outcome may clearly respond to the proposed intervention, for example childhood asthma, the focus on this outcome may not overlap with the NHS or CCGs.
priorities for reducing costs. EWAs from the young and elderly provide a good illustration of an immediate priority for the NHS in terms of cost and service delivery, which may provide a better focus for the FP SIB, i.e. the savings associated with reducing winter admissions associated with childhood respiratory conditions and/or slips and falls are more immediate and meet key targets.

CSE has meet with a number of strategic health professionals in the South West and Bristol area to help identify the level of priority for each health outcome and the scale of the cost savings available (see chapter 7). In particular the study will attempt to develop a clear rationale for capturing the financial savings with a focus on the split between activity that’s funded by NHS CB contracts with GPs, CCG relationships with NHS Hospital Trusts and local authorities (see below).

5.3.4 Additional Sources of SIB funding (social and community care)

Section 4.1 outlines the new role for local authorities in delivering public health services and prevention programmes. Funding for wider public health issues, such as adult and adolescent mental health, may also be an important source of finance for the FPA SIB. For example, Bristol City Council has recently used funds from its Community Health budget to fund insulation measures for vulnerable households previously funded by the housing renewal team, i.e. replacing a cut in housing renewal funding.

The FPA SIB may need to focus on a broader set of health outcomes that encompass community care, social care and social services. Improvements in general health and wellbeing could have a measureable impact on the need for community care and uptake of benefits. Rather than just focussing on narrow health outcomes it may be worth considering a measure of reducing health inequalities.

5.3.5 Additional Sources of SIB funding (energy related)

The preliminary review of NHS funding has identified two primary funding opportunities, i.e. the health sector and social/community care, which may not lend themselves directly to a FPA SIB. The programme may therefore need to attract additional funding to deliver secondary targets. The expansion of the programmes’ activities will also provide additional opportunities for funding, i.e. from investors aligned with or delivering these secondary outcomes.

Energy suppliers currently write off a significant amount of funds for customer fuel debt. In some cases, the funds to do this are currently held (tax efficiently) in charitable trust funds and could be invested in a SIB to instigate a debt management or debt reduction strategy. In this instance an early intervention in debt management (alongside energy efficiency advice and/or measures) could reduce the energy supplier’s long-term loss, i.e. when writing the debt off and in chasing the debt. There could also be tax advantages to the energy supplier in SIB investment rather than holding the funds in a trust; however, the timing of this investment would need to be aligned with the broader SIB funding model.

District Network Operators (DNOs) manage investment to the electricity system (the grid). DNOs need to prioritise large sums of investment to those areas of the grid that need replacing or upgrading first. In some instances improving the energy efficiency of homes and their heating systems may be a more cost effective solution than replacing large scale equipment. If the FP SIB focussed on an area where the investment offset a large scale capital cost then it may be able to
draw down funding for the intervention itself, e.g. changes to electrically heated systems or insulation.

Other proposed and largely un-quantified social benefits from fuel poverty interventions include improvements to educational performance and reductions in anti-social behaviour and vandalism. If these are to be serious contenders as desired outcomes of a SIB, there is a need to identify a long-term financial value of these outcomes which some institution would willingly fund from the avoided costs (or improved outcomes) associated with the outcome.
6 Designing the Fuel Poverty Social Impact Bond

6.1.1 Measuring health outcomes and the success of an intervention

QinetiQ and the University of Leicester were selected by the Ministry of Justice (MOJ) as the Independent Assessor of the reconviction impact of the HMP Peterborough SIB. The SIB model relies on statistical measurement techniques as the basis of the payment mechanism, i.e. the intervention is shown to deliver results compared to the status quo. The detail of the report has been summarised here as an exemplar framework for a future FP SIB.

The SIB payment mechanism is designed to ensure that MOJ pays investors when an observable change in reconvictions has occurred. MOJ and the scheme’s managing agent, Social Finance, determined that using a matched control group was the best approach to removing the influence of external events on reconviction levels (such as changes in sentencing policy, economic environment, etc.). Health outcomes are also often influenced by a number of confounding factors (e.g. smoking, diet, alcohol, etc.); the method of matching could therefore be used to ensure patients are paired with a comparable control.

The HMP Peterborough SIB uses a Comparison Group of prisoners discharged from other prisons during the same time period as the Peterborough cohort to determine the intervention’s success, i.e. the prison service has saved money. The SIB uses a technique called propensity score matching (PSM) to develop the Comparison Group.

The objective of the Comparison Group is to provide a measure of the reconviction levels of the Peterborough cohort without the SIB intervention. The actual measure under comparison is the ‘frequency of reconviction events’, which is defined as the number of times an offender is reconvicted in the 12 months following release from prison. It counts the number of times an offender is reconvicted at court, regardless of the number of re-offences committed. This measure is being used because the number of court appearances is more closely linked to costs to the criminal justice system than the number of offences committed. Once a valid Comparison Group has been defined, any improvement in the reconviction proxy of the Peterborough cohort will then be attributed to the SIB intervention.

The Peterborough SIB will be measured using three cohorts of approximately 1,000 people (described as Cohorts 1, 2 and 3). The length of time to form each cohort will be determined by the time required for 1,000 unique short-sentence prisoners to be released from HMP Peterborough, but will not be longer than 24 months per cohort. Thus, the cohort may be less than 1,000 if the number of prisoners released from HMP Peterborough over the 24-month period is less than this amount. The whole population of around 3,000 people may be measured in aggregate at the end of the intervention period (described as Cohort 4) if a 10% reduction in reconviction events has not been found for any of the three cohorts separately. If Cohort 4 achieves a 7.5% reduction in the frequency of reconviction events compared to its Comparison Group, outcome payments will be made.

---

79 MOJ, Peterborough Social Impact Bond: an independent assessment, Development of the PSM methodology, May 2012
Figure 4: Overall method and structure for the Peterborough SIB evaluation framework

Figure 4 above shows the overall framework for the development of the Peterborough SIB comparison group. The independent assessment of the Peterborough SIB contains further detail on the data sources and the quality assessment method used. The FPA SIB would need to work with the local public health authority and the local health service providers (i.e. depending on the targeted outcome) to ensure the data is both available and of sufficient quality.

The set-up phase of the FPA SIB would need to review a historic dataset to select the necessary match variables for the comparison group. The technique uses logistic regression to create the propensity score matching model (PSM) model, i.e. first testing a series of variables for inclusion in the model.

For example, variables that are statistically significant at the p<.20 level between the Peterborough group and the other prisons were included in the model. This level of significance was selected based on support from the academic literature.80 For continuous variables (e.g., age at first offence, number of previous convictions) squared versions will be included to account for non-linear effects.81 It is important to consider the impact of the potentially small number of individuals available for some variables on the model. For example, if only one individual from HMP Peterborough had an index offence of child sexual offences, including this person could result in a high standard error.

Each released prisoner in the cohort will be matched to up to ten prisoners from a Comparison Group. By undertaking ‘power calculations’ on past data, MOJ and Social Finance agreed that a 10% reduction in the frequency of reconviction events would be sufficient under PSM, given a treatment group (i.e. Peterborough cohort size) of 1,000 and a Comparison Group of over 9,000. This requirement, summarised as 10:1 matching, was stated in the contract between MOJ and Social Finance. This has since been relaxed to up to 10:1 matching, within a stated calliper to be defined by the Independent Assessor to prioritise closeness of match over a strict threshold for the number of


matches. However, the objective remains to maximise the number of matches where suitable to increase the diversity of individuals in the Comparison Group.

The Peterborough SIB used the following five variables to create the Comparison Group: age; date of release sentence; time in custody; prison type; and data availability. The FPA SIB would therefore need to evaluate health data to determine the necessary match variables for any given control group. The match variables themselves are likely to vary depending on the health condition targeted. For example, childhood asthma may require the SIB to allow for factors such as age, ethnicity, if the parent(s) smoke, whereas adult heart disease may require the evaluation of factors that are entirely related to the patient only.

6.1.2 Measuring wider benefits and reporting to funders

The review of health research presented in this report would indicate a rationale for focusing on a narrow set of health outcomes, i.e. those that most readily respond to the interventions. This is supported by the process of measuring the SIB performance by matching those treated with a comparison group which may vary by health outcome.

However, the FPA SIB could also identify and capture any additional health benefits and secondary benefits that stem from an intervention, if these are themselves of significant value. The SIB’s interaction with a range of secondary outcomes could potentially spread the risk of investment and maximise the potential return on investment. For example, increasing the internal temperature of a home which contains a child with asthma could also improve school attendance and attainment.

As discussed in section 5.2.3 the FP SIB could need a range of primary and secondary indicators (referred to as a dashboard) to monitor its performance against several target outcomes. The dashboard of indicators that focuses on a set of wider outcomes may facilitate investment from a broader cohort. For example, the inclusion of school performance may open the FPA SIB up to additional funders whose mission aligns with this secondary goal. A list of example dashboard indicators is included here:

1. Health outcomes (condition related morbidity)
2. Health outcomes (condition related treatment dependency)
3. Health outcomes (patient need for wider block contracted services, e.g. ambulances, etc.)
4. Wider health benefits, e.g. obesity, smoking rates
5. Wider societal benefits such as wellbeing and happiness and potential reductions in social security payments
6. Child school performance
7. Levels of fuel debt

This feasibility study does not remove the need for a FPA SIB pilot where the costs and dashboard measurements themselves are further assessed. The study needs to be clear about the stages in this journey and the next steps needed. The indicators listed above will be key to the SIB’s operation and it is therefore crucial to test them in a real world situation. The indicators themselves could also play a role in developing referral mechanisms and identifying opportunities for early interventions. The pilot phase would need the involvement of a health economist to help deliver a full needs assessment, i.e. to understand the complexity of investor risk links with the different measurements presented.
6.1.3 Example financial model

CSE has used the incidence of childhood asthma in Bristol to examine the financial case for a SIB. Bristol’s JSNA states that there are 1,074 respiratory hospital admissions for children each year. Whilst the total number of children with asthma is unknown, the Asthma UK report ‘Asthma: Better for Less’ states that 1 in 11 children have asthma; in Bristol this would translate to 6,642 children. The report also provides some indicative costs for asthma treatment with a cost of £156 per person\textsuperscript{82} for treatment and £964 for an admission\textsuperscript{83} based on national tariffs.

Table 6 shows that as a result of the above information, the cost of emergency services and treatment for childhood asthma in Bristol is £1,035,595 and £1,033,242, respectively. However, all of these costs cannot be prescribed to cold and damp homes. According to the WHO report on the ‘Environmental burden of disease associated with inadequate housing’, relative risk estimates from five studies conducted over the last 15 years show that approximately 10% of asthma onset in European children can be attributed to indoor mould and approximately 15% to indoor dampness.

The total cost of childhood asthma in Bristol attributable to fuel poverty can therefore be estimated at £517,000 i.e. 25% of the total cost. However, despite the SIBs targeting children who have both asthma and live in a home deemed to be at risk from mould and damp, the SIB cannot be assumed to deliver a 100% success rate for all patients. The study has therefore assumed a success rate of less than half at 45%, i.e. giving a total reduction in cost to the health service of £232,744.

<table>
<thead>
<tr>
<th>Table 6: Estimated costs associated with childhood asthma in Bristol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bristol childhood asthma admissions</td>
</tr>
<tr>
<td>Estimated children with asthma</td>
</tr>
<tr>
<td>Cost emergency</td>
</tr>
<tr>
<td>Cost treatment</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
</tr>
<tr>
<td>Childhood asthma due to damp and mould</td>
</tr>
<tr>
<td>Emergency admissions children (cold and damp)</td>
</tr>
<tr>
<td>Estimated children with asthma (cold and damp)</td>
</tr>
<tr>
<td><strong>Total opportunity for SIB</strong></td>
</tr>
<tr>
<td>Asthma intervention success rate (45%)</td>
</tr>
</tbody>
</table>

Table 7 below provides an estimate of the numbers of measures and costs required to intervene in 1,661 homes of children with asthma that may be associated with mould and dampness i.e. 25% of the 6,642. The total cost of the interventions is approximately £820,000; however, if (conservatively) 20% of the homes are eligible for ECO Affordable Warmth then the cost can be reduced by around £160,000. In the first year the SIB would therefore require £656,000 of investment from the bond to secure the full set of interventions.

---

\textsuperscript{82} £840m was spent nationally on treating 5.4 million people
\textsuperscript{83} Total Payment by Results Cost of Emergency Admissions for Asthma in England of £58.294m for 60,456 admissions
Table 7: Cost of fuel poverty interventions associated with the proposed SIB

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
<th>Cost</th>
<th>Total cost</th>
<th>ECO Contribution</th>
<th>Adjusted Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lofts</td>
<td>498</td>
<td>£350</td>
<td>£174,360</td>
<td>£34,872</td>
<td>£139,488</td>
</tr>
<tr>
<td>Total cavities</td>
<td>249</td>
<td>£500</td>
<td>£124,543</td>
<td>£24,909</td>
<td>£99,634</td>
</tr>
<tr>
<td>Total heating control upgrades</td>
<td>996</td>
<td>£200</td>
<td>£199,268</td>
<td>£39,854</td>
<td>£159,415</td>
</tr>
<tr>
<td>Advice</td>
<td>1661</td>
<td>£140</td>
<td>£232,480</td>
<td>£46,496</td>
<td>£185,984</td>
</tr>
<tr>
<td>Benefits checks</td>
<td>332</td>
<td>£70</td>
<td>£23,248</td>
<td>£4,650</td>
<td>£18,598</td>
</tr>
<tr>
<td>Administration</td>
<td>1661</td>
<td>£40</td>
<td>£66,423</td>
<td>£13,285</td>
<td>£53,138</td>
</tr>
<tr>
<td>Cost of package for homes</td>
<td></td>
<td></td>
<td>£820,321</td>
<td>£164,064</td>
<td>£656,257</td>
</tr>
</tbody>
</table>

If the SIB were to run for three years (with all interventions in the first year and only more limited admin costs after that) then the total savings to the NHS would be £698,232. If this were all captured and passed through the SIB, it would represent an IRR of 6.5%.

The proportion of available ECO Affordable Warmth funding and the overall success rate of the intervention are critical to the success of the project. For example, a higher ECO eligibility of 25% increases the return on investment to 14.1% where as a reduction in the asthma intervention success rate to 40% results in the bond making a loss of £35K (IRR -5.3%).

The 6.5% return on investment appears relatively favourable; however, the pilot SIB would need to negotiate the timescales of operation to a minimum of 3 years. A longer period (e.g. 4 years) would significantly enhance the return but this would require that the cost savings are sustained and that the evidence can continue to be gathered. Whatever the period chosen, this would need to be agreed in the contract between the CCG and intervention providers.
7 Interview findings

The team interviewed 16 stakeholders representing organisations from the spheres of health, finance, energy and housing. See Annex II for a more detailed discussion of issues by stakeholder type.

The concept of a fuel poverty and health related SIB received strong support from the majority of stakeholders covering the four broad areas of health professionals, financiers, housing managers and scheme delivery agents. The importance of the HWB and the JHWS they produce and manage (see section 4.1) was strongly reiterated by all those stakeholders involved in local delivery.

Despite the strong support for the concept of a SIB, the complexity was clear to the majority of stakeholders for a variety of reasons (which will be discussed further below): the difficulties of demonstrating causality; ethical concerns when sharing data; and the efficiency savings that are currently driving NHS business planning.

The interviews reaffirmed the health outcomes that were initially identified in the literature review as most closely related to cold and damp homes: premature death; respiratory disease (young children and elderly, i.e. over-70); cardiovascular disease; falls; mental well-being. The strength of the evidence base required to make the link between these health outcomes and cold and damp homes varied between stakeholders. Health professionals felt that the new commissioners (NHS CB and their Area Team, CCGs, Public Health England and their local Public Health Director) would require the highest level of evidence linking housing conditions to poor health. In the absence of conclusive research in this area, the SWPHO was approached to discuss the opportunity of linking data on morbidity to household level data for property age, fuel poverty incidence and fuel bill. The HES Data Access and Information Sharing Manager felt that the SIB deliverer would need to apply for an extract containing the required data. The SWPHO indicated that the application process would be lengthy and require some funding from the SIB deliverer. To improve the likelihood of success the SIB deliverer would need a strong set of health partners and / or access to the data via one of the health partners directly.

The financiers themselves would also need to see a reasonable level of evidence linking housing condition to poor health (though of course the key issue is actually the link between the interventions and health service costs). However, the level of available evidence may be offset by the level of risk they are willing to take on the investment in relation to the identified return on investment. The contract between the SIB provider and the health commissioner would need to be watertight to provide the investor with the necessary assurances. In addition, the investors would need to see a stringent process for the evaluation of performance as described in section 5.3.2.

Several health academics raised the issues of cost and of data protection when discussing the design of a cohort for a SIB. For example, data sharing would be almost impossible without buy-in from the local GPs and CCGs i.e. they manage data and provide summary information.

---

84 DECC, 2010. Fuel Poverty Index at LSOA level
85 CSE in-house modelling for Bristol and Somerset Warm Streets programme
The health professionals and financiers felt that, despite the complexity, savings to the health service could be captured by a SIB. However, there were a number of issues regarding the capturing of these savings.

- **Ethics**: if these savings are captured then interviewees were concerned that this means they can’t be diverted to other health services (even though the savings are needed to fund the investment creating the savings). Access to data also raises confidentiality issues.

- **Contracts**: capturing the savings may only be possible if the contracts between the commissioners and the healthcare providers allow the savings to accrue, i.e. if there are reduced visits to the GP does the GP get to keep the savings so it can be allocated to fund the SIB – or is it removed.

- **Short-term vs. long-term savings**: the NHS is focussed primarily on short-term savings and these may be subsumed by the following year’s budget cuts; the move to focussing on long-term savings would require a wider culture change towards value within the health service.

The local (Bristol) NHS Hospital Trust and Public Health Directors felt that the SIB concept had significant potential, particularly if fuel poverty was included in the JSNA as it sets the priorities for funding in Bristol, i.e. via the various commissioning groups. The stakeholders from public health in charge of social interventions potentially required the lowest level of evidence as they are more familiar with the re-direction of money to generate savings. For example, they were able to demonstrate the cost and health benefits of providing WeightWatchers vouchers for obesity rather than prescription drugs. Despite this, because of the reorganisation of the NHS and the relocation of commissioners, the level of evidence required is uncertain until the transition is complete.

However, to take an intervention forward the SIB would need to gain support from the wider HWB as none of the commissioning groups would be able to act independently as the benefits are theoretically to everybody. The future of any SIB or directly health funded fuel poverty programme is therefore dependent on the local needs as defined by the JSNA and the strength of the relationships between the delivery agent and the health providers. The SIB deliverer would need to be embedded in the local area with a strong set of pre-existing partnerships and relationships to enable the programme to develop in a relatively short timescale. The most likely way forward would therefore be a pilot programme to study and capture the benefits, possibly using a system of ‘pooled funding’ from all commissioning groups. Including investment from the NHS may make it easier to get the IRR up to required levels for outside investors.

The public health sector has shown significant interest in the concept of a SIB. A pilot scheme could fit well with the HWBs as they are designed to move health care towards prevention, rather than focus primarily on treatment. However, this would require endorsement from all commissioning bodies in the area to receive the intervention and as such there is a need for ongoing engagement.
8 Conclusions and next steps

The main challenges that were identified in this study were related to the strength of evidence, ethical issues associated with capturing cost savings to fund investment in fuel poverty prevention, and access to data sharing. These are likely to be the same for designing and making the case for any health-sector funded FPA project, whether financed through a SIB mechanism or directly by the health service.

Overcoming these challenges will require investment in well-designed pilots which can measure and evaluate the extent of health service cost savings associated with a FPA project targeted at specific patients with conditions known to be exacerbated by living in a cold home.

In the current situation where NHS funding is shrinking relative to the demand for services, making the case for health-service-funded interventions to prevent fuel poverty is likely to require this more callous focus on outcomes related to health service cost reduction rather than health and quality of life benefits.

Whilst the project has successfully mapped the landscape for a SIB, there remains a need for a health economist to perform a full economic appraisal of the health benefits associated with fuel poverty based interventions. There are a number of academic institutions that are currently working on this and it’s important to ensure that future FPA projects reviewed the evidence accordingly. It also important that this work assesses not just the beneficial health outcomes of FPA projects but also their impact on beneficiaries’ use of the health service and associated costs.

In the event of a health economist developing further evidence on the impacts of interventions and the costs of measures, the next stage in the development of a SIB is still likely to be a pilot phase whereby the idea is both tested and proved. This pilot phase will be crucial to empirically verify the intervention. To help minimise the cost and resources associated with this pilot phase, it is important to ensure that there is strong NHS involvement in the design and delivery of the SIB and of the monitoring and evaluation framework (in particularly the control strategy). The involvement of a partner from the CCG or the local authority public health team could help overcome some of the issues associated with the design and management of a rigorous data collection system.
Annex I – Further literature review

Health and fuel poverty

Energy Policy: Fuel Poverty and Human Health

A recent review by Liddell and Morris (2010)\(^{86}\) looks at the evidence of the health impacts of major fuel poverty programmes over the last ten years, including: the Warm Front Evaluation (also discussed separately below); the Scottish Central Heating Programme (CHP); the New Zealand Housing; Insulation and Health Study (HIHS); and Housing, Heating and Health Study (HHHS); a NATCEN longitudinal study of housing conditions and their association with English children’s well-being; and the US Children’s Sentinel Nutritional Assessment Programme (C-SNAP).

The paper concludes that, despite the risks to physical health from cold homes, improvements to energy efficiency and the reduction of fuel poverty achieved by some of the programmes had a modest measurable impact in improving the physical health of adults. However, the potential for measuring such effects is hampered by methodological limitations in the evaluations, including the sample sizes of the studies. Measuring the health impact of improvements in energy efficiency and reduced fuel poverty is particularly difficult for adults who may have long term health conditions related to cold housing which are the result of lengthy exposure to cold houses.

The impacts are easier to measure in children, who are more readily susceptible to changes, and for the elderly who are at higher risk of mortality or developing life-threatening conditions. The main findings across the studies are summarised in the points below:

- To date studies haven’t been sufficiently powered to detect physical health impacts in adults, due to their size and the sample population i.e. the benefitting population isn’t necessarily tied to a health need and / or outcome.

- Significant effects on the physical health of the young were evident, especially in terms of infants’ weight gain, hospital admission rates, and caregiver-rated developmental status, as well as self-reported reduction in the severity and frequency of children’s asthmatic symptoms. However, these studies tended to focus on health impacts within the population of study rather than searching for a trend within the wider population. Several of the studies that focussed on adults examined trends in the wider population which may partly explain the more pronounced findings for children.

- Improvements to mental well being are better document, although again study design (not focussing on those with mental health issues) and the survey form used (SF-3687 rather than GHQ12\(^{88}\)) may have been an issue.

---


\(^{87}\) The SF-36 is a multi-purpose, short-form health survey with only 36 questions

\(^{88}\) 12-item General Health Questionnaire
• Problems with targeting the fuel poor as part of the overall energy efficiency scheme design e.g. CERT priority group has a 35% match rate with fuel poverty, so how can we be sure the subjects of the study are fuel poor

• After improvements have been made to homes, health improvements for adults were measurable, although modest, and mostly related to perceptions of mental well-being and self-assessed general health.

• Large-scale studies suggest that impacts of cold temperatures as a function of poor housing on mortality and morbidity are almost certain across the whole population.

Case Study: Strabane District Council - Health Impacts of the Heating Conversion Programme

Between 2003 and March 2009, residents of Strabane District Council (SDC) participated in a Heating Conversion Programme, in which solid fuel heating systems were replaced with oil-fired central heating systems. These replacements took place in 2,501 homes. The Programme aimed to improve the air quality of the area and alleviate fuel poverty through making homes more energy efficient.

Strabane is categorised by a higher than average unemployment rate, a higher proportion of people who look after a home or family permanently, and more people at home all day because they are permanently sick or disabled. These factors suggest that a greater than average proportion of residents are likely to live for long periods in or very near their home i.e. their risk from fuel poverty is exacerbated.

In accessing council level health benefits the study chose a cost-offset approach based on the Housing Health and Safety Rating System (HHSRS) calculator. The HHSRS is underpinned by a body of statistical evidence\(^89\) which examined the medical risk from cold and damp housing. The assessment assumed a 15-year lifespan for measures (consistent with other studies e.g. Warm Front) and allowed for demographic changes by assuming a varied occupancy of 5 years each for a single pensioner, a pensioner couple and a family of 1.5 adults and 1.5 children. This approach was deemed to provide a more representative assessment of health impacts.

The Strabane study calculation of benefit uses Quality Adjusted Life Years (QALYs) as a measure of overall saving. The figure given therefore represents a total saving to the health service rather than a value linked to one specific health outcome\(^90\). The Chartered Institute of Environmental Health (CIEH) toolkit\(^91\) which supports the HHSRS calculator and gives more detail on the key HHSRS indicators, such as damp and mould, however the results are still generic rather than intervention specific.

\(^{90}\) http://www.foe.co.uk/resource/reports/warm_homes_nhs_costs.pdf
NatCen Report: Health, mental health and housing conditions in England

Survey data collected in 2007\textsuperscript{92} were analysed by the National Centre for Social Research (NatCen) in an attempt to link the various indicators of fuel related poverty. The survey was designed to cover a representative sample of the population aged 16 and over living in private households in England, to understand the complex connection between income, fuel poverty, and financial strain.

The report\textsuperscript{93} reveals that both cold and mould, indicators often used for fuel poverty, can much more clearly and independently predict poor mental health and poor physical health. For example, being in fuel debt was independently associated with having a respiratory illness, such as asthma, which can often be linked to the presence of mould. While heating homes still remains a priority, this should include adequate ventilation if an increase in health conditions associated with mould is to be avoided.

The results also allowed them to group respondents using latent class analyses, based on 11 different measures of fuel poverty and financial strain\textsuperscript{94}, along with other socio-demographic factors that were not solely reliant on income. Four distinct clusters were revealed, where householders either managed or struggled on an income higher or lower than £10,575 (the boundary of the lowest equivalised household income quintile). The majority of participants (80\%) were classed as ‘managing on a higher income’, 10\% were ‘managing on a low income’, 5\% were ‘struggling on a low income’, and 4\% ‘struggling on a low income’.

The two typical proxy indicators of fuel poverty are low household income and being in fuel debt. Using either of these includes and excludes different clustered groups. For example, using low household income includes both ‘low income managers’ and ‘low income strugglers’, but excludes ‘higher income strugglers’. Recognising the inability to capture all of those in fuel poverty in any intervention scheme should therefore be ethically required.

There was a very strong association between being a ‘low income struggler’ and a lone parent living with children, which is also linked to low levels of education and unemployment. It can thus be conjectured that children in these households are at a greater risk of living in worse conditions, for example dealing with health issues such as mould and subsequent respiratory illnesses. Households in this category can be predicted by both the typical proxies noted above, and as such they should be relatively simple to identify.

Warm Front Scheme: Health Impact Evaluation

Although the Warm Front scheme was not initially designed to directly reduce levels of fuel poverty and its associated health issues, as discussed here there are potential health benefits to householders following the installation of energy efficiency improvements. The Warm Front Study

\textsuperscript{92} The Adult Psychiatric Morbidity Survey, commissioned by the NHS Information Centre, included questions on aspects of fuel related poverty, characteristics of their property, and the presence of doctor diagnosed physical health complaint, as well as assessing for common mental disorder.

\textsuperscript{93} Harris et al., 2010. \textit{Health, mental health and housing conditions in England}. Research for the eaga Charitable Trust by the National Centre for Social Research.

\textsuperscript{94} These included being in receipt of benefits, being unemployed, having mould in the property, being disconnected for fuels, being unable to keep the home warm enough in the winter, among others.
Group\textsuperscript{95}, operating from 2001-2006, revealed in their overview report that, although there are many difficulties associated with directly identifying and assessing the health outcomes produced by Warm Front, better living conditions can have a significant impact on health.

Some of these challenges are evident in the design of the research. They had to choose a range of measurement and modelling techniques pre- and post-improvement, including property surveys, resident interviews and diaries, in order to overcome ethical difficulties associated with forming a control group. There are also issues surrounding which households are classified as fuel poor, and which households actually receive Warm Front improvements i.e. receipt of means tested benefits is not necessarily a direct proxy for fuel poverty. The team attempted to model the number of cold homes actually captured by Warm Front, based on their income, but found that they offered limited potential due to the large number of factors affecting household temperature.

In terms of physical impacts after Warm Front improvements, the team identified the following:

1. Temperatures rose modestly in the majority of post-improvement properties, by 1.6 $^\circ$C to 2.8 $^\circ$C, linked with an average rise of 21 SAP points.
2. Ventilation rates did not decrease as expected, which meant that humidity levels did not increase, thus having no effect on mould and related respiratory problems.
3. The overall fuel consumption of residents increased, even though the government’s model predicted a 60% decrease.

In terms of health, they also demonstrated that:

1. Residents were more comfortable post-improvement, and at a lower temperature (19 $^\circ$C) than recommended as a healthy threshold by the government (21 $^\circ$C). This improved comfort was also reflected in lowered stress levels of residents.
2. Relief from the financial pressures of fuel poverty led to reduced anxiety and depression by almost 50% following Warm Front improvements\textsuperscript{96}.
3. Modelling techniques showed that respiratory problems in children, such as asthma, were comparatively less following improvements.
4. Modelling techniques also revealed that deaths related to cardiovascular health in older people could be significantly linked to colder homes, which could potentially be reduced by energy efficiency improvements.

Although a marked improvement in comfort, stress, and residents’ associated mental health levels were key outcomes of this evaluation, it was much more ambiguous as to whether Warm Front improvements had any effect on fuel poverty, which is potentially due to the indicators used to define it. Future schemes to reduce the incidence of fuel poverty must thus be very specific about how it is defined, and which aspect of the associated issues they are looking to improve.

\textsuperscript{95} Green, G. and J. Gilbertson, 2008. \textit{Warm Front Better Health: Health Impact Evaluation of the Warm Front Scheme}. Published by the Centre for Regional, Economic and Social Research, Sheffield Hallam University.
\textsuperscript{96} See also: Gilbertson et al., 2012. Psychosocial routes from housing investment to health: Evidence from England’s home energy efficiency scheme. \textit{Energy Policy}, 49, pp.122-133.
Marmot review: The health impacts of cold homes and fuel poverty

The Marmot review (2011) examines the existing evidence of the direct and indirect health impacts suffered by those living in fuel poverty and cold housing. It highlights a range of groups that fuel poverty affects in different ways: children, adolescents, adults and older people.

A case study examines a pilot programme from the UK Public Health Association (UKPHA) Health and Fuel Poverty Forum, which developed the AWARM model (see below). It was found that a model of local area partnerships that linked health, housing and fuel poverty services was the most effective approach for directing services to the vulnerable. The AWARM model was piloted in Manchester and since April 2008 over £600,000 was invested in new and replacement central heating systems and insulation. In the first year over 1,000 referrals were made by frontline professionals from social services, voluntary, local government, housing and health sectors. A key lesson learned was that there are numerous opportunities to share data between local authorities, GPs and PCTs to improve how referrals are targeted.

Describing energy efficiency standards, the review states that the lowest standards (Energy Performance Certificate bands F and G) broadly correlate with those which constitute a category 1 hazard for excess cold, as defined in English and Welsh environmental health legislation. The direct health impacts of living in a cold home can be divided into higher risk of mortality and increased morbidity rates, and the relationship between these and cold temperatures is supported by a longstanding body of evidence

Many factors contribute to excess winter deaths with increases in respiratory and circulatory diseases as the main cause of excess winter mortality. It is reported by the Department of Health that circulatory diseases are believed to cause around 40% of excess winter deaths, while respiratory diseases are responsible for about a third. Subsequently, research has shown improvements in circulatory health through improvements in the thermal efficiency of housing, with self reported reductions in medication use and hospital visits.

One study of deaths from cardiovascular disease found ‘strong, although not conclusive, evidence that winter mortality and cold-related mortality are linked to sub-optimal home heating’ with indoor temperatures being associated with 50% of excess winter deaths. The recent Interim Report from the Hills Review team identified a lower link with 10% of excess winter deaths being attributed to fuel poverty, although the Review itself does not provide the rationale for this reduction.

97 Guy, W.A., 1857. On the annual fluctuations in the number of deaths from various diseases, compared with like fluctuations in crime and in other events within and beyond the control of human will. Journal of the Statistical Society, 21, pp.52-86.
It reported that deaths from cardiovascular disease were 22.9% higher in winter months than the average for the rest of the year, with a statistically significant relationship between excess winter mortality and the age of the property (28.8% in properties built before 1850 compared to 15% in properties built after 1980). The elderly are particularly vulnerable to excess winter deaths for a variety of reasons: a 1°C lowering of living room temperature is associated with a rise of 1.3 mmHg blood pressure, due to cold extremities and lowered core body temperature. Older people are also more likely to be fuel poor, as they are likely to spend longer in their homes than other people and therefore require their houses to be heated for longer periods.

The relationship between respiratory problems and cold temperatures is evident in the seasonal level of contact between sufferers and the healthcare services. Increased contact for adults during the winter months has been related to fuel poverty, with one study in North Staffordshire finding that respiratory disease admissions increased twofold in the winter months.

Other health conditions associated with cold housing include mental ill-health, exacerbation of the common flu and cold, arthritis and rheumatisms.

**Case Study: Impact of heating improvements on the health of children with asthma**

In 1994 each of the six district councils in Cornwall was allocated £50,000 to spend on improving conditions in social housing, with the specific aim of delivering improved health outcomes. A condition of the funding stipulated that impacts on health resulting from the scheme should be evaluated. The study identified asthma in children as its key target group and measure of impact, recognising the link between this childhood disease and damp housing – the latter of which was prevalent in Cornwall at the time – and having concluded that “an attempt to measure all possible health outcomes relevant to housing conditions was considered impractical”.

Under this initiative, children living in council housing and suffering from asthma were identified. A health assessment of the child was undertaken, including a questionnaire with the parent to ascertain experience of breathlessness and number of days off school due to asthma in the previous 3 months. An NHER assessment of the home also assessed the level of damp and insulation, and identified measures that could be installed to deliver a “warm, dry and energy-efficient” house. The assessment process was repeated between 3 and 22 months after the intervention was delivered.

In total, 98 houses in the county received measures through the scheme; 59 of these (containing 72 children with asthma) had sufficient follow-up data for impact assessment. All households received new heating systems. The follow-up assessment showed significant reductions in respiratory illness.

---


symptoms and time off school due to asthma following the installation of central heating. However, these findings have to be treated with some caution due to key methodological issues highlighted with the study. Principally the lack of a control group to compare changes in health status means that effects of age, season and reporting bias (all particularly pertinent due to the varying time lag between recruitment to the scheme, intervention delivery and follow-up assessment) cannot be adequately accounted for. This study critically “highlights one of the difficulties of undertaking this type of evaluation” and makes the case that “the NHS [should not] necessarily be seen as the source of funds for health-related housing improvements” but instead a strategy is needed to make the appropriate link between, and provision of resources for addressing, poor housing and poor health.

North West Public Health Observatory (NWPHO), the Winter Forecast for NHS Emergency Care

Diseases of the respiratory and circulatory systems are shown to contribute most to ill health in winter\textsuperscript{109} and previous analyses by NWPHO have found increasing emergency hospital admissions in winter due to falls on ice and snow across the North West.\textsuperscript{110} For example, the number of emergency hospital admissions for falls involving ice and snow increased dramatically last winter compared to the previous three winters, from 149 in the winter of 2006/07 rising to 3,170 admissions during the winter of 2009/10, an increase of over twentyfold. There is considerable potential to reduce the burden of winter on health services through increased public health intervention such as encouraging greater self-care, improved uptake of the flu vaccine, providing more affordable warmth and improving insulation and energy efficiency in our homes.\textsuperscript{111,112}

Over the five year period between 2005/06 and 2009/10, average winter temperatures dropped from 3.9 to 1.7°C and the number of emergency hospital admissions in winter (December to February) across the North West increased by just over 18,000. This represents an increase of 9.7%, similar to the rest of England.

In winter 2009/10, there were 36,000 more emergency hospital admissions in the North West than would have been expected if winter emergency admissions were the same as the average for England. The estimated cost to the NHS for every 1,000 excess emergency admissions in the North West could be as high as £2.4 million, based on the approximate average cost of an emergency admission in the region\textsuperscript{113}. This would suggest the cost of excess emergency admissions to North West hospitals alone could be just over £86 million.

There are big differences in levels of excess winter emergency admissions seen in primary care trust areas across the North West; ranging from 59.3% higher than expected in Liverpool to about the same as, or below, expected levels in Trafford and North Lancashire (3.4% and -3.6% respectively).


\textsuperscript{110} North West Public Health Observatory, 2010. Falls involving ice and snow, transport accidents and respiratory conditions: the impact of winter (2009/10) on emergency hospital admissions in the North West. Liverpool: NWPHO.


\textsuperscript{113} According to data used in the NHS North West Finance Demand and Activity Model.
However, data should be interpreted alongside other intelligence such as levels of deprivation, disease prevalence and the provision of health services.

Diseases of the respiratory and circulatory systems accounted for 22.2% of all winter emergency hospital admissions in the North West during 2009/10, 45,570 emergency admissions in total. In 2009/10, of all excess winter emergency admissions for a respiratory condition in the North West, 43.5% were among children aged under 5 years while a further 23.7% were for those aged 65 years and over (amounting to 1,982 and 1,080 excess emergency admissions respectively).

People living in the most deprived areas are more than twice as likely to be admitted as an emergency for a respiratory condition than those living in the least deprived. In winter 2009/10, the very youngest (children aged under 5 years) in the North West and the very oldest (people aged 85 years and over) living in the most deprived 20% of areas nationally were at greatest risk of being admitted to hospital as an emergency due to a respiratory condition.

Cold homes and low outdoor temperatures are associated with increased hospital admissions and deaths in winter. Areas in Manchester, Liverpool, Blackburn, Burnley, Wirral and Knowsley have been ranked among the ten worst in England for estimated levels of fuel poverty. As many as 36% of dwellings in the North West are deemed to be below the decent homes standard; a decent home is one which is ‘wind and weather tight, warm and has modern facilities.’

The paper concludes that working with local authorities and partners to address fuel poverty and improve affordable warmth is a key public health intervention for local NHS organisations. Other identified interventions to tackle the rising numbers of winter emergency hospital admissions, particularly for respiratory conditions, include flu vaccination and self-management programmes. Local cold weather plans should also consider measures to prevent the dramatic increase in emergency hospital admissions for falls involving snow and ice seen last winter.

**Summary of WHO report: Environmental burden of disease associated with inadequate housing.**

The World Health Organisation (WHO) recently published a report\textsuperscript{114} that discusses the evidence linking disease to inadequate housing in a selection of European countries, including the UK. There are a few key chapters relevant to this report, which will be summarised below.

*Indoor dampness and mould problems in homes and asthma onset in children*

Relative risk estimates from five studies\textsuperscript{115} conducted over the last 15 years show that approximately 10% of asthma onset in European children can be attributed to indoor mould and approximately 15% to indoor dampness, although these estimates range from 6.5-26% and 11-23%, respectively. These estimates have been used to produce DALYs (disability-adjusted life years)\textsuperscript{116} that show indoor


\textsuperscript{115} A relatively small number that reduces the certainty of the combined results.

\textsuperscript{116} A measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. It is socially weighted to take into account the economic value of a year of life of a given individual.
mould and dampness can be attributed to a considerable burden of asthma in European children: 55,842 DALYs based on the exposure prevalence of 10% of indoor mould, and 69,462 DALYs based on that of 15% of indoor dampness. In most developed countries, asthma is the most significant chronic disease among children, and can lead to higher morbidity, greater use of health services, absence from school and a lower quality of life.

There is no single test or symptom used to define or recognise the existence of asthma. Diagnosis is based on a set of various symptoms, particularly changes in lung functioning, over a given period of time. Thus the prevalence of diagnosed and recorded asthma can be much lower than the true prevalence of asthma symptoms in a population. Hence studies, such as the ones used in this report, determine its presence based on self- or parental-reported symptoms, which can lead to incorrect diagnosis, as a number of other respiratory conditions can have similar symptoms. This only becomes a problem however when different methods of diagnosis are used in exposed and unexposed subjects. There are also many other risk factors identified for childhood asthma which could increase the chances of its onset (such as parental smoking indoors or the presence of pets), however these have been adjusted for.

There is no conclusive evidence pointing to a particular microbial agent emitted from mould in the home, although one study does point towards the importance of hydrophilic fungi being associated with asthma onset in adults. This does affect the certainty with which parallels can be drawn between poor housing conditions and the onset of asthma. Dampness and mould are often used as indicators, although they can be measured and described in a variety of ways. It is also dependent on who assesses the extent of either condition. Some studies that use self-reporting methods can be subjective and therefore carry a greater risk of error, for instance allergy sufferers may be more likely to report fungal growth in their home than non-allergy sufferers. Other studies, however, have shown that this particular bias is unlikely to occur. Using trained inspectors to assess the presence of dampness and mould in houses is one way to reduce the likelihood of this error occurring, although it can be a costly measure.

Making sure that the public (those working in housing, building and maintenance sectors, urban planning, health professional and residents) is aware of the health risks associated with the presence of indoor mould and dampness may help to prompt preventative and corrective actions. Intervention studies for reducing indoor mould problems have shown positive improvements on respiratory health, however there is very little data specifically relating to the onset of child asthma.

*Indoor cold and mortality*

Mortality data is the only routinely available national data, but morbidity data is not so freely available, which makes a thorough analysis of cold-related health effects impossible. Conservative estimates put the proportion of excess winter deaths attributed to cold homes Europe-wide at 30%, which is mainly due to the incidence of low indoor temperatures (the majority of people spend much of their time indoors). If more data were available on the cause of excess winter mortality deaths, which are normally down to cardiovascular and respiratory diseases, this figure is likely to look much

---

117 Includes observations of high relative humidity, condensation on surfaces, moisture/water damage, signs of leaks and stained/discoloured surface materials.
118 Includes observations of visible microbial growth and mould odour.
higher. There is also some uncertainty found in the definition of winter - some studies depend on
the season running from December to March, which can fail to account for particularly cold spells in
November and April. Some studies also use different measures or effects of indicators, such as fuel
poverty or building characteristics, which can make it hard to compare their results.

Indoor temperatures in winter vary from country to country, however this report finds that it is
typically countries with milder winters that suffer from the lowest indoor temperatures, as opposed
to those with much more extreme winters. It is thought that the higher the variability in
temperature, the greater the chances of cold-related mortality, as well as the fact that countries
with more extreme winters generally have more energy efficient housing. For example, one study
found that the average indoor temperature in Ireland was 15°C, but 21°C in Norway. Although there
have been a number of health warnings relating to high summer temperatures, for example
following the 2003 European heatwave\textsuperscript{119}, cold-related mortality is actually consistently much
greater and thus a constant concern for health authorities.

In England approximately 50% of excess winter deaths are due to cardiovascular disease and one
third to respiratory disease, however quite a number of these could be pre-existing conditions and
there is a strong link in occurrence between the two types, which can hamper the true nature of
causality. This is further confounded by the fact that the effects of cold temperatures are often
much more delayed than those of high temperatures. One effect of lowered indoor temperatures,
particularly in the living room, is associated with increased blood pressure and the subsequent risk
of cardiovascular problems. Chronic obstructive pulmonary disease, a respiratory problem, is also
exacerbated by indoor cold temperatures. In particular, these are likely to affect older people much
more than any other population group – over 90% of excess winter deaths in England and Wales
occur in those over 64.

Factors that can reduce the health impacts of cold indoor temperatures are appropriate clothing,
insulation, humidity, ventilation, and of course warming cold rooms, which is recommended to be a
minimum of 20°C for vulnerable groups, including older people. One study found that the effect of
cold weather on cardiovascular mortality decreased by 0.15% for each degree increase in indoor
temperature. Improving domestic insulation is the key recommendation for reducing the number of
excess winter deaths and cold-related diseases.

\textit{Housing quality and mental health}

There is a strong negative link between poor quality housing\textsuperscript{120} and the existence of mental health
problems. This negative link also exists for people living in multiple family housing or on the upper
floors of high rise buildings; however these associations are not quite as strong. It is thus
recommended that housing policies take into account mental health as part of their health
outcomes, and the factors relevant to mental health issues. For example, it can directly affect
chronic stress, as well as co-existing with poverty and therefore other physical and social risk factors.

One study used in this review looked at the mental health benefits following the remodelling of
council homes in the UK, compared to those who remained constant. It found that following the

\textsuperscript{119} For example, Heatwave Plan for England (Department of Health, updated 2012).
\textsuperscript{120} Poor quality or inadequate housing can be described as lacking the following amenities: flushing toilet, hot
running water, bath or shower, private cooking facility, bad physical conditions.
remodelling, 29% and 4% had significant levels of anxiety depression, respectively, in comparison to 89% and 32% before the remodelling. Other global studies find varying degrees of evidence for the relationship between housing quality and the prevalence of mental health issues, however the association is unavoidable. Some of the main issues for residents living in poor quality housing that can lead to the decline of mental health include worries about hazards and safety, hassles with maintenance, financial worries and loss of self-efficacy.

Testing delivery

Peterborough Prison Rehabilitation

The world’s first and most developed SIB was launched at HMP Peterborough in September 2010. Social Finance, a financial intermediary, obtained around £5 million of investment from individuals and charities. The funding is used to finance interventions for adult males (aged 18 or over) receiving custodial sentences of less than 12 months (‘short-sentence prisoners’) and discharged from HMP Peterborough. Interventions are flexible to meet the needs of the offender group.

Independent monitoring determines whether offenders are reconvicted less in the 12 months following release than similar ‘matched’ offenders from other prisons who have not had access to a SIB-funded intervention.

Lower reconviction rates has benefits for the Ministry of Justice and wider society, in the form of improved outcomes for the offenders and their communities, as well as saving the government money through reduced costs of policing, court cases, prison places, and so on. Under the Peterborough Prison SIB programme the Ministry of Justice and the Big Lottery Fund have undertaken to pay a return on investment to investors, if reoffending is reduced by 7.5% overall, compared to a comparison group. The provisional performance suggests a 7% return on investment.

The Ministry of Justice commissioned an independent evaluation of the Peterborough SIB. The report presents the findings from interviews with 22 individuals from organisations involved in the development and implementation of the SIB at Peterborough. The following summarises some key findings:

- Interviewees perceived contractual relationships behind the Peterborough SIB to be complex. This is understandable, given the novelty of the SIB at Peterborough, and the need to capture methodologically detailed arrangements for determining outcomes and payments. The nature of the legal relationships between the parties to the Peterborough SIB may provide, in part, a transferable model for future SIBs in offender management or other policy areas.
- There was an appetite for mission-aligned investing among the charitable organisations interviewed. Many of the charitable investors in the Peterborough SIB invested using their endowment capital rather than by giving a grant. Measures which might encourage investment in future SIBs and other payment-by-results pilots include clarifying trustees’ fiduciary duties as regards social investments and offering tax incentives for investing.

Interviewees believed that financial risks appeared to have been successfully transferred from both the Ministry of Justice and small providers to the private investors. However, at this early stage the success of assigning risk in the Peterborough SIB contracts is yet to be tested.

The ability of Social Finance to engage and negotiate with different stakeholders appears to have enabled development of the Peterborough SIB. Interviewees from the Ministry of Justice said it is likely that if there are SIBs in the future, the delivery agency will be appointed by competitive tender.

The Peterborough SIB potentially involves a new commissioning relationship. In other payment-by-results arrangements, government has tended to maintain some control over the selection of providers. In the Peterborough SIB the government leaves that selection to an intermediary (such as Social Finance in the Peterborough SIB) and has no direct relationship with the service provider.

Statistical significance and attributing change to the SIB-funded intervention were crucial elements in negotiation of the outcome measure for the Peterborough SIB. These measurement issues are likely to be central in future SIBs and other PBR mechanisms in offender management and other policy areas. There is a balance to be achieved between the robustness of the outcome measure and time, simplicity, resources and data availability.

The design of the Peterborough SIB aims to reduce incentives to ‘cherry-pick’. A risk in PBR models is that providers focus on members of the target group who are the easiest to help. In Peterborough, outcomes are measured among all offenders discharged from HMP Peterborough, rather than just those who engage with SIB-funded services.

Development of the payment model demanded considerable analytical resources and relied upon the availability of Ministry of Justice data about the cost of reconviction events. Those developing new SIBs and other payment-by-results mechanisms in new policy areas may wish to consider the extent to which robust cost data are available.

The Peterborough SIB is likely to provide the first evidence of the performance of SIBs as a new kind of financial product, at least in the area of offender interventions. Developing a track record of investment is crucial to building an investor base and improving understanding of outcome risk.

Future SIBs may face the challenge of sharing outcome payments across central and local government departments or other agencies. Outcome payments are made by the Ministry of Justice and the Big Lottery Fund in the Peterborough SIB, but potentially a range of local and national government departments could benefit.

Affordable Warmth Access Referral Mechanism (AWARM) Manchester

The UK Public Health Association (UKPHA) commissioned the Greater Manchester Public Health Practice Unit to evaluate the Manchester health related fuel poverty pilot, AWARM. The AWARM pilot was developed with support from the Health Housing and Fuel Poverty Forum (HHFPF) as an optimal delivery model for identifying those most in need of energy efficiency measures. The programme used a range of sources, including GP referrals to identify and refer householders to the interventions.

Warm Front scheme. The evaluation seeks to assess the impact of the initiative on recipient quality of life.

The AWARM evaluation combines scheme collated data about the costs of interventions with the available literature to describe the benefits of interventions and to inform the development of an economic model. The final economic model includes a set of transparent assumptions by which the benefits can be explored and justified. The report discusses model findings, limitations, the cost effectiveness and value for money of warm housing interventions and draws a conclusion about whether the interventions are a good use of resource.

The cost benefit analysis considered AWARM interventions in 52 households. The AWARM process ensures that recipients of interventions are those in need. The residents were 82 adults and 12 children. The interventions were mainly insulation (wall and loft) and heating improvements (boiler repair or new central heating). The cost of providing interventions was estimated to be £88,800.

The model analysed benefits of warmer housing in terms of an increase in quality of life and a smaller increase in length of life. The model considered benefits in adults. The gain in quality adjusted life years (QALYs) due to an improvement in quality of life in 82 adults was estimated to range from a minimum 1.67 to a maximum of 31.16 depending on the scenario modelled.

The life years gained from living longer was estimated to be 2.55 years, this was assumed to equal 1.53 QALY, a reduction of 40% because the years gained are towards the end of life.

Using the NHS threshold of £20,000 for a QALY, an intervention costing £88,800 must generate at least 4.44 QALYs. In the scenarios modelled the value of the QALYs gained ranged from £64,000 to £653,800. It is only in one scenario, in which benefits are limited to a small group (those with measurable depression and anxiety), and are short term, that the intervention was not cost effective. When modest benefits are assumed to accrue to half of the recipients or large benefits accrue to those with measurable depression and anxiety the interventions are very cost effective.

In a second analysis the value of benefits needed to reach the total cost of the intervention was considered. It was found that if the whole benefit to a recipient of a warm housing intervention is valued at 50p for each cold day then the benefits would exceed costs after about ten years. If a higher value of £1 is thought to be more reasonable then benefits exceed costs within five years. The value that should be placed on helping to keep a vulnerable member of the population or a child warm in their home are not known but an amount of £1 for each cold day does not seem excessive or unreasonable when placed into the context of expenditure on fuel to keep warm or alternative health interventions. In terms of the opportunity cost the report concluded that, “it was hard to think of alternative interventions that might have a substantial impact on mental wellbeing at a lower cost”.

This report states that warm housing interventions in targeted populations are almost certainly cost effective and that they can be considered a good use of public resources. The benefits gained in the UK are likely to be mainly from comfort taking and a consequent improvement in mental wellbeing. If the scale of the project were to be increased to England or UK level then it may be possible to demonstrate impacts on mortality and morbidity.
Liverpool City Council Healthy Homes Programme

Liverpool is the most deprived local authority in England, with high levels of unemployment. Forty-five per cent of children and 29 per cent of people over the age of 60 live in income-deprived households\(^\text{123}\). The city also has some of the worst health inequalities in the country. Life expectancy for males (73.4 years) is the third lowest in the country and life expectancy for females is the lowest in the country (78.1 years). The percentage of Liverpool’s houses that fail the Decent Homes Standard or are classed as unfit is higher than the national average. The Council estimates that one in four houses in Liverpool is ‘poor’ and one in four households are at risk of fuel poverty.

Improving housing standards, choice and affordability and improving health, well-being and health inequalities are objectives within Liverpool’s sustainable community strategy\(^\text{124}\). The sustainable community strategy and the local strategic partnership’s health subgroup (which includes the Primary Care Trust (PCT), the City Council, Environmental Health and the pathfinder’s Health Improvement Team) recognise that these objectives are linked and that poor quality housing and living conditions can have an adverse effect on people’s health. Based on national estimates, poor housing conditions are believed to be a significant contributor in up to 500 deaths and around 5,000 illnesses needing medical attention in Liverpool each year.

Because of this link between poor quality housing and occupants’ health, the Council wanted to target unhealthy and unsafe housing conditions to reduce preventable deaths and illness. Following a pilot housing market renewal project that aimed to inspect properties and identify the most serious hazards, the Council decided to implement a larger project to help improve housing standards and health and well-being across Liverpool. The Council applied to the PCT for funding to assess the health needs of households with a particular focus on privately rented properties in the most deprived areas (using the HHSRS to assess the condition of homes at high risk).

Over an 18-month period (April 2009 – September 2010), the Healthy Homes Programme aimed to assess the individual health needs of the occupants of 15,000 properties. Where there are health needs (for example smokers who want to give up or inadequately heated homes) referrals are made to correct partner agencies. The worst 2,750 properties are also identified for HHSRS inspection, which Environmental Health officers, funded by the programme, carry out.

Up to July 2009, 1,105 homes had been visited and 223 vacant properties had been identified in the target areas. Surveys have been conducted at 523 of these properties and 919 referrals to partner agencies have been made (including 178 to Environmental Health officers). Including the pilot exercise, 598 properties have received an HHSRS inspection and hazards are either being, or have been, removed. In one case an elderly resident suffering from emphysema was living in an inadequately heated home which was contributing to his condition worsening. With the help of the Healthy Homes team, Environmental Health and the Council’s energy efficiency team an application for central heating through Warm Front was fast tracked.

The Council and primary care trust recognise the difference between outputs and outcomes. While outputs, such as number of homes visited and improvements made, are fairly straightforward to

---


\(^{124}\) Liverpool 2024: A thriving international city
measure, the drop in the number of hospital admissions and deaths due to the programme is more difficult to measure. The Council and primary care trust are confident the approach will deliver positive outcomes as the HHSRS is based on the premise that hazards in the home have a negative effect on health and well-being. By understanding people’s health and well-being needs and signposting to suitable services the programme can also tackle health and well-being needs that do not relate to the quality of the home. The Council and primary care trust have commissioned John Moores University to conduct an evaluation of the Healthy Homes Programme, as part of wider evaluation of health programmes taking place in the area over the coming years.

**Analysis of the potential for a cold-related illness and mortality Social Impact Bond in Leeds**

Social Finance undertook an initial analysis of the available data to evaluate the feasibility of a Social Impact Bond for reducing cold-related illness and mortality in Leeds. The review examined the potential to target the reduction of excess winter deaths and cold related illnesses. The initial desk based review identified several interesting findings:

- They were unable to find robust data on the costs to the public sector of an excess winter death.
- Many studies have investigated the relationship between housing and health but, because of the number of intervening variables, it is difficult to demonstrate clear ‘cause and effect’ relationships. These variables include poverty; level of disease in the population; and diet and exercise.
- Cold housing is not systematically recorded as a reason for GP and hospital visits so data in this area is very limited.

The Leeds SIB analysis explored the potential to measure health outcomes for a target group of over 69 year olds who were: reporting to A&E with respiratory illnesses; reporting to GPs with cold related illnesses; and ineligible for Warm Front but, suffer or are at risk from cold-related illnesses. The health metrics, shown below, ranged from area wide metrics to health specific outcomes, namely:

1. **Area based**: Excess winter deaths among 69 year olds
2. **Health specific**: Acute hospital admissions among over 69 year olds receiving a housing intervention for respiratory illness between November and March
3. **Health specific**: Acute hospital admissions among the over 69 year olds receiving a housing intervention for circulatory illness between November and March
4. **Health specific**: Self-reported improvement in health among the over 69 year olds

The review of the outcome metrics found insufficient evidence to suggest a strong enough link between health outcomes and housing temperature to form the basis of a Social Impact Bond. The following highlights a number of their key findings:

---

• Excess Winter Deaths are a robust metric that is well recorded.

• It was difficult to quantify cost savings to the health sector for Excess Winter Deaths.

• In terms of measuring the impacts on Excess Winter Deaths the target area (Leeds) was too small for a measureable effect, and other factors such as climate may be responsible for larger variations.

• Both acute admissions for respiratory and circulatory illness were linked to significant cost to the NHS Leeds, with robust data collection and potential for controls and national and local baselines.

• Respiratory disease is more strongly linked to the level of disease in the population than housing condition. Wilkinson et al. (see reference above) found that ‘the winter rise in respiratory death is more to do with respiratory infection and other seasonal changes than it is to do with the direct effects of temperature.’

• Both respiratory and circulatory conditions often impacts on people with existing health problems and as such they may not be significantly improved by living in a warmer home.

• The local health related insulation referral scheme, ‘Health Through Warmth’, indicated low levels of referrals for both respiratory and circulatory conditions.

• Self reported health improvements were easy to record but could not necessarily be linked to NHS savings.

• Unfortunately due to data protection, information on costs and savings could not be supplied to the team.

Similarly to the area in which the Centre for Sustainable Energy is based, Avon and Somerset, there were a number of energy efficiency schemes (interventions) that aimed to make homes in Leeds warmer. The review highlighted the potential for a FPSIB to provide advice on the use of their heating (as an aftercare service) and / or to top-up existing grants for private home owners i.e. where householders are ineligible for free measures under the Carbon Emissions Reduction Target (CERT). The provision of advice could have been linked to Warm Front in the past but the current Government is currently phasing out this programme (March 2013 onwards). The forthcoming roll out of the Green Deal and the new Energy Company Obligation could be linked to a health programme to provide funding or subsidised support for energy efficiency measures.
Annex II – Detailed interview findings

Health Academics

We know that the main health issues related to cold homes are premature death, respiratory diseases, cardiovascular diseases, falls and anxiety. Although it is logical that reducing the prevalence of mould and damp in a home (i.e. factors that aggravate and are symptomatic of these health issues) will reduce the severity and/or incidence of these health issues, there are very few studies that have explicitly monitored housing improvements in terms of health impacts. As such, it is very hard to provide the evidence that is required to direct health money towards social interventions. A lot of these studies in Britain have not targeted health improvements and therefore haven’t been able to empirically measure them – the best work to date can be found in a study carried out in New Zealand.126

As previously mentioned, there are likely to be a number of ethical issues related to gathering health data to determine the target population of the intervention. In this case, we would ideally be looking to gather health data that matches people likely to be affected by cold homes with actual dwelling data. One way to do this would be to work very closely with local health providers and other housing intervention schemes that may have access to the housing condition data required. For example, GPs may be able to refer patients who may be living in a cold home and presenting with cold home related diseases.

Although there are many social benefits that may accrue from improving the mental health of the population, it is much harder to capture this in terms of short-term financial savings to the NHS. Due to the taboo surrounding many mental health issues, most incidences go unreported, and as such they would make quantifying any improvements very difficult. Other societal benefits may be linked to improving the health of children. For example, reducing the severity and incidence of childhood asthma would potentially result in a reduction of the number of days absent from school and thus less disruption to their education, which has been shown to have an impact on their adult life and contribution to society.

In 2009 it was estimated that £850 million of NHS costs arise from the impact of cold homes on health, which was pushed up to £1.3 billion in 2011. However, there is no apparent methodology published which explains the way these estimates are calculated. A couple of health economists are currently putting together a way of doing just this, so that it will be easier in future evaluations (for parties such as ourselves) to compare the health costs of cold homes on an annual basis. Others, such as the Department of Energy and Climate Change (DECC), use Quality Adjusted Life Years (QALYs) as a way of determining the benefit of housing improvements to health, however these are very hard to link to direct savings for the NHS. They are currently working with some health academics to put together a toolkit with which to strengthen the link between cold homes and morbidity, as well as produce an estimate of the costs placed on the NHS as a result. The best non-QALY work available at the moment comes from the Yorkshire & Humber Public Health Observatory.

Centre for Sustainable Energy

(YHPHO) who specialise in excess winter admissions (EWA) into hospital. There are also some reference costs available for different NHS Trusts; however these still require medical knowledge to pull out the exact costs.\(^{127}\)

In terms of monitoring and research, a SIB would require clear targets and specific outcomes in order to go ahead. Matching on a case-by-case basis (as carried out for a successful SIB at HMP Peterborough) will be much harder to do for a health intervention as much patient data is highly confidential, both in terms of practicality and the resources that would be required. However, proving that there is a causal link between improving cold homes and NHS savings would require extensive monitoring, so this is one key barrier to implementing a SIB intervention of this kind.

**Health Delivery**

The main aspect influencing the delivery of this health intervention is the current restructuring of the NHS. This includes: changes to the organisational structure; who commissions and provides health services; what evidence is required to divert funds towards new schemes. On top of this, staff will be taking on extra work as they go through the transition in the next few months (due to be complete by April 2013, but it will take time to get things running smoothly) and integrate into different departments throughout the local authority, as well as dealing with budget cuts.

Staff in Primary Care Trusts (PCTs) are being re-organised within the local authority in order to make health a priority of other departments (e.g. housing), and as such the way they address health interventions may change. In particular, they are currently more used to basing their work very strongly from a research angle, however a lot of departments they will be integrated into in the council don’t have the same procedure. It will thus be interesting to see exactly how this will affect the commissioning procedure, as it is likely to have a direct effect on the future of this intervention.

The strength of the causal link between cold homes and cost to the NHS will be determined by the grade of evidence required. As mentioned previously, this link has rarely been studied explicitly, which complicates the evidence base for this intervention.

As part of the new CCG, GPs now have commissioning responsibilities (for secondary healthcare) on top of their existing responsibilities as health care providers. Whilst this may introduce a conflict of interests, it gives them a unique angle from which to direct commissioning of healthcare services. In particular, they are likely to be much more aware of the health needs of the local population, which may affect how particular interventions are viewed.

Any health intervention would have to take into account the local health needs. In Bristol, for example, a rapidly growing child population means that there are likely to be more children living in deprived areas, which can have a big effect on the prevalence of childhood asthma due to poor quality housing (i.e. the presence of damp and/or mould). Reducing the prevalence and severity of asthma is likely to reduce spend on the secondary care drug budget for asthma medicine. This would demonstrate a clear saving if tracked and monitored appropriately. Again, this would also feed back into longer term societal benefits that come about as a result of giving children the best start in life.

Another new aspect of the NHS is the production of the Health & Wellbeing Strategy (JHWS), which provides the context for the commissioning of all local health services. It is put together by the HWB and based upon the contents of the local health needs as defined in the Joint Strategic Needs Assessment (JSNA). The JSNA is put together by those in the local authority and the CCG, and places a legal binding upon the direction of local health spending, and thus the commissioners in charge of this budget. The HWB will act as an ‘umbrella’ organisation holding each commissioning group to account and to the JHWS. It will thus be crucial to engage with members of the HWB and the commissioning groups in order to get an intervention like this off the ground.

**Scheme Delivery**

As the NHS restructuring is implemented, there are emerging local and national programmes that fuel poverty related agencies should be looking at. For example, the Bristol NHS has a programme called **Healthy Futures** which is aimed locally at improving service delivery - one of their themes is focussed on how to develop a more integrated system that links with community services to reduce admission numbers and the spend on acute care. The Private Housing team in the council is also about to start a new intervention project that will focus on improving housing in an area based upon their Home Action Zones principle, which targets some of the most deprived areas of the city.\(^1\)

The Housing Health and Safety Rating System (HHSRS) is one way of identifying houses at risk from cold and damp. It is “a risk-based evaluation tool to help local authorities identify and protect against potential risks and hazards to health and safety from any deficiencies identified in dwellings”\(^2\) and includes ‘damp and mould growth’ and ‘excess cold’ as 2 of the 29 hazards they look for when inspecting a property. There is the potential for this to be utilised as part of this intervention, particularly because it is related to a BRE calculator that attempts to quantify the cost of poor housing. Use of the HHSRS indicates that the most vulnerable groups of the population are those under 14 and 60+. Most local authorities are not able to match different population groups with the housing they target, which limits the evaluation. It may be necessary to investigate these dwellings on the ground to improve the level of detail possible for an evaluation of the intervention.

The biggest challenge to this scheme is to make a clear link between the activity being funded and the results that are generated. An extensive monitoring programme with detailed control groups would be required to show that savings were occurring as a direct result of the intervention being funded. This is not something that is normally done in health interventions (apart from drugs trials) due to the level of finances and resources required.

**Finance**

As GPs (as part of the CCG) will be the beneficiaries of reducing secondary healthcare spend, or increasing the efficiency of this spending, they are likely to want to make some structural changes to how money is directed. This was also indicated when speaking to business strategists in the NHS. The majority of spending in the NHS is spent on treatment and very little on prevention. It is clear to many that much more needs to be directed towards preventative measures however, in the current climate of budget cuts and a growing annual deficit, it is not deemed a priority, regardless of the


logic behind it and the long-term benefits that will undoubtedly accrue. The introduction of a number of SIB pilot schemes may be one way to change this way of thinking, and this factor made it quite popular with a number of those interviewed in the health sector.

All commissioning organisations have to produce an annual Commissioning Intentions document that gets sent out to everyone in the provider community. This sets out the principles around the services they will be commissioning in the coming 12 months, what their budgets will be, and also acts as a basis upon which contracts are negotiated between commissioners and providers. Because the budget is pre-set like this, it is based upon previous spending and expected increases. It is in the commissioners’ interest to get this as exact as possible so that there is not an over-spend, and it will depend upon the specific contract as to what becomes of any savings when an under-spend occurs. Generally, any savings will accrue to the commissioner and not the provider, which is another indication that it will be key to get the commissioners onboard, as opposed to say particular hospitals or NHS trusts. It is actually in the interest of the provider to increase the volume of patients they treat as this will increase the size of their budget, whereas it is the interests of the commissioner to reduce the volume of patients. Hospitals often provide more services than they are funded for the wellbeing of their patients, so there is a risk that this gap will merely be reduced rather than create actual savings.

To decrease the risk of investing in a scheme such as this, and as previously mentioned, there will need to be a strict monitoring and auditing system in place to assess performance of the intervention. Financial investors would need to see a solid contract between the commissioner and the provider to ensure that the results will ensure a return payment. The timescales of the bond will also be important to investors – these link clearly to the expected health outcomes of the intervention – and their level of interest may vary accordingly. There are a few areas where capturing savings will not be as easy as others, for example reducing the number of GP visits for cold home related diseases, or freeing up hospital beds.