

SECTOR STUDY

Good housing and good health?

A review and recommendations for housing and health practitioners

This sector study was researched and written by Jan Gilbertson and Geoff Green, Centre for Regional Economic and Social Research Centre (CRESR), Sheffield Hallam University, with David Ormandy, Safe and Healthy Homes Research Unit (SHHRU), University of Warwick, and Hilary Thomson, MRC Social Public Health Sciences Unit, University of Glasgow.

This report is jointly published by the Housing Corporation and the Housing Learning and Improvement Network in the Care Services Improvement Partnership at the Department of Health. It highlights the evidence of the links between housing and health in supporting the health and well being of people in their homes and provides up-to-date examples of practice and recommendations for housing and health practitioners.

About the Housing Learning and Improvement Network

The Housing Learning and Improvement Network is a learning network within the Care Services Improvement Partnership at the Department of Health. It is a unique network for promoting new ideas and supporting change in delivering housing, care and support services for older and vulnerable people. It has the lead for supporting the implementation of the Department of Health's Extra Care Housing Grant arrangements and related housing with care and support capital and revenue programmes.

The Housing Learning and Improvement Network manages both national and regional networks and has extensive online resources and learning materials at: www.changeagentteam.org.uk/housing

For enquiries e-mail: housinglin@cat.csip.org.uk

Care Services Improvement Partnership 

We help to improve services and achieve better outcomes for children and families, adults and older people including those with mental health problems, physical or learning disabilities or people in the criminal justice system. We work with and are funded by



Key findings

Literature review

Common health effects of unsatisfactory housing include respiratory symptoms, such as asthma, lung cancer through exposure to asbestos and radon; depression and anxiety; injury or death from accidents and fires; hypothermia; skin and eye irritation; and general physical symptoms.

Studies of the impact of housing investment on health have not always demonstrated improvements in health and, overall, evidence is mixed.

However, improvements to mental health are consistently reported by intervention studies. It is likely that investment in housing improvements, particularly rehousing and major refurbishment, will help improve residents' mental health.

The impact of housing improvements on physical health and well being are less clear cut and more difficult to detect. Respiratory health may be improved through energy efficiency improvements to housing, although improvements to respiratory health following more general housing improvement and neighbourhood regeneration cannot necessarily be assumed.

The likely positive effects of regeneration programmes include improved feelings of safety, enhanced levels of area and housing satisfaction and increased community involvement. These factors have been linked to mental health benefits.

The effects of the redevelopment process on the health and well being of residents should not be underestimated. There may be detrimental effects for some, and those who experience stress during redevelopment may report poorer mental health for a period of time.

Recommendations for future housing intervention and health studies included large studies which embrace a broad understanding of the socio-economic determinants of health; collaborative studies which bring together housing and health agencies; robust holistic design which utilises both quantitative and qualitative research methods; longitudinal studies, although expensive, are useful when examining complex housing interventions; studies need to provide evidence on the cost effectiveness of interventions and comparison of costs and effects of specific interventions.

Interviews

Professionals interviewed for the study held a holistic perspective on the linkages between housing and health, which could be both direct and indirect. Those interviewed set the housing and health agenda within a neighbourhood context. Rather than housing alone, it was the interplay between structural factors, neighbourhood conditions and opportunities, social relationships and housing conditions, as well as individual factors such as lifestyle, which determine health and health inequalities.

There were a number of clear messages about what form the housing and health evidence base might take to make it more useful to both sets of practitioners including: utilising existing internet networks in both sectors to provide information and relevant evidence on the links between housing and health; evidence should be linked to practical examples and application; and the evidence base needs to be organised and translated in such a way that it speaks to a broader audience of professionals so that they can more easily inform partnership working.

Introduction

The association between housing conditions and both physical and mental health, has long been recognised and is now generally accepted. Whilst there are a range of specific housing factors which affect health outcomes, the relationship between housing quality and health is complex, not least because the links between different dimensions of housing and health operate at a number of inter-related levels. Housing does not simply operate in isolation to influence health, rather the interplay between structural forces, the broader policy environment, employment opportunities, educational achievement, neighbourhood conditions, social relationships, and housing conditions (as well as individual factors like lifestyle) essentially determine health and health inequalities in society.

Research evidence examining the relationship between housing quality and health has largely been developed by two separate traditions¹ of investigation - that of social science, and epidemiological and medical research. Between and within both traditions there is a lively debate about causal links. The quality of the research evidence gathered is often affected by the problem of 'confounding' factors: those

living in unsatisfactory housing tend to experience so many other deprivations, that isolating the influence of housing on their health is difficult.

However, possibly hundreds of studies have reported consistent statistically significant associations between unsatisfactory housing conditions and the incidence of ill health. A number of reviews have also attempted to pull evidence from different sources and disciplines together (see, for example, Smith, 1989; Burridge and Ormandy, 1993; Wilkinson, 1999; Rudge and Nicol, 2000). A review of studies which gathered evidence on the cost of unsatisfactory housing also suggests that as a result of under investment in housing, additional costs are 'exported' to other service sectors such as health, education etc.

In terms of the wider policy environment housing has re-emerged as an element in policy debates around public health, improving the health of the nation and national health inequality issues. For example, the Department of Health's White Paper, *Choosing health: Making healthy choices easier* (2004) and the subsequent resources pack produced with the NHS,

¹ There has also been considerable research on 'design' by those involved in, or informing, the construction industry (both for housing and other buildings), but this often only informs new building (British Standards, the Building Regulation Approved documents).

Local Government Association and the Office of the Deputy Prime Minister, Creating healthier communities: A resource pack for local partnerships (2005). More recently, the Department of Health has set out its vision for promoting choice, independence and well being in Our health, our care, our say: A new direction for community services (2006).

The renewed focus on the socio-economic determinants of health and the increasing recognition that investing in housing stock may form part of a wider strategy of health improvement represents an important change of emphasis in policy. A summary of the public health aspects of key policies concerned with housing, regeneration and sustainable communities is provided in the National Institute for Health and Clinical Excellence (NICE) review of interventions for improving health. In addition, the Housing Learning and Improvement Network has produced a useful toolkit for practitioners, Assessing health risks and health inequalities in housing (2005).

There is now growing interest in how investment in housing can lead to benefits in health and potentially lead to cost savings in other service areas. A number of recent reviews have also gathered and assessed the evidence of the effectiveness

of housing interventions to improve health. An extensive bibliography at the end of this study can be used for further reference and to inform future research work.

The main aim of this report is to bring together evidence on whether improved housing can help improve health by synthesising findings from a variety of studies and different sources. From interviews with housing and health professionals the report also provides insight into how the existing housing and health evidence base is perceived and used. Using the evidence gathered from the review and interviews, the report makes recommendations for future housing improvement and health studies and suggests how evidence on housing and health could be more effectively packaged and communicated to practitioners.

A bibliography can be found at the end of this report.

Part 1: Evidence linking unsatisfactory housing and poor health

In the UK, housing hazards have been ranked in order of their seriousness, with the most important being poor air quality; excessive heat, cold and/or humidity (poor hygrothermal conditions); radon; slips, trips and falls; noise; house dust mites; and fires (see Raw et al, 2001). Carried out by both medical and health and safety experts, this ranking is based on a review of evidence which assesses the relative risk of housing hazards on the strength of evidence, the number of people affected and the seriousness of the harm caused.

The types of health outcomes that these hazards are frequently associated with are summarised below.

Common health effects of unsatisfactory housing

Respiratory symptoms such as asthma, lung cancer through exposure to asbestos and radon;
Depression and anxiety;
Injury or death from accidents and fires;
Hypothermia;
Skin and eye irritation; and
General physical symptoms.

Research studies have consistently identified a range of housing-related factors which impact on health, such as the quality of the indoor environment, physical conditions, design and layout, social and behavioural factors, neighbourhood and the macro-policy environment.

This section presents details on some of these factors.

Indoor housing conditions

Dampness

The health implications of living in damp homes have been examined in several epidemiological studies (see for instance Martin et al 1987; Burr et al, 1989; Platt et al 1989). Despite debate over methodological limitations, results from such studies have consistently demonstrated that dampness is associated with a higher prevalence of poor health. Some studies have demonstrated a dose response relationship² between the severity of damp and the extent of health problems, particularly for children (Strachan, 1988; Platt et al, 1989).

² The relationship between the amount of exposure (dose) to a substance and the resulting changes in body function or health (response).

One of the ways that damp housing poses a risk to health is through the effects of house dust mites and moulds. Allergic reactions and infections develop with repeated exposure and children, the elderly and those with existing illnesses are most at risk (Hunt, 1993). House dust mites and airborne mould spores can cause or exacerbate respiratory conditions such as asthma as well as other symptoms such as wheeze, aches and pains, diarrhoea, nausea and headaches (Martin et al, 1987). Children who sleep in damp homes are twice as likely to suffer from wheezing and coughs than those who sleep in dry homes (Best, 1995). They are more likely to experience gastrointestinal upsets, aches and pains, fatigue and nervousness too (Hunt, 1993). Adults tend to report aching joints, nausea, blocked nose, breathlessness and poor mental health (Hunt et al, 1988³).

Depression and anxiety (Hopton and Hunt, 1996), particularly in women (Brown et al, 1977⁴), have been associated with damp housing. Damp homes have also been associated with a reluctance to invite friends into the home, anxiety and feelings of shame and embarrassment which may lead to social isolation (Markus, 1993).

It is perhaps worth noting that few studies have investigated the potential health benefits of reducing mould in the home (Peat et al, 1998; Thomson and Petticrew, 2005).

Cold homes

Much English housing stock is in poor condition and is energy inefficient. Around a third of all properties fail to meet the Decent Homes standard, with failure to meet the thermal comfort criterion (26% of total stock) the most common cause. Many homes have inefficient heating systems and the presence of a central heating system does not necessarily result in warmer homes. Issues of affordability and fuel efficiency are important when considering the health implications of cold housing. Those experiencing fuel poverty, defined as needing to spend over 10% of their income on energy to maintain an adequate standard of warmth, are likely to be particularly vulnerable. The ability to keep the home warm enough in winter, and in particular the worry that can be associated with such concern, has been shown to be associated with poor health outcomes (Evans et al, 2000).

³ Cited in Hunt SM, McKenna SP. The impact of housing quality on mental and physical health, *Housing Review* 1992, vol. 41(3) pp.47-49

⁴ Cited in Marsh A, Gordon D, Pantazis C, Heslop P (1999) *Home sweet home? The impact of poor housing on health* The Policy Press

Colder temperatures in winter are also linked to excess winter deaths. The biggest causes of these winter deaths are cardiovascular and respiratory conditions, particularly for older age groups. Boardman (1991) has argued that a major reason why Britain has comparatively more winter deaths than other colder countries, is the general quality of the housing stock. However, there is little association between deprivation and excess winter mortality. Lawlor et al (2000; 2002) argue that the relationship between excess winter deaths and deprivation has been inadequately investigated but found that excess winter deaths were not associated with deprivation.

Whilst there has been debate over the relative importance of indoor and outdoor temperatures in contributing to the burden of winter deaths (Keatinge, 1986; Keatinge et al, 1989; Donaldson et al, 1997; 1998a; 1998b), recent research has pointed to a link between indoor temperatures and excess winter deaths. There is a growing body of evidence suggesting that those living in cold homes are more likely to experience ill health, which in turn may lead to excess winter deaths, particularly in older age groups (see Wilkinson et al, 1998; Wilkinson

et al, 2000; Wilkinson et al, 2001; Wilkinson et al, 2004). In particular, vulnerability to cold-related death may in part be caused by inadequate home heating (Wilkinson et al, 2001).

Recent evidence from the Warm Front evaluation (Warm Front Study Group, forthcoming) demonstrates that warmer homes are associated with lower risk of cold-related death than colder ones. Indoor temperature is a main function of a dwelling's energy efficiency (Wilkinson et al, 2001) and such findings indicate that improving domestic energy efficiency will deliver important health benefits⁵.

Indoor pollutants

Domestic indoor air pollution poses a risk to health with the greatest risk being associated with hygrothermal conditions (humidity and temperature), radon, house dust mites, environmental tobacco smoke and carbon monoxide (see Raw et al, 2001). Air pollutants tend to be most detrimental to asthmatics and the elderly. Increased levels of domestic allergens have been linked to increased risk of asthma in children, and exposure to such allergens may trigger attacks among asthmatics. However, there is

⁵ The work on Statistical Evidence to Support the Housing Health and Safety Rating System (HHSRS) shows that Excess Cold is the greatest problem in English Housing. In the HHSRS Operating Guidance, at page 59, the national average Hazard Score for all pre 1945 dwellings is in Band C – a Category 1 Hazard for the purposes of Part 1 of the 2004 Housing Act, placing a duty on local authorities to take action to deal with the hazard

limited evidence to suggest that exposure to allergens is a risk factor in the development of asthma. The health impacts of improved air quality have not been assessed (Thomson and Petticrew, 2005; see also The THADE Report, 2004).

Asbestos

Inhalation of asbestos fibres causes two main kinds of cancer: mesothelioma and lung cancer. There are many sources of asbestos which may contribute to non-occupational exposures and many asbestos materials are present in homes. The risk of exposure will be related to the release of these fibres, for instance during home renovations or repairs, or when building surface materials have been damaged or have deteriorated. The link between exposure to non-occupational sources of asbestos and lung diseases (see Konetzke et al, 1990) highlights the importance of the use of asbestos free materials in the home.

Accidents in the home and home safety
Home and leisure accident statistics estimate that each year in the UK there are approximately 2.7 million accidents in the home which necessitate a visit to hospital and around 4,000 deaths as a result of injury in the home. There is a strong correlation between accidental death and social class,

with a disproportionately high number of deaths occurring among less affluent populations (Wilkinson, 1999).

Some of the environmental hazards associated with home accidents are related to poor design and inadequate maintenance of the dwelling. Common accidents in the home which cause injuries and deaths tend to be as a result of falls, fires, burns and poisoning. In particular children and the elderly are at the greatest risk. Those living in temporary accommodation or in houses in multiple occupation (HMOs) are also at increased risk of injury.

Overcrowding and density

The health risks of overcrowded housing were recognised as long ago as the 19th century when such conditions were associated with the spread of infectious diseases such as tuberculosis and led to an extensive slum clearance programme. Overcrowding is still recognised as a risk to health (Lowry, 1991) and has been associated with both physical and mental health risks (see also ODPM, 2004) including the spread of infectious diseases, accidental deaths and asthma, cardiovascular diseases, stress and depression. Overcrowded conditions are more likely to occur in HMOs and temporary accommodation such as converted flats,

hostels, B&Bs and student accommodation, which typically have shared amenities for bathing, cooking and food storage.

Related to overcrowding is the issue of density and housing design. Research evidence tends to link living in flats, particularly high-rise ones, with stressful living conditions and social problems such as crime, social isolation and reduced privacy. A review of studies (Ineichen, 1993) found that residents living in high rise accommodation reported more mental health symptoms than those living in traditional style dwellings, whilst other studies reported no such association. These mixed results tend to support the view that high-rise living can have a negative effect on mental health for some groups. Such housing can provide suitable accommodation for many, and there is little conclusive evidence that the height of a home from ground level is associated with either reduced health or housing satisfaction. Research in this area also typifies the problem of confounding factors since the circumstances of high-rise living are often bound up with many other social problems (Wilkinson, 1999).

Home ownership and homelessness

Tenure

Type of housing tenure has consistently been associated with mortality and morbidity in Britain and elsewhere (Macintyre et al, 2003), with renters experiencing worse health than owner occupiers. Many British studies have found a stronger relationship between tenure and mortality than between social class and mortality (Chandola, 2000; Woodward et al, 1992; Haynes, 1991).

In terms of health inequalities it is often assumed that tenure itself may not have a direct influence on health but is rather a proxy for other factors like income and social class which do. Work undertaken by Sally Macintyre and colleagues at Glasgow (see for example, Macintyre et al, 2003; Ellaway and Macintyre, 1998) suggests that tenure may not simply be related to health because it is a marker for income. Their work has shown that social renters are more likely to experience housing stressors, such as dampness and overcrowding, as well as to be exposed to many other potentially health-damaging factors such as crime and anti-social behaviour than owner occupiers. Social renters are also less likely than owners to have access to features

which may benefit health, such as gardens and good local amenities. The authors conclude that these variables may help to explain some of the observed relationship between tenure and health and that the link, although independent of income, may be due to rented housing largely being a proxy for poor quality housing.

As well as differences in the physical housing quality and environment which may partly explain the relationship of health differences between tenures, there are also social and psychological characteristics attributable to housing which may influence the different health outcomes of residents living in rented and owner occupied properties. The home has been identified as a key source of ontological security, and home owners may more readily be able to obtain the benefits from ontological security's key components of haven, autonomy and status from their homes (Saunders, 1990). Home ownership has been independently associated with improved health primarily because it may help to generate security and control (Hiscock et al, 2000). However, research on mortgage arrears has also demonstrated that stress and stress-related illnesses are associated with insecure home ownership (Nettleton and Burrows, 1998; 2000).

Furthermore research on the psycho-social benefits of the home, undertaken in Scotland (see Kearns et al, 2000), suggests that most people derive psycho-social benefits from the home regardless of whether they are renters or owner occupiers. Tenure was not found to be a significant explanatory factor in explaining the benefits occupants derived from the home when consideration of housing and neighbourhood factors were incorporated into statistical models. This suggests that there are mediating variables such as feeling happy about the home, living in a nice area, having few problems with the conditions of the house etc. which may influence the potential benefits derived from the home and which may in turn influence health.

Access to housing and homelessness

It seems likely that the relationship between access to housing and health is interactive (Whitehead, 1998). People with health problems are disproportionately more likely to occupy unsatisfactory housing and also often find it difficult to access secure, decent housing. Both these factors may exacerbate their health problems. Along with poverty and inequality these factors combine to affect both housing and health experiences (Wilkinson, 1996).

Homelessness is closely related to poor health and a higher incidence of health problems than the general population as a whole. Living on the street and homelessness are associated with high mortality rates, high levels of health need and difficulties accessing health care, particularly primary health care services (Social Exclusion Unit, 1998; Bines, 1994; Burrows et al, 1997).

Outdoor housing conditions ⁶

Neighbourhood, social cohesion and community safety

Satisfaction with the neighbourhood has been linked to health. Whilst it is not an explicit health indicator it has been used as a proxy for satisfaction with life and an influence of mental health. In a recent analysis of data from the Scottish Household Survey of 2001, Parkes and Kearns (2004) have shown that neighbourhood conditions are associated with health and health behaviours, over and above the effects of poverty. After controlling for a range of socio-demographic characteristics such as age, gender, social tenure, access to a car and smoking, feeling unsafe increased the likelihood of poor health by 40%, while a high number of anti-social problems in an

area increased poor health by 30%. Those who liked their neighbourhood because it was well maintained, was landscaped and had nice open spaces were more likely to engage in healthy behaviour such as walking and were less likely to smoke.

Social relationships and networks within and beyond a neighbourhood may be related to health outcomes, both positively (see Cooper et al, 1999; Blaxter et al, 2001; Coultard et al, 2001) and negatively. For instance, social capital can negatively influence health behaviour by providing channels to facilitate unhealthy behaviour or educational underachievement (Portes and Landolt, 1998). Components of social capital such as feelings of empowerment, levels of trust and social networks have been found to influence feelings of safety in the home and within the neighbourhood (Gilbertson et al, 2005).

Fear of crime particularly affects the elderly, women, poor and other disadvantaged and vulnerable groups and has been shown to be significantly associated with poorer health. In a study of housing renewal in Liverpool feelings of safety were a consistent predictor of health status. Those residents who felt less safe reported significantly lower mental and social well being (Green et al, 2002).

⁶ See also American Journal of Public Health Sept 2003 issue (Vol. 93 Issue 9) which concentrated on the built environment and health, and included several reviews of the evidence.

Part 2: The cost of unsatisfactory housing

The increased incidence of ill health associated with poor living conditions is likely to add costs not only to health services but also to a wide range of other key service providers. In a review of studies examining the cost of poor homes, the Cost Effectiveness in Housing Investment (CEHI) research team termed these additional costs “exported costs” because they are generated by under investment in the housing sector and then exported to others (Ambrose et al, 1996).

Examples of exported costs as a result of unsatisfactory housing identified include:

- the health service (because of the association between poor physical conditions and an increased incidence of ill health which leads to greater use of services);
- the education service (because children living in cold damp and overcrowded homes cannot learn as effectively);
- the police and judicial services (because unsatisfactory housing design and inadequate security is associated with increased likelihood of certain crimes and increased levels of fear);
- the emergency services (because poor design and cold conditions increase the likelihood of accidents and may increase

the use of unsafe secondary heating appliances which can increase fire risks); and

- the energy supply services (because energy inefficient homes use excess energy and produce environmental damage).

A simple example of how unsatisfactory housing conditions may have cost implications for other service providers can be illustrated by examining the evidence on the number of falls in the home and the information available on the cost implications of falls for the NHS (see shaded box). If efforts were made to reduce the risk of falling in the home by improving the condition of stairs and providing handrails, it is likely that such investment in housing would lead to substantial cost reductions for health and social services.

The cost of falls in the home

Historic data from the Consumer Affairs Directorate of the DTI on accidental falls in the home suggests that there are over 1 million non-fatal accidents each year resulting from falls, a quarter of which are classed as serious. People over 65 account for almost half of all serious cases.

In the home, most deaths and injuries occur on the stairs (Templer, 1992). Falls also often occur on the level, between levels and in the bathroom. Both personal and environmental factors influence the likelihood of whether older people fall in their homes. Personal factors include decreased balance, reduced strength and mobility, impaired vision, illness and side effects from medication (Askham et al, 1990; Bath and Morgan, 1999). In relation to the stairs, environmental factors include poor design, absence of handrails, stairs that are too steep, poor condition of the step surface or surface covering, poor lighting or objects left on stairs (Templer, 1992). Also the design of houses may not cater for the changing needs and abilities of inhabitants as they age (Healy and Yarrow, 1998).

Injuries arising from falling result in significant costs to health and social care services, and a loss of independence for the older person. Fractures tend to be the most common form of injury in older people who suffer a fall, but falls can also have serious psychological and social consequences affecting mobility, confidence and general quality of life (Hill et al, 2000).

Hip fractures account for around 20% of orthopaedic bed occupancies in the UK, and current population estimates calculate that the number of hip fractures may rise to 120,000 a year by 2015 (Johnell et al, 1992). A report by the University of York (Parrott, 2000) on the economic cost of hip fractures estimates that the total cost to society is almost £726 million a year. Over half of this cost is attributable to the social care of patients recovering from a broken hip.

The example above is perhaps somewhat simplistic and the costs of unsatisfactory housing will obviously extend into much wider costs across society. For instance, research from the US on the cost implications of lead poisoning and home injuries takes into account costs to the individual (loss of income) costs associated with welfare and provision of carers, loss to society generally (loss of income tax), as well as medical costs.

But this example does illustrate how improvements in housing design could potentially reduce some of the cost burden of falls on the NHS. Investment in housing could provide a means for reducing public expenditure and also help to increase the private and social benefits obtained from other services. The introduction of the Housing Health and Safety Rating System may also help to direct housing investment so that it more effectively addresses health and safety issues which can then lead to cost savings elsewhere.

Part 3: Housing Health and Safety Rating System

The Housing Health and Safety Rating System (HHSRS) is the Government's new approach to evaluating the potential risks to health and safety posed by deficiencies identified in dwellings. It shifts the focus of the assessment of housing conditions from the structure of dwellings to the potential effect on health (i.e. the effect of defects). From 6th April 2006, it became the prescribed method for assessing housing to determine whether enforcement action should be taken under Part 1 of the Housing Act 2004.

Part 1 of the 2004 Act places a duty on local housing authorities to take enforcement action to deal with unacceptable hazards in any dwelling other than those owned and managed by local authorities. It also gives authorities powers to deal with any hazards that, while not being unacceptable, the authority still considers that risk could be reduced. In addition to being the prescribed assessment method for enforcement purpose, the HHSRS will replace the Fitness Standard as a part of the Decent Homes Standard.

The HHSRS assessment is based on the risk to the potential occupant who is a member of the age group most vulnerable to that hazard. For example, when assessing hazards relating to stairs, the elderly are considered the most vulnerable group, while for falls out of windows and from balconies children under five years are the most vulnerable. There are 29 HHSRS potential housing hazards, each one, to a greater or lesser extent, attributable to the design, construction and/or maintenance of dwellings (not included are hazards solely attributable to occupier behaviour). The Operating Guidance includes profiles of each of the hazards, including the potential impact on health and matters that may increase or mitigate the risk.

The introduction of the HHSRS may help to inform housing stock investment and conditions survey decisions and help to increase the cost effectiveness of the use of public money. The system directs housing investment to those matters that should reduce threats to health and safety, reducing the burden on the health services.

Part 4: Better housing, better health?

The large body of research reviewed above demonstrates the links between housing and health, and supports the premise that investment in good quality housing may help to improve both physical and mental health. Evidence of the cost of unsatisfactory housing also implies that investment in housing has the potential for reducing the public costs of services other than housing. However, studies of the impact of housing investment on health have not always demonstrated improvements in health and overall evidence is mixed.

The most comprehensive review of studies which have examined the effects of housing improvements on health has been undertaken by Hilary Thomson and colleagues at the MRC Social Public Health Sciences Unit in Glasgow (see Thomson et al, 2002⁷). Despite searching for studies from around the world, the report only found 19 studies (dating from 1936) which had examined the health effects of housing improvement. The quality of these studies was often poor. Most of the studies reviewed insufficiently reported changes in the specific housing hazards such as dampness, reduction in mould etc which made assessment of whether the health

impacts reported in the studies were due to less exposure to these hazards almost impossible.

Furthermore there was insufficient data to attribute specific health changes to a particular type of housing improvement. A report for the World Health Organisation undertaken by Thomson and Petticrew in 2005 also documents the various health impacts detailed by their review of housing intervention studies (see Thomson and Petticrew, 2005). Recently, the National Institute for Health and Clinical Excellence (NICE) has published a review of reviews which have assessed health impacts of housing improvement.

It should be remembered that housing improvements often occur as part of larger regeneration schemes. The local socio-economic and cultural context and the political environment in which these programmes are operating may also change, influencing housing conditions and other housing related factors. Changes which influence these conditions will interact and may have a bearing on whether improvements are accompanied by either positive or negative health consequences.

⁷ There are three reasons (i) it is the dwelling which is assessed, not the dwelling as occupied (the assessment stays with the dwelling, but if it was the dwelling as occupied, a reassessment would be necessary every time there was a change of occupancy); (ii) if the dwelling is assessed as safe for the vulnerable age group, then it is safe for all ages; and (iii) an empty dwelling can be assessed.

Housing hazards and health

The recent NICE review identifies research evidence which suggests that reducing housing hazards can lead to improvements in health and safety in relation to falls and fire related injuries. For instance, in terms of accidental injury prevention in children, home visits, advice on home hazards combined with education and media campaigns were effective in encouraging parents to make physical changes to the home to make the home safer, and the provision of free or discount home safety equipment and/or educational campaigns may lead to behavioural and environmental change (see Centre for Reviews and Dissemination, 1996; Towner et al, 2001 quoted in NICE, 2005).

However, the review concludes that evidence of the impact of home safety equipment or educational campaigns on the level of physical injuries in children and young adults through modifications of the home is less persuasive. Similarly, whilst efforts to remove or repair safety hazards are effective in reducing falls in older people, there is more limited evidence on their effectiveness in reducing the risk of falls in older people through changes in the home environment when compared with other measures such

as exercise or correction of visual problems to reduce falls (see Gillespie et al, 2003; Lyons et al, 2003 quoted in NICE, 2005).

Housing improvements and mental health
Perhaps the most commonly documented benefit following housing improvements reported in the research reviews (above) is to mental health. Each study that assessed changes in mental health following housing improvement, including medical priority rehousing, general refurbishment, re-housing, and housing led area regeneration, reported improvements to mental health. In one study, mental health improvement was also directly related to the extent of the housing improvement suggesting a dose response relationship. Two of these studies found that improvements in mental health persisted up to four to five years after housing improvements were completed (see Ambrose, 2000; Blackman et al, 2001 etc. quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005).

Since improvements to mental health are consistently reported by studies it is likely that investment in housing improvements, particularly rehousing and major refurbishment, will be associated with an improvement in residents' mental health.

Housing improvements and general physical health and well being

The impact of housing improvements on physical health and well being are less clear cut. Evidence suggests that small improvements in physical health and illness episodes may be apparent following intervention but studies have also reported adverse effects on general health.

Housing improvements and respiratory health

Evidence from intervention studies in the reviews suggests that respiratory health may be improved through energy efficiency improvements to housing, although improvements to respiratory health following more general housing improvement and neighbourhood regeneration cannot necessarily be assumed.

One study detailed in the review found that children's respiratory health improved and fewer days were lost from school due to asthma three months after the installation of central heating (see Somerville et al, 2000 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005). Other studies examining the impact of general improvement and regeneration have found mixed results in terms of respiratory conditions. For instance, in one study

the number of adults reporting chronic respiratory conditions increased by 12% five years after a move to better neighbourhoods (Blackman et al, 2001 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005) whilst in another, improvements in chronic respiratory health were reported. Up to four years after housing and neighbourhood improvements, illness episodes due to asthmatic and bronchial symptoms fell by 11% among residents (Ambrose, 2000 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005).

Housing improvements and indirect impacts on health

Housing improvements may also have other impacts which may have subsequent health impacts. Energy efficiency improvements may result in an easing of household budgets and improve the ability of households to afford more of the basic essentials of life (see Green and Gilbertson, 1999). Savings on heating bills can increase available income which can be spent on food and may result in dietary improvements (see Gilbertson et al, forthcoming). There is also evidence of a significant drop in GP consultations by those who moved to new homes during a housing redevelopment programme (Critchley et al, 2004), though it is not clear what this means in terms of

health impact. Conversely, improvements may have unintended negative impacts which indirectly affect health. Increased rents as a result of improvement programmes may mean tenants economise on food, or for those on benefits such an increase in living costs may act as a barrier to employment opportunities (Ambrose, 2000 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005).

Other social impacts reported in studies of housing improvement included increased perceptions of safety and social and community participation (Woodin et al, 1996; Ambrose, 2000; Blackman et al, 2001 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005) and reduced concern with local crime (see Ambrose, 2000 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005). Green et al (2002) and Critchley et al (2004) reported a link between increased feelings of safety after redevelopment of housing and improved mental health. These changes may improve attitudes to the local area as a place to live and enhance residents' satisfaction with their homes.

Process of redevelopment

Whilst it may be anticipated that improved living conditions will be beneficial to health

and quality of life, the redevelopment process itself may have a negative impact on health which can persist for some time. Housing improvement programmes, whether they involve decanting and moving, or refurbishment with residents in situ, are likely to cause disruption and uncertainty which can lead to stress (see Ellaway et al, 1999 for examples of how decanting during a housing improvement programme can negatively impact on tenants).

Moving house and the uncertainty preceding a move can be stressful, especially for older people (Ekstrom, 1994) and when the move is forced (Diamond et al, 1987). In a study designed to establish living conditions and assess perceptions of health, before and after Liverpool tenants moved from high rise flats to new bungalows, the impact of a redevelopment programme itself, was an influential factor in residents' mental health (Green et al, 2002; Critchley et al, 2004). Those residents who found the process of renewal most stressful reported poorer mental health. Furthermore, the study found that the improvements to residents' health brought about by moving to properties with enhanced living conditions were muted by the stresses and strains of the redevelopment process (Critchley et al, 2004).

Housing relocation may also impact on the feeling of community within an area and has been associated with an uprooting of social networks (Fried, 1966 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005) and unsatisfied social aspirations (Yuchtman and Spiro, 1979 quoted in Thomson et al, 2002 and Thomson and Petticrew, 2005).

Clearly the way in which housing improvements are carried out is important if the risk of potential negative impact on health and well being is to be minimised. Allen (2000) discovered that the degree of 'personal control' a group of residents felt they had during an estate regeneration programme influenced health. Importantly, the opportunity to exercise an appropriate level of control seemed to have a clear relationship to health by helping to reduce stress. Tenant involvement in the design process may help to produce better quality housing improvements and may also benefit tenants in terms of confidence and self esteem (Ellaway et al, 1999). Good communication, tenant involvement, along with the relevant support and advice, may help to reduce the stress often associated with redevelopment.

Summary assessment of the likely health effects of housing improvements

- Exercise, balance training and removal of clutter such as rugs and electrical cords can help reduce falls in the elderly. Education, media campaigns and the provision of subsidised home safety equipment such as smoke alarms may not be effective if advice is not reinforced through home visits or the equipment is not properly installed;
- It is likely that improvements to housing will be accompanied by improvements to mental health which could persist for months or even a number of years. The degree of improvement to mental health may be linked to the extent of the housing improvements;
- Housing improvements may lead to small improvements in physical health and general well being, although these improvements may be harder to detect;
- Energy efficiency improvements may help to alleviate some respiratory symptoms;
- Programmes of regeneration and housing improvement are likely to be accompanied by other changes to the community which may have indirect effects on health. These effects may be beneficial, detrimental or both. For example, improvements in feelings of safety in the community are likely to improve mental health, whereas increased rents brought about by improvements may mean tenants economise on food, or for those on benefits, rises in rent may increase the barriers back into employment;
- The likely positive effects of regeneration programmes include improved feelings of safety, enhanced levels of area and housing satisfaction and increased community involvement. These factors have been linked to mental health benefits; and
- The disruptive effects of the redevelopment process on the health and well being of residents should not be underestimated. There may be detrimental effects for some, and those who experience stress during redevelopment may report poorer mental health.

Part 5: The link between housing and health

The housing and health professionals interviewed as part of the study included: public health consultants and representatives of an Arms Length Management Organisation (ALMO).

The main aims of the interviews were to:

- explore housing and health professionals' understanding of the links between housing and health;
- investigate how housing and health issues informed their work;
- ascertain practitioners' familiarity with, use of, and opinion of the evidence base; and
- explore the benefits of investing in housing.

Semi-structured interviews were conducted using a topic guide. Interviews were recorded and notes were taken. Issues relevant to the study and any others of interest were then noted and sorted into themes.

Findings from interviews

How are housing and health links regarded? All professionals held a sophisticated view of the connections between housing and health. Generally they held a wider more holistic perspective on the linkages between housing and health, which could be both direct and indirect. Those interviewed set the housing and health agenda within a neighbourhood context. Rather than housing alone, it was the interplay between structural factors, neighbourhood conditions and opportunities, social relationships and housing conditions, as well as individual factors such as lifestyle, which were thought to determine health and health inequalities. Isolating housing as an influence on health was difficult and often problematic particularly given the onus of their policy work which was organised around neighbourhoods and narrowing the gap between the poorer and better off neighbourhoods in their communities. While physical housing conditions were a determinant of health, the wider context of the neighbourhood – unemployment, educational attainment, the level of anti-social behaviour, crime, fear of crime and drug-use – was emphasised, and perhaps seen as more important.

Certain aspects of housing were, however, easier for professionals to relate directly to health than others. Both sets of professionals identified cold and damp conditions particularly in relation to the problem of excess winter deaths, housing design/safety issues in relation to falls in the elderly at home and escape routes for fires. Health professionals related these aspects directly to potential costs to the NHS since they impacted directly on hospital admissions. Whether it was safe or advisable for a patient to return home because of its condition was also a concern since this affected subsequent social care costs. For housing professionals, housing management was also identified as a factor which could have as great an impact as housing conditions on issues which affected mental health particularly, such as feelings of safety in the home, anti-social behaviour and fear of crime in the neighbourhood.

Professionals also recognised more indirect links to health through, for example, feelings about and satisfaction with the home and perceptions and feelings of safety both within the home and the neighbourhood.

How is the evidence base used?

When asked about the housing and health evidence base, health professionals were

fairly familiar with potential sources of information and/or would commission systematic reviews of the research evidence if required. The strong primacy given to quantitative studies by the health sector was commented on, although this was not necessarily always seen as helpful. It was recognised that a weakness of the current evidence base was that there was little information on what actually worked in terms of housing investment and health. Future research needs to focus on providing robust evidence of what interventions really work and importantly should quantify the impact and link this has to the big issue of resources.

Despite the extent of the evidence base there was a sense that this was not necessarily in the most accessible, appropriate or helpful form particularly for housing professionals. For those working in housing a great deal of the existing evidence base simply fell by the wayside because of workload pressures or because it was not directly applicable to the context within which they were working. Better evidence of what works in relation to housing investment and health benefits was needed as was evidence which had practical application.

What evidence would be useful?

There were a number of clear messages about what form the housing and health evidence base might take to make it more useful to both sets of practitioners and how it should be presented:

- regular columns, brief articles on health and housing issues in the professional journals would be a useful starting point. Reference to relevant internet sites and sources of further information should also be provided;
- existing internet networks in both sectors such as NICE, the Housing Quality Network etc should be utilised fully to provide information and relevant evidence on the links between housing and health. Sites could also offer practical advice and guidance. Bulletins, case studies and examples of best practice could all be used to illustrate how the connections between housing and health can have beneficial spill-over effects and offer potential cost savings across more than one sector;
- given the time and work pressures of many practitioners, evidence should be straightforward and in “easily digestible chunks” which are “preferably in context and preferably related to possible policy options that could be pursued to deal with the particular issue”. Evidence should be linked to practical examples and application;
- too often it was not easy for housing professionals to see how evidence on housing and health could be applied to the broader context that they were working in. If the evidence has too narrow a focus then it is difficult for practitioners to see the relevance and relate to any comprehensive agenda for change. Evidence on the benefits of housing investment should be packaged in such a way that it can be used as a “tin opener” for housing managers and other professionals to “make more rational and intelligent decisions about the use of resources and the direction of policy”;
- the links between housing and health are not always easily translated into joint working and/or joint action by those working in either sector. The evidence base needs to be organised and translated in such a way that it speaks to a broader audience of professionals so that they can use the information to inform partnership working more easily. One way would be for the evidence base to play into targets which are jointly owned by the health authority, the local authority and other housing agencies. Relevance to joint service targets in local

service agreements and the way services are delivered would be an advantage;

- key messages and recommendations on the potential added benefits of investing in housing were needed to inform, back-up and reinforce bids for funding; and
- robust evidence which better quantified the benefits of investing in housing was needed, as well as evidence which could attribute health impacts to particular types of housing improvement.

Part 6: What type of studies on housing interventions are needed?

Existing systematic reviews of research studies that have examined the health effects of housing improvements conclude that the quality of such studies is often poor. These reviews usually exclude many studies from the outset because they do not meet certain selection criteria or standards.

As already highlighted, interviews conducted revealed a comprehensive and holistic understanding of housing and health issues. Research studies examining the effects of housing improvements on health should embrace such a perspective considering housing within the broader context of the socio-economic determinants of health. Larger studies that investigate this broader context are required. There is also a need for more collaborative and multidisciplinary studies which can provide evidence to assist professionals working in both fields more effectively and aid practical application.

In particular, both the review of literature and findings from the interviews suggest evidence of the effectiveness and cost effectiveness of specific housing interventions is required. Comparative information on the costs and effects of specific types of improvements will help

both policy makers and practitioners make more informed decisions about the direction of policy and the use of resources.

Quantifying the impact of housing interventions on health requires robust research design which incorporates quantitative and qualitative methods, and economic evaluation. Although expensive, longitudinal studies have been recommended as a particularly useful research design for trying to evaluate complex interventions such as housing (Smith, 1989).

Interviews with housing representatives in particular also highlighted the importance of how research evidence is communicated, packaged and presented. More good research on the health gains that result from investment in housing is needed, but it also needs to be relevant to the context within which both housing and health practitioners work. Evidence from research studies could be presented to help to inform joint service targets and this may assist joint working and further collaboration between housing and health agencies.

These points (summarised in the shaded box) largely support recommendations for future studies examining the health effects of housing interventions made elsewhere (see for example, Thomson et al, 2001; NICE 2005).

Summary of recommendations for housing intervention and health studies

- Large studies which embrace a broad understanding of the socio-economic determinants of health;
- Collaborative studies which bring together housing and health agencies;
- Robust holistic design which utilises both quantitative and qualitative research methods;
- Longitudinal studies, although expensive, are useful when trying to examine complex interventions such as housing; and
- Studies need to provide evidence on the cost effectiveness of interventions and comparison on the costs and effects of specific interventions.

Conclusions

The evidence on whether housing improvements can lead to health benefits is mixed. Current evidence suggests that housing improvements are likely to lead to mental health improvements. However, improvements can have detrimental impacts on health and the programme of redevelopment itself can prove harmful for some residents. Those who are already vulnerable in terms of their health and age are likely to be most at risk of such consequences, but these groups perhaps have the most to gain from improvements. The impact of housing on health is influenced by social and economic circumstances and neighbourhood factors which may well change during improvement programmes. These changes can indirectly affect health positively or negatively.

In addition there is insufficient evidence to identify which types of intervention are likely to result in the greatest health improvements and to assess the relative cost effectiveness of different types of improvement. Future studies need to address these shortcomings if policy makers and practitioners are to make more informed decisions about the use of resources, the benefits to health and the potential savings to other public services of investing in housing.

Housing does not operate in isolation to deliver benefits and other service providers also have a role to play. While physical housing conditions influence health, the wider neighbourhood context including factors such as unemployment, educational attainment, the level of anti-social behaviour, fear of crime etc may well be of greater importance in determining health.

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Housing Corporation offices

Maple House

**149 Tottenham Court Road
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109/119 Charles Street
Leicester LE1 1FQ
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Trinity House
Cambridge Business Place
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Cambridge CB4 0WZ
Tel: 0845 230 7000

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Waverley House
7-12 Noel Street
London W1F 8BA
Tel: 0845 230 7000
Fax: 020 7292 4401

NORTH:

4th Floor
One Piccadilly Gardens
Manchester M1 1RG
Tel: 0845 230 7000

1 Park Lane
Leeds LS3 1EP
Tel: 0845 230 7000
Fax: 0161 242 2001

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Beaufort House
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Exeter EX4 4EP
Tel: 0845 230 7000
Fax: 01392 428201

Good Housing Good Health? A review and recommendations for housing and health practitioners.

GILBERTSON, Janet <<http://orcid.org/0000-0003-3338-7590>>, GREEN, G., ORMANDY, D. and THOMSON, H.

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