

# Regeneration & neighbourhood change

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## An evidence-based approach

This paper considers the impact of regeneration and neighbourhood renewal on health and on inequalities in health. We discuss the evidence on these impacts produced from research, and we consider the ways in which people working in regeneration may use the evidence base. We make some observations about the quality of the evidence currently available and areas where more, or better, evidence is needed. We conclude with some recommendations for policy and practice and for research priorities.

In the appendix we provide summaries of the research evidence on some of the changes associated with regeneration and renewal.

## Regeneration, neighbourhood change and health change

We use the terms 'regeneration' and 'renewal' here to refer to policies and interventions aiming to change the economic, social and physical environment in neighbourhoods, through, for example;

- improvements to the housing stock;
- enhanced opportunities for training and employment; and
- initiatives to improve transport infrastructure and make them more sustainable.

In this paper we focus on these types of urban changes because they are typical of many initiatives resulting from the *Single Regeneration Budget* and the *New Deal for Communities*. However, regeneration and renewal schemes in Britain are varied and are implemented by many different agencies and through a variety of policies and interventions (1-3). The general conclusions we draw here are likely to be relevant to other policies and interventions for regenerating socio-economically disadvantaged areas where health status is relatively poor.

A fundamental question for this paper is whether changes produced by urban renewal will also change population health. There is a general presumption that urban renewal is beneficial for health because schemes act on working and living conditions which are, in turn, determinants of health. It may appear self-evident that improvements in health determinants for disadvantaged groups will lead to health improvement and so reduce health inequalities in society. However, this assumption must be considered in the light of the evidence from research on health inequalities. Otherwise, as Allen (4, p444) points out, such an assumption becomes a 'given' based on a perspective that is too narrow and inflexible.

There is a growing body of work in health impact assessment (HIA) <sup>α</sup> which aims to facilitate the use of public health evidence to inform regeneration planning and implementation. In this paper we are particularly concerned with the kinds of evidence that are needed for rapid prospective HIA. Rapid HIAs, carried out at an early stage in the development of an initiative, enable us to identify the likely health effects of a regeneration initiative and then to use this information to help 'form' the developing initiative. This early systematic appraisal will also contribute to designing the monitoring and evaluation strategy (6,7).

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<sup>α</sup> HIA is defined as ... a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (5).

We focus on rapid HIAs as this is where, at present, there is especially strong demand for evidence. For this kind of HIA, we need to be able to produce timely advice, based on existing evidence, to make judgements about likely future health outcomes from neighbourhood change.

### **Challenges faced in providing the evidence base**

There are several challenges involved in providing a useful evidence base which shows the effects of neighbourhood renewal on health and health inequality. These arise from

- the requirements of the users of the evidence base;
- the principles which guide the production of the evidence base;
- the kinds of evidence currently available.

### **The requirements of the users**

Users will include stakeholders in regeneration who are not specialists in public health and who are not very familiar with health improvement or reduction of health inequalities as a 'performance target'<sup>β</sup>. Neighbourhood renewal schemes require high levels of community involvement so the evidence needs to be available to members of the public, as well as to professional practitioners.

### **Important principles for the evidence base**

There are particular questions we need to ask of the evidence base: it therefore needs to be structured in a way that will make the evidence useful.

1. Evidence is required which clarifies the *causal pathways* and *mechanisms* by which socio-economic conditions relate to health inequality. For example, research shows an association between change in employment status and change in health. If these results are summarised and presented without explaining the processes and causal links between unemployment and health change they will be of little use in the development and implementation of an employment programme.
2. Urban regeneration is often based on target areas and on particular population groups, so any applications of evidence will need to be *sensitive to local conditions* (6). We need to know whether evidence on relationships between neighbourhood conditions and health are likely to apply in different places or settings and for different age, gender or ethnic groups.
3. Urban renewal usually aims to improve conditions for local communities. Relevant evidence for HIA must show how *change* (ie *improvement*) in socio-economic conditions is likely to affect *change* in health inequality, and whether the health disadvantage associated with deprivation and exclusion is reversible by improving socio-economic conditions.
4. HIA tends to proceed on the basis of the precautionary principle, aiming to take account of all possible health effects. However, ideally we would like to be able to prioritize different health impacts on the basis of knowledge about the *relative importance* of different factors influencing change in health inequality.

Important areas of research are those that show how specific types of urban change are associated with health change for individual people. Also relevant is research examining how conditions in *places* affect health and research which examines the effectiveness of interventions in particular *settings* (based in schools, workplaces, or strategic locations in the community) (see for example: 8,9). Much of the useful evidence uses a social model of health, which focuses on the environmental and socio-economic determinants of health as well as on individual factors (see for example 10,11).

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<sup>β</sup> Initiatives for neighbourhood economic and social development are typically managed from outside the conventional 'health' (NHS) sector. Health change is rarely viewed as the primary objective of neighbourhood renewal. Evidence of health change from economic and social development will therefore be applied at the interface between policy and action for urban renewal and for public health.

## The kinds of evidence

We need a variety of different kinds of evidence for HIA. For example, the evidence base should include evidence from research which is:

- *quantitative* and *extensive*, to measure the size and significance of change and show us how far associations are generalizable for populations;
- *qualitative* (and often intensive), to help us understand how urban change influences health and how this is experienced by the people who are affected;
- *longitudinal*, to demonstrate effects of *change* over time
- designed to explore associations at the level of *individuals*;
- designed to establish whether the individual pathways linking health and socio-economic change also vary between different *places or settings*;
- designed to show whether it is possible to *attribute* change in health clearly to change in socio-economic conditions.

It might be argued that the strongest evidence comes from studies that collect similar data for large samples of individuals, chosen from a variety of different places and follow them over time, with complementary, qualitative studies to collect more in depth information. Ideally, research should also use 'quasi case-control' methods to compare populations affected by a particular type of regeneration change with other groups who are not affected. This type of research costly to commission, and may be almost impossible to conduct, for practical and ethical reasons. For example, Rogers et al (12) discussed the problems, of finding 'control' groups for studies of the impact of housing improvement on health. In fact, therefore, we need to be able to critically assess what can be gained from research that does not always match all these conventional criteria for epidemiological studies.

## Gaps

There are some general shortcomings in the existing evidence base for HIA of regeneration schemes. For example, we have noted a lack of:

- systematic and comparable evidence on how local interventions through urban renewal impact on health over time and at the individual level;
- quantified evidence of such health impacts;
- evidence in an accessible form for use by lay people and professionals who are not public health specialists.

There is a significant amount of evidence in the form of 'grey literature' which is not scientifically 'peer reviewed'. This may be difficult to access and to interpret. It often takes the form of local case studies, which may not be widely generalisable, but do provide accounts of conditions in particular places or for specific population groups. Such studies may be quite influential to local thinking about regeneration and health.

Principles from natural science are not the only considerations governing interpretation of the evidence on urban conditions and health inequalities (13). Wismar and Busse (14), for example contrast the 'technocratic' view of evidence with the 'participative' view. Scientific criteria may not have democratic legitimacy if they are inconsistent with considerations such as social values, moral criteria or ethics. It is difficult to weight qualitative and quantitative evidence, and there is a danger that by privileging quantitative evidence, we will ignore important relationships in variables that we cannot measure very reliably (eg spiritual aspects of health; well-being; aesthetic aspects of environment).

## **What we learn from the existing evidence**

There is a large body of evidence on socio-economic determinants of health showing that disadvantage over the life course is linked to poor health (15-17). These associations vary for different population groups. The links between socio-economic disadvantage and poor health also vary according to specific local settings and conditions in places are important for health, as well as individual circumstances (18-21).

Some evidence shows that worsening conditions are associated with worsening health. A smaller part of the evidence relates to how *positive change* affects health. The evidence relating to the 'reversibility' of the impact of disadvantage on health is limited but some rigorous studies suggest that it is not realistic to expect that the damage to health due to poverty will be reversed quickly when poverty is reduced. To achieve reduction in health inequality, sustained and significant improvement in health determinants, for the most disadvantaged groups, is likely to be required (see for example 22).

On pages 7 to 16 we have summarized some of the evidence about how specific types of change due to regeneration appears to relate to health. We précis the evidence below.

These summaries do not represent a systematic review; at present systematic review techniques are inadequate to review an evidence base with the characteristics described above.

### **employment**

The research evidence suggests that unemployment, or employment in jobs with poor working conditions, is generally damaging for health. Changes in employment status have been shown to be linked to changes in health. Re-employment of unemployed people may be beneficial to health, but for those moving into work where conditions are poor, changes in health may be detrimental. Studies of regeneration that has improved the general economic situation in previously depressed areas have suggested that economically disadvantaged, long term residents do not always benefit. Participation in Active Labour Market Intervention schemes (ALMIs) are intended to address this problem by improving the capacity of unemployed people to participate in the labour market. Participation in ALMIs has health benefits, but may also have some negative effects on health.

### **housing**

Poor housing is associated with a range of physical and mental health conditions. In the short term, housing refurbishment can be disruptive and intrusive. In the longer term, improvements have been reported in general self-reported physical and mental health, as well as reductions in symptoms and use of health services. While there is potential for health gain for the people moving into improved housing, the health effects for the wider population of rehousing or housing refurbishment may be mixed. Housing regeneration programmes do not always improve housing equally for all local populations. Those with the most severe housing needs and some marginalized groups may be further excluded or displaced by housing schemes. Thus neighbourhood 'improvements' may displace social problems rather than solve them, so they may not help to reduce general health inequalities.

### **transport**

Improvements to transport infrastructure is often included as part of urban regeneration schemes. Transport has a number of features that contribute positively to determinants of health, by improving access to a range of services, facilities and amenities and providing social interaction. Improvements to transport infrastructure such as major roads or airports may also impact negatively on health through pollution, accidental injury, severance of communities and reduction in some forms of travel which are healthy and sustainable, such as walking and cycling. Socially and economically disadvantaged communities are particularly

at risk of these detrimental effects and so it is important to minimize or mitigate the potential negative health effects of transport development to avoid exacerbating health inequality.

## **Conclusions and Recommendations**

Regeneration programmes targeting specific areas and populations are not designed to change the wider structural factors in society that contribute to social inequalities. Also, they do not affect disadvantaged populations outside the target group or target zone. Health is affected by many different factors, whereas regeneration schemes often aim to tackle a more limited range of conditions that affect health. It is therefore **important to be realistic** about the potential for regeneration programmes to produce change in health and their potential to reduce health inequalities must not be over-stated (13,23). On the other hand, there is evidence that, in the right conditions, **regeneration can make a positive contribution to health** improvement and the reduction of health inequalities.

When planning regeneration schemes it is also important to be aware **there is some potential for negative health impacts** and a worsening of health inequalities. We have noted that, in the competitive context of bidding for and justifying regeneration funding, it is sometimes difficult for stakeholders to feel empowered to consider potentially negative outcomes for health. However, our experience with prospective health impact assessment of regeneration projects has shown that, where these potential risks to health are given consideration, it is possible for schemes to be modified to try to mitigate these possible negative effects, without altering the overall aims of the project (13). **We recommend that stakeholders should be encouraged to create an environment for planning regeneration schemes which is more receptive of critical thinking about health impacts.**

The evidence base for prospective health impact assessment of regeneration schemes needs to be improved in two ways. First, the **existing evidence needs to be made more accessible and relevant for health impact assessment**. This process has already begun with several reviews prepared to inform health impact assessment (24-29).

Research councils and other funding organizations have commissioned a good deal of valuable research on health inequalities. Examples include the *Health Variations* programme supported by ESRC, the *Health of the Public* programme funded by the MRC and DoH research on health variations. These organizations are increasingly investing in efforts to present research findings from these programmes in ways that can be used for policy development. The results need to be accessible not only to those working in public health but also for professionals and other stakeholders in other fields responsible for urban regeneration.

We need to do more to develop **suitable guidelines and protocols for reviewing** and presenting a large and very varied body of research findings. Existing systematic review methods developed to enhance the evidence base for clinical medicine are too limited to be applied to evidence in this field of social policy.

More needs to be done **to empower all the relevant stakeholders to be able to use the evidence effectively** in participative decision making processes. At present the capacity and competence of users to interpret and apply the evidence base for health impact assessment is quite limited. There are significant implications in terms of requirements for training. Our experience with health impact assessment through stakeholder consultation has also shown that it is important to anticipate lay perceptions about the links between regeneration and health, which often correspond to the research evidence, but which may weigh the evidence in varying ways according to social values and ethical issues.

We have identified **some limitations and gaps in the research evidence** to support prospective health impact assessment of regeneration schemes. We particularly need better evidence on whether improvements in social, economic and environmental conditions,

consequent upon regeneration, produce appreciable changes in health and in health inequalities. We need information on negative, as well as positive, health effects that can result from such changes, and explanations for how such health impacts are produced, and in what circumstances.

This implies a continued effort to **improve evaluation of regeneration programmes**. National evaluations of programmes such as *New Deal for Communities* provide an opportunity for relatively systematic evaluation of regeneration schemes of various types and in various settings. Local evaluations of renewal projects tend to focus heavily on performance with respect to the particular goals set for the project, but they should also pay attention to health outcomes. Rapid prospective health impact assessment may help to design evaluation of regeneration programmes and projects as they proceed. We also need to continue to build the evidence base with **new research on how urban change relates to change in population health and health inequalities**. Research Councils and other funding bodies have a role to play in this respect.

## **Appendix: Summaries of research evidence**

These summaries do not represent a systematic review (at present systematic review techniques are inadequate to review an evidence base with the characteristics described above). The following notes come from structured reviews of the evidence, which have particularly tried to bring out the best available evidence that is relevant for HIA in this field (see for example 24).

### **employment**

The research evidence suggests that unemployment, or employment in jobs with poor working conditions, is generally damaging for health. Changes in employment status have been shown to be linked to changes in health. Re-employment of unemployed people may be beneficial to health, but for those moving into work where conditions are poor, changes in health may be detrimental. Studies of regeneration that have improved the general economic situation in previously depressed areas have suggested that economically disadvantaged, long term residents do not always benefit from such economic regeneration. Participation in Active Labour Market Intervention schemes (ALMIs) are intended to address this problem by improving the capacity of unemployed people to participate in the labour market. ALMIs can have some health benefits, but they may also have some negative effects on health.

Research on employment status and health (reviewed for example by: 11,17,30,31,32,33,34,35,36,37,38) has demonstrated that unemployment has effects which are generally damaging to health. Also, those at greatest risk of unemployment also have a higher risk, when they are in work, of 'negative' job attributes such as:

- low pay;
- lack of job security;
- low levels of job control and involvement for employees;
- lack of support from colleagues at work;
- low reward to effort ratio;
- lack of prestige and poor physical working conditions.

Unemployment and work with negative attributes produce negative material effects which include:

- low income and poverty (30,31,39-46) associated with low standards of living and poor housing;
- greater risk of physical effects like hazards at work (30,31).

There are also negative psychosocial effects (17,33,37,38,47) such as:

- in the case of unemployment, loss of 'traction' (the routines and habits associated with work which help to motivate people and guide their daily activities) (37,38,48);
- uncertainty and lack of choices and control in life (33,37,38);
- disruption of life plans due to unplanned changes in employment status (37,38);
- negative social stigma and loss of self esteem (37,38,49);
- stresses due to effort/reward imbalance and lack of control in work (8,50-54).

The research evidence suggests that changes in employment status, alter these Material and psychosocial determinants (especially the psychological stressors that people experience through their work). It is sometimes also suggested that, employment change may influence *behavioural* health determinants, (*eg* diet, alcohol consumption, smoking, the amount of exercise they take) but the research evidence does not clearly demonstrate this (55,56).

Figure 1 summarizes research evidence on the health changes that result from change in these health determinants. These health impacts of employment change include:

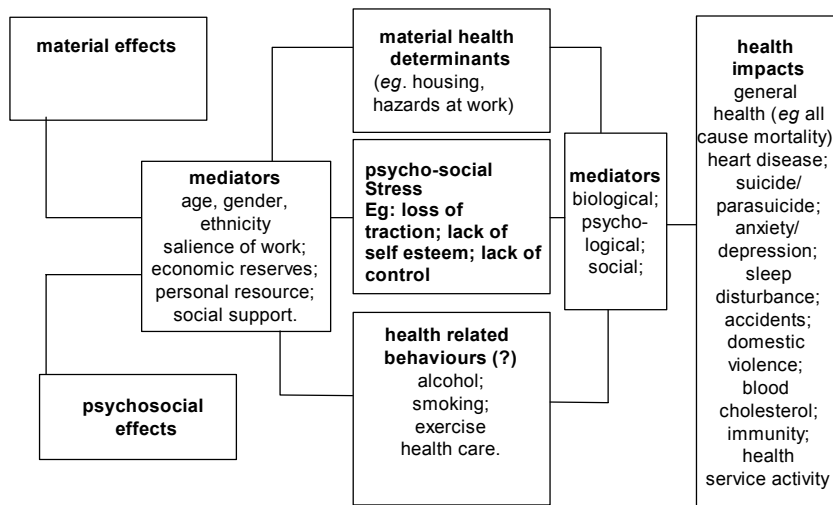
- changes in general aspects of health (*eg* risk of death from all causes, and from specific causes such as cardiovascular disease, cancers, suicide, accidents, respiratory disease) (39,41,55,57,58);
- illness or death due to specific physical and mental health problems (like heart disease (50,51), domestic violence (59), depression and anxiety (49,56,60) and general self reported health (47,48,55,61-63);
- physiological changes to, for example, blood cholesterol and immune system have also been detected (55,64).

Changes in health are also indicated by changes to use of health services, sickness absence from work, pensionable disability (65-68).

The health impact of change in employment will vary for different people, depending on 'mediating factors' (see for example: 69,70,71,72) such as:

- age;
- gender;
- ethnicity;
- the salience (or perceived importance) of their work for them and the compatibility of work with other roles and responsibilities;
- their personal capacity to cope with changes in their work;
- the amount of social support they enjoy;
- individual's biological and psychosocial susceptibility to illnesses.

**Figure 1: Summary of potential health impacts of unemployment or negative job attributes**



Most of the evidence for the relationships shown in Figure 1 comes from studies of 'negative' conditions at work such as poor working conditions, experience of redundancy, or of unemployment, which in general are damaging to health.

There is some evidence that reemployment can reverse the negative health effects of unemployment (69,73-79). However, other research suggests that negative health effects are not always quickly or easily reversed by improvements in labour market conditions or income (62,80). The relationships summarized in Figure 1 indicate that, while reemployment into satisfying work may be beneficial, a transition from

unemployment to 'inadequate' work, with negative job attributes, is unlikely to be beneficial to health (36,63,81,82). Furthermore, it may take a significant time for the 'damage' to health resulting from unemployment to be repaired.

Some studies have suggested that the employment opportunities created by regeneration schemes risk being dominated by low paid, insecure, secondary sector, non-standard forms of employment which may contain many of the negative attributes described above (83-85). Re-employment in such forms of work may be actually worse for psychological health than the experience of unemployment (33,81,86). Even if employment prospects do improve, for some groups of workers such as lone mothers, there may be conflicts between the demands of employment and other salient roles and responsibilities (70-72).

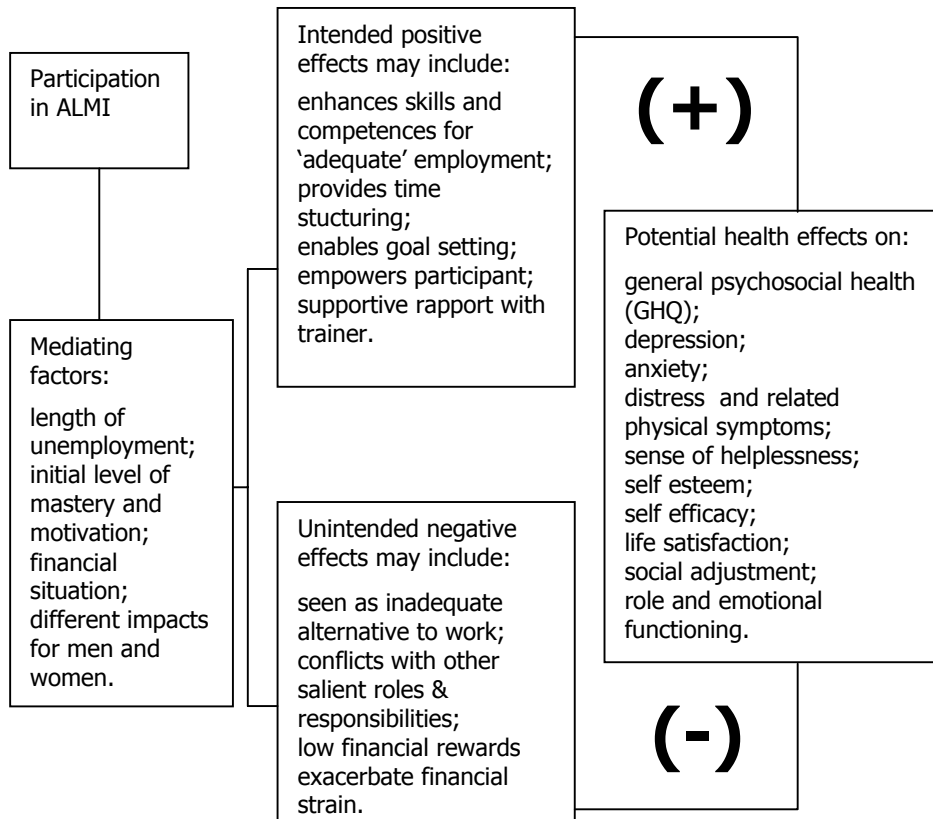
Critics of urban regeneration (87-89) have pointed out that new jobs created by regeneration initiatives are often filled by workers from other parts of the city, rather than local populations in areas targeted for regeneration. A few studies have considered the implications for health. For example, Glenn et al (62) conducted a longitudinal study of the health and economic status of a cohort of residents in Johnson County, Tennessee, USA. After a period of economic recession, the local economy improved between 1990 and 1993. The authors found that between 1990 and 1993, long term, non-migrating residents did not on average benefit economically from the regeneration. They experienced a significant decrease in average household income. These residents had a statistically significant worsening in the Duke Health Profile measure of physical health status. Their mental health, measured by the Duke Health Profile - showed slight (insignificant) improvement. Their decline in health was tentatively attributed to either direct or indirect effects of the decline in family income. There was a rapid population increase during the expansion, attributable to inward migrants who were younger and healthier than existing residents. They conclude that local economic development can leave long term area residents poorer and less healthy, and this problem may be masked by an increase in healthier, wealthier inward migrants (62).

ALMIs (Active Labour Market Intervention schemes) may help those who are excluded or disadvantaged in the labour market to benefit from expanding local employment opportunities (90). Some studies have specifically investigated the more immediate, short term health impacts of participation in ALMIs. The results of these are summarised in Figure 2. Most of the studies reviewed here have concentrated on the psychological impacts of ALMIs for participants in the short term, and there is relatively little evidence concerning long term change, or possible physical health impacts. Most studies involved measurement of change in psychological health outcomes prospectively (though Branthwaite and Garcia (91) used comparison of participants and non-participants at a single time point, and Hagquist and Starrin (92) used retrospective questioning to assess change). These studies provide evidence that certain intended outcomes of ALMIs can have immediate and beneficial health effects, arising directly from participation in the scheme. Theoretically, this is explained by Creed, Hicks and Machin (93) and Creed (94) in terms of Jahoda's model of latent functions (37), Fryer's agency restriction model (35), and theories concerning the health effects of social support at work. They suggest that outcomes that may produce positive health change include enhancement of skills and competences; imposition of a structure to the working day; helping participants to set goals for themselves; and empowering them to take greater control of their lives; provision of supportive rapport between participant and trainer. Such effects of ALMIs are thought to explain psychological health improvements that have been reported over the period of participation in ALMIs. These include:

- improved general psychosocial health, (as measured by the General Health Questionnaire) and reduced distress and related physical symptoms (92,95-97);
- reduced depression (77,94,96,97);
- reduced anxiety (96);
- improved social adjustment (96);

- reduced sense of helplessness (97);
- improved self esteem (94,96-98);
- improved self efficacy (99);
- improved life satisfaction (94,96);
- improved role and emotional functioning (77).

**Figure 2: Immediate Health impacts of Active Labour Market Intervention schemes reported in the research literature**



Some researchers report benefits persisting for a time beyond the period of participation in an ALMI (95,98), though some of the effects may only be temporary (94). On the other hand, as shown in Figure 2, these health benefits may not be realised where ALMIs fail to produce the outcomes intended. ALMIs may also have unintended outcomes which have also been reported in evaluations. These negative effects include the possibility that ALMIs will be seen as inadequate alternatives to work (91) or that low financial rewards will exacerbate financial strain (96).

The nature of the health impacts of ALMIs will depend partly on mediating effects. For example the impacts may be different for men and women (92,95). The duration of unemployment and the severity of financial strain may influence health impacts (92,95,99). Initial psychological state may influence the potential for health improvement. For example, those with initially poorer wellbeing and poor sense of mastery and motivation may benefit most (77,94,98).

### housing

Poor housing is associated with a range of physical and mental health conditions. While there is potential for health gain for the people moving into improved housing, the health effects for the wider population of rehousing or housing refurbishment may be mixed. In the short term housing refurbishment can be disruptive and intrusive. In the longer term improvements have been reported in overall self reported physical and

mental health, as well as reductions in symptoms and use of health services. The evidence suggests that housing regeneration programmes do not always improve housing equally for all local populations. Those with the most severe housing needs and some marginalized groups may be further excluded or displaced by housing schemes. Neighbourhood 'improvements' may displace social problems rather than solve them, and this will not help to reduce inequalities in housing or in health.

Dunn and Hayes present a conceptual model of housing and health (100): they argue that inequalities in housing, and housing satisfaction, are due to a combination of *individual attributes*, such as age, gender and income, employment status and *housing attributes* such as tenure and type of housing. The attributes of housing (especially its physical condition) can have direct impacts on physical and mental health. Health inequalities are also related to the 'multiple, overlapping stressors of day-to-day life, of which housing is both a conduit and one source' (100, p505). Various sources of stress and support are included: stress is related to employment, child care and housework. Social support is a mediator of the wide range of stressors so this is reflected in Figure 3. Unexpected events, or critical life events, are shown as being contingently related to health the figure suggests links between housing and other factors such as employment and social capital, which are discussed elsewhere in this review. These stressors have potential to affect health.

Individual and housing attributes are modified by:

- household characteristics: eg number of persons, household type, number of children, ethnicity, marital status, language spoken in the home;
- individuals' appraisal of various dimensions of their housing interior: eg design/layout, sunlight, inside noise, outside noise, space, heating, indoor air quality and safety/security; and
- neighborhood: eg parks & greenspace, traffic, streetlights, police, recreation and personal safety.

In Figure 3 on page 13 we show how housing components of regeneration and renewal place most emphasis on the physical condition of the dwelling and the social and physical characteristics of the neighbourhood eg on 'dwelling satisfaction' and 'neighbourhood satisfaction'.

Several reviews have pointed to links between poor physical condition of housing and health (31,101-106). Aspects of physical health which may be affected by poor housing include: greater risks of injury; greater levels of reported respiratory disease and gastro-intestinal problems associated with cold, damp and mould growth; and an increased risk of infections due to crowded conditions especially in temporary accommodation. Cold, damp housing or crowded housing which is in poor condition may also be associated with mental illness. Children living in temporary accommodation are more susceptible to a range of conditions including disturbed sleep, poor eating, hyperactivity, bedwetting and soiling, aggression and higher rates of accidents and infectious disease.

Mental health of mothers and children living in flats may be worse, perhaps due to isolation and the difficulties of getting out of the home. Living in cramped unsanitary conditions is also very stressful and undermines personal and parental relationships (107). Evidence for women in Britain suggests that high density living may be damaging to mental health (108).

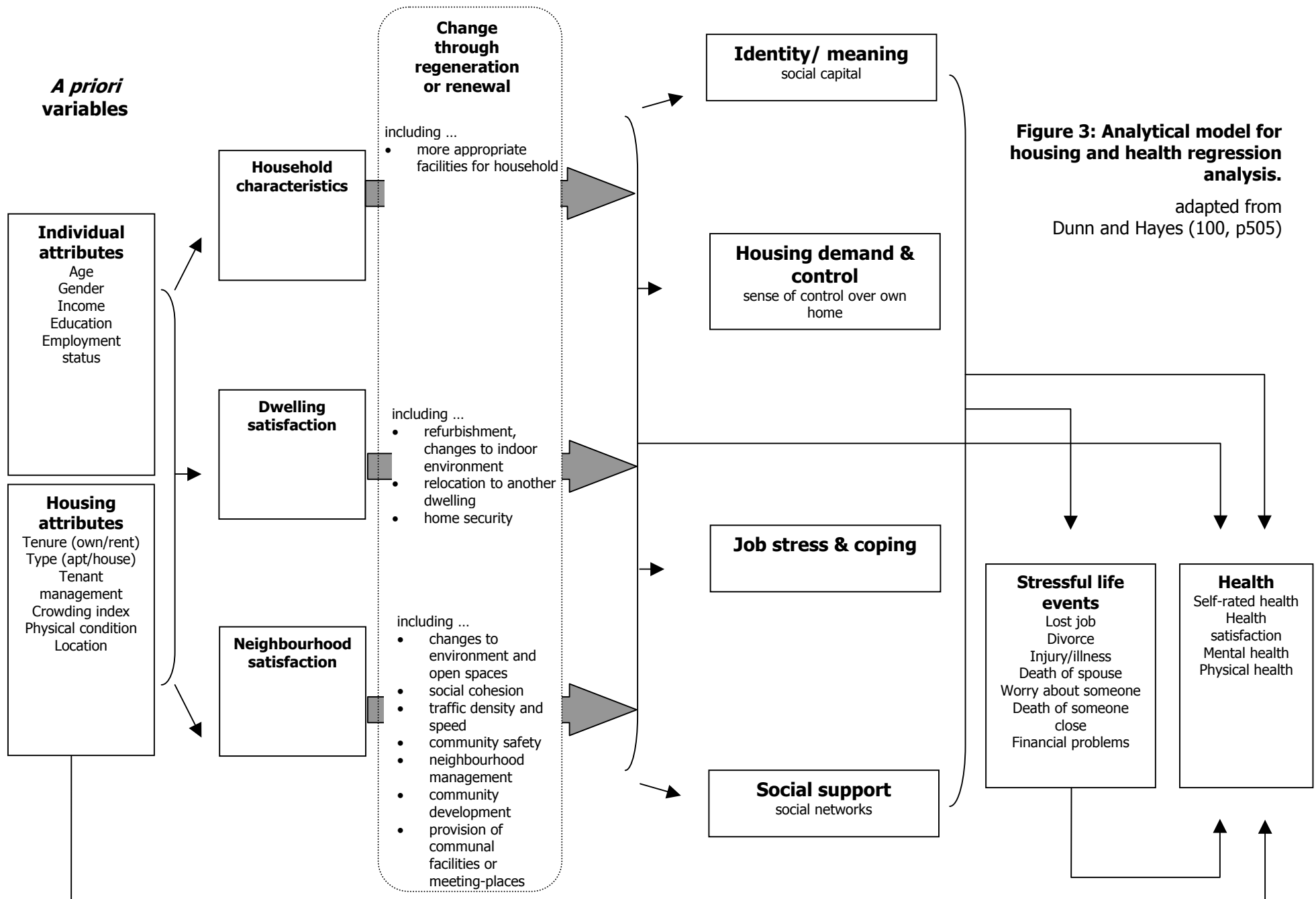
The design of the housing may not be solely responsible for the observed link between mental health and high density (109). A recent review (110) noted that residents of high-rise flats report a greater sense of isolation and have a higher risk of experiencing psychiatric disturbance than people who live in houses. However, the review found no reports of such effects from other countries where living in high-rise blocks is more

common. Indeed, studies comparing psychological distress rates in high rise flats in urban and suburban areas, and in mixed types of housing, suggest that it is "problem" estates that impact most on people's mental health, rather than the style of housing (111).

Atkinson (112) describes how neighbourhood improvement may 'gentrify' an area; social problems tend not to be solved but evacuated. The subsequent absence of social problems is thereby used as evidence that gentrification has positive social impacts. This displacement has real social costs (112): for example, increased housing need, overcrowding in 'hidden households' and homelessness. In addition, displaced residents may feel resentment, disenfranchisement and a sense of exclusion. Displacement also has neighbourhood effects (113) *ie* impaired social networks and reduced service provision. These neighbourhood effects will adversely affect vulnerable groups that are less able to cope with the psychological and financial costs.

The evidence concerning the links between health or wellbeing and regenerative changes in housing is less extensive. The available evidence suggests that outcomes may not be strongly or universally positive.

We have adapted Dunn and Hayes' analytical framework (100) to include the effects of housing change on health (Figure 3 on page 13).



**Figure 3: Analytical model for housing and health regression analysis.**

adapted from  
Dunn and Hayes (100, p505)

Thomson et al (114) reviewed the health effects of housing improvement. They found few studies examining the effects of housing improvements on health, and the quality of the studies identified was generally poor. Improvements were reported in overall self reported physical and mental health, as well as reductions in symptoms and use of health services. There was some evidence of improvements in broad indicators of social inclusion such as neighbourliness and fear of crime. Thomson et al (114) found only one study looking at 'rehousing, refurbishment and relocation or community regeneration' which had an acceptable study design: Wilner et al (115,116) conducted a prospective controlled study and reported that rehousing and refurbishment<sup>z</sup> had beneficial effects on health outcomes, including improvements in mental health. Wilner et al (115,116) report an initial increase in illness episodes in the intervention group at 9 months. This group was reporting a greater reduction in illness episodes than the control group at 18 months. Thomson et al note that the absolute difference was small (29 episodes/1000 people) and the rate of follow up was not stated (114, p323).

Some authors do report positive health changes following housing regeneration.

For example, Halpern (117) reports on the situation in an English town estate before and after housing improvements to windows, bathrooms; fencing of semi-private space; closing alleyways, traffic calming, improved children's play facilities. Mental health and psychosocial changes found to be associated with these improvements were reduced anxiety and depression and improved self-esteem, reduced fear of crime and greater perceived 'friendliness' of area. In a Swedish study of changes in urban neighbourhoods, Dalgard and Tambs (118) reported that in an area which had undergone improvement to local services and facilities, the population showed reduced mental illness and increased social support. Smith *et al* (119) found that medical priority rehousing alleviated mental illness and depression. However they also found that rehousing could precipitate bouts of depression.

Wadham (120) reports a study before and after refurbishment of Holly Street estate in East London. People living in the new houses reported higher levels of self-rated health. However, this study is not a longitudinal study of the same population: the people who were moved out were not followed up so comparison between the two surveys do not show individual health impact.

Allen (4) examined the experiences of tenants on a peripheral local authority housing estate which was undergoing renewal. The experiences they reported appeared to depend on the amount of control they wished to have, and managed to exert, over the refurbishment process. Some found it intrusive and disempowering to have no say over the improvements, choice of contractor or when the work should take place. Others were pleased with the improvements to their home. A recurring theme in the interviews was that although the tenants consistently paid their rent, and invested emotional, and other, resources in their home they still had little control over whether the work was done. Allen suggests that tenants should be involved as much as possible in the process of renewal.

Ambrose (121) describes a programme of work, including housing improvements, on an estate in East London. Original residents from the estate who were rehoused after the improvements reported high levels of satisfaction with the new flats. There were also difficulties: the new flats were larger so the bills for heating were higher. Kempson (122) describes how families often have to buy kitchen equipment and furniture for their new and larger homes. Bills for utilities have to be paid so resources for food often become restricted. Collard (123) recorded the experiences of Bangladeshi families in temporary accommodation. The families reported that financial assistance in moving, redecorating and furnishing the new home would have been helpful. Temporary accommodation is one phase in the transition

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<sup>z</sup> Thomson et al (114) do not specify whether participants in this study were undergoing rehousing or refurbishment.

from homelessness to rehousing. High levels of mobility had detrimental effects on the families access to primary health care and education.

### **transport**

Transport infrastructure is often included as part of urban regeneration schemes. Different types of transport regeneration initiatives may vary in the extent to which they emphasise improvement of accessibility, as opposed to improving the sustainability of transport systems and traffic calming measures. Although the primary function of transport is in enabling access to people, goods and services ((124) cited in (31)), it also has a number of other functions. A review for the DETR (125) suggested a link between transport and health and commented that transport provides:

- access to work, food, health facilities, training, education, leisure
- practical services (e.g. in isolated rural areas, buses serve variety of functions such as carrying parcels, and a 'bank');
- social interaction, through greater levels of contact between people ;
- symbolic expression of an area as well connected with wider society in the city as a whole.

While good transport systems may have these sorts of benefits for local populations, traffic can also present a hazard to health in various ways. We refer the reader to the conceptual framework produced by Joffe and Mindell (126). This shows how traffic volume and speed, the design of transport systems and the travel behaviour of individuals may all influence mental and physical health through a number of causal ways. The pathways that might result in detrimental health effects are likely to operate through:

- emissions that cause populations to be exposed to air and noise pollution (eg 127);
- traffic related accidents and injury (eg 128,129,130,131,132,133);
- reduction in healthy physical activity such as walking and cycling (eg 134);
- physical severance of communities by major transport routes that are difficult to cross ((eg 135) cited in (136, p102));
- restrictions on some sorts of travel, which may prevent some journeys and limit access for some populations (eg 31, p56).

Deficient transport systems and exposure to the health risks associated with traffic may be unevenly distributed for different socio economic groups and this may contribute to health inequality. Lack of access to transport is experienced disproportionately by women, children and disabled people, people from minority ethnic groups, older people and people with low socio-economic status. These groups find their access is reduced to services such as shops and health care and they spend a higher proportion of their resources on transport (31, p56). Disadvantaged urban areas tend to be characterized by high traffic volume, leading to increased levels of air and noise pollution and higher rates of road traffic accidents without the benefits of access to private transport (124).

Because there is an association between poverty and greater exposure to the 'nuisances' and health risks associated with transport, it can be difficult to establish the true extent of the transport related health effects. Research in environmental epidemiology on the health effects of proximity to roads and airports faces technical challenges in distinguishing impacts that are due to traffic pollution or from those due to other socio-economic factors. This has been discussed by Haines et al (137) in relation to research on the impact of aircraft noise on performance tests of school children.

The association between transport associated health risk and other aspects of socio-economic deprivation also highlights the importance of HIA of transport developments to ensure that they do not have the effect of exacerbating health inequalities. Some early examples of HIA focused on development schemes which were intended to enhance transport: for example the HIA of the proposals to extend Manchester Airport (138). This illustrated the need to balance the benefits to the economy in a whole region against the costs to local communities

close to the Airport development site, due to increased weight of air and road traffic generated.

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