Strategic Review of Health Inequalities in England post-2010

Task Group 4: The Built Environment and Health Inequalities

Final Report 12 June 2009

Task Group Members:

Professor Anne Power (Chair) – LSE

Jonathan Davis – CABE

Paul Plant – DH

Tord Kjellstrom – ANU

Research Support:

Catalina Turcu – LSE Housing/ CASE

Helen Eveleigh – CABE / SDC

CONTENTS

1. Overview, Summary of Themes and Recommendations

We developed our understanding of area and health inequality under five main themes:

- Open and Green Spaces
- Housing Conditions, Fuel poverty and Inequality
- Safety and Security on Streets; Anti Social Behaviour
- Density, Noise, Traffic, 'Urban Stress'
- Public Health (including violent incidents)

We agreed that public health was the cross-cutting and overarching theme that unified and underpinned our work. The diagram below shows this set of ideas, which are reflected in our report and recommendations.

Main Themes

Area Inequality & Health

Open & Green Spaces

- link to mental health
- children's play
- social links
- link to obesity

Housing Conditions, Fuel Poverty & Inequality

- existing built environment
- how to change through time
- tenure (renting)
- social infrastructure, inc. GP access/health centres
- cooling & shading
- food growing
- Insulation and energy efficiency

Safety & Security on Streets – anti-social behaviour

- "broken windows"
- social and community activities

Density, Noise, Traffic, "Urban Stress"

- social isolation and interaction, caused and fostered by design and its impacts
- public transport

Cross-cutting

Public Health (inc. violent incidents)

- childhood
- pathogens
- physical activity
- active old age

Section 1 Introducing unequal areas and health inequalities

1) There is a link between the built environment, health outcomes and inequalities in health. The evidence on unequal area conditions is comprehensive and although the gap in conditions has closed, it is still very wide.

2) The direct elements that have an impact on health outcomes are: air pollution, traffic, 'dirty' activities, noise, space, housing, indirect safety, security, behaviour, stress and mental health, infections, and obesity.

3) Climate change will have different impacts: heat and cold; flooding, insulation problems and migration. Low income communities have fewer resources and lower resistance and less ability to deploy resources or achieve energy efficiency in homes. Therefore climate change will make poor communities even more vulnerable. In addition, the very poor countries in the world, especially South Asian and Sub Saharan African countries, are already suffering disproportionally the impact of climate change and their populations are migrating to the poorest urban areas of the UK.

4) Neighbourhood conditions create serious disadvantages in people's lives and we found evidence of complex interactions leading to a serious gap in conditions and opportunities for people living in poor areas.

5) The lack of play and green space for children in disadvantaged areas is very significant. Parents' fears about safety lead them to constraint their children. Environmental conditions can give strong signals of problems, and fear generates withdrawal from streets and public spaces, particularly by families and the elderly.

6) Ethnic minorities have on average poorer health and are concentrated in poorer areas.

7) Gaps in health, for example in life expectancy have not closed in spite of general improvements. Concentrated deprivation and concentrated mortality go together.

8) Sustainable development, generally understood as bringing together social, economic and environmental progress in a complimentary and mutually reinforcing way requires operating within natural resource limits while promoting socially just and healthy societies. Social development by definition requires no tradeoffs and therefore poorer areas need special efforts to integrate them within a more sustainable framework. Environmental limits require intense care of local urban environments so that spaces, buildings and materials are conserved and reused for social as well as environmental benefit. Group TG5, focusing on sustainable development, develops this theme.

Section 2 Evidence of the built environment and health inequalities

1) Physical activity through the presence of green space not only reduces the risk of heart disease (by up to 50%), but also has a positive impact on stress, obesity and a general sense of well being. It also cuts the risk of premature death (by 20-30%).

2) Green infrastructure has a significant impact on health, mental health in particular, and wellbeing in general
   - Green spaces link directly to levels of physical activity. Children with more green space are less likely to be overweight. Children in greener neighbourhoods have lower Body Mass Index.
   - Green infrastructure will help mitigate the effects of climate change
   - Residents who live 'near nature' in poorer areas cope better (as we have co-existed for thousands of generations) with nature and have an innate sensitivity to and need for other living things. A population is generally healthier if it is near green areas
   - 'Walkable' neighbourhoods help because they are by definition more compact and traffic tamed. Many walkable destinations such as shops, schools etc encourage exercise through cycle routes, parks, and foot paths which is a prerequisite for 'active travel' and healthier life styles.
   - Better off areas more likely to have access to facilities, spaces, physical activity
   - Urban design can help deliver green infrastructure, play areas and active travel routes

3) Housing: a main issue is the lack of space for children to play as they get older with a concentration of environmental problems in the surrounding areas and a sense of insecurity on streets, in parks and play areas. Therefore letting children out becomes problematic.
   - Poor housing conditions such as damp and cold are problematic but are limited and falling. However rising fuel prices may impact further on the problem of poorly insulated and energy inefficient homes causing more serious fuel poverty and related health impacts. Well designed and well laid out housing helps. It can be high density and highly urban as in the older flatted blocks in the centres of European cities. Poor quality private renting is a major problem, but so is concentrated poverty in social housing.
   - Overcrowding affects only a small proportion of households, often large families or multiple adult households. It created high pressures on those families.

4) Child and elderly friendly
   - Community facilities and meeting points
   - Engagement in decisions and local services is very important
   - Sociability, knowing you can call on neighbours, sense of security

5) Growing things, community gardens, allotments, trees etc are all positive
   - Also helps link to food and diet
   - The use of vacant land for allotments can produce cheap and nutritious food, encourage exercise, facilitate building of local social capital, and contribute to a more sustainable environment
   - The natural green environment has a beneficial effect on mental health and well being in general. This is very deficient in poor areas.

Section 3 Disadvantaged areas and poor health

1) Street crime and ASBOs deter people from using the street, and generate knock-on fears.
   - The Broken Windows Theory that neglected small crimes and anti-social behaviour generate more crime is generally accepted. Adopting it can seriously reduce crime e.g. NYC
   - Youth violence as 'epidemic' (Boston Public Health Authority)-by targeting whole population (media), parents (schools), youth directly and creating 'weapons amnesty', cut violent crime dramatically-also cut copy-cat aspect

2) Traffic, street life, sociability and acquaintances: social contact between neighbours is low in car-busy residential streets, but high in quiet residential streets. This affects both families and the elderly:
   - Increased risk of respiratory illness
   - Noise affects 1/3 of households-worse in (RCEP) high density, rented housing areas, linked to deprivation and urban (RCEP)
   - Also affects mental health, children's concentration and sleep patterns e.g. airports

3) Urban development generally affects health negatively-and can also lead to psychotic and depressive illnesses. The size of a city may make things worse e.g. schizophrenia is twice as common in London as Bristol.
   - Poor urban design, congestion, pressure of numbers, poorer quality services: together impact on health.

4) Generally poor area conditions and poor health go together-linked to poor diet, lack of exercise, poor education, cramped conditions, sense of insecurity, crime rates etc.

5) Poor areas have predominantly worse quality housing and more households in fuel poverty.

6) The effects of climate change impact disproportionately on poor areas. This includes increased respiratory and cardiovascular problems, flloding and lack of escape. Deprivation often increases vulnerability to climate change and climate change increases deprivation.

7) Disability is highly concentrated in the poorest areas. Among children and young people, the lack of infrastructure for play, walking etc. actually generates ill health and disability, including obesity and mental health problems as well as violent behaviour. Moreover, disabled people's level of physical activity is hampered by access barriers and they need carefully designed built environment and buildings.

Section 4 Evidence of interventions that work

1) Many government interventions to improve and equalise poor areas don't reduce health gap but do improve the basic conditions that may, in the long run, improve health

2) Neighbourhood management and neighbourhood wardens have improved area conditions, increased involvement, led to more local delivery and therefore shown measureable improvements in quality of life and wellbeing. They have also closed the gap on crime, education, jobs etc

3) Sure Start, by targeting vulnerable families with under 4s has demonstrated measureable gains in quality of parenting, child health (immunisation), health education for parents, parents involvement etc, again closing gaps

4) Jamie Oliver's Greenwich school meals programme targeted all state schools-many highly disadvantaged-this brought about a diet change, a ban on 'junk food', and parents, teacher and dinner lady education. This led to measurable improvements in test scores (University of Essex 2009).

5) Many experiments in local policing e.g. (Meadowhall, Bluewater Farm, Birmingham) have shown a steep fall in crime and some reductions in fear of crime (Louise Casey's report, Home Office 2008).

6) Many NGOs with Government backing; show beneficial links between safe cycle routes, cycle/walk to school and children's health (Sustrans); benefits of cared for outdoor spaces (Groundwork); the link between community involvement of itself and a sense of wellbeing (City Survivors; Empowering Communities, Trafford Hall, cooperatives and credit unions) inner city farms and allotments. There are many other examples. These bodies focus on trying to benefit lower income groups.

7) New Deal for Communities: like most large scale regeneration schemes has proved slow and rather cumbersome. But unlike earlier programmes it had a high element of community involvement and supported many local projects. The measurable outcomes have shown a closure of key gaps (education, crime, jobs, poverty, environments) and much greater satisfaction with areas.

8) Planning vision versus planning control – Planning as local enabler and problem solver.

9) Overall action to target specific area-based problems and disadvantages through local action and involvement has shown some significant gains and closing the gap-at least in the sense of well-being, belonging, and overall conditions. It seems reasonable to assume that if sustained, it should feed through into better health. Indeed, whole primary preventive health (e.g. health visitors) initiative, through local delivery in poor areas, has shown improved health outcomes and the gap is closing (David… Government GP Director)

Section 5 Recommendations

1) Transformative approach: Concerted area programmes, targeting specific problems such as crime, neighbourhood, environments, school meals, pre-school programmes (e.g. Sure Start), help address those local problems locally. This makes them highly visible, involves the local community and therefore has bigger impact. Sustaining and extending these successful pilots can transform conditions particularly for children and young people.

2) Traffic calming: Traffic-calmed residential streets, safe cycle and pedestrian routes are much safer for families, children, youth and elderly. Home Zones show this, here and in North Europe. We should extend 20 mph speed limit to all built up areas and residential neighbourhoods-10mph for Home Zones. We should have protected urban cycle ways should have protected urban cycle ways, equivalent to bus lanes, connecting areas, schools etc, as in Denmark and the Netherlands.

3) Green infrastructure: Green infrastructure makes urban living healthy and encourages physical activity. There should be a park or small supervised (overlooked) play area within 4 minutes walk of every family home. These must be well designed, overlooked and family friendly. Community gardens and allotments are also very good for health, particularly for older people, and we should develop a new push on growing your own food.

4) Transport: Public transport and green infrastructure are complimentary in promoting active travel and less reliance on cars. Planners and urban designers have a vital part to play in promoting public health by providing environments where physical activity is encouraged through active travel. An integrated public transport policy should help shape urban planning.

5) Local supervision: Targeting crime prevention and street security, would reduce stress and increase children's ability to play freely and safely. Unstable, fast-changing communities, housing many newcomers are difficult to police and require sensitivity particularly in regard to inter-ethnic relations e. We should make regular street and park policing alongside local neighbourhood management a required function for local government and local policy. Without informal as well as formal supervision people in poor areas will not feel safe.

6) Continual investment: Improving physical environments, empty derelict buildings and spaces, reduced opportunity for crime and gives positive behaviour signals to young people. It leads to increased density of people and activity and therefore a greater sense of security and natural surveillance. Thus we should continue neighbourhood renewal programmes on an ongoing basis. Making streets and areas more attractive and better cared for encourages social contact, helps prevent disorder and enhances people's well being.

7) Energy saving and fuel poverty: Home upgrading in poorer areas brings many benefits, including greater energy and water efficiency, tackling fuel poverty, helping attract more mixed communities and mitigating the impact of climate change. We recommend that Government develop a comprehensive programme of energy efficiency measures to implement the ambition set out in the recent Heat and Energy Savings Strategy consultation. This should target deprived areas through programmes such as the Community Energy Savings Programme and introduction of an energy focused Decent Homes 2. Funding mechanisms must be in place to enable households across all tenures to upgrade their homes.

8) Public health: Direct Public Health campaigns promote preventative health measures and can also prevent and reduce violence, improve diets, reduce stress, anxiety, disorders and encourage action to tackle climate change. To succeed they depend on participation and empowerment. Special efforts are needed to include minorities in community activities. They need community meeting places and community development inputs in order to work in very poor areas; schools and churches could often provide these facilities. We should insure village halls exist in every community so beneficial activity have a local home.

9) Planning system: The Planning system plays a very important role in enabling or diminishing these recommendations. Public health should be involved in planning, to ensure that public health interventions such as lower speed limits and safe routes to schools etc are built into new and upgradedarea plans.

Section 6 Policy Implementation Framework

We have prepared a framework for understanding how policy can be implemented, which we show next.

Recommendation	**Evidence**	**Outcomes, Impacts and Payback**	**Current Examples**	**Policy Department/ Profession/ Stakeholders** Whose Responsibility?	**Timescale** Short, Medium or Long Term	**Tie in with other Task Groups**
1. Transformative approach: Sustaining and extending successful pilots	Strong (consistent evidence of progress)	Positive outcomes Saves money	Sure Start, Children's Centres	DCLG, NRU,	Short/ long	
2. Traffic calming: 20mph speed limit + protected urban cycle ways	Strong (almost universal agreement)	Positive outcomes Saves lives, reduced injuries, noise, better health	Sustrans campaign, Home Zones, Denmark	Local councils, Transport agencies, schools, Police	Short/ medium	TG1; TG5; TG8
3. Green infrastructure: Supervised/overlooked small park within 5 minutes walk of family homes + push to grow own food	Strong (e.g. children's health)	Positive outcomes Big health gain	Play Strategy; Cleaner, safer, greener	Natural England, CABE Space, Forestry Commission, Environmental Agency, voluntary sector, etc	Medium/ long	TG1; TG5; TG8
4. Transport: promote active travel and integrate public transport policy and urban planning	Strong (i.e. obesity; healthy cities)	Positive outcomes Healthier lifestyles, reduced cardio-vascular disease	London's Congestion Charge, Healthy Cities,	Local authorities, Media, transport and planning agencies, education sector, voluntary sector	Short/ medium/ long	TG5
5. Local supervision: Regular street and park policing alongside local neighbourhood management	Strong (e.g. Broken windows theory)	Positive outcomes Reduces fear	Neighbourhood Management Pilots	Home Office, Police, NRU (street wardens),	Short	
6. Continual investment: Continue neighbourhood renewal programmes on an ongoing basis	Strong Evidence of need for continual repair	Positive outcomes Avoids need for high spend	Neighbourhood renewal Programme	DCLG, NRU,	Short/ medium/ long	
7. Energy saving & fuel poverty: Implementing energy efficiency proposals, esp. Community Energy Saving Programme	Strong (e.g. Office for Climate Change)	Positive outcomes Net negative cost over time; improved heating, reduced indoor noise	SDC case studies; DENA programme (Germany)	Local councils, housing sector, building and energy supply industries	Short/ medium/ long	TG5
8. Public health: Direct public health campaigns to reduce violence, improve diet, reduce stress, anxiety and disorders through participation and empowerment	Strong Evidence from earlier public health campaigns	Positive outcomes over long time if consistent and high profile	Anti-smoking, seat-belt campaigns	Health authorities, Police, Media, Schools	Long	TG1; TG9
9. Planning: public health should be involved in planning	Strong (e.g. Healthy Cities)	Positive outcomes Reduced injuries, noise, pollution	Healthy Cities, Home Zones	Local authorities, Planning and health agencies, RTPI, RIBA, CABE, higher education	Long	

2. Literature Review: a summary

CONTENTS:

This review of literature summarizes the main literature on health inequalities and the build environment/ disadvantaged areas; there are five main parts to the paper and they are as follows:

- Part 1: the built environment, area inequality and their impacts on health inequalities
- Part 2: positive and necessary features of the built environment to support healthy lives
- Part 3: why many urban areas fall far behind (negative features of the built environment that impact on healthy lives)
- Part 4: what evidence is there of improvements through policy change?
- Part 5: what have different studies recommended to deliver better health outcomes through better built environment? (recommendations and impact of recession)

A wide range of literature has been reviewed including academic literature, policy documents, government reports, and voluntary sector literature.

Part 1: The built environment, area inequality and their impacts on health inequalities

This section answers the following questions:

- What aspects of built environment affect health?
- What impacts do disadvantaged (unequal) areas have on health of poorer groups?

…and the evidence is grouped under the following main headings:

- Elements of the built environment affecting health
- Area/ Neighbourhood effects (on health)
- Disadvantaged areas & Health/ Health inequalities
- Vulnerable groups
- Dynamic/ Long-term trends

Elements of the built environment that affect health

The Sustainable Development Commission looks at direct (including natural spaces, air pollution, road traffic, noise, floods, climate) and indirect (including accessibility, safety and incivilities, mixed land-use, street design) aspects of the build environment that affect health outcomes (Sustainable Development Commission, 2008).

The Royal Commission on Environmental Pollution (Royal Commission on Environmental Pollution, 2007a, 2007b) summarises them as:

- air pollution (i.e. trafic, asthma)
- climate (winter i.e. fuel poverty/summer i.e. over heating)
- mental health (urbanisation, crime, overcrowding)
- infectious diseases (housing conditions)

- obesity (physical activity, green spaces)
- traffic accidents

Area/ Neighbourhood effects on health

There are two main schools of thought regarding area/ neighbourhood effects on outcomes in general and health outcomes in particular: on one hand some scholars agree that *there is an area effect/ the area one lives in matters* and it has an impact on health (usually qualitative studies i.e. Power, Lupton), while on the other hand, others argue that an area effect is difficult to pin down and prove, and thus *it does not exist* (usually quantitative studies see for example (Propper et al., 2005)). However, the evidence is not conclusive so far mainly due to methodological issues.

Power argues that the area one lives has a major influence on his/ her future outcomes in particular and life in general (see also Power& Mumford, Lupton). Moreover, a Perpetuity research discussed the impact of the built environment/ neighbourhoods on children of school age and showed that the quality of the physical environment affected children's behaviour and attitudes and in relation to schools and schools were affected adversely by being located within declining physical neighbourhoods (Perpetuity Group, 2009); Picket & Peal argued that neighbourhood affects may be less evident in more equal countries (Pickett & Pearl, 2001).

Proper research looked at the association between mental health and areas/ neighbourhoods and found that what matters for levels of common mental disorders are individual characteristics, not the place (Propper et al., 2005).

Disadvantaged areas & health/ Health inequalities

... for every stop on the Jubilee line between Westminster and Canning Town, life expectancy goes down by one year... (Alan Johnson speech 12/09/2007)

Living in deprived urban areas increases the risk of poor health outcomes even after controlling for individual characteristics (see detailed hard facts in (Royal Commission on Environmental Pollution, 2007a, 2007b)). Moreover, there is a powerful relationship between the gap in life expectancy and local measures of deprivation; in the North West in 2001- 2003, men and women living in the most deprived fifth of areas nationally can expect to live on average 6.8% and 5% respectively less than the average for England and Wales. Men and women living in the most affluent fifth of areas nationally can expect to live 3-4% longer than the average for the country. Some conditions show an extremely strong relationship with deprivation (greater than 3-fold to 10-fold variation) with greater levels of resulting ill health in the most deprived areas. For example: self-harm, violence, chronic obstructive pulmonary disease, alcohol related conditions, births to lone mothers, claimants of disability living allowance and incapacity benefits. Other conditions, which may be grouped into related categories, show 2- to 3-fold variation with deprivation. For example: asthma, lung cancer, respiratory conditions and smoking related deaths, diabetes and heart disease, alcohol related deaths and mental health, self rated poor health and frequent fliers (persons with frequent emergency admissions to hospital) and epilepsy (Wood et al., 2006).

Health inequalities

The gap between rich and poor areas increased in the 1980s and 1990s; and despite New Labour efforts inequalities in life expectancy are still widening (Shaw, Smith, & Dorling, 2005)

Sassi gave a good and up to date overview (over the last 15 years) of general trends in mortality, longevity, health status, CVD, mental health etc. and concludes that current trends of health inequalities look worrying bearing in mind Government's efforts over the past 15 years. However, on a positive note, inequalities in life expectancy showed stabilisation or slight decline across LA with different levels of deprivation. On a less positive note, inequalities worsened among women to a significantly greater extend than among men (and across a series of indicators: obesity, CVD, life

expectancy and mental health). Areas of particular concern include substantial emerging inequalities in mental health and increasing inequalities in aspects of lifestyle such as those associated with obesity (Sassi, 2009).

Mitchell & Popham found that income-related inequality in health is less pronounced in populations with greater exposure to green space (Mitchell & Popham, 2008)

Vulnerable groups

A large body of literature focuses on health inequalities in relation to vulnerable groups, such as children and young people, women, older people, ethnic minority groups and disabled people.

People from groups at risk of deprivation are more likely to be subject to an 'obesogenic' environment which discourages walking and cycling, perceiving their neighbourhoods to be busier with traffic, less attractive, and less supportive of walking. They also often disproportionately bear the impacts of car-dominated urban planning practice. Lower socioeconomic groups have higher incidences of injury and deaths from traffic accidents. More than a quarter of child pedestrian casualties happen in the most deprived 10% of wards. In Wales, children and people aged over 65 living in deprived areas are twice as likely to be injured by motor vehicles as are those living in more advantaged areas **(Insall, 2009)**.

Children and young people

Literature dominated by the importance of safe access to green/ play areas and recreational facilities: greater access means higher levels of physical activity and less obesity (Penny Gordon-Larsen, Nelson, & Popkin, 2006); their perceptions of the neighbourhood are assoc with levels of activity (Hume, Salmon, & Ball, 2005); parents' perceptions of the neigh (i.e. safety) impacts on children's levels of activity (Timperio, Crawford, Telford, & Salmon, 2003); those living close to busy roads

have 50% increased risk of respiratory illnesses (Royal Commission on Environmental Pollution, 2007a, 2007b)

Women

Women undertake less physical activity than men but are more likely to engage in walking than men (Duncan & Mummery, 2004); they face different barriers - i.e. small children (Krenichyn, 2004) and perceptions of safety (Bengoechea, Spence, & McGannon, 2005)

Older People

Good pedestrian access and convenience of facilities important (W. King, Brach, & Belle, 2003); safe neighbourhoods are important (Booth, Owen, & Bauman, 2000); those living in problematic neighbourhoods more likely to experience functional deterioration (Balfour & Kaplan, 2002); they prefer to continue living in a hazardous neighbourhood because it is familiar and social nets (Russell, Hill, & Basser, 1998); walkable greenspace positively influence longevity (Takano, Nakamura, & Watanabe, 2002); stress levels and mental deterioration positively influenced by parks (Orsega-Smith, Mowen, Payne, & Godbey, 2004a)

Ethnic minority groups

Evidence shows that some ethnic minority groups experience poorer health than others (health inequalities), undertake less physical activity than the general population and also experience poorer access to facilities and poorer quality of services (inequities in access). These have been connected to levels of deprivation ethnic minority groups are more likely to be subject to, racial discrimination and cultural insensivity in the provision of health care.

- *Hard facts about their health in general:* 15 per cent of Bangladeshi men report their health to be 'bad or very bad' compared to 6 per cent of men in the general population. However, Black African and Chinese groups report better health than average. Moreover, some

conditions and diseases are particularly prevalent among certain ethnic groups, for example coronary heart disease among South Asians, and diabetes among South Asians (prevalence five times higher than the general population) and people from African and Caribbean backgrounds (three times higher) (Department of Health, 2009).

- *Physical activity:* With the exception of Black Caribbean and Irish populations, all other minority ethnic groups have lower rates of physical activity. Inequalities are greatest for South Asian women. Only 11% of Bangladeshi and 14% of Pakistani women were reported to have done the recommended amounts of physical activity, compared with 25% in the general population (Department of Health, 2009).

- *Access to facilities:* High-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight (Penny Gordon-Larsen, Nelson, & Popkin, 2006)

- *Access to services:* Bangladeshi populations report significantly poorer experiences (as hospital inpatients) than White British or Irish respondents, particularly on questions of prompt access, as well as their experience of involvement and choice (Department of Health, 2009).

The disabled

Disable people are more likely to be concentrated in social housing than in privately own or rented properties and within the social renting sector their number increased over the last decade (Hills, 2007). Deprived areas have a higher than average concentration of social housing and therefore of disable people. Moreover, lower socio economic groups concentrated in deprived areas and they tend to have higher levels of disability due to poorer health, more accidents and more mental health problems.

Use of fitness centres and physical activity among disable people is limited by barriers (such as lack of curb cuts, inaccessible access routes, doorways being too narrow for wheelchair access, lack of elevators, slippery

floors and the absence of handrails on stairs,) and promoted by facilitators (such as anti slippery surfaces, adequate parking space, related to the built environment in general and the way buildings are designed in particular. (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004)

Dynamic/ long-term trends

Shaw et al. found that the gap of inequalities in life expectancy is still widening despite New Labour efforts (Shaw, Smith, & Dorling, 2005) while Sassi argued that it stabilised and showed a slight decline recently (Sassi, 2009).

The relationship between spatial distribution of social deprivation and spatial distribution of mortality in inner London is still the same as a century ago! (Dorling, Mitchell, Shaw, Orford, & Davey Smith, 2000)

Part 2: Positive and necessary features of the built environment to support healthy lives

This section answers the following question

- What are the most important aspects of the built environment that would support more equal and healthier lives?

…and the evidence is grouped under the following headings:

- The importance of physical activity
- Green infrastructure
- Walkability
- Accessibility
- Housing conditions/ Buildings

- Design/ Secured by Design and Designing out Crime

The importance of physical activity

Physical inactivity, the main sign of which is obesity, is one of the ten leading causes of death in developed countries. Physical inactivity is associated with increased risks of developing many of chronic diseases such as type II diabetes, obesity, cardiovascular diseases, certain cancers, depression and anxiety. It also has a positive effect on a range of health determinants such as body weight, blood pressure, cholesterol levels. The benefits of physical activity for health is undisputed, with the Government recommending everyone undertakes at least 30 minutes of moderate intensity activity at least five times a week (DoH 2004).

Sustrans reviewed the evidence between physical activity, health and social inequality finding that obesity, diabetes and cancer all affect people from deprived communities disproportionately. They link this primarily to the environments in which they live. Lower density car-based developments and problems of traffic, pollution, crime, litter, lighting and poor public transport are all identified as contributory factors. It noted that research (by Moore et al 2006) had found that traffic free cycle and walking routes were most effective in encouraging cycling and walking in deprived areas. This also identified case studies where improvements in the physical environment had led to increased walking. This includes an estate in Glasgow where traffic calming measures had led to a 20% increase in walking (Sustrans Active Travel, 2008).

People from the poorest households are least likely to meet the recommended levels of physical activity. They are also the most likely to be sedentary – achieving less than 30 minutes of physical activity per week. For example, 44% of women and 34% of men in the poorest households in England are sedentary, compared to only 33% of women and 28% of men in the wealthiest households. People living in deprived areas are also less likely to meet physical activity recommendations – in the most deprived areas of Wales people are twice as likely to be inactive.

These low physical activity levels are a significant cause of health inequalities, with inactive groups suffering poorer health and living shorter lives than the general population (Insall, 2009).

Green infrastructure

Green space/ parks have a positive and significant influence on levels of physical activity – particularly important for children and young people (i.e. children with more access to green space less likely to be overweight); and is associated with greater longevity in older people. Moreover, studies exploring adult and community contact with natural environments have shown:

- Positive effects of natural environment on social interaction and cohesion in different age groups, by providing inclusive places to meet. **Bird (2007)**
- Living near green space led to less health complaints and better mental and physical health than an urban environment. For every 10% increase in green space there was a reduction in health complaints equivalent to a reduction of five years of age **De Vries (2001)**
- People living in green areas are generally healthier than people in less green areas (Dutch study by (De Vries, Verheij, Groenewegen, & Spreeuwenberg, 2002)).

Contact with the natural environment/ nature/ greenery is considered to have the following benefits on wider health and mental health:

- **increased likelihood of physical activity across all age groups:** open spaces with a range of attractive attributes (such as trees, lakes, landscaped features) encourage higher levels of walking (Giles-Corti et al, 2005)
- **Reduced violence and aggression:** a reduction in behavioural indicators and incidence of crime in urban areas with green spaces
- **Reduced health inequalities:** significant reductions in mortality and morbidity from all causes and circulatory disease associated with areas of greater green space. This effect is controlled for income deprivation.

- **Improved mental health and well being indicators for children, young people and adults**
- **increased potential for adaptation to climate change (floods, heatwave)**
- **improvement in air and noise quality**

Interestingly, a study of London found that, public access to green space improved between 1990 and 2003 as a result of regeneration and acquisition of new areas. The average reduction in distance to green space was 162 metres (from 1.192 km to 1.039km) and was greater for affluent areas than it was for deprived areas (London School of Hygiene & Tropical Medicine, 2005).

Green space and inequalities

A recent review cited studies reporting that green spaces are associated with better health regardless of socio-economic status. This effect was still seen after controlling for socio-economic factors. **(Green Space Scotland, 2007)**

A recent large-scale study in the UK **(Lancet 2008)** showed reduced inequalities in mortality in areas related to increasing levels of green space. This effect was still seen after taking into account income deprivation.

Green space enhances the capacity of residents in urban public housing to cope with the effects of poverty. Residents who lived in public housing with nearby nature showed greater capacity to cope with stress than those who lived in dwellings without nearby nature (Kuo, 2001).

Green space and children

Children and youth living in greener neighbourhoods had lower Body Mass Index, presumably due to increased physical activity or time spent outdoors (Bell, Wilson, & Liu, 2008).

Access and contact with nature improves attention among children with attention deficit disorder and self-discipline among inner city girls **(Faber, Kuo, & Sullivan, 2001, 2002)**; and enhances emotional and values-related development in schoolchildren **(Kellert, 2002).** Moreover, **s**tudies examining children's contact with natural environments have shown:

- views onto trees and grass were associated with reduced stress **(Wells & Evans, 2003)**.
- increasing levels of accessible urban green spaces is associated with increased amounts of play for local children **(Sallis, Nadir, & Broyles, 1995)**.
- natural features can create enclosed areas to promote play between different groups and create varied activities suitable for different age groups leading to better overall concentration and motor skills.

Green space and rehabilitative benefits

- Patients with views of nature through hospital windows had improved post-operative recovery and lower need for pain relief. Stressed patients showed lower levels of fear and anger **(Ulrich, 1984; Ulrich et al., 1991)**.
- Contact with nature was linked to fewer clinic visits in prisoners **(Moore, 1982)**.
- Women with breast cancer showed better concentration on their treatment if they had regular contact with natural environments **(Cimprich, 1993)**.
- Looking at nature through a window can lead to reduced stress and enhanced work performance in the office **(Kaplan & Kaplan, 1995)**.

Green space and mental health

A review of existing literature on the natural environment and well being by Newton found that there is a wealth of evidence on the beneficial well being impact of green spaces. In particular the role they play for the well being of inner city and suburban residents (Newton, 2007). A study undertaken by MIND found that self-esteem levels increased and depression levels decreased following a green

walk. This was in comparison to reduced self-esteem and some increase in depression following an indoor walk (Mind, 2007).

A recent study showed a trend of reduced admissions for mental illness and reduced under-75 mortality associated with increasing levels of green space in an area. This effect was seen after controlling for deprivation and population density. **(Wheater C 2008)**

Green space and climate change

Green infrastructure can help both in mitigating and adapting to climate change. Well designed green infrastructure mitigates change by reducing travel trough provision of local recreation opportunities, promoting active travel, supplying biomass, biofuels or timber, increasing local food production and improving carbon storage and sequestration. Likewise it can help adapt to the impact of climate change through managing surface water run-off to prevent flooding, creating cooler microclimates and providing shelter and protection in extreme weather **(CABE, 2009, www.sustainablecities.org.uk).**

Green infrastructure: allotments and community gardens

The use of vacant land for allotments can produce cheap and nutritious food, encourage exercise, facilitate building of local social capital, and contribute to a more sustainable environment (Thrive, The allotments regeneration initiative; QED allotments newsletter). There is also a significant amount of literature on the health benefits of allotments or community gardens (Armstrong, 2000; Twiss & et al, 2003).

Walkability

"Walkable" neighbourhoods are associated with higher levels of physical activity, and lower levels of obesity. In high walkable neighbourhoods residents reported approximately two times more walking trips per week than residents of low walkable neighbourhoods (Giles-Corti et al, 2005; T. Pikora, Giles-Corti, & Knuiman, 2005; Saelens, Sallis, & Frank, 2003)

People are more likely to be physically active if they live in neighbourhoods with many destinations, such as shops and other facilities, and with many street intersections (Frank, Schmid, & Sallis, 2005). Also, neighbourhoods that are perceived to have high levels of functionality, are associated with more walking for a number of different purposes, including walking to work, walking for recreation, and task-related walking (McCormack, 2004).

Accessibility

Evidence consistently shows that people who have easy access to physical activity facilities are more likely to engage in physical activity than those who do not. Inadequate facilities, the absence of facilities or barriers to access (such as steep hills, busy roads to cross) have a negative impact on physical activity.

People who report nearby facilities for physical activity are more likely to engage in physical activity than those who do not have such facilities nearby (Duncan, Spence, & Mummery, 2005).

Access to facilities such as cycle paths, local parks and other green spaces, beaches, or recreation centres is strongly and positively associated with physical exercise (Humpel, Owen, & Leslie, 2002).

People reporting the presence of shops and services within their neighbourhood are more likely to be physically active (Duncan, Spence, & Mummery, 2005). Lower-SES and high-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight (Penny Gordon-Larsen, Nelson, & Popkin, 2006).

Housing conditions/ Buildings

The prevalence and exacerbation of asthma is associated with both indoor and outdoor air quality, the presence of dust mites or cockroaches, excess particulates from cooking or smoking, dampness and mould, and community violence (Wright, Mitchell, & Visness, 2004).

Cold is believed to be the main factor underlying the extra deaths which occur in the period between December and March compared with the death rate for other months of the year. Most vulnerable groups: children, older people and people with long term illness (Royal Commission on Environmental Pollution, 2007a, 2007b).

Overcrowding (more people than rooms in a household) is associated with poor physical and mental health (SASI Research Group, 2005).

Design/ Secured by Design and Designing out Crime

Evidence regarding particular characteristics of the built environment that might be most strongly associated with well-being and physical activity is less robust. However, evidence suggests that the presence of pavements or footpaths that are well maintained with good surfaces, cycle paths, and street lighting increase the number of walking and cycling trips (Cochrane et al., 2009; Lee & Mouden, 2008; Saelens, Sallis, & Frank, 2003).

NICE published a clinical guideline on the prevention, identification, assessment and management of overweight and obesity in adults and children in December 2006. The guidance advised local authorities to work with local partners, such as industry and voluntary organisations, to create and manage more safe spaces for incidental and planned physical activity, such as parks, and to address as a priority any concerns about safety, crime and inclusion. In particular they were advised to provide facilities and schemes such as cycling and walking routes, cycle parking, area maps and safe play areas (NICE, 2006).

Secured by Design/ Designing out crime

Hillier's research analyses how crime is related to certain aspects/ design of the built environment such as: urban density, permeability and movement, housing typologies and grouping, mixed use. (Hillier, 2004; Hillier & Sahbaz, 2008)

A study carried out by University of Huddersfield and West Yorkshire Police conducted an evaluation of Secured by Design (SBD) housing within West Yorkshire. The findings were extremely positive with two of the refurbished housing estates recording 67% and 54% reductions in crime rates and a significant improvement in perception of safety post SBD improvements (Armitage, 2000). Similar findings were found for the Northview estate in Swanley, Kent which went through a programme of regeneration focusing on external landscaping and inclusion of security features within the residential properties. Landscaping was used to define public and private space, natural surveillance across the estate was maximised, secure areas were provided for cycles and refuse and other areas such as children's play areas were given distinct uses. Crime figures show an 80% reduction in crime (including theft from motor vehicles, criminal damage and theft offences) since the works have been completed (HUDU, 2007).

Part 3: Why many urban areas fall far behind (negative features of the built environment that impact on healthy lives)

This section answers the following question

- Why and in what ways do poorer urban areas suffer inequality of area conditions and health outcomes?

…and the evidence is grouped under the following topics:

- Street crime/ Anti Social Behaviour
- Traffic/ Transport/ Pollution
- Noise
- Fuel poverty and housing conditions
- Climate change
- Housing conditions (fuel poverty, climate change)
- Mental Health & Urbanisation

- Poor design (disability/ access)

Street Crime/ ASB/ Vandalism/ Graffiti

Many people, particularly women and older people, are concerned about safety in their neighbourhood, usually related to issues such as street crime, fear of injury from traffic. Parents' perceptions of neighbourhood safety impact of levels of physical activity in children.

The Broken Windows Theory (BWT)

The Broken Windows Theory was developed by Wilson & Kelling (1982) and first implemented through 'zero-tolerance' policing in New York, in 1985 – as a consequence, both petty and serious crime fell suddenly and significantly. 'Zero-tolerance' policing could include things like street police patrolling, CCTVs, freeway speed enforcement, sobriety checks, street lighting, building codes reinforcing, discouragement of loiterers, arrests made for minor crimes, and an expansion of mental and homelessness health services. The Broken Windows Theory was most recently tested experimentally in Groningen, Holland and found that one example of disorder, like graffiti or littering, encouraged another, like stealing (The Economist, 2008). The message for policymakers and police officers is that clearing up graffiti or littering promptly could help fight the spread of crime

The main critics of this approach focused on the social justice problem behind 'zero-tolerance' policing (Keeling & Coles, 1996) and the fact that 'maintaining' order will not prevent serious crime.

Public Health campaigns

Violence was significantly cut down in Boston by using a three tier prevention campaign: primary (targeted at public i.e. media, newspapers), secondary (for groups at risk) and tertiary (minimising the spreading effect of a 'bad' incident & stopping it to happen in the future) **(Prothrow-Smith, 2002)**.

In the UK, Home Office's Tackling Knives Action Programme (TKAP) launched in June 2008 showed a fall in assault with a sharp object among those aged 13 to 19 years (figures fell by 26 per cent in England - 30 per cent in the areas targeted by the Tackling Knives Action Programme and 17 per cent in other areas) **(Department of Health, 2009)**.

Traffic/ Transport/ Pollution

Transport in general

Transport (particularly private motor vehicle transport) is a major contributor to greenhouse gas emissions (GHGs) and these are increasing when other GHGs are being reduced.

Transport is also a major public health hazard in itself, and the recent Swedish analysis of Road Transport and Public Health shows that in that country injuries, air pollution and lack of physical activity each might contribute app. 30% of the burden of disease and injury (BODI) caused by road transport. The remaining 10% is due to traffic noise but this hazard exposure is increasing. GHGs from a country like Sweden also contributes health impacts in poor developing countries, estimated to be, on average until 2080, more than twice the injury health impact in Sweden (Kjellstrom, Ferguson, & Taylor, 2008).

Road accidents

The most deprived people often disproportionally bear the impacts of car dominated urban planning practices (Van Lenthe, Brug, & Mackenbach, 2005). Lower socio-economic groups have higher incidences of injury and death from traffic accidents (Gorman, Douglas, Conway, Noble, & Hanlon, 2003). A recent report found that the casualty rates for child pedestrians in the most deprived local authority wards were more than four times higher than in the most affluent wards (Grayling, Hallam, & Graham, 2002). The Social Exclusion Unit estimated the gulf to be five times higher (Social Exclusion Unit, 2003). Also, more than a quarter of child pedestrian casualties happen in the most

deprived 10% of wards (Social Exclusion Unit, 2003). In Wales, children and people aged over 65 living in deprived areas are twice as likely to be injured by motor vehicles as are those living in more advantaged areas (Mark Drakeford, 2006).

Death rates from road traffic accidents have fallen in England and Wales in most socio-economic groups over the past 20 years, but not for children in families without a working adult. A report analysed records from the 1981, 1991 and 2001 censuses and found that overall, pedestrian death rates for the most deprived group were 20 times higher than for the wealthiest group, and cyclist death rates were 27.5 times higher (Edwards, Roberts, Green, & Lutchmun, 2006).

Air pollution

Between 12,000 and 24,000 people die prematurely every year as a result of air pollution. Data suggest that the cost in terms of health impacts was an estimated £9.1-21 billion in 2005. (Govt Stats).

Traffic

Residents of busy streets have less than one quarter the number of local friends that those living on similar streets with little traffic (study carried out in Bristol replicating the Appleyard study) (Hart, 2009).

Several recent studies indicate that children living close to busy roads have an approximate 50% increased risk of experiencing respiratory illness including asthma (Royal Commission on Environmental Pollution, 2007a, 2007b).

Research carried out in Sweden found that annually transport-related air pollution may cause 2200 deaths, traffic noise is associated with 300 deaths and physical inactivity due to daily commuting by car may cause 700 deaths (Kjellstrom, Ferguson, & Taylor, 2008).

Noise

It is a problem for one in three households in the UK and has a major impact on the wellbeing of one in a hundred people ((Royal Commission on Environmental Pollution, 2007a, 2007b)see Ref 65). Opinion poll research conducted in 2003 found that problems are worse in areas of high density housing, rented accommodation (both social and private sectors), areas of deprivation and areas which are highly urbanised ((Royal Commission on Environmental Pollution, 2007a, 2007b)Ref 66)

Studies have also reported adverse effects of aircraft and traffic noise on mental health ((Royal Commission on Environmental Pollution, 2007a, 2007b)Ref 67).

A significant body of research has focused on noise impact (mainly from traffic and aircrafts/ airports) on children's behaviour, educational outcomes as well as general levels of stress. Penetration of traffic sounds into the home impairs the child's ability to learn verbal skills (Cohen, 1973). Noise from aircraft/ airports significantly elevates stress among children far below those necessary to produce hearing damage (G. W. Evans, Bullinger, & Hygge, 1998). Moreover, chronic aircraft noise exposure was associated with higher levels of noise annoyance and poorer reading comprehension; the association between aircraft noise exposure and reading comprehension could not be accounted for by the mediating role of annoyance, confounding by social class, deprivation, main language or acute noise exposure (HAINES, STANSFELD, JOB, BERGLUND, & HEAD, 2001).

Fuel poverty and housing conditions

Buildings can be highly energy efficient. However the majority f housing stock consists of older properties and many of them are occupied by low income households. Fuel poverty is a big problem and although the government has a programme in place to tackle it, it requires more investment in a more thorough way **(Sustainable Development Commission, 2006)(HEES Strategy)**.

- Old, leaky, poorly insulated stock produces 27% of all CO2

- Fuel poverty is intensified by inefficient homes – 'eat or heat'
- Attempts to improve housing conditions through demolition largely failed due to costs, time lag and community opposition. Upgrading of existing stock is cheaper, quicker, has less impact on environment and can hit high efficiency standards
- HESS proposals show gains to be made and CESP targets for the poorest 100 areas (100,000 homes – overall by 2016, 400k homes pa tackled)
- This issue has received highest national priority in Germany (DENA) with major success (ZukunftHaus) – now copied here

The need to upgrade existing housing stock is now widely recognised, of extreme urgency and requires urgent action **(H M Treasury, 2006)(Office for Climate Change, HEES)**. Moreover, if energy efficiency standards are raised by investing across the board, not only neighbourhood renewal is brought about but also more local jobs and better local economies **(DENA website)**.

Climate change

Research at global level has found that urban populations are especially vulnerable to climate change as are people with a pre-existing respiratory disease. The California heatwave of 2006 showed large increases in admissions to hospital from cardiovascular and other illness, and the heatwave in Germany in 2003 increased mortality rates, especially from respiratory causes **(Costello, Abas, & Allen, 2009).**

CAG Consulting (2009) undertook research into the social impacts of climate change in the UK. The research found that climate change will affect both physical and metal health alongside quality of life. It also found that those likely to be the most vulnerable to the impacts of climate change include those who are already deprived by their health, level of income and quality of homes. **(CAG Consulting, 2009)**

Cold is believed to be the main factor underlying the extra deaths which occur in the period between December and March compared with the death rate for other months of the year. In 2005, there were

27,500 additional deaths in this period across the UK. The elderly are subject to the greatest increase in deaths in winter, with 20,200 more deaths in the UK among those aged over 75 years during the winter of 2005/06 compared with levels in the non-winter period. Other groups are also vulnerable, including children and people with long term illness **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

Mental health & Urbanisation

A recent study of 4.4 million adults in Sweden found that the incidence rates of psychosis and depression rose in proportion with increasing levels of urbanisation. Those living in the most densely populated areas had a 68-77% and 12-20% greater risk of developing any psychotic illness and depression respectively when compared to a reference group in rural areas (Royal Commission on Environmental Pollution, 2007a, 2007b)(Ref 72).

Within urban areas, rates of psychiatric illness are greatest in the most deprived areas and the rates for psychoses map closely those for deprivation (Royal Commission on Environmental Pollution, 2007a, 2007b)(Ref 74). The size of a city also matters; schizophrenia rates in London are about twice those in Bristol or Nottingham (Royal Commission on Environmental Pollution, 2007a, 2007b)(Ref 76).

Poor design (disability/ access)

Research found that levels of physical activity in fitness centres among disable people are limited by barriers and promoted by facilitators related to the built environment in general and the way buildings are designed in particular. Barriers included lack of curb cuts, inaccessible access routes, doorways being too narrow for wheelchair access, slippery floors and the absence of handrails on stairs. Facilitators included providing nonslip mats; adequate number of accessible parking spaces; installing push-button operated doors; one of the most frequently mentioned facilitators was to provide family changing rooms, which would make it easier for parents to help their children with disabilities with changing, or in situations where a person with a disability

needs assistance dressing and undressing usually by another family member or a personal assistant.

(Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004)

Part 4: what evidence is there of improvements through policy change?

This section answers the following question:

- What do different policy experiments show about the impact of policy change on lives?

…and the evidence is structured under the following topics:

- Area Based Initiatives (Health Action Zones, SRB, NDC, Sure Start, Hope IV)
- London's Congestion Charge
- Boston's Public Health Campaign
- UK's Tackling Knifes Action Programme
- Other US initiatives
- Jamie Oliver's healthy food campaign
- Home Zones/ Traffic calming measures
- Other UK initiatives

Area Based Initiatives

Health Action Zones

First area based initiative aimed at targeting health inequalities under Labour. Little impact but meant a good start for bringing health inequalities back on the politicians' agenda (Bauld et al., 2005).

Single Regeneration Budget

Showed reduction in those considering themselves in good health; however, it did not have a large health component.

NDC

Little impact on: smoking, health worse than 12 months ago; long standing illness.

Sure Start

This ABI has seen a reduction in the proportion of low birth-weight babies and reduction in the rate of hospital admissions as a result of serious injury (Department of Social security, 1999)

Hope VI (in the US)

Recipients of Hope VI still in poor health: Hope VI people still die at the same age as people in South Saharan Africa; alarmingly high rates of chronic health problems (obesity, hypertension, diabetes, depression); many with multiple health problems; poor mental health etc.

However positive impact on safety/fear of crime and therefore better mental health and less depression; and notable improvements on housing conditions which led to less asthma prevalence(Harris & Kaye, 2004; Howell, Harris, & Popkin, 2005; Popkin & Cove, 2007).

London's Congestion Charge

Cut down traffic and pollution and encouraged active travelling an cycling (80% more cyclist between 2000 and 2007) (Transport for London, 2007).

Boston's Public Health Campaign

Cutting down on street violence in Boston by using a three fold prevention campaign: primary (targeted at public i.e. media, newspapers), secondary (for groups at risk) and tertiary (minimising the spreading effect of a 'bad' incident & stopping it to happen in the future) (Prothrow-Smith, 2002).

Boys & Girls Clubs of America Gang intervention programs (secondary prevention) shown that 48% of participants improved their school attainment.

Big Brothers/ Sisters Mentoring Programmes (secondary prevention) – participants were 46% less likely to experiment with drugs, 27% less likely to experiment with alcohol, and almost 33% les likely to hit someone than youth not participating in the program.

UK's Tackling Knives Action Programme

In the UK, Home Office's Tackling Knives Action Programme (TKAP) launched in June 2008 showed a fall in assault with a sharp object among those aged 13 to 19 years (figures fell by 26 per cent in England - 30 per cent in the areas targeted by the Tackling Knives Action Programme and 17 per cent in other areas) **(Department of Health, 2009)**.

US initiatives

See table in the extended literature review at the back (Appendix 2) – various initiatives that address both the social and built environment; however, the focus is on the built environment and design/ community design (Brisbon, Plumb, Brawer, & Paxman, 2005).

Jamie Oliver's campaign

The campaign shows how politicians could be influenced to change policy i.e. pupils performance and attainment improved due to healthier school meals (Waite, 2009).

Home Zones/ Traffic calming measures

By creating 'slow/ reduced' traffic streets HZ improves residents' health and, in particular, the health of children through less traffic and therefore less accidents, and more 'play area and therefore more potential for playing and physical activity (Biddulph, 2001).

NICE evidence review found that traffic-calming interventions may be useful in enabling children specifically to benefit from physical activity through play outdoors in the short and long term. It also concluded that closing or restricting use of roads can lead to long-term increases in walking and cycling and a decrease in road traffic accidents. Provision of cycling infrastructure can lead to a long term increase in cycling and a reduction in cycle casualties (Killoran & Doyle, 2008).

Residential streets with well-designed layouts and a 20mph speed restriction point to significant benefits such as reductions in accidents and car fumes; research found children being able to play in a safer street. Residents also felt that the area would become a more friendly place with less disruptive traffic and a annual levels of recorded crime in the Morice Town, Plymouth home zone have fallen by 90% (Maconachie & Elliston, 2002).

In Copenhagen, Denmark, measures introduced over the last 30 years to reduce traffic and improve the quality of public spaces in the city centre has encouraged a 65 per cent rise in bicycle use since 1970 (Gehl & Gemzøe, 1988).

Other UK Initiatives

West Cumbria Health Impact Assessment

A HIA carried out by Durham University for West Cumbria recommended that improvements to the living environment should be aimed at promoting better health and encouraging people to move into and stay in the area *(Durham University, 2007)*. This should include:

- adopting a 'decent neighbourhood standard'
- access to healthy food
- prioritising home heating and insulation
- healthy primary schools; better local access to public and advice services
- schemes to take healthy living messages to the community including the most hard-to-reach groups.

Sheffield Decent Homes Program

A report found that Sheffield's Decent Homes Programme had a major impact on the health and quality of life of residents – reducing heart and respiratory disease, reducing the number of accidents in the home and giving greater security and mental well-being (Gilbertson, Green, & Ormandy, 2006).

There are a number of good examples and best practice from across the South West and from other areas in the UK and Europe, which emphasize the importance of tackling health inequalities through the lens of area deprivation and built environment. The box below highlights some of them.

Healthy Cities examples:

- The work of Glasgow Centre for Population Health in developing a regeneration plan for Glasgow East End
- Brighton and Hove city centre development regeneration

Traffic calming

- The Active Bristol approach is a good example of how the NHS, City Council and others can work together to agree shared agendas.

Green infrastructure

- Swindon Green Infrastructure Strategy
- Forest of Avon Green Infrastructure Tool
- Bristol Greenspace Audit
- Funding – Malmo, Sweden, private developers obliged to take responsibility for on-going management of green spaces in new developments.

Energy saving and fuel poverty

- Barton Hill in Bristol and Devonport in Plymouth are examples of best practice in reducing health inequalities in concerted area programmes funded via the New Deal for Communities programme.
- Carrick Housing in Cornwall and Cheltenham Borough Homes in Gloucestershire are examples of best practice where local authorities have set up Arms Length Management Organisations using government funding successfully improving all their council homes to the Decent Homes Standard ahead of the national target date of 2010.

Part 5: what changes in policy are needed to deliver better health outcomes through better built environment? Likely impact of recession?

Recommendations

Link back health into the built environment/ planning processes (Royal Commission on Environmental Pollution, 2007a, 2007b) i.e. Gothenburg in Sweden has appointed a group on healthy planning; Sandness in Norway has a comprehensive municipal plan which includes health issues; Belfast Healthy Cities partnership; in Scotland every LA has a health improvement officer; the London Health Strategy incorporated health issues at a strategic level

HOPE VI Policy Recommendations (Harris & Kaye, 2004): assist people with health problems in regeneration areas; consider prevalence and type of health issues in an area before regeneration

The society is ageing and technology advancing; actual provision of NHS care (in big hospitals) is bound to be phased out in favour of smaller units, more personalised services in the home and local communities (Pullen, 2009)

Impact of recession

Health inequalities will rise further as the recession deepens due to extreme impact on vulnerable and disadvantaged groups: as unemployment rates rises the risk of suicide, depression and attempted suicide will increase (Danny Dorling, professor of human geography at the University of Sheffield). Most vulnerable/ deprived will be hit first and worst.

The evidence from studies looking at the closure of factories and industries throughout 70s and 80s is that everybody who lost their job saw their health go down regardless of how healthy they were to start with.

Any positive impacts?

Two studies in the US: one suggests that employed people become healthier in a recession, perhaps because they reduce risk-taking behavior such as drinking and smoking (Ref?) also (BBC News, 2009); the other shows that death rates go up in times of boom as people overwork, drink and smoke too much, and are involved in car crashes and industrial accidents (Ref).

Mental health

Mental health charity *Rethink* says mental health problems will manifest themselves quickly, with more referrals and admissions to mental health services. In October, it released a survey of 2,000 people, which highlighted the prospect of home repossession as their most pressing concern, with 46% saying it would damage their mental health.

Unhealthy eating

In November, celebrity chef and food campaigner *Jamie Oliver* told the health select committee that unhealthy eating would probably increase in a recession as people will turn to cheaper options, will work longer hours and have less time for cooking and fresh food.

Fuel poverty

Help the Aged has warned that some 50% of pensioners will not be able to heat more than one room this winter as inflation eats into their income. This will mean an increase in people with respiratory conditions presenting to GPs and at A&E.

Annexe 1

Key tables, charts and graphs

Figure 1 - Source: (F. E. Kuo, 2001)

Surrounding natural vegetation and the ability of single mothers to cope with major life issues[143].

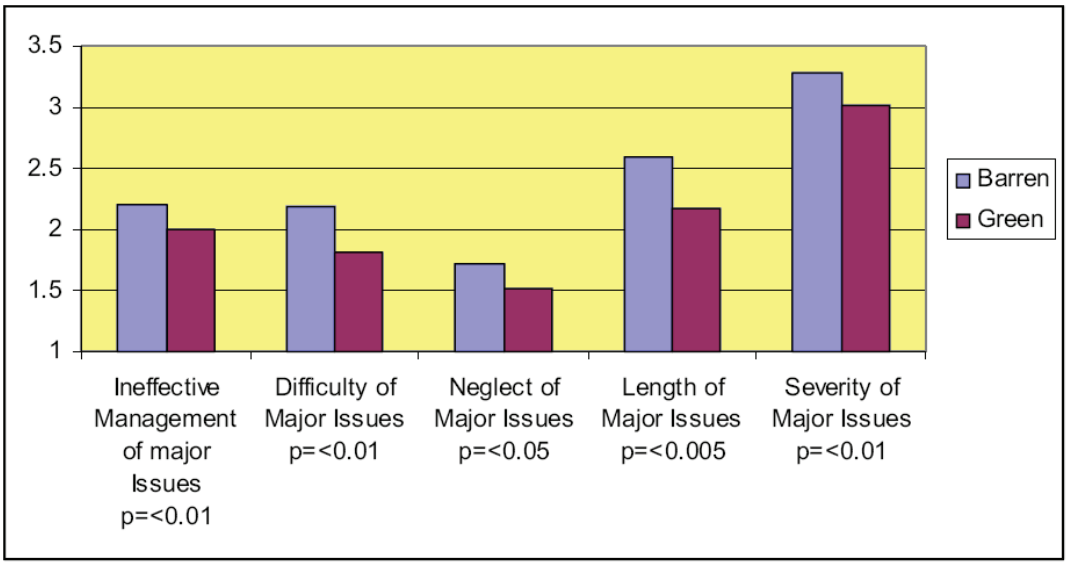


Figure 2 - Source: (Bird, 2008)

Nature moderates effects of stressful life events on psychological distress (p<0.05).

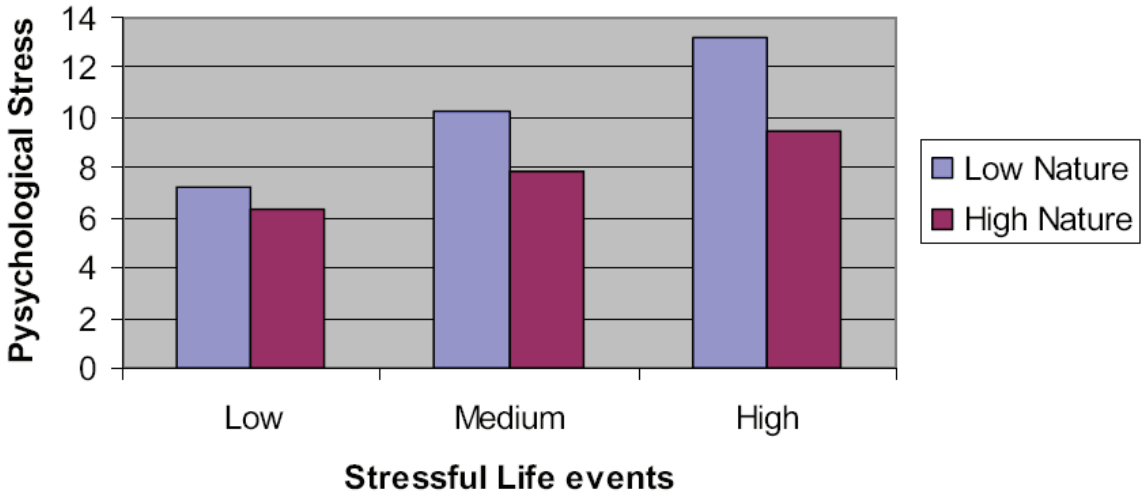


Figure 3 - Source: (Bird, 2008)

What motivates people to continue to participate in Health Walks

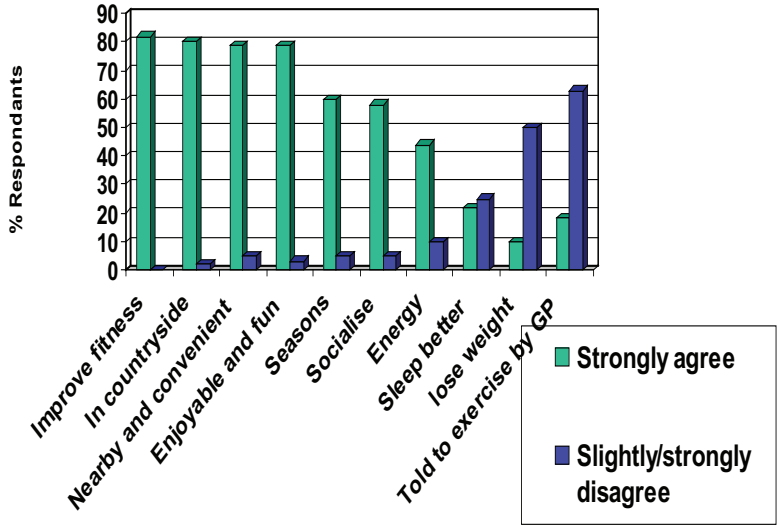


Figure 4 - Source: (Bird, 2008)

Is greenery associated with obesity?

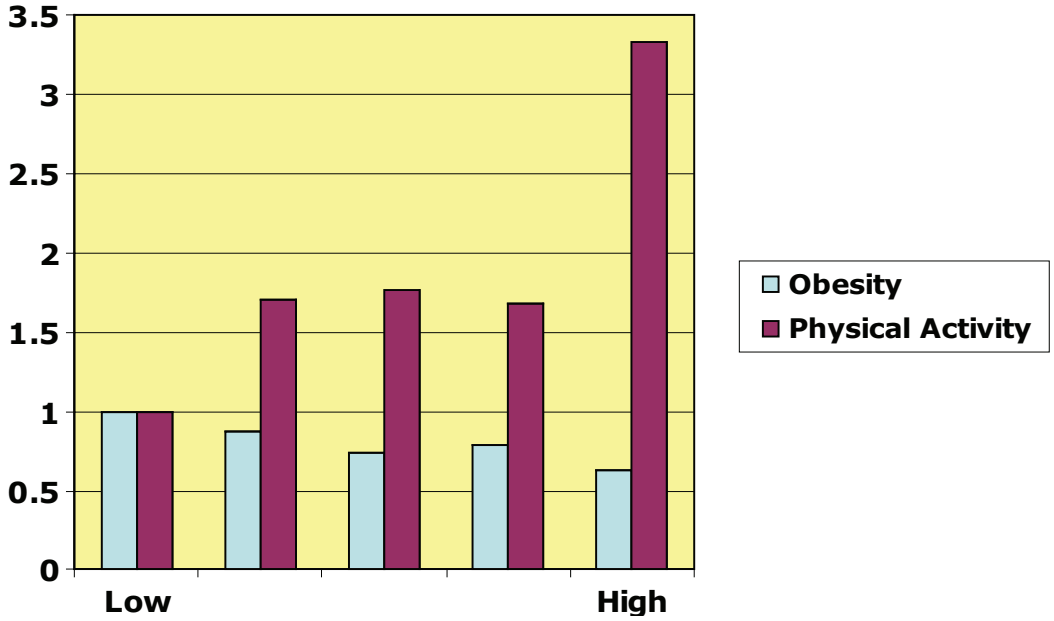
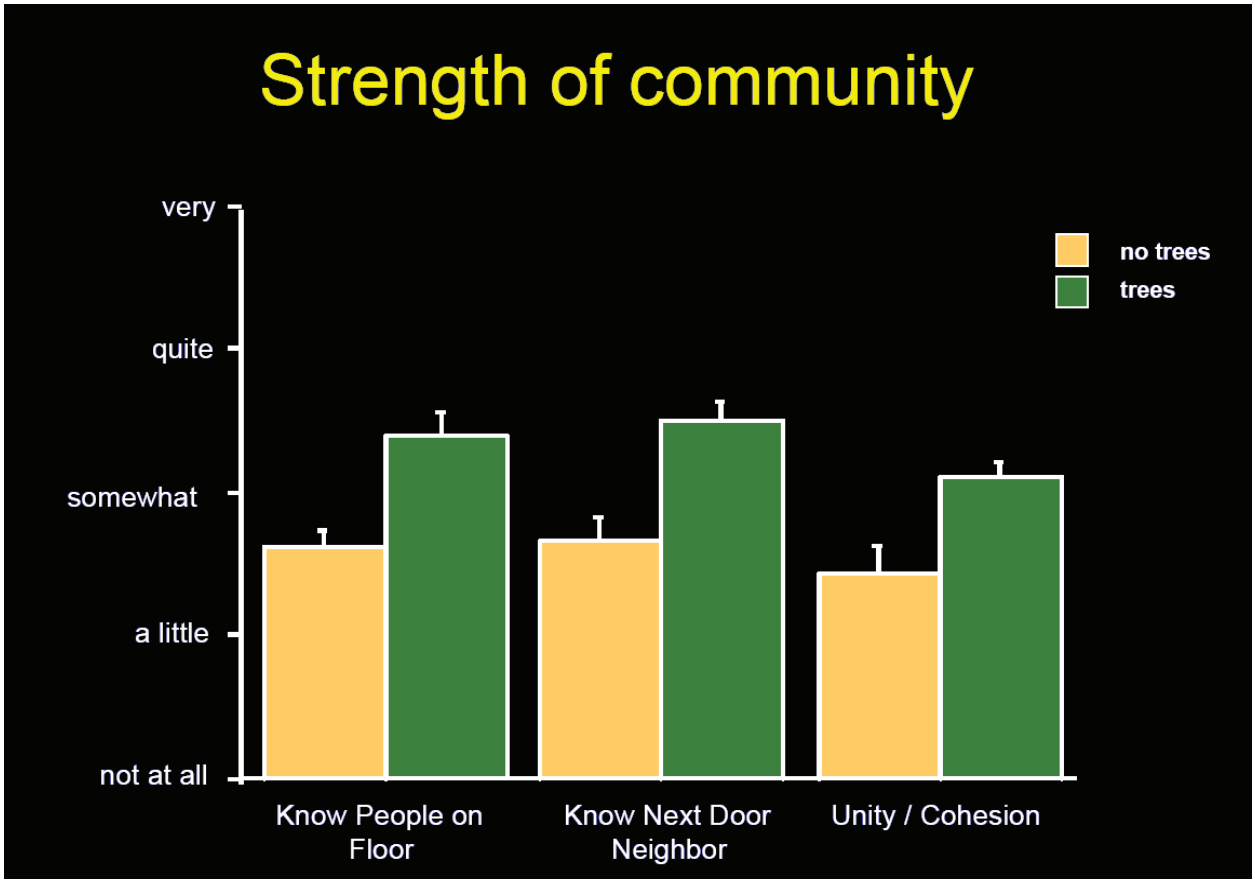


Figure 5 & 6 - Source: (Bird, 2008)

Social Cohesion, Aggressive Behaviour and Trees



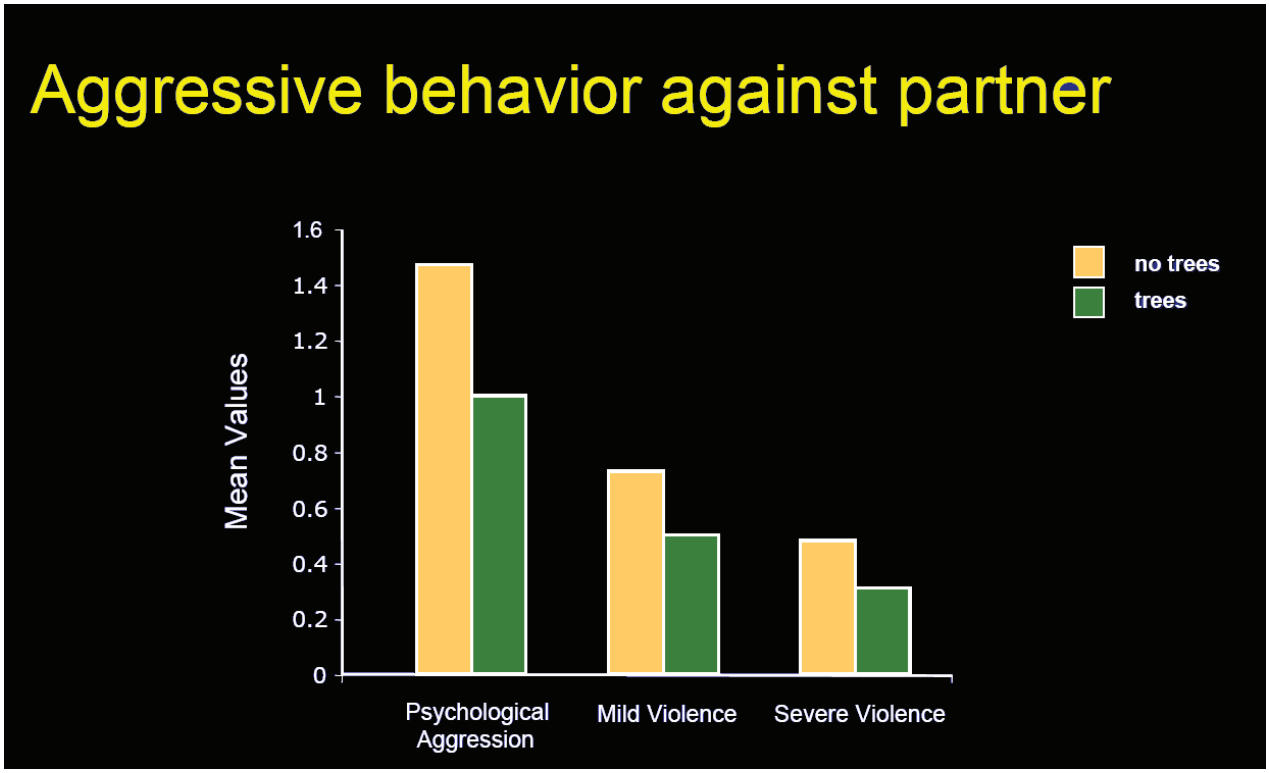
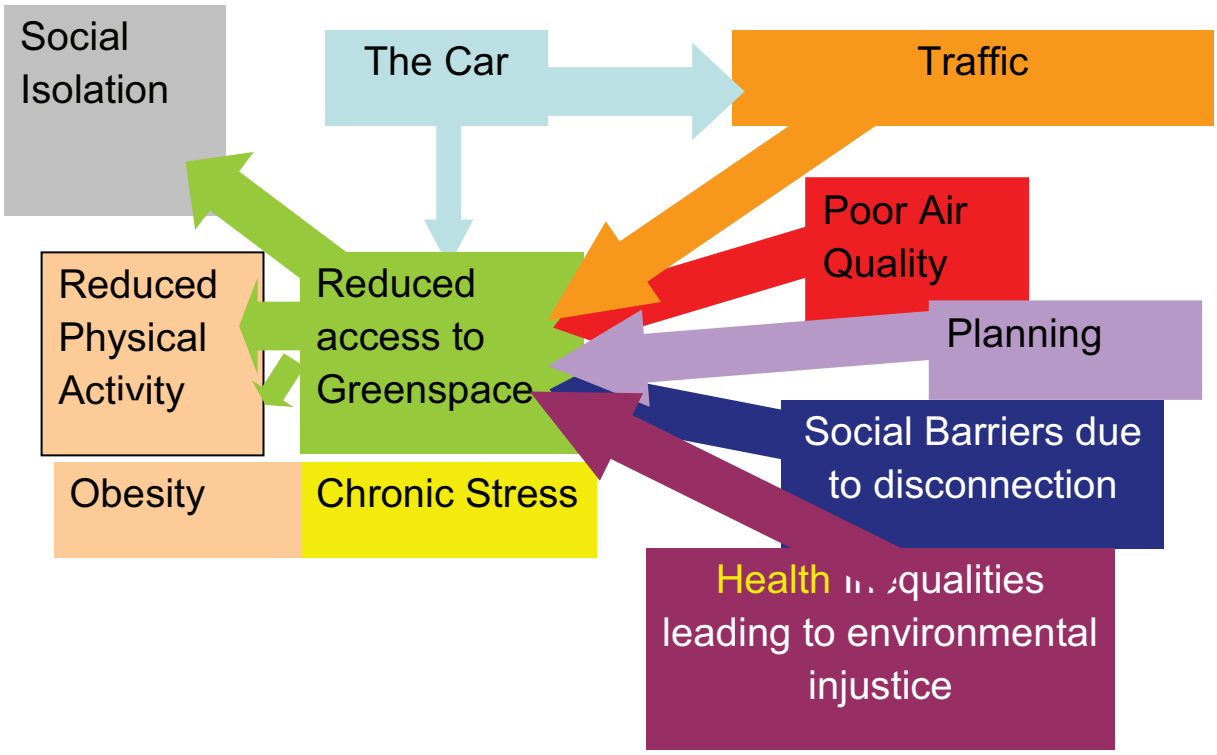


Figure 7 & 8 - Source: (Bird, 2008)

Reduced access to GREEN SPACE



How Stress can be seen as a major public Health Problem

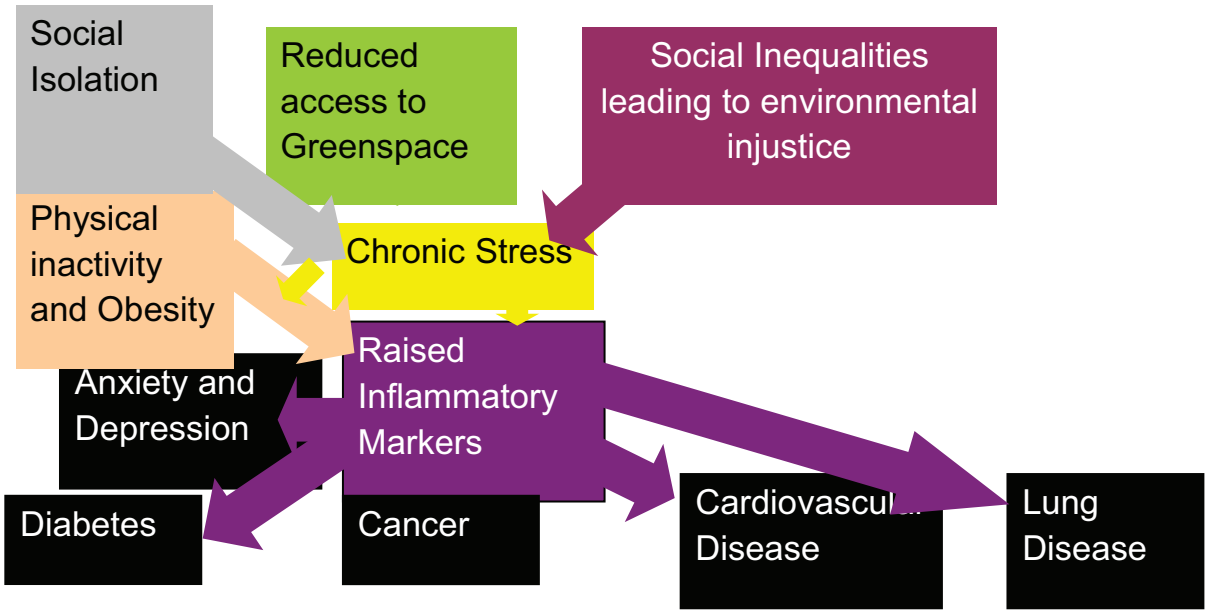


Figure 9 - Source: (Stamatakis & Hamer, 2009)

Sitting time and obesity: an independent relationship

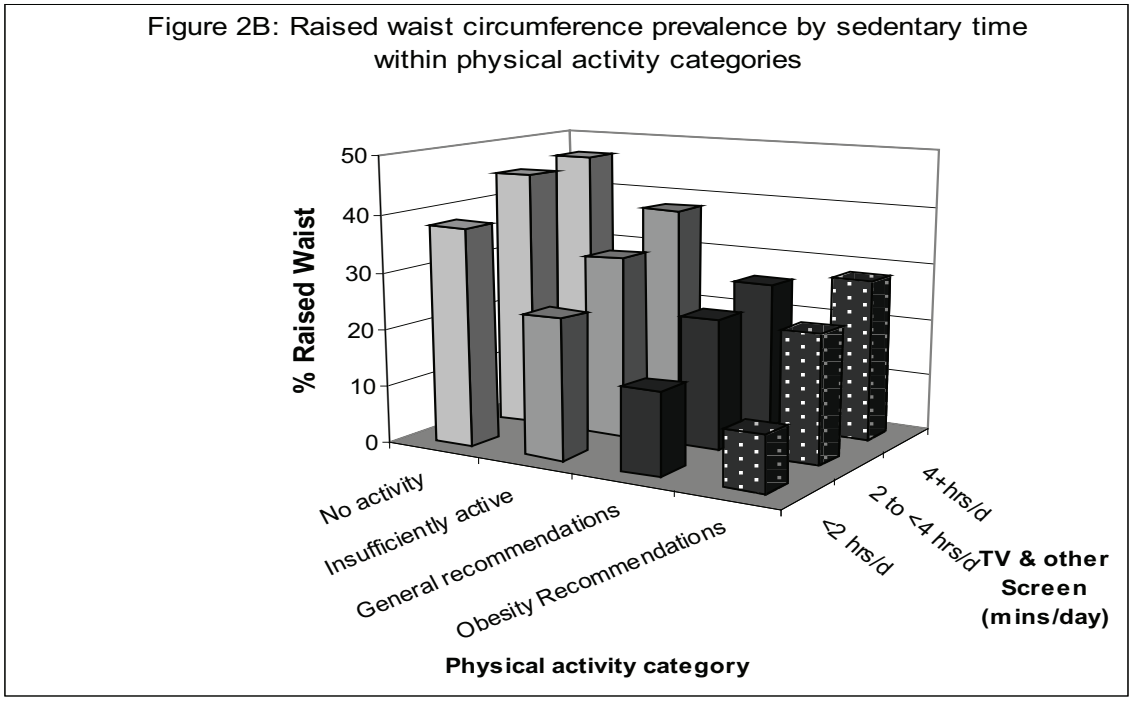
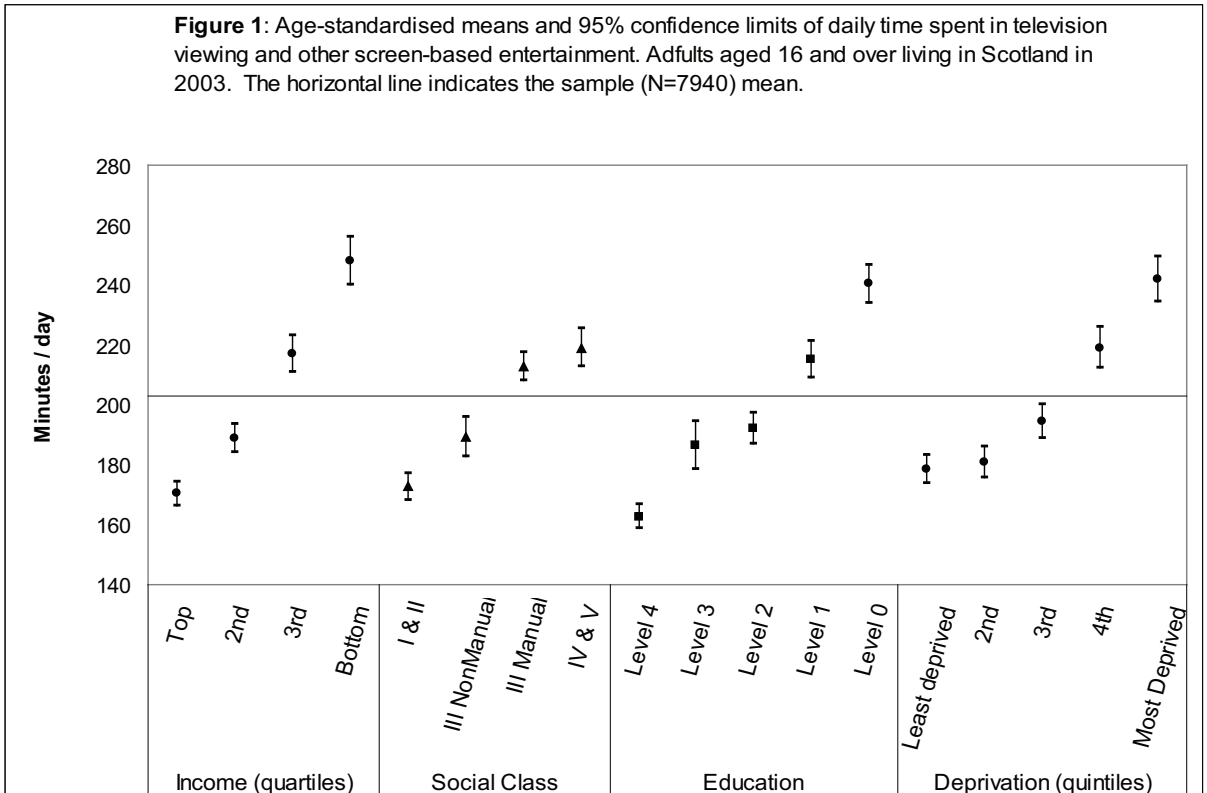


Figure 10 - Source: (Stamatakis & Hamer, 2009)

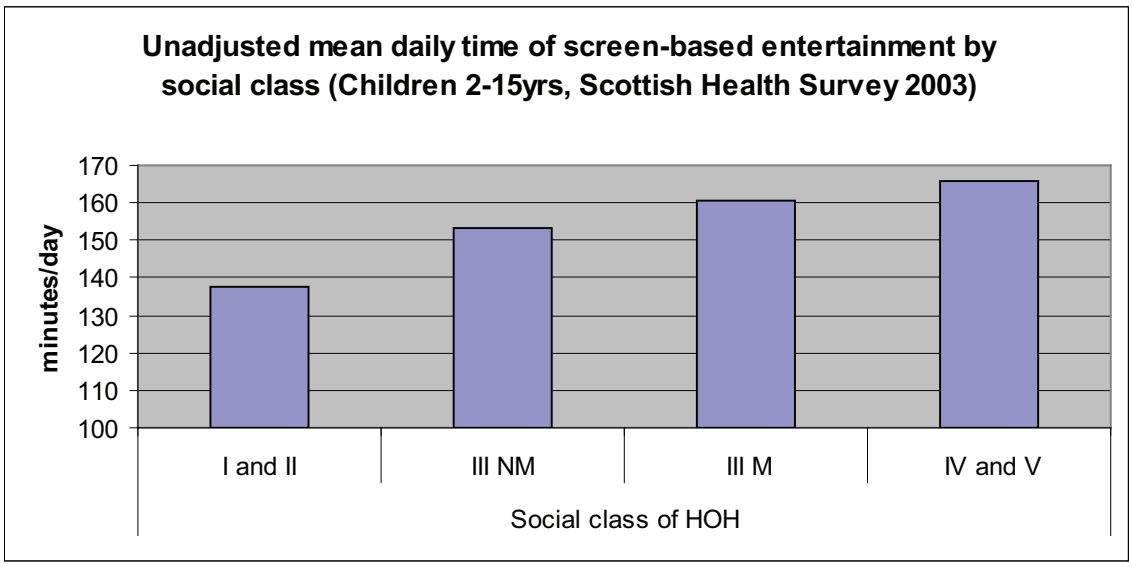
Is there a social gradient in sedentary behaviour? - Adults



Source: (Stamatakis & Hamer, 2009)

Figure 11 & 12 - Source: (Stamatakis & Hamer, 2009)

Is there a gradient in sedentary behaviour in children?



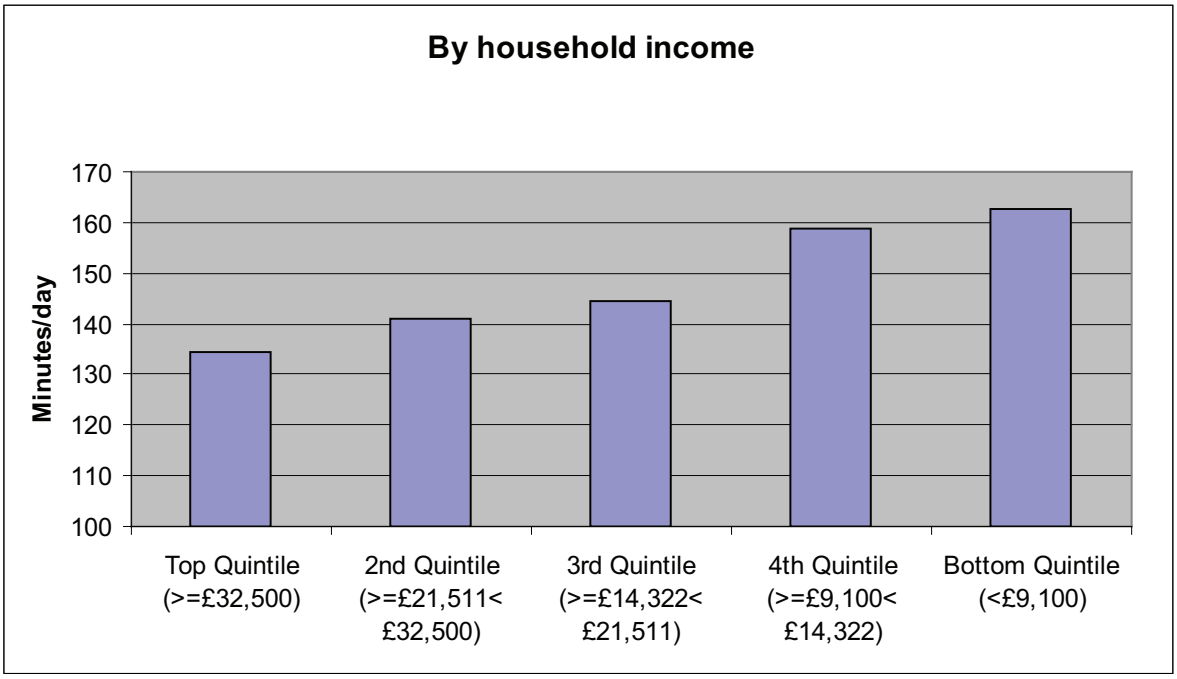
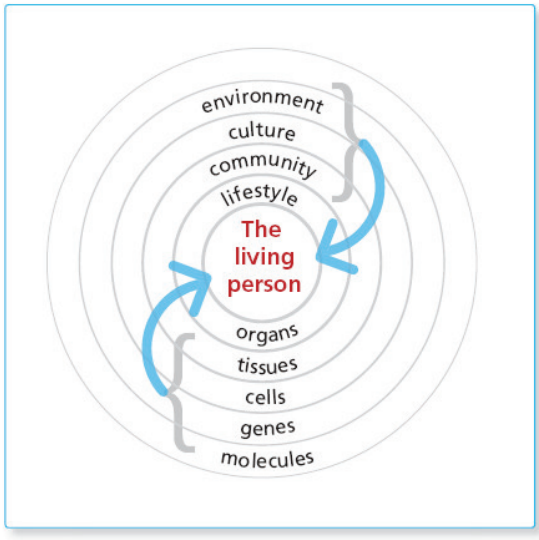


Figure 13 - Source: (Royal Commission on Environmental Pollution, 2007a, 2007b)

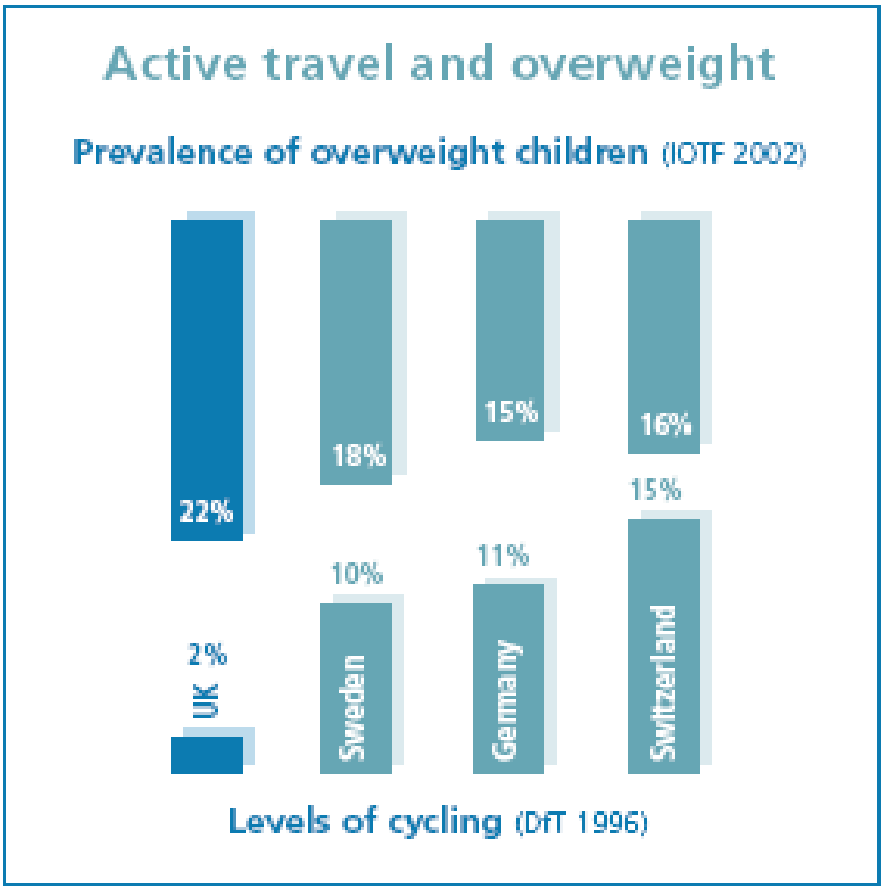
FIGURE 3-I

Interacting factors influencing an individual's health[7]



The intrinsic characteristics of the individual are placed at the core; surrounding these are layers of different influences on health.

Figure 14 - Source: (Sustrans, 2008; Sustrans Active Travel, 2008)



Annexe 2

Literature Review in detail

CONTENTS:

- Design/ Secured by Design & Design out Crime

Part 3: Why many urban areas fall far behind (negative features of the built environment that impact on healthy lives)

- Street crime and Anti Social Behaviour (ASB)
- Traffic, Transport and Pollution
- Noise
- Fuel poverty and housing conditions
- Climate change
- Mental health and urbanisation
- Poor design (disability/ access)

Part 4: What evidence is there of improvements through policy change?

- Area Based Initiatives (Health Action Zones, SRB, NDC, Sure Start, Hope IV)
- London's Congestion Charge
- Boston's Public Health Campaign
- UK's Tackling Knives Action Programme
- Other US initiatives
- Jamie Oliver's healthy food campaign
- Home Zones/ Traffic calming measures
- Other UK initiatives

Part 5: What have different studies recommended to deliver better health outcomes through better built environment?

- Recommendations
- The impact of current recession

Literature Review in detail

This review of literature discusses in detail the main literature on health inequalities and the build environment/ disadvantaged areas; there are five main parts to the paper and they are as follows:

- Part 1: the built environment, area inequality and their impacts on health inequalities
- Part 2: positive and necessary features of the built environment to support healthy lives
- Part 3: why many urban areas fall far behind (negative features of the built environment that impact on healthy lives)
- Part 4: what evidence is there of improvements through policy change?
- Part 5: what have different studies recommended to deliver better health outcomes through better built environment? (recommendations and impact of recession)

Part 1: The built environment, area inequality and their impacts on health inequalities

This section answers the following questions:

- What aspects of built environment affect health?
- What impacts do disadvantaged (unequal) areas have on health of poorer groups?

…and the evidence is grouped under the following main headings:

- Elements of the built environment affecting health
- Area/ Neighbourhood effects (on health)
- Disadvantaged areas & Health/ Health inequalities
- Vulnerable groups and health inequalities
- Dynamic/ Long-term trends

***

Evidence consistently indicates that there is an association between the built environment, health and well-being, and levels of physical activity; however, study designs adopted thus far (i.e. cross-sectional studies) do not allow the assumption of a causal effect.

The importance of walking (and to a lesser extent cycling) as a means of achieving recommended levels of exercise should not be underestimated. Regular walking is associated with lower levels of obesity, and generally better health and well-being. Walking is consistently reported as the most common form of exercise and the preferred form of physical activity, particularly for those who do not undertake other types or exercise. Streets and public spaces are important locations for exercise and physical activity. Changes to the environment to make spaces more conducive to exercise may bring about considerable and sustainable public health gain.

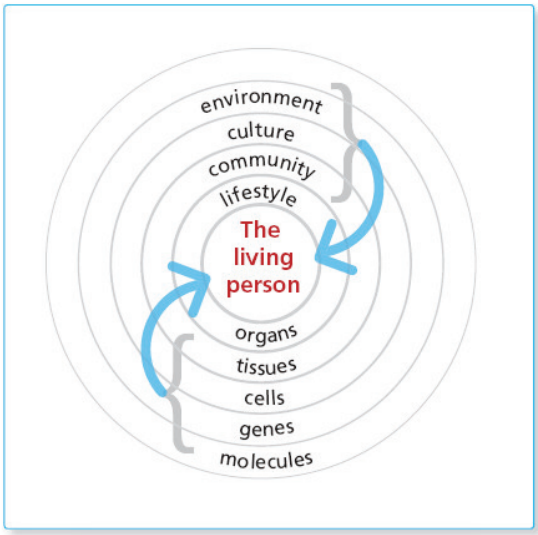
More recent studies show that attitudes and beliefs about exercise may have more important associations with levels of physical activity than the physical environment. The relationship between individual beliefs and motivations and the built environment need further investigation.

The evidence is limited with regard to other variables that might interact with or moderate environmental variable to facilitate physical activity, for example, gender, age, social class, and ethnicity. This would seem to be an area where further research could usefully be undertaken. Qualitative studies might enhance our understanding of individual attitudes and perceptions to both physical activity and the built environment.

(About the body of literature in general on the relationship between the built environment and health) The literature on general health and the built environment has a strong UK base. However studies considering physical activity (and perhaps to a lesser extent obesity) are predominately from North America and to a lesser extent Australia. It might be questioned whether the findings of these studies can be meaningfully transferred into other geographical and cultural contexts. The majority of studies employ a cross-sectional design with sophisticated statistical analyses to unpick the association between the built environment and levels of activity **(Croucher, Myers, Jones, Ellaway, & Beck, 2007)**.

However, the nature of the relationship between health and place is poorly understood. It is difficult to establish whether and how the urban environment causes unfavourable health outcomes. The urban environment affects the health and wellbeing of everyone who lives and works in cities and towns. However, many problems are concentrated in the most deprived areas where a combination of environmental, social and economic factors leads to poor outcomes and low life expectancy **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

FIGURE 3-I
Interacting factors influencing an individual's health[7]



The intrinsic characteristics of the individual are placed at the core; surrounding these are layers of different influences on health.

.

Aspects of built environment that affect health

The Sustainable Development Commission groups aspects of the built environment that affect health as follows **(Sustainable Development Commission, 2008):**

1. Aspects of the outdoor environment that influence health (direct)
   - Natural spaces
   - Air pollution
   - Road traffic
   - Noise
   - Floods
   - Climate
2. Aspects of the outdoor environment that influence health (indirect)
   - Accessibility
   - Safety and incivilities
   - Mixed land-use
   - Street design
   - Natural spaces

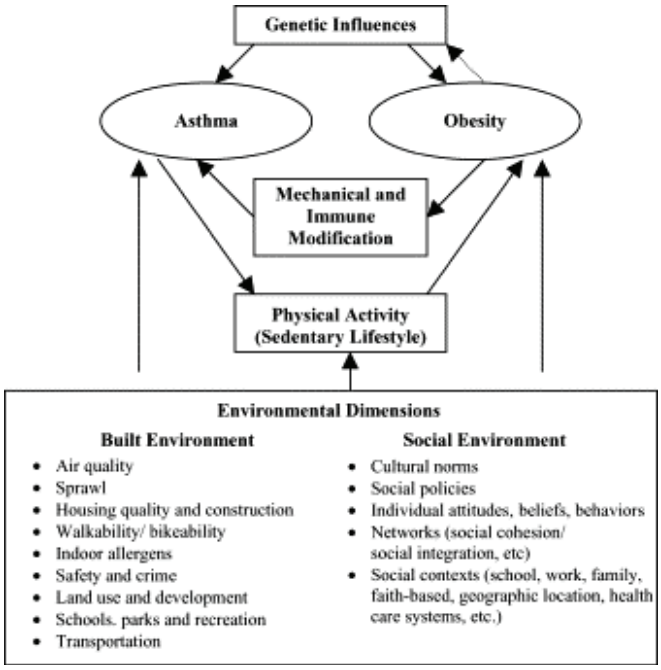
The table bellow shows another classification of elements of the built environment that can have an influence on health **(Royal Commission on Environmental Pollution, 2007a, 2007b).**

TABLE 3.1

Summary of aspects of the urban environment that affect health and wellbeing

Issue	Scale of health effects (all figures are approximate)
Air pollution	24,000 premature deaths per year in Great Britain;[103] reduced average life expectancy by around eight months in 2005[104]
Climate — Winter	25,700 extra deaths occurred in the period December 2005 to March 2006 in the UK, compared with the death rate for other months of the year[105]
Climate — Summer	at least 2,000 excess deaths in UK in heatwave of summer 2003[106]
Mental health[107]	association between urban residence and the prevalence of psychiatric disorders in the UK, which persists after adjustment for confounding factors
Infectious diseases	some disease transmission rates are higher in urban areas; this could also be the case for pandemic influenza or exotic infectious diseases
Obesity	34,000 premature deaths and about 16 million attributable days of certified incapacity per year in England[108]
Traffic accidents	3,300 deaths and 29,000 serious injuries per year in Great Britain[109]

In **(Brisbon, Plumb, Brawer, & Paxman, 2005)**



Neighbourhood/ Area effects

The neigh/ area effects studies are traditionally based on qualitative studies (the place where one lives matters!). However more recently expansion of quantitative studies trying to assert if variation in outcomes such as educational attainment, voting, health, children's behaviour and domestic violence can be explained to a certain extent by the areas individuals live in once differences between individuals are statistically controlled for. The evidence is not conclusive so far due to methodological issues i.e. incomplete adjustment for individual SES **(S. Macintyre, Ellaway, & Cummins, 2002; S. Macintyre, Maciver, & Sooman, 1993).**

There two main trends in literature: *pro area effects* studies (usually qualitative) and *no area effects* studies (and usually quantitative). Some authors also argue that neighbourhood effects may be less evident in more equal countries.

1. *No area effects* studies see (Propper et al., 2005)

This paper examines the association between neighbourhood and levels and changes in common mental disorders and finds that **neighbourhood characteristics are not generally statistically associated with**

levels or changes in mental ill health. There is some evidence of interaction between neighbourhood characteristics and gender and ethnicity, but while statistically significant these interactions are small in size compared to the main effects of individual and household characteristics. **What appears to be important for levels of common mental disorders are the observed characteristics of individuals and their households, not of place.**

2. Pro area effects studies

- **See Power, Mumford, Lupton** literature

Walking past boarded-up houses and litter on the way to school can have devastating effects on children's behaviour and exam results, says *One More Broken Window: The Impact of the Physical Environment on Schools* by Perpetuity Group, for the Nasuwt teaching union **(Shepherd, 2009)**.

The research by Perpetuity Research Ltd for the NASUWT explores the impact of the physical environment on behaviour and attitudes within schools. It concludes that the quality of the physical environment affects individual behaviour and behaviour within and in relation to schools. Where local physical environments are allowed to become dirty, litter strewn and covered in graffiti, this is likely to give rise to the perception that: "No one else really cares about this area, so why should I?" or "That's a really run-down area; I wouldn't want to go there". Fear avoidance is a main response to poor physical environments, leading to spiralling decline. The more an area is avoided, the greater becomes the perception of danger and the more the area is avoided. Eventually the perception of danger becomes reality. This can lead to the establishment of 'no go' areas. Schools are affected adversely by being located within declining physical neighbourhoods. Poor quality physical neighbourhoods are likely to impact on the way that individual schools are perceived, the willingness of parents to choose to send their children to these schools, the ability of schools to recruit and retain high quality staff, and the motivations and outcomes of pupils who attend these schools. In short, an association is established between the unpleasant characteristics of the locality and the school in the area, leading to school avoidance **(Perpetuity Group, 2009)**.

There is evidence to suggest that factors in the physical environment external to the school can impact upon schools, affecting behaviour, attendance, academic achievement and maintaining parental support. Investigating the impact of the external environment is a critical element in explaining pupil behaviour. The establishment of extended schools and the statutory duties on schools to promote community cohesion and ensure pupil wellbeing raise issues about how and to what extent schools should be involved in and consulted about wider community safety agendas **(Perpetuity Group, 2009)**.

The role of schools in the regeneration agenda needs to be carefully considered without adding to the existing burdens of school leadership teams. Community safety policies can contribute to helping to improve the behaviour of pupils within schools; however, schools are not sufficiently involved in or consulted about the development of these policies. Crime and fear of crime data relating to the areas served by individual schools should be readily available for use by schools to enable better joined-up planning. Schools should be encouraged to share with other local stakeholders data that contributes to building a picture about the needs of the local community, including data relating to pupil attendance, achievement and behaviour. Critical incident data relating to individual schools is essential in order to enable schools and other bodies to understand and respond to problems **(Perpetuity Group, 2009)**.

3. Relationship between area effects and inequality

Pickett & Pearl argue that neighbourhood effects may be less evident in more equal countries which have less polarised neighbourhoods. However this has been challenged by a study from Sweden which found (see ((UK) Blackman, 2006) pg. 81) **(Pickett & Pearl, 2001).**

Disadvantaged areas

Living in deprived urban areas increases the risks of poor health outcomes, even after controlling for individual characteristics. In Scotland, for example, mortality rates for those under 75 years of age in the 10%

most deprived areas are three times as high as those in the 10% least deprived. The figures for long-term limiting illness are equally striking, with 30% of the population in the 10% most deprived areas being affected compared with 12% in the 10% least deprived. The social inequalities within urban environments are particularly marked, and this has an effect on health outcomes. For example, in different areas within the London Borough of Camden there is a life expectancy difference in the populations of up to 11 years **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

For almost every adverse health problem, individuals with low socio-economic status are more likely to experience disease and die younger than the affluent. Factors such as relative poverty, low wages, occupational stress, unemployment, poor housing, poor education, poor diet, limited access to transport and shops, and a lack of recreational facilities all have an impact on people's health. While increased mortality is more closely correlated simply with low socio-economic status, a poor urban environment can also add to the factors that contribute to ill health. Although it is difficult to separate the effects of poor environment from low socio-economic status, concentrations of poverty and disadvantage in an area are likely to have health effects over and above the effects of personal disadvantage. For example, respiratory problems in London are concentrated in the poorest areas and correlate with high traffic levels. Possible reasons for this higher burden of illness include inadequate housing, nutritional status, limited access to health care and greater air pollution exposure **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

The concern that economically disadvantaged people may sometimes be exposed to greater environmental health hazards has been investigated as part of the concept of environmental justice. This goes beyond a simple analysis of the distribution of environmental pollution to suggest that issues of participation in environmental decision making and the distribution of environmental benefits, rather than just consideration of risks, are important in order to overcome inequality **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

There is a powerful relationship between the gap in life expectancy and local measures of deprivation; in the North West in 2001- 2003, men and women living in the most deprived fifth of areas nationally can expect to live on average 6.8% and 5% respectively less than the average for England and Wales. Men and women living in the most affluent fifth of areas nationally can expect to live 3-4% longer than the average for the country. Some conditions show an extremely strong relationship with deprivation (greater than 3-fold to 10-fold variation) with greater levels of resulting ill health in the most deprived areas. For example: self-harm, violence, chronic obstructive pulmonary disease, alcohol related conditions, births to lone mothers, claimants of disability living allowance and incapacity benefits. Other conditions, which may be grouped into related categories, show 2- to 3-fold variation with deprivation. For example: asthma, lung cancer, respiratory conditions and smoking related deaths, diabetes and heart disease, alcohol related deaths and mental health, self rated poor health and frequent fliers (persons with frequent emergency admissions to hospital) and epilepsy **(Wood et al., 2006)**.

Health inequalities

Sassi gives a good and up to date overview (during the last 15 years) of general trends in mortality, longevity, health status, CVD, mental health etc. and concludes that current trends of health inequalities look worrying bearing in mind Government's efforts over the past 15 years. However, on a positive note, inequalities in life expectancy show stabilisation or slight decline across LA with different levels of deprivation. On a less positive note, inequalities have worsened among women to a significantly greater extend than among men (and across a series of indicators: obesity, CVD, life expectancy and mental health). Areas of particular concern include substantial emerging inequalities in mental health and increasing inequalities in aspects of lifestyle such as those associated with obesity **(Sassi, 2009)**.

Trends in Mortality and Longevity – react slowly to policy changes

Overall inequality in *age at death* –increasing since 2001 in men and since 2002 in women, with an acceleration in both groups since 2006.

Infant mortality – inequality (between most disadvantaged and national average) increased from 13% to 17% between 2001 and 2006.

Life expectancy (between the most and least deprived local authorities) – inequalities increased between the early 1990s and 2002, and steadily declined between 2002 and 2005, in both men and women **(Sassi, 2009)**.

Inequalities in health between rich and poor areas of Britain widened in the 1980s and 1990s, and the current government has repeatedly expressed its intention to reduce these inequalities. In this article, however, the authors report that inequalities in life expectancy have continued to widen, alongside widening inequalities in income and wealth, and argue that more potent and redistributive policies are needed **(Shaw, Smith, & Dorling, 2005)**.

Studies have shown that exposure to the natural environment, or so-called green space, has an independent effect on health and health-related behaviours. We postulated that income-related inequality in health would be less pronounced in populations with greater exposure to green space, since access to such areas can modify pathways through which low socioeconomic position can lead to disease **(Mitchell & Popham, 2008)**.

Populations that are exposed to the greenest environments also have lowest levels of health inequality related to income deprivation. Physical environments that promote good health might be important to reduce socioeconomic health inequalities **(Mitchell & Popham, 2008)**.

Levels of physical activity also show an association with ethnicity. With the exception of Black Caribbean and Irish populations, all other minority ethnic groups have lower rates of adherence to the Chief Medical Officer's recommendations on physical activity for adults. Inequalities are greatest for South Asian women. Only 11% of Bangladeshi and 14% of Pakistani women were reported to have done the recommended amounts of physical activity, compared with 25% in the general population **(Department of Health, 2009)**.

They argue that neighbourhood effects may be less evident in more equal countries which have less polarised neighbourhoods. However this has been challenged by a study from Sweden which found (see ((UK) Blackman, 2006) pg. 81) **(Pickett & Pearl, 2001).**

It is now widely accepted that the form of the built environment is a strong determinant of physical activity levels, with lower development densities and car-focused land use patterns leading to more sedentary travel and lower activity levels (Frank et al, 2004; Transportation Research Board /Institute of Medicine, 2005) **(Sustrans Active Travel, 2008)**.

Lower socioeconomic groups have higher cases of injury and deaths from traffic accidents (Gorman et al, 2003). More than a quarter of child pedestrian casualties happen in the most deprived 10% of wards (Social Exclusion Unit, 2003). In Wales, children and people aged over 65 are twice as likely to be injured by motor vehicles in deprived areas than in more advantaged areas (M Drakeford, 2006) **(Sustrans Active Travel, 2008)**.

A study of people living in a deprived housing estate on the outskirts of Glasgow where the main road was traffic calmed showed that 20% of adults walked more after the traffic calming, and there was a statistically significant improvement in physical health (Morrison et al, 2004) **(Sustrans Active Travel, 2008)**.

The way in which residents perceive their environment has been shown to have an influence on mental health. One study found that areas perceived to be safer and more aesthetically pleasing can enhance mental health, while adverse effects were found in the case of factors such as road congestion and urban noise (Leslie et al, 2008) **(Sustrans Active Travel, 2008)**.

There is some evidence to show that people with physical disabilities who live in activity-friendly neighbourhoods are more likely to walk or cycle for transport (Kirchner et al, 2008; Spivock et al, 2007, 2008) **(Sustrans Active Travel, 2008)**.

Vulnerable groups

Studies also show that the negative impact of poor physical environment is greater for different types of residents, notably **women (Stafford, Cummings, & Macintyre, 2004)**, people who are **unemployed (Cummings, Stafford, & Macintyre, 2005)**, and **older people (Krause, 1996)**.

People from the most disadvantaged groups are more likely to be subject to an 'obesogenic' environment which discourages walking and cycling, perceiving their neighbourhoods to be busier with traffic, less attractive, and less supportive of walking. They also often disproportionately bear the impacts of car-dominated urban planning practice. Lower socioeconomic groups have higher incidences of injury and deaths from traffic accidents. More than a quarter of child pedestrian casualties happen in the most deprived 10% of wards. In Wales, children and people aged over 65 living in deprived areas are twice as likely to be injured by motor vehicles as are those living in more advantaged areas **(Insall, 2009)**.

1. Children & Young people

The theme of access to safe places to play dominates this small literature. Access to safe greenspaces, such as parks and playgrounds, and recreational facilities are particularly important for children and young people.

Evidence clearly shows that children who have better access to such safe places are more likely to be physically active, and less likely to be overweight, compared to those living in neighbourhoods (usually poorer neighbourhoods) with reduced access to such facilities **(P Gordon-Larsen, Nelson, Page, & Popkin, 2006)**.

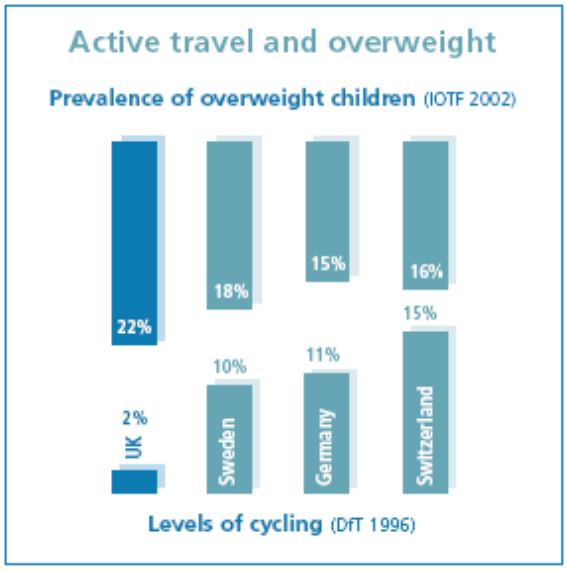
Children and young people's perceptions of the neighbourhood were also likely to be associated with levels of activity, thus positive reports of neighbourhood facilities such as shops, the social environment, and the aesthetics were also associated with increased levels of activity **(Hume, Salmon, & Ball, 2005)**.

The study perceptions of parents toward the neighbourhood and how this impacted on children's levels of activity. Parents' perceptions were an important determinant of levels of activity. Where parents perceived the neighbourhood to be safe for walking and cycling, children were more likely to undertake these activities; however, girls of all ages were less likely to walk or cycle than boys **(Timperio, Crawford, Telford, & Salmon, 2003)**.

Several recent studies indicate that children living close to busy roads have an approximate 50% increased risk of experiencing respiratory illness including asthma. Control of road traffic flows in and around the city of Oxford was introduced in 1999 and this has been shown to increase lung function and reduce wheezing in asthmatic children, with the greatest improvements in those from less affluent backgrounds. Looking more broadly at childhood asthma levels, a recent international study of asthma and allergy in children has shown that the UK has the highest asthma prevalence in the world with 21% and 25% of 6-7 and 13-14 year-olds respectively having reported asthma symptoms within the past 12 months. This is compounded in urban areas where children have been shown to have a higher prevalence of allergic disorders than, for example, those living on farms **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

Current data show that only 32% of UK adults take 30 minutes of moderate exercise five times a week, which is the threshold for improving cardiovascular health. The issue is particularly important for children, where inactivity is helping to create a new generation who are more likely to become inactive and obese adults. For example, over 30% of children in England are overweight and nearly 20% are obese. The rising trend in obesity results from a variety of factors, but one element may be less access to recreation and exercise. Parents and children may not feel safe using car-dominated streets, and evidence shows "that children and young people do not play out as much as they used to and that their opportunities for free play are restricted". At the same time, the number of children travelling to school by car has doubled over the last twenty years, while the number walking and cycling has fallen, and it has been argued that "We have 'designed' a lot of incidental exercise out of our lives." **(Sustrans Active Travel, 2008)**

(Sustrans, 2008)



2. Women

Typically women undertake less physical activity than men, and that they may also face different barriers to exercise, for example, lack of time due to multiple roles and perceptions of safety.

The study concluded that there were differences in perceptions of neighbourhood between men and women, and these differences could account for some differences in levels of leisure time physical activity between men and women. Women were more likely than men to perceive their neighbourhood as being unsafe for walking. Seeing other people being active in the neighbourhood was also more likely to encourage women to exercise. Of particular importance for women was the availability of free or low cost recreational facilities. Those with the lowest rates of participation in physical activity are found among the poor and women of child bearing age, thus it seems highly likely that lack of access to low cost recreational facilities is a major factor inhibiting opportunities for exercise and health improvement in low income women and their families **(Bengoechea, Spence, & McGannon, 2005)**.

Although women typically undertake less exercise than men, women are also more likely to engage in walking for recreational exercise than men **(Duncan & Mummery, 2004).**

The study explored the themes of relationships and caring among women undertaking physical activity in an urban park in New York. It found that the presence of others in greenspaces promoted feelings of safety and enjoyment, as well as providing opportunities for social interaction and support for undertaking physical activity **(Krenichyn, 2004)**.

3. Older people

Little literature in UK and Europe, mainly North American literature.

Good pedestrian access and convenience of facilities is an important predictor of physical activity among older people **(W. King, Brach, & Belle, 2003; Patterson & Chapman, 2004)**.

Indicators of low safety (for example, poor street lighting and unattended dogs) were related to a decrease in physical activity in older people **(Booth, Owen, & Bauman, 2000; A. King, Castro, & Wilcox, 2000)**.

The study by shows that older people who reported living in neighbourhoods which were perceived to be problematic (with regard to traffic, noise, crime, litter, lighting, and public transport) were more likely to

experience functional deterioration than older people living in neighbourhoods that were perceived to be less problematic **(Balfour & Kaplan, 2002)**.

The study notes the association of pleasant or favourable surroundings with increased levels of walking among older women **(W. King, Brach, & Belle, 2003)**.

The findings of this qualitative study show older people's willingness and capacity to cope with hazardous urban environments, and their apparent preference to continue to live in a hazardous neighbourhood because it is familiar to them and is the location of social and family networks. This suggests that for older people at least, favourable attitudes to neighbourhood are not just about environmental qualities **(Russell, Hill, & Basser, 1998)**.

A Japanese study demonstrated that living in areas with walkable greenspace positively influenced the longevity of older people in an urban area (Tokyo), independent of age, sex, marital status, baseline function and socio-economic status **(Takano, Nakamura, & Watanabe, 2002)**.

They demonstrated that the stress levels of older people could be positively affected by the use of urban parks **(Orsega-Smith, Mowen, Payne, & Godbey, 2004b)**.

An Health Impact Assessment carried by Derbyshire Dele Council into new housing designed for older people at Lifetime Homes Standard found that new housing contributed to significantly improved quality of life, independence and self-efficacy **(Derbyshire Dales District Council, 2007)**. Other areas of health benefit identified were as follows:

- The well insulated and easy to heat environment mitigated against avoidable winter deaths
- The age appropriate internal design features such non-slip floors, easy access and provision of wet rooms mitigated against housing related accidents
- Accessibility and proximity to local community services increased uptake of health services and wider community participation
- The exterior design in the vernacular was considered non stigmatising and gave residents a positive psychological experience
- The siting of the developments in areas of low deprivation increased residents' neighbourhood attachment and perception of safety.
- Access to housing advice and support from local housing support workers resulted in housing transition being less stressful than anticipated.
- The option of shared ownership of some properties enabled residents to release equity and increase disposable income.

4. Ethnic groups

(Penny Gordon-Larsen, Nelson, & Popkin, 2006) Lower-SES and high-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight

Levels of physical activity also show an association with ethnicity. With the exception of Black Caribbean and Irish populations, all other minority ethnic groups have lower rates of adherence to the Chief Medical Officer's recommendations on physical activity for adults. Inequalities are greatest for South Asian women. Only 11% of Bangladeshi and 14% of Pakistani women were reported to have done the recommended amounts of physical activity, compared with 25% in the general population **(Department of Health, 2009)**.

According to the Department of Health, is that some ethnic minority groups experience poorer health than others (health inequalities) and also experience poorer access to services and poorer quality of services (inequities in access) **(King's Fund, 2006(King's Fund, 2006)**.

The latest evidence from the *2004 Health Survey from England* reveals that 15 per cent of Bangladeshi men reported their health to be 'bad or very bad' compared to 6 per cent of men in the general population. But not all ethnic groups report worse health: the same survey reveals that men from Black African and Chinese groups report better health than average. In addition to this self-reported evidence, the Department of Health reports that: 'some conditions and diseases are also particularly prevalent among certain ethnic groups, for example coronary heart disease among South Asians, and diabetes among South Asians (prevalence five times higher than the general population) and people from African and Caribbean backgrounds (three times higher)'.

Causes

A body of evidence has existed for some time that connects the deprivation experienced by a person with the increased chances of illness and shorter life. Many people from ethnic minority backgrounds also experience high levels of poverty, and analysis of self reported ill health data has shown that deprivation explains a large amount of the ill health experienced by ethnic minority groups. However, factoring in socio-economic disadvantage, such as low income, does not fully explain the differences in health between ethnic minorities and the majority population. It seems highly likely that other factors, perhaps including the experience of racial discrimination or cultural insensitivity in the provision of health care, are also associated. Research continues into the role that biological factors and cultural differences might play in determining health.

Access to health care

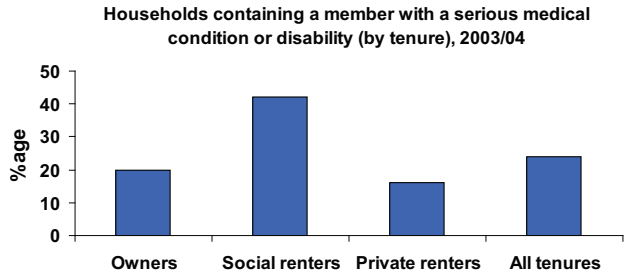
Bangladeshi backgrounds reported significantly poorer experiences (as hospital inpatients) than White British or Irish respondents, particularly on questions of prompt access, as well as their experience of involvement and choice.

5. The unemployed/ low socio-economic groups

Lower-SES and high-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight **(Penny Gordon-Larsen, Nelson, & Popkin, 2006)**.

6. Disabled people

A current review of the future of social housing in the UK found that disable people are more likely to be concentrated in social housing than in privately own or rented properties. Moreover, their number increased over the last decade (Hills, 2007). Deprived areas have a higher than average concentration of social housing and therefore of disable people. Moreover, lower socio economic groups concentrated in deprived areas and they tend to have higher levels of disability due to poorer health, more accidents and more mental health problems.



Research also found that levels of physical activity among disable people are limited by barriers and promoted by facilitators related to the built environment in general and the way buildings are designed in particular. Barriers included lack of curb cuts, inaccessible access routes, doorways being too narrow for wheelchair access, facility front desk being too high for persons in wheelchairs to communicate with the person at the desk, and lack of elevators; slippery floors and the absence of handrails on stairs. Facilitators included providing nonslip mats in locker rooms; providing an adequate number of accessible parking spaces; installing push-button operated doors; constructing multilevel front desks that can accommodate both wheelchair users and non-wheelchair users; lowering or removing door thresholds to facilitate wheelchair access; providing ramp access to whirlpools and hot tubs; and in new construction, building zero-depth entry pools that can be entered by a person using a wheelchair without the need for a ramp or pool lift. One of the most frequently mentioned facilitators was to provide family changing rooms, which would make it easier for parents to help their children with disabilities with changing, or in situations where a person with a disability needs assistance dressing and undressing usually by another family member or a personal assistant. **(Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004)**

Dynamism/ Trends

For many causes of death in London, measures of deprivation made around 1896 and 1991 both contributed strongly to predicting the current spatial distribution. Contemporary mortality from diseases which are known to be related to deprivation in early life (stomach cancer, stroke, lung cancer) is predicted more strongly by the distribution of poverty in 1896 than that in 1991. In addition, all cause mortality among people aged over 65 was slightly more strongly related to the geography of poverty in the late 19th century than to its contemporary distribution.

Contemporary patterns of some diseases have their roots in the past. The fundamental relation between spatial patterns of social deprivation and spatial patterns of mortality is so robust that a century of change in inner London has failed to disrupt it **(Dorling, Mitchell, Shaw, Orford, & Davey Smith, 2000)**.

Part 2: Positive and necessary features of the built environment to support healthy lives

This section answers the following question

> - What are the most important aspects of the built environment that would support more equal and healthier lives?

…and the evidence is grouped under the following headings:

- The importance of physical activity
- Green infrastructure
- Walkability
- Accessibility
- Housing conditions/ Buildings
- Design/ Secured by Design and Designing out Crime

An Healthy Urban Area (as defined by WHO) from (Royal Commission on Environmental Pollution, 2007a, 2007b)

BOX 3C CHARACTERISTICS OF A HEALTHY URBAN AREA[113]

- A clean, safe physical environment of high quality;
- Stable and sustainable ecosystems;
- A strong, mutually supportive, integrated and non-exploitative community;
- A high degree of participation and control by inhabitants over decisions affecting their lives, health and wellbeing;
- Basic needs of all inhabitants met (in terms of food, water, shelter, income, safety and employment);
- Access to a wide variety of experiences and social and cultural resources;
- A diverse, vital and innovative urban economy;
- Enabling connections with the cultural and biological heritage of the various urban inhabitants;
- An urban form that is compatible with enhancement of all the other specified characteristics;
- An optimum level of appropriate public health and care services accessible to all; and
- High levels of positive health outcomes and low levels of morbidity.

The importance of physical activity

Physical inactivity, the main sign of which is obesity, is one of the ten leading causes of death in developed countries. Physical inactivity is associated with increased risks of developing many of chronic diseases such as type II diabetes, obesity, cardiovascular diseases, certain cancers, depression and anxiety. It also has a positive effect on a range of health determinants such as body weight, blood pressure, cholesterol levels. The benefits of physical activity for health is undisputed, with the Government recommending everyone undertakes at least 30 minutes of moderate intensity activity at least five times a week **(DoH 2004)**.

Sustrans reviewed the evidence between physical activity, health and social inequality finding that obesity, diabetes and cancer all affect people from deprived communities disproportionately. They link this primarily to the environments in which they live. Lower density car-based developments and problems of traffic, pollution, crime, litter, lighting and poor public transport are all identified as contributory factors. It noted that research (by Moore et al 2006) had found that traffic free cycle and walking routes were most effective in encouraging cycling and walking in deprived areas. This also identified case studies where improvements in the physical environment had led to increased walking. This includes an estate in Glasgow where traffic calming measures had led to a 20% increase in walking **(Sustrans Active Travel, 2008)**.

Increasing levels of physical activity would contribute to achieving reductions in coronary heart disease and obesity, hypertension, depression and anxiety. Even relatively small increases in physical activity are associated with some protection against chronic disease and improved quality of life. People who are physically active reduce their risk of developing major chronic diseases – such as coronary heart disease, stroke and type 2 diabetes – by up to 50%, and the risk of premature death by about 20–30% **(Department of Health, 2009)**.

Physical activity:

• is associated with a reduction in the overall risk of cancer, has a clear protective effect on colon cancer and is associated with a reduced risk of breast cancer in women after the menopause;

• reduces the risk of diabetes – physically active people have a 33–50% lower risk of developing type 2 diabetes compared with inactive people, with a particularly strong preventive effect for those at high risk of developing diabetes;

• is important for helping people to maintain weight loss over several months or years. (Those who include physical activity as part of their weight loss plan have a better chance of long-term success. Physical activity brings important reductions in risk of mortality and morbidity for those who are already overweight or obese);

• can help protect against osteoporosis and have beneficial effects in those with osteoarthritis and low back pain;

• in childhood has a range of benefits, including healthy growth and development, maintenance of energy balance, psychological well-being and social interaction; and

• is associated with reduced risk of depression and dementia in later life, is effective in the treatment of clinical depression and can be as successful as psychotherapy or medication, particularly in the longer term. More generally, physical activity helps people feel better and feel better about themselves, as well as helping to reduce physiological reactions to stress **(Department of Health, 2009)**.

People from the poorest households are least likely to meet the recommended levels of physical activity. They are also the most likely to be sedentary – achieving less than 30 minutes of physical activity per week. For example, 44% of women and 34% of men in the poorest households in England are sedentary, compared to only 33% of women and 28% of men in the wealthiest households. People living in deprived areas are also less likely to meet physical activity recommendations – in the most deprived areas of Wales people are twice as likely to be inactive. These low physical activity levels are a significant cause of health inequalities, with inactive groups suffering poorer health and living shorter lives than the general population **(Insall, 2009)**.

Green infrastructure

Green space plays an important role in facilitating exercise and promoting health and well-being. Evidence consistently shows that accessible and safe urban greenspaces have a positive and significant influence on levels of physical activity, as well as enhancing individuals' sense of well-being by providing opportunities for engagement with nature, and social interaction. Access to safe green spaces, such as parks and playgrounds, and recreational facilities are particularly important for children and young people. Evidence clearly shows that children who have better access to such safe places are more likely to be physically active, and less likely to be overweight, compared to those living in neighbourhoods with reduced access to such facilities. Moreover access to greenspace is associated with greater longevity in older people. Also Evidence indicates that greenspace is most valuable as a resource for physical activity when used by high volumes of people; therefore, spaces need to be accessible, of sufficient size, and connected to residential areas. Greenspaces need to be diverse, as evidence suggests that single use greenspace (such as sports fields) deter undedicated use. Also, some studies have specifically investigated the role of green space with regard to general health (as opposed to exercise).

De Vries *et al* (2002) tested the hypothesis that people in green areas are healthier than people living in less green areas by combining Dutch data on the self reported health of 10,000 people with land use data on the amount of green space in their living environments. The authors conclude that living in a greener environment was positively related to all three of the available health indicators and the association was somewhat stronger for housewives and older people. The three health indicators considered by De Vries *et al* were: number of symptoms experience in the previous 14 days; perceived general health measured on a five point scale; and the score on the Dutch version on the General Health Questionnaire **(De Vries, Verheij, Groenewegen, & Spreeuwenberg, 2002)**.

Swanwick *et al* (2003) in a multi-method study in the UK concluded that green space has the ability to contribute positively to some of the key agendas in urban areas including health, social inclusion, sustainability and urban renewal **(Swanwick, Dunnett, & Woolley, 2003)**.

Kuo (2001) in a study in the USA tested the hypothesis that green space enhances the capacity of residents in urban public housing to cope with the effects of poverty. This in depth study used a random assignment of public housing residents to buildings with and without nearby nature. Residents who lived in public housing with nearby nature (for example, with views of trees or open space) showed greater capacity to cope with

stress than those who lived in dwellings without nearby nature. The authors suggest that public housing projects could be configured to enhance residents' resources for coping with the poverty **(F. E. Kuo, 2001)**.

Open spaces with a range of attractive attributes (such as trees, lakes, landscaped features) encourage higher levels of walking; walking in such spaces is associated with the restorative qualities of nature, and more than just the benefits of exercise **(Giles-Corti et al, 2005)**.

The natural environment – everything from parks and open countryside to gardens and other green spaces – can play an important part in promoting and maintaining good health and well-being. It can also aid patient recovery. As part of the NHS's commitment to sustainable development, healthcare organisations can incorporate elements of the natural environment into the design of buildings and estates in ways that will contribute to a healthy community, economy and environment **(Sustainable Development Commission, 2007)**.

The existence of safe and attractive green space designed to encourage physical exercise and play is of increasing importance for public health.88 Physical inactivity is a major preventable health risk and tackling it should be a public health priority. Current data show that only 32% of UK adults take 30 minutes of moderate exercise five times a week, which is the threshold for improving cardiovascular health.89 The issue is particularly important for children, where inactivity is helping to create a new generation who are more likely to become inactive and obese adults.90 For example, over 30% of children in England are overweight and nearly 20% are obese.91 The rising trend in obesity results from a variety of factors, but one element may be less access to recreation and exercise. Parents and children may not feel safe using car-dominated streets, and evidence shows "that children and young people do not play out as much as they used to and that their opportunities for free play are restricted". At the same time, the number of children travelling to school by car has doubled over the last twenty years, while the number walking and cycling has fallen, and it has been argued that "we have 'designed' a lot of incidental exercise out of our lives."94 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Green spaces also provide elements of physical comfort such as shading, cooling, fresh air and places to rest, and provide opportunities for formal and informal social interactions. Furthermore, research suggests that "humans have an innate sensitivity to and need for other living things – as we have co-existed for thousands of generations"96 and that many people have emotional responses to the natural environment.97 There is convincing evidence of the positive benefits to be gained from both active and passive involvement with natural areas in towns and cities.98 For example, hospital patients with views of nature recovered more rapidly than those with views of other buildings.99 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Greenness may present a target for environmental approaches to preventing child obesity. Children and youth living in greener neighbourhoods had lower BMI z-scores at Time 2, presumably due to increased physical activity or time spent outdoors. Conceptualizations of walkability from adult studies, based solely on residential density, may not be relevant to children and youth in urban environments **(Bell, Wilson, & Liu, 2008)**.

There is a body of epidemiological and other evidence that suggests that if there is increased access to green space and therefore more physical activity, significant health impacts should follow. In areas of London from 1990 to 2003, public access to green space improved as a result of regeneration and acquisition of new areas. The average reduction in distance to green space was 162 metres (from 1.192 km to 1.039km) and was greater for affluent areas than it was for deprived areas. this raises the issue of potentially widening health inequalities…**(London School of Hygiene & Tropical Medicine, 2005)**

Case study: A study of the Westwood estate in Peterborough involved road narrowing, traffic calming, new garages and hardstandings, landscaping and lighting. A number of alleyways were blocked off to keep out strangers. Housing improvements included new porches, secure windows, and new bathrooms and kitchens. Surveys showed that before the work residents' mental health, and their satisfaction with the estate, were both extremely poor. Three years after the work, there were substantial improvements to mental health and

satisfaction which were put down to the physical changes and the residents' perception of them **(Halpern, 1995)**.

Contact with the natural environment/ nature/ greenery is considered to have the following benefits on wider health and mental health:

- **Reduced violence and aggression:** a reduction in behavioural indicators and incidence of crime in urban areas with green spaces
- **Reduced health inequalities:** significant reductions in mortality and morbidity from all causes and circulatory disease associated with areas of greater green space. This effect is controlled for income deprivation.
- **Improved mental health and well being indicators for children, young people and adults:**
- **increased potential for adaptation to climate change (floods, heatwave)**
- **improvement in air and noise quality**
- **increased likelihood of physical activity across all age groups.**

Moreover, studies exploring adult and community contact with natural environments have shown:

- positive effects of natural environment on social interaction and cohesion in different age groups, by providing inclusive places to meet. **Bird (2007)**

- living near green space led to less health complaints and better mental and physical health than an urban environment. For every 10% increase in green space there was a reduction in health complaints equivalent to a reduction of five years of age **De Vries (2001)**

Green spaces and reducing inequalities

A recent review cited studies reporting that green spaces are associated with better health regardless of socio-economic status. This effect was still seen after controlling for socio-economic factors. **(Green Space Scotland, 2007)**

A recent large-scale study in the UK **(Lancet 2008)** showed reduced inequalities in mortality in areas related to increasing levels of green space. This effect was still seen after taking into account income deprivation.

Studies in deprived urban areas in the U.S have shown that those with high levels of green spaces had half the levels of crimes compared to similar areas without green spaces (52% fewer crimes, 48% less property crimes, and 56% less violent crime). There were lower levels of aggressive behaviour and domestic violence indicators**.** These areas also showed increases in strength of community indicators, and increased ability for the poorest, single-parent mothers to cope with major life issues. **(F. Kuo, 2001; Kuo & Sullivan, 2001a, 2001b)**

Psychosocial benefits of access and contact with nature

- improves attention among children with attention deficit disorder , and self-discipline among inner city girls **(Faber, Kuo, & Sullivan, 2001, 2002).**

- enhances emotional and values-related development in schoolchildren **(Kellert, 2002).**

- is associated with reduced crime, aggression and violence **(Kuo and Sullivan 2001a)**, as well as increased civility and neighbourliness **(Kuo et al. 1998).**

- Using nature to build communities through participation in local nature activities has been shown to increase sense of community strength and pride **(Austin, 2002; Inerfield & Blom, 2002).**

Rehabilitative benefits of access to Green Spaces

- Patients with views of nature through hospital windows had improved post-operative recovery and lower need for pain relief. Stressed patients showed lower levels of fear and anger **(Ulrich, 1984; Ulrich et al., 1991)**.

- Contact with nature was linked to fewer clinic visits in prisoners **(Moore, 1982)**.

- Women with breast cancer showed better concentration on their treatment if they had regular contact with natural environments **(Cimprich, 1993)**.

- Looking at nature through a window can lead to reduced stress and enhanced work performance in the office **(Kaplan & Kaplan, 1995)**.

Mental and Physical Health benefits across the life-course

Green spaces play an important role for the well being of inner city and suburban residents **(Newton, 2007)**. A study undertaken by MIND found that self-esteem levels increased and depression levels decreased following a green walk. This was in comparison to reduced self-esteem and some increase in depression following an indoor walk **(Mind, 2007)**.

A recent study showed a trend of reduced admissions for mental illness and reduced under-75 mortality associated with increasing levels of green space in an area. This effect was seen after controlling for deprivation and population density. **(Wheater C 2008)**

Studies examining children's contact with natural environments have shown:

- views onto trees and grass were associated with reduced stress **(Wells & Evans, 2003)**.

- increased access to urban green spaces, led to increased concentration and self discipline in children **(Faber et al 2002)**;

- increasing levels of accessible urban green spaces is associated with increased amounts of play for local children **(Sallis, Nadir, & Broyles, 1995)**.

- access to green spaces reduced ADHD symptoms in children **(Kuo et al 1995)**.

- natural features can create enclosed areas to promote play between different groups and create varied activities suitable for different age groups leading to better overall concentration and motor skills.

Green infrastructure and climate change

Green infrastructure can help both in mitigating and adapting to climate change. Well designed green infrastructure mitigates change by reducing travel trough provision of local recreation opportunities, promoting active travel, supplying biomass, biofuels or timber, increasing local food production and improving carbon storage and sequestration. Likewise it can help adapt to the impact of climate change through managing surface water run-off to prevent flooding, creating cooler microclimates and providing shelter and protection in extreme weather **(CABE, 2009, www.sustainablecities.org.uk).**

Green infrastructure: allotments and community gardens

The use of vacant land for allotments can produce cheap and nutritious food, encourage exercise, facilitate building of local social capital, and contribute to a more sustainable environment (Thrive, The allotments regeneration initiative; QED allotments newsletter). There is also a significant amount of literature on the health benefits of allotments or community gardens (Armstrong, 2000; Twiss & et al, 2003).

Walkability (walking distance)

"Walkable" neighbourhoods are associated with higher levels of physical activity, and lower levels of obesity. Studies consistently show higher levels of walking in "walkable" neighbourhoods as opposed to

neighbourhoods that are less "walkable". Although "walkability" is conceptualised in various ways, typically a walkable neighbourhood will have high residential density, a variety of land use, good connectivity (i.e. street layout and design allow direct routes to destinations), and good accessibility (i.e. a variety of destinations or facilities such as retail facilities in easy proximity). Neighbourhoods that have these features in combination promote *greater levels of physical activity*.

Saelens' review combines the findings of a number of different studies. They estimated that residents in high walkable neighbourhoods reported approximately two times more walking trips per week than residents of low walkable neighbourhoods. These findings are supported by **(T. Pikora, Giles-Corti, B., Knuiman, M, 2005; Saelens, Sallis, & Frank, 2003)**.

Results indicate that people are more likely to be physically active if they live in neighbourhoods with many destinations, such as shops and other facilities, and with many street intersections between residential and commercial districts to enable direct pathway to destinations **(Frank, Schmid, & Sallis, 2005)**.

Like walkability, neighbourhoods that are perceived to have high levels of functionality, are associated with more walking for a number of different purposes, including walking to work, walking for recreation, and task-related walking **(McCormack, 2004)**.

Accessibility/ Access to facilities (including transport)

Accessible neighbourhood resources are strongly associated with levels of physical activity. Accessible neighbourhood resources are also a key determinant of physical activity. Evidence consistently shows that people who have easy access to physical activity facilities are more likely to engage in physical activity than those who do not. Access to facilities such as cycle paths, local parks and other green spaces, beaches, or recreation centres is strongly and positively associated with physical activity. Inadequate facilities, the absence of facilities or barriers to access (such as steep hills, busy roads to cross) have a negative impact on physical activity.

Evidence consistently shows that people who report nearby facilities for physical activity are more likely to engage in physical activity than those who do not have such facilities nearby **(Duncan, Spence, & Mummery, 2005)**.

Access to facilities such as cycle paths, local parks and other green spaces, beaches, or recreation centres is strongly and positively associated with physical exercise The absence of such facilities or barriers to facilities (such as steep hills, busy roads to cross) or the perception that such facilities are inadequate have negative associations with physical activity **(Humpel et al., 2002(Humpel, Owen, & Leslie, 2002)**.

People reporting the presence of shops and services within their neighbourhood are more likely to be physically active **(Duncan, Spence, & Mummery, 2005; T. Pikora, Giles-Corti, & Knuiman, 2005)**.

Environmental factors are suggested to play a major role in physical activity (PA) and other obesity-related behaviours, yet there is no national research on the relationship between disparity in access to recreational facilities and additional impact on PA and overweight patterns in US adolescents.

Findings: Higher-SES block groups had a significantly greater relative odds of having 1 or more facilities. Low-SES and high-minority block groups were less likely to have facilities. Relative to zero facilities per block group, an increasing number of facilities was associated with decreased overweight and increased relative odds of achieving ≥5 bouts per week of moderate-vigorous PA.

Conclusion: Lower-SES and high-minority block groups had reduced access to facilities, which in turn was associated with decreased PA and increased overweight **(Penny Gordon-Larsen, Nelson, & Popkin, 2006)**.

Housing conditions / Buildings

Substandard housing creates a variety of health risks, including an increased risk of chronic disease, injury, poor nutrition, and poor mental health **(G. Evans, Saltzman, & Cooperman, 2001; Evans GW & 2000;68(3):526–30., 2000; Fullilove & Fullilove, 2000; Kreiger & Higgins, 2002)**. Children may be

particularly vulnerable to adverse effects. About 35% of the housing of poor people in the United States contains lead levels determined to be hazardous to health, and the risk of paediatric injury is also associated with poor housing quality **(Shenassa, Stubbendick, & Brown, 2004)**.

Asthma has been especially strongly tied to housing quality. The prevalence and exacerbation of asthma is associated with both indoor and outdoor air quality, the presence of dust mites or cockroaches, excess particulates from cooking or smoking, dampness and mould, and community violence **(Wright, Mitchell, & Visness, 2004)**.

In the indoor environment, interactions between air pollutants, household chemicals and airborne biological agents (such as viruses, bacteria, fungi, and allergens from mites and animals) contribute to childhood asthma and possibly other forms of lung disease.59 With allergy now affecting up to one third of the population, it is important to encourage low allergen dwellings.60 Other factors in the indoor environment also influence health and wellbeing giving rise to a heterogeneous group of disorders referred to as Sick Building Syndrome (appendix F). Homes in poor condition are damaging to the health of those who live in them, particularly older people and children.61 As we have learnt repeatedly from history, improving housing reduces negative health impacts.62 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Design

Evidence regarding particular characteristics of the built environment that might be most strongly associated with well-being and physical activity is less robust **(Croucher, Myers, Jones, Ellaway, & Beck, 2007)**.

Nevertheless the evidence suggests that the presence of pavements or footpaths that are well maintained with good surfaces, cycle paths, and street lighting increase the number of walking and cycling trips **(Saelens, Sallis, & Frank, 2003)**.

In a analysis of 608 respondent survey data from Washington State on neighbourhood design and physical activity Lee and Mouden concluded that the specific attributes of the built environment associated with increased physical activity in neighbourhoods were medium to high residential density, mixed land uses, utilitarian destinations (small grocery stores/restaurant/retail) next to residential uses, connected street system with pavement, the availability of recreational facilities, traffic and crime safety and high visual quality. They found the key barriers to walking included too much traffic, distance to places too great, no interesting places to which to walk and dangerous street crossings. These were also identified as factors preventing cycling along with the lack of bike lanes and road safety. Many of the design improvements requested were at the micro-level including better lighting, more street trees and benches. Lee and Mouden, 2008, Neighbourhood design and physical activity, Building research and Information, 36.:5,395-411 **(Lee & Mouden, 2008)**.

Based on a study of physical activity and environment in Stoke on Trent research found that physical activity should be promoted through designing in walking access (ideally within 1-5 minutes) to work, shops and local services and to providing for better public use of green space that was widely available. Alongside this traffic calming and re-routing should be considered to reduce the incidence of urban road accidents **(Cochrane et al., 2009).**

The National Institute of Health and Clinical Excellence published a clinical guideline on the prevention, identification, assessment and management of overweight and obesity in adults and children in December 2006. It recommends that prevention and management of obesity should be a priority at both a strategic level and in delivering services. Within the guidance is a section aimed at local authorities, schools, workplaces and the public. Local authorities are advised to work with local partners, such as industry and voluntary organisations, to create and manage more safe spaces for incidental and planned physical activity, such as parks, and to address as a priority any concerns about safety, crime and inclusion. In particular they are advised to provide facilities and schemes such as cycling and walking routes, cycle parking, area maps and safe play areas **(NICE, 2006)**.

Case study from ‘Tackling obesities - The foresight report’ (2008).

EPODE is a French project and set out to impact upon the planning processes to create a 'healthy town'. A number of agencies became involved in the project from town planners, health, education and the voluntary sector. The outcomes for the project which included several towns in France were staggering. The French 'fit' communities led to the proportion of overweight boys almost halving from 19 per cent and the rate among girls dropping from 10 per cent to seven per cent. Similar projects have been carried out in Australia and Finland.

Over the course of five years, the target group children aged between five and 12 years, are measured and weighed annually to calculate their body mass index. In an interview with a school doctor, parents are given a letter explaining their child's weight status and guidelines for diet and physical activity. Each town receives suggestions for activities, diets and community initiatives. Leaflets are distributed in shops and supermarkets. An example of success for one of the French towns is as follows: The city of Royan with 1,365 children aged 5-12. In 2004, 17 per cent were overweight. In 2007, only 15 per cent were categorised as overweight.

Designing out crime

Hillier and Sahbaz looked at the following questions…and found:
- Are some kinds of dwellings safer than others? Flats have least risk and detached houses most (due to the nr of sides they expose to the public domain); All classes tend to be safer in flats, but with increasing wealth the advantage of living in a flat rather than a house increase, as does the disadvantage of living in a house - in spite of the extra investment that better off people are believed to make in security alarms. At the same time, purpose built flats are much safer than converted flats.

- Is density good or bad?

Higher ambient ground level **densities** of both dwellings and people *reduce* risk, though off the ground density may increase it. But taking both together overall density is beneficial.

- Is movement in your street good or bad?

Local movement is beneficial, larger scale movement not so.

- Are cul de sacs safe or unsafe?

Relative affluence and the number of neighbours have a greater effect than either being in a cul de sac or being on a through street.

- Does it matter how we group dwellings?

Dwellings should be arranged linearly on two sides of the street. Residential blocks should be larger rather than smaller.

- Is mixed use beneficial or not?

Mixed use street segments are relatively safe with good numbers of residents, and vulnerable with few residents.

- Should residential areas be permeable or impermeable?

Local movement reduces risk, so residential areas should be designed to structure local through movement, while exercising care about larger scale movement **(Hillier, 2004; Hillier & Sahbaz, 2008)**.

A study carried out by University of Huddersfield and West Yorkshire Police conducted an evaluation of Secured by Design (SBD) housing within West Yorkshire. These are estates where improvement work has been undertaken to design crime out by improving natural surveillance, distinction between private and public space etc. The research looked at whether or not residents living in SBD properties experience less crime and fear of crime than their non-SBD counterparts. The findings were extremely positive with two of the refurbished estates recording 67% and 54% reductions in crime rates and a significant improvement in perception of safety post SBD improvements **(Armitage, 2000)**.

Case study – Northview estate, Swanley, Kent. This 1970s estate has degenerated by the mid 1990s with large levels of anti-social behaviour. West Kent Housing association began a programme of regeneration in the 1990s focusing on external landscaping and inclusion of security features within the residential properties. Landscaping was used to define public and private space, natural surveillance across the estate was maximised, secure areas were provided for cycles and refuse and other areas such as children's play areas were given distinct uses. Crime figures show an 80% reduction in crime (including theft from motor vehicles, criminal damage and theft offences) since the works have been completed **(HUDU, 2007)**.

Part 3: Why many urban areas fall far behind (negative features of the built environment that impact on healthy lives)

This section answers the following question

> - Why and in what ways do poorer urban areas suffer inequality of area conditions and health outcomes?

…and the evidence is grouped under the following topics:

- Street crime/ Anti Social Behaviour
- Traffic/ Pollution
- Noise
- Fuel poverty and housing conditions
- Climate change
- Mental Health & Urbanisation
- Poor design (disability/ access)

Street crime/ ASB

Studies show that many people, particularly women and older people, are concerned about safety in their neighbourhood, usually related to issues such as street crime, fear of injury from traffic. Parents' perceptions of neighbourhood safety impact of levels of physical activity in children. Thus it seems likely that a range of measures that enhance people's perceptions of safety are likely to encourage greater levels of walking and cycling **(Croucher, Myers, Jones, Ellaway, & Beck, 2007)**.

***

The Broken Windows Theory

The idea that graffiti-spraying and other forms of low-level delinquency promote further bad behavior has now been tested experimentally.

A PLACE that is covered in graffiti and festooned with rubbish makes people feel uneasy. And with good reason, according to a group of researchers in the Netherlands. Kees Keizer and his colleagues at the University of Groningen deliberately created such settings as a part of a series of experiments designed to discover if signs of vandalism, litter and low-level lawbreaking could change the way people behave. **They found that they could, by a lot: doubling the number who are prepared to litter and steal.**

The researchers' conclusion is that one example of disorder, like graffiti or littering, can indeed encourage another, like stealing. Dr Kelling (of broken windows theory) was right. The message for policymakers and police officers is that clearing up graffiti or littering promptly could help fight the spread of crime **(The Economist, 2008)**.

Broken Windows Syndrome – Evidence Pro and Against

1) The original theory – *Broken Windows: The Police and Neighbourhood Safety* by James Q. Wilson and George L. Kelling (1982 – The Atlantic Monthly).

- Washington DC Police Foundation - evaluation of five years foot-patrol project: no reduction in crime rate, but improvement in feeling of safety amongst residents and in job satisfaction and community relations amongst officers.

- Anecdotal evidence from social psychologists and police officers agreeing that the broken windows syndrome applies to nice and run-down neighbourhoods.

- **Zimbardo (1969)**: Bronx and Palo Alto experiment of car without licence plate – the car in Palo Alto was plundered as much as in the Bronx as soon as disorder was created.

- Surveys from Boston public housing project show that the greatest fear of crime was expressed by people living in buildings where disorder and incivility, not crime rates, were highest.

2) The development of the original theory – *Fixing Broken Windows: Restoring Order and Reducing Crime in Our Communities* by George L. Kelling and Catherine Coles (1996 – Free Press).

The book reviews the evidence presented in the paper, and addresses the critique of the social justice problem behind the 'zero-tolerance' policing proposed by the BWT. It analyses the history of policing in the US, how it has changed and how the role of the police has moved from one of maintaining order to one of fighting crime.

The book addresses the social justice issue in 'zero-tolerance' policing; it was written in the context of a bed-ridden New York and does not conclude how 'zero-tolerance' policing should be implemented and what limits it should have – the core of the argument is that it would be up to well-trained policemen to distinguish between disorderly acts and poverty/homelessness.

This in practice becomes and argument of the 'deserving poor' (the homeless willing to go to shelters, not begging, etc.), the 'undeserving poor' (those making themselves homeless, refusing help, panhandling, etc.), and the 'ill' (the homeless who are mentally ill, drug or alcohol abusers). The authors consider the 'deserving poor' not problematic as they assume that they will access services, accept help, 'do what they are told', and quickly re-enter mainstream society. The 'undeserving poor' are those who create disorder, use homelessness as an excuse and intentionally lead a life of petty crime, and thus should be dealt with zero-tolerance policing, not so much for the petty crimes, but for the disorder and consequent problems that they inflict on a community, while the 'ill' should also be dealt with zero-tolerance on the basis that it is for their own good as well as the community's good, ie. they should be 'forced' into rehabilitation programmes and leaving them on the street would in itself be socially unjust.

The implication of their argument is that the authors refute that there are causes to the causes, that socio-economic status is a determinant of homelessness, or even a determinant of mental ill health, alcoholism or drug abuse. The authors go as far as saying that democratising policing and involving residents in restoring order will inevitably bring a number of injustices, but this is preferable than diminishing the order of a community, and can be policed.

Evidence pro broken window syndrome:

- New York City – The BWT was first implemented in the New York subway system between 1984 and 1990. In 1993 Mayor Rudy Giuliani adopted a 'zero tolerance' policy based on the BWT, which was part of an interlocking set of wider reforms, which had been underway since 1985. Rates of both petty and serious crime fell suddenly and significantly.

- Alburquerque – Safe Streets programme in 1997 was composed of several related elements, including saturation patrols, follow-up patrols, freeway speed enforcement, and sobriety checkpoints. Substantial drop in crime against person and property as well as drop in traffic accidents.

- Groningen – 6 field experiments were conducted by which the same scenario was set up in an orderly situation and a disorderly situation to check if the disorderly situation would 'create' more petty crime. In the disorderly situation petty crime rates were consistently and substantially higher.

- Lowell – 34 crime hot spots were selected and 50% of them were cleared of trash, streetlights were fixed, building codes enforced, loiterers discouraged, arrests made for minor crimes and mental health

services and aid for the homeless expanded. There was a 20% reduction in calls to the police with no apparent impact from zero-tolerance policing or boost in social services.

Critique to the broken window syndrome – this has tended to focus on the claim that maintaining order will, to a certain extent, prevent serious crime:

- New York City. There were too many other things happening at the same time, such as the police reforms, welfare to work programmes, housing vouchers, waning of the crack epidemic, dropping numbers of males aged 16-24. Lott (2000) in *More Guns Less Crime* states that the impact of broken windows policies was not very consistent across different types of crimes and that the pattern in crime reduction was almost random: arrest rates, policing and right-to-carry laws were more relevant in explaining changes in crime rates.

- Levitt and Dubner's *Freakonomics* claims that the greatest impact on falling crime rates was from legalised abortion and the related drop in male youth born in broken families. Strong refutation of this analysis appeared in The Wall Street Journal and The Economist.

- Harcourt and Ludwig (2006) looked at the New York programme that re-housed inner city project tenants into more orderly neighbourhoods: tenants continued to commit crime at the same rate. This is based on an assumption that the BWT works 'both ways', ie. people's behaviour will change if you move them to an orderly place and not just if you make their environment orderly.

    - This is problematic as 'displacing' residents comes with a burden of breaking social relations, creating new community tensions, challenging tenants resilience in dealing with moving, adapting to a new home, neighbourhood, etc.

    - The BWT never claimed that order would eradicate all crime (in the same way as Designing Out Crime does not eradicate all crime, but has a substantial impact on opportunistic crime rates): the experiments in Lowell and Groningen both show that even in orderly circumstances a substantial proportion of people will still commit petty crimes.

    - The re-housing in New York was targeted at low-income families living in high-crime public housing communities characterized by high rates of social disorder. They were randomly assigned housing vouchers to either move to less disadvantaged and disorderly communities (experimental) or to any other communities (Section 8). In both cases misdemeanor arrest rates were substantially lower than for the population that did not move, more so in the experimental group than in the Section 8 group (Section 8 participants moved to less disorderly neighbourhoods anyway).

    - Some subgroups clearly responded to less disorderly neighbourhoods by reducing their involvement in criminal behaviour, most notably female youth, however increases in antisocial behaviour among other subgroups were observed leading the authors to state that the BWT "is not a complete explanation for how communities influence criminal behaviour, because even if the broken windows mechanism is at work for MTO participants, other behavioural processes seem to predominate for at least some subgroups" (p.307)

- Harcourt and Ludwig (2007) showed further evidence that 'mean reversion' fully explain the changes in crime rates in New York during the 1990s.

Traffic/Transport/ Pollution

Transport in general

Transport (particularly private motor vehicle transport) is a major contributor to greenhouse gas emissions (GHGs) and these are increasing when other GHGs are being reduced.

Transport is also a major public health hazard in itself, and the recent Swedish analysis of Road Transport and Public Health shows that in that country injuries, air pollution and lack of physical activity each might contribute app. 30% of the burden of disease and injury (BODI) caused by road transport. The remaining 10% is due to traffic noise but this hazard exposure is increasing. GHGs from a country like Sweden also contributes health impacts in poor developing countries, estimated to be, on average until 2080, more than twice the injury health impact in Sweden (Kjellstrom, Ferguson, & Taylor, 2008).

The most deprived people often disproportionally bear the impacts of car dominated urban planning practices (Van Lenthe, Brug, & Mackenbach, 2005). Lower socio-economic groups have higher incidences of injury and death from traffic accidents **(Gorman, Douglas, Conway, Noble, & Hanlon, 2003).** More than a quarter of child pedestrian casualties happen in the most deprived 10% of wards **(Social Exclusion Unit, 2003)**. In Wales, children and people aged over 65 living in deprived areas are twice as likely to be injured by motor vehicles as are those living in more advantaged areas **(Mark Drakeford, 2006)**.

Very few areas of the UK are safe from air pollution. Pollution levels exceed Government health standards all over the country on many days every year, even in rural areas. The impact of this pollution is huge: even the Government now accepts that between 12,000 and 24,000 people die prematurely every year as a result of air pollution. The contribution of road transport is higher still in towns and cities. In London, traffic is responsible for 99 per cent of carbon monoxide, 76 per cent of nitrogen oxides and 90 per cent of hydrocarbons **(Friends of the Earth, 1999)**.

This paper addresses the problem of comparability between urban pollution data measured at the kerbside. The study found up to a threefold difference in pollutant concentrations (6 min averages of CO measured at head height) between different sides of the same road under cross-wind conditions, with the leeward side of the street experiencing higher levels than the windward **(B Croxford & Penn, 1998)**.

The main findings are that large differences in pollutant levels are found over small spatial distances and that pollutant concentrations are highly dependent on local wind speed **(Ben Croxford, Penn, & Hillier, 1996)**.

Research carried out in Sweden found that annually transport-related air pollution may cause 2200 deaths, traffic noise is associated with 300 deaths and physical inactivity due to daily commuting by car may cause 700 deaths **(Kjellstrom, Ferguson, & Taylor, 2008)**.

***

Road traffic casualty rates are far higher in the most deprived parts of England than in the wealthiest areas. A recent report found that the casualty rates for child pedestrians in the most deprived local authority wards were more than four times higher than in the most affluent wards **(Grayling, Hallam, & Graham, 2002)**. The Social Exclusion Unit estimated the gulf to be five times higher **(Social Exclusion Unit, 2003)**.

Death rates from road traffic accidents have fallen in England and Wales in most socio-economic groups over the past 20 years, but not for children in families without a working adult. A report analysed records from the 1981, 1991 and 2001 censuses and found that overall, pedestrian death rates for the most deprived group were 20 times higher than for the wealthiest group, and cyclist death rates were 27.5 times higher **(Edwards, Roberts, Green, & Lutchmun, 2006)**.

To address this inequality in 2002, a new government target was developed - secure a greater reduction in the overall number of road casualties in the 88 Neighbourhood Renewal Fund areas in England than for England as a whole, comparing the figure for 2005 with the average for 1999 to 2001. Through investment in programmes such as Neighbourhood Road Safety Initiative which delivered physical and educational measures this was met in 2005. England showed a 15% fall and the Neighbourhood Renewal areas showed a 19% fall in all reported casualties. Despite this there still remains a significant variation.

The DfT report into their Neighbourhood Road Safety Initiative attributes a key cause of this disparity to be the nature of the environment in which deprived communities live **(Department for Transport, 2008)**.

***

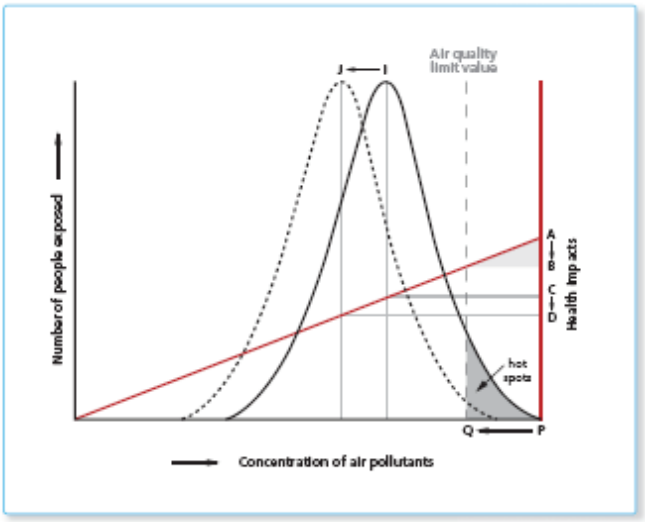
The study suggested that residents of busy streets have less than one quarter the number of local friends that those living on similar streets with little traffic. The study focused on 3 streets in Bristol with light, medium and heavy traffic respectively. It found that motor traffic, which has grown more than tenfold in the UK since 1950, has a considerable negative impact on quality of life, particularly for residents living beside heavy motor traffic flows **(Hart, 2009)**.

The research confirm for the first time in the UK the results of a 1969 San Francisco study by Professor **Donald Appleyard**, which found similar social isolation on busy streets.

Air pollution remains a serious, if poorly understood, health issue. It led to an estimated 24,000 premature deaths in Great Britain in 1995/96 (this estimate is due to be updated during 2007).19 More recent data suggest that the cost in terms of health impacts was an estimated £9.1-21 billion in 2005.20 The more severe effects of air pollution occur at the highest levels of exposure, but for some pollutants there are no known threshold values below which effects in a population are not observed.21 This finding is reiterated by the Department of Health's Committee on the Medical Effects of Air Pollutants (COMEAP) in its upcoming report, *Long-term Exposure to Air Pollution: Effects on mortality.*22 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

FIGURE 3-II

Schematic graph of population exposure to air pollution and associated health impacts[42]



On children (in urban areas)

Several recent studies indicate that children living close to busy roads have an approximate 50% increased risk of experiencing respiratory illness including asthma.28 Control of road traffic flows in and around the city of Oxford was introduced in 1999 and this has been shown to increase lung function and reduce wheezing in asthmatic children, with the greatest improvements in those from less affluent backgrounds.29 Looking more broadly at childhood asthma levels, a recent international study of asthma and allergy in children has shown that the UK has the highest asthma prevalence in the world with 21% and 25% of 6-7 and 13-14 year-olds respectively having reported asthma symptoms within the past 12 months.30 This is compounded in urban areas where children have been shown to have a higher prevalence of allergic disorders than, for example, those living on farms.31 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Noise

It is a problem for one in three households in the UK and has a major impact on the wellbeing of one in a hundred people.65 Opinion poll research conducted in 2003 found that problems are worse in areas of high density housing, rented accommodation (both social and private sectors), areas of deprivation and areas which are highly urbanised.66 Persistent environmental noise above 40-55 dBA Leq (time-weighted average noise exposure in decibels) causes annoyance, levels of 40-60 dBA Leq disturb sleep, while levels of 65-70 dBA Leq increase the risk of ischaemic heart disease. Noise levels above 75 dBA contribute to acquired hearing impairment. Studies have also reported adverse effects of aircraft and traffic noise on mental health.67 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

A cross-sectional study of environmental noise and community health based was conducted in residential neighbourhoods near Sydney Airport with high exposure to aircraft noise and in a matched control suburb unaffected by aircraft noise. Noise measurements were analysed and a novel noise metric formulated based on background environmental noise levels. After controlling for confounders, subjects who have been chronically exposed to high aircraft noise level are more likely to report stress and hypertension compared with those not exposed to aircraft noise **(Black, Black, Issarayangyun, & Samuels, 2007)**.

Reduction in Blood Pressure following a stress event **(Bird, 2008)**

The study looked at chronic exposure to aircraft noise elevated psycho-physiological stress (resting blood pressure and overnight epinephrine and norepinephrine) and depressed quality-of-life indicators over a 2-year period among 9- to 11-year-old children. Data collected before and after the inauguration of a major new international airport in noise impacted and comparison communities show that noise significantly elevates stress among children at ambient levels far below those necessary to produce hearing damage **(G. W. Evans, Bullinger, & Hygge, 1998)**.

Penetration of traffic sounds into the home impairs the child's ability to learn verbal skills **(Cohen, 1973)**.

Chronic aircraft noise exposure was associated with higher levels of noise annoyance and poorer reading comprehension measured by standardized scales with adjustments for age, deprivation and main language spoken. Chronic aircraft noise was not associated with mental health problems and raised cortisol secretion. The association between aircraft noise exposure and reading comprehension could not be accounted for by the mediating role of annoyance, confounding by social class, deprivation, main language or acute noise exposure **(HAINES, STANSFELD, JOB, BERGLUND, & HEAD, 2001)**.

Fuel poverty and housing conditions

Houses can be highly energy efficient. However the majority f housing stock consists of older properties and many of them are occupied by low income households. Fuel poverty is a big problem and although the government has a programme in place to tackle it, it requires more investment in a more thorough way **(Sustainable Development Commission, 2006)(HEES Strategy)**.

The need to upgrade existing housing stock is now widely recognised, of extreme urgency and requires urgent action **(H M Treasury, 2006)(Office for Climate Change, HEES)**. Moreover, if energy efficiency standards are raised by investing across the board, not only neighbourhood renewal is brought about but also more local jobs and better local economies **(DENA website)**.

Fuel poverty is low income and poor area based, although all housing stock is affected. It affects poor people more severely because it affects life chances and how they spend on food.

Although not entirely an urban problem, one of the major adverse factors contributing to winter deaths is the failure to maintain residential properties at an adequate temperature. This is a particular problem for less active and elderly people and in substandard homes, the latter are more common in urban areas. The government aims to tackle these problems through programmes to combat fuel poverty, such as the Warm Front Scheme, the Decent Homes Standard (to which all council owned and managed properties should conform by 2010), and the Energy Efficiency Commitment, which focuses largely on low income groups **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

According to the 2001 Census there were just under half a million (1.9% of total number of households) had more people than rooms and, by our definition, are overcrowded. Overcrowding is associated with poor physical and mental health **(SASI Research Group, 2005)**.

Climate change

Research at global level has found that urban populations are especially vulnerable to climate change as are people with a pre-existing respiratory disease. The California heatwave of 2006 showed large increases in admissions to hospital from cardiovascular and other illness, and the heatwave in Germany in 2003 increased mortality rates, especially from respiratory causes **(Costello, Abas, & Allen, 2009).**

CAG Consulting (2009) undertook research into the social impacts of climate change in the UK. The research found that climate change will affect both physical and metal health alongside quality of life. It also found that those likely to be the most vulnerable to the impacts of climate change include those who are already deprived by their health, level of income and quality of homes. People living in deprived areas were more likely to live in high risk flooding areas, more susceptible to the effects of heat wave from poor housing, live in areas of poor air quality which can be exacerbated by high temperatures, are less likely to live near green spaces in which they can shelter in hot weather and are more likely to live near rivers of poor and bad quality. In other words the state of deprivation increases vulnerability to climate change and climate change increases deprivation. **(CAG Consulting, 2009)**

Cold is believed to be the main factor underlying the extra deaths which occur in the period between December and March compared with the death rate for other months of the year. In 2005, there were 27,500 additional deaths in this period across the UK.45 The elderly are subject to the greatest increase in deaths in winter, with 20,200 more deaths in the UK among those aged over 75 years during the winter of 2005/06 compared with levels in the non-winter period.46 Other groups are also vulnerable, including children and people with long term illness **(Royal Commission on Environmental Pollution, 2007a, 2007b)**.

Mental health and urbanisation

Consistently studies show that there is a relationship between mental health and neighbourhood. However, that thus far the evidence does not allow for particular elements of neighbourhood to be identified that have a greater impact than others on mental health. This is in part due to the wide variety of different variables that have been considered across different studies. As Truong and Ma note, it is not possible to determine a causal effect from the vast majority of studies, and it is difficult to determine whether people with mental health problems drift towards poorer neighbourhoods, or perceive their neighbourhoods more negatively because of poor mental health**(Croucher, Myers, Jones, Ellaway, & Beck, 2007)**.

Truong and Ma (2006) have systematically reviewed the relations between neighbourhoods and mental health **(Troung & Ma, 2006)**.

Chu *et al* (2004) have assessed the evidence on the impact on mental well-being of the urban and physical environment **(Chu, Thorne, & Guite, 2004)**.

The study by **Leventhal and Brooks-Gunn** is a rare example of a quasi-experimental study where families were randomly allocated the opportunity to move to a different, more affluent neighbourhood. Those families that did move demonstrated better mental health at follow-up, suggesting a causal effect of neighbourhood (Note, however, that the methods of this study have been criticised. Although participants were randomly allocated the opportunity to move, not all families took the opportunity, thus those who do could be described as self selecting) **(Leventhal & Brooks-Gunn, 2003)**.

A recent study of 4.4 million adults in Sweden found that the incidence rates of psychosis and depression rose in proportion with increasing levels of urbanisation. Those living in the most densely populated areas had a 68-77% and 12-20% greater risk of developing any psychotic illness and depression respectively when compared to a reference group in rural areas.72 Studies in Denmark confirm that the risk of schizophrenia is greater in those born and brought up in urban environments. Not only were the rates higher in towns compared with rural areas, but higher in larger towns and highest in Copenhagen. These studies have also shown that the degree to which an area is urbanised (urbanicity) reinforces the known risk-increasing effect of a positive family history of psychoses.73 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Within urban areas, rates of psychiatric illness are greatest in the most deprived areas and the rates for psychoses map closely those for deprivation.74 Previous studies in the UK have found an association between urban residence and the prevalence of psychiatric disorders, which persists after adjustment for confounding factors.75 The size of a city also matters; schizophrenia rates in London are about twice those in Bristol or Nottingham.76 **(Royal Commission on Environmental Pollution, 2007a, 2007b)**

Poor design (disability/ access)

Research found that levels of physical activity among disable people are limited by barriers and promoted by facilitators related to the built environment in general and the way buildings are designed in particular. Barriers included lack of curb cuts, inaccessible access routes, doorways being too narrow for wheelchair access, facility front desk being too high for persons in wheelchairs to communicate with the person at the desk, and lack of elevators; slippery floors and the absence of handrails on stairs. Facilitators included providing nonslip mats in locker rooms; providing an adequate number of accessible parking spaces; installing push-button operated doors; constructing multilevel front desks that can accommodate both wheelchair users and non-wheelchair users; lowering or removing door thresholds to facilitate wheelchair access; providing ramp access to whirlpools and hot tubs; and in new construction, building zero-depth entry pools that can be entered by a person using a wheelchair without the need for a ramp or pool lift. One of the most frequently mentioned facilitators was to provide family changing rooms, which would make it easier for parents to help their children with disabilities with changing, or in situations where a person with a disability needs assistance

dressing and undressing usually by another family member or a personal assistant. **(Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004)**

Part 4: what evidence is there of improvements through policy change?

This section answers the following question:

- What do different policy experiments show about the impact of policy change on lives?

…and the evidence is structured under the following topics:

- Area Based Initiatives (Health Action Zones, SRB, NDC, Sure Start, Hope IV)
- London's Congestion Charge
- Boston's Public Health Campaign
- UK's Tackling Knives Action Programme
- Other US initiatives
- Jamie Oliver's healthy food campaign
- Home Zones/ Traffic calming measures
- Other UK initiatives

Health Action Zones (HAZs)

When New Labour came to power intheUKin1997 it brought with it a strong commitment to reducing inequality and social exclusion. One strand of its strategy involved a focus on area based initiatives to reduce the effects of persistent disadvantage. **Health Action Zones (HAZs) were the first example of this type of intervention, and their focus on community-based initiatives to tackle the wider social determinants of health inequalities** excited great interest both nationally and internationally. This suggests that, despite their relatively limited impact, it is best to consider that they made a good start in difficult circumstances rather than that they failed. As a result there are some important lessons to be learned about the role of complex community-based interventions in tackling seemingly intractable social problems for policy-makers, practitioners and evaluators **(Bauld et al., 2005).**

Single Regeneration Budget (SRB)

Overall, the results showed a reduction in those considering themselves to be in good health and an increase in people in bad health suggesting a considerable widening in the gap compared with the Great Britain average. However, SRB did not have a large health component.

Sure Start (for children 0-5)

Health outcomes in Sure Start areas:

• reduction in the proportion of low birth-weight babies;

• reduction in the rate of hospital admissions as a result of serious injury

(Department of Social security, 1999)

New Deal for Communities (NDC)

Interim evaluation findings show little change in relation to health (looking at smoking; health worse than 12 months ago; long standing illness).

Similar programs to NDC are Social Inclusion in Scotland and Communities First in Wales.

Hope VI

Research by Susan Popkins at the Urban Institute, Washington on Hope VI found that recipients of Hope VI were still in poor health (despite regeneration initiatives/ relocation in better areas) and high mortality rates in the sample (Hope VI people in the US die at the same age like people in South Saharan Africa)

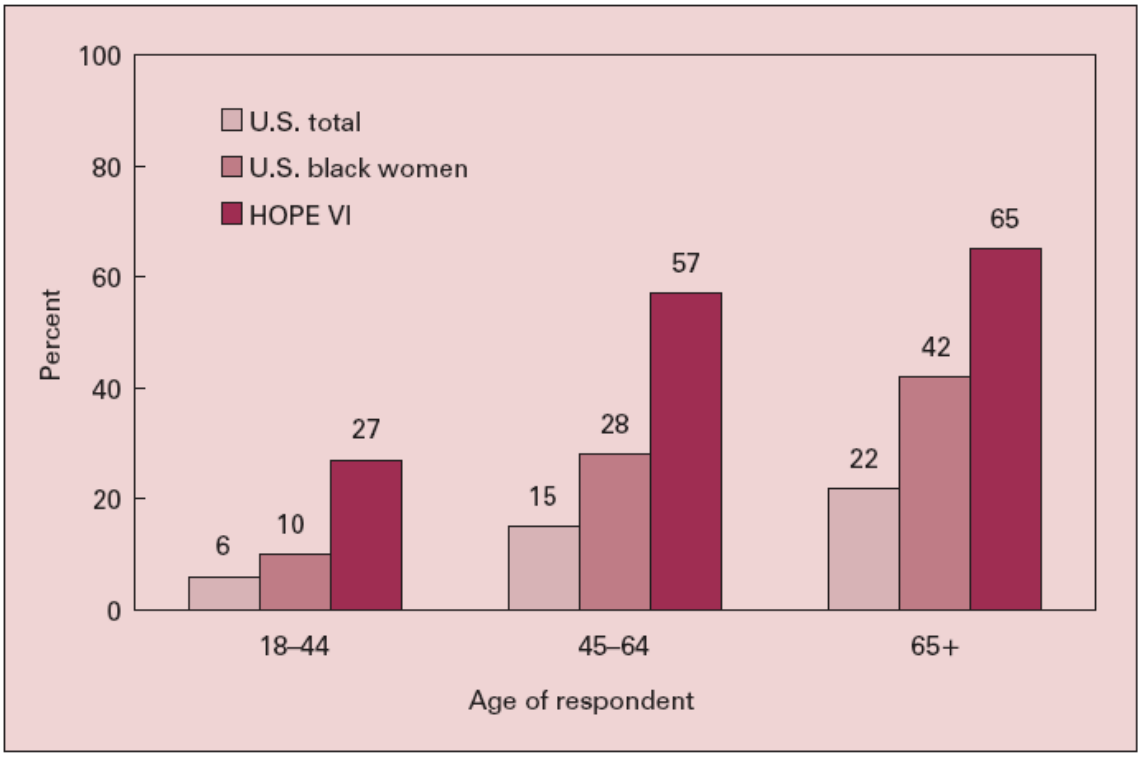
(Negative) Findings from (Harris & Kaye, 2004)

The HOPE VI program aims to improve neighbourhood conditions by revitalizing distressed public housing communities and assisting residents with moving to better housing in less distressed neighbourhoods (Buron 2004; Comey 2004). In addition to housing, one goal of the HOPE VI program is to address the social and economic needs of the original residents. The HOPE VI Panel Study is tracking the well-being of residents from five sites where relocation began in 2001 (see page 7). Our baseline survey indicated that health—both physical and mental—is a major concern for HOPE VI Panel Study families (Popkin et al. 2002). Adult respondents reported extremely high rates of overall poor health. Several physical health problems were significantly more prevalent among HOPE VI adults than among the overall population, and even more prevalent than among minority women nationwide,1 a group that already has higher prevalence rates for many health problems than whites and men. The proportion of respondents reporting problems with depression and anxiety was also very high.

Other findings:

- *HOPE VI survey respondents have alarmingly high rates of many chronic health problems, including obesity, hypertension, diabetes, and depression.*
- Many Adults Report Poor Overall Physical Health
- Serious Physical Health Problems Are Widespread
- Many Adults Have Multiple Health Problems - *Adults in the HOPE VI sample are twice as likely to have been diagnosed with asthma, but a larger share are far more likely than other adults with asthma to suffer from attacks and visit urgent care centres because of the disease.*
- Poor Mental Health Is Also Prevalent among Hope VI Adults
- Health Problems Limit Mobility and Employment

FIGURE 1. Adults Reporting Fair or Poor Health



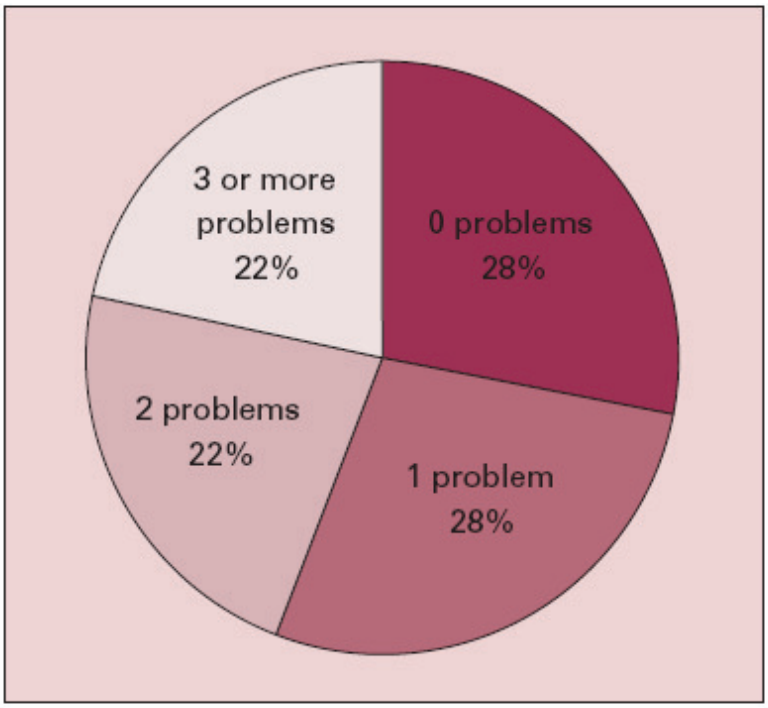
Sources: HOPE VI Panel Follow-up Survey (2003) and NHIS (2001).
Note: The total sample size is 736 for the HOPE VI sample and 12,613 for the NHIS sample 18 years and older.

TABLE 1. Adults Reporting Diagnosed Health Problems (percent)

		18–44 years old		45–64 years old		65+ years old	
	Total HOPE VI sample	HOPE VI	U.S. black women	HOPE VI	U.S. black women	HOPE VI	U.S. black women
Obesity	**47**	46	33	51	47	40	29
Hypertension	**37**	21	11	56	50	73	69
Diabetes	**15**	5	4	27	16	38	26
Arthritis	**28**	15	10	42	29	62	35
Asthma	**22**	24	12	19	14	18	10

Sources: HOPE VI Panel Follow-up Survey (2003) and NHIS (2001).
Note: The total sample size is 736 for the HOPE VI sample and 12,613 for the NHIS sample 18 years and older.

FIGURE 2. *Number of Physical Health Problems Reported by HOPE VI Adults*



Source: HOPE VI Panel Follow-up Survey (2003).
Note: The total sample size is 736. Physical health problems are obesity, hypertension, diabetes, arthritis, and asthma.

(Positive) Findings on Safety from (Popkin & Cove, 2007)

Fear of crime has profound implications for residents, causing stress and social isolation; relocation has brought about a dramatic positive impact on residents' life circumstances. Those residents who left traditional public housing—voucher holders and unassisted renters and homeowners—are now living in neighbourhoods that are dramatically safer than their original public housing developments. These improvements in safety have had a profound impact on their quality of life; they can let their children play outside, they are sleeping better, and are feeling less worried and anxious overall. However, those who remain in traditional public housing developments are still living in extremely dangerous circumstances, little better than where they started.

(Positive) Findings on Housing Conditions from (Popkin & Cove, 2007) (Howell, Harris, & Popkin, 2005)

The purpose of this study is to provide new data on the relationship between housing quality and health status for people in five HOPE VI public housing developments around the country. HOPE VI is a federal program to replace or redevelop some of the poorest quality public housing in the country. A special survey of residents of these developments was conducted while they lived in HOPE VI housing before its redevelopment. Data for these individuals provides a profile of the quality of housing and the health status of people in HOPE VI housing before its renovation, of residents of publicly assisted housing across the nation, of other people living below the federal poverty level, and of non-poor people. Previously, the lack of data sets that included both housing quality and health status measures has prevented such an analysis. We examined two indicators of health status— perceived overall health status and medically diagnosed asthma. The health status of HOPE VI residents is decidedly worse than that of others in assisted housing and other poor people, despite their similarity in terms of economic deprivation. The difference in the level of asthma

prevalence, a condition that has been tied to various measures of housing quality, is especially pronounced. **Our analysis indicates that one major benefit of improving housing quality may be improved health status.**

- **Policy approaches: integrating health and built environments/ planning in Sweden, Scotland and London**

From (Royal Commission on Environmental Pollution, 2007a, 2007b)

BOX 3D APPROACHES TO INTEGRATING PLANNING AND HEALTH

Gothenburg in Sweden has achieved integration of planning and health by establishing a group on healthy planning which seeks to use opportunities to promote health at every level of the planning process, and also participates in a variety of local groups related to health and wellbeing to identify and co-operate on key issues. By contrast, Sandnes in Norway has implemented a more central approach of implementing health objectives through its comprehensive municipal plan.[116] We visited Belfast, where the Belfast Healthy Cities partnership operates across various public health areas. This includes working with planning authorities to integrate Health Impact Assessment into spatial planning policies, and developing a healthy urban planning programme,[117] the principles of which will be embedded in the Belfast Metropolitan Area Plan.[118]

In Scotland, every local authority has a health improvement officer. The officer is given the task of supporting the development of a joint health improvement plan through the community planning process, which places a statutory duty on core partners such as NHS boards to participate in the planning process. The powers of local authorities elsewhere in the UK are more limited, particularly in England, but health issues can be incorporated in regional strategies and local development documents, and working partnerships between relevant bodies created.

In some urban areas in England, health issues have been integrated at the strategic level, as in the London Health Strategy. The Regional Public Health Group for London has created the Healthy Urban Development Unit. This develops partnerships for health organisations to engage planners at an early stage, to influence the plan-making process and affect the outcomes of planning applications. A key part of influencing urban development across London is building relationships between NHS Primary Care Trusts and borough councils.[119] In Brighton and Hove, the planning department is also working closely with the local Primary Care Trust to deliver health objectives. In other urban areas, such as Stoke-on-Trent, health objectives are being tackled at the local authority level through Local Strategic Partnerships and other community-based initiatives.[120]

The WHO Healthy Urban Planning objectives require a wide-ranging programme entailing a large amount of commitment from local government and a determination to pursue goals that may lack clarity and require intersectoral collaboration.

- **London's Congestion Charge**

The congestion charge scheme is the UK's most notable intervention in shifting the balance from sedentary transport to active travel, although it was planned without explicit public health objectives. Cycling in central London has risen by over 80% between 2000 and 2007, and although Transport for London is only now establishing a completely robust system to monitor walking, outline monitoring indicates growth here too **(Transport for London, 2007)**.

- **Boston's Public Health Campaign**

Prothrow-Smith paper describes how public health and criminal justice systems were brought together in order to tackle youth violence in Boston through a conceptual framework including:

- primary prevention – (for the general public) aiming for example to reduce the level of violence shown on TV or to promote gun control; to control 'criminogenic' commodities such as guns, drugs, and alcohol or establish elementary school drug and violence prevention education by police

e.g. The Boston Violence Prevention Program – focusing on training teachers and youth services staff how to teach adolescents about the risks of violence and to discuss measures that can be employed to prevent fights – no measurable outcomes were provided.

- secondary prevention – (for targeted groups at risk, early intervention with youthful offenders) aiming for example to educate the urban poor men how to resolve disputes without using violence; 'behavioural' modelling of those at risk

e.g.

1) Boys & Girls Clubs of America Gang intervention programs – 48% of participants shown improvement in school

2) Big Brothers/ Sisters Mentoring Programmes – participants were 46% less likely to experiment with drugs, 27% less likely to experiment with alcohol, and almost 33% les likely to hit someone than youth not participating in the program.

- tertiary prevention – (after an incident has happened) aiming to stop the negative effects of what just happened; or use the incident in order to prevent future similar incidents

Why this campaign was needed? (facts in America):

- low socioeconomic levels Blacks have a higher risk of homicide than Whites. At higher socioeconomic levels the race difference disappears. This could be explained by W J Wilson's work on neighbourhood poverty which argues that poor Blacks are much more likely than poor Whites to live in neighbourhoods where the majority of residents are poor and therefore they are more exposed to high rates of victimisation.

- housing density: overcrowded Whites have a domestic homicide rate comparable to that of overcrowded Blacks

- core urban areas: gun-related homicides for African american male living in core urban areas occur at an alarming rate of 143.9 per 100,000 **(Prothrow-Smith, 2002)**.

- **UK's Tackling Knives Action Programme**

As part of the Home Office's Tackling Knives Action Programme (TKAP), the Regional Public Health Group and NHS London have been working closely with Primary Care Trusts, the Government Office for London, the Metropolitan Police, and the Greater London Authority to address both knife crime and alcohol-related violence.

The programme was launched in June 2008 to tackle knife crime in hotspot areas. The number of individuals admitted to NHS hospitals in London following assault with a 'sharp object', has been increasing year on year since 2002/2003.

However, latest figures show that assault with a sharp object among those aged 13 to 19 years, fell by 26 per cent in England - 30 per cent in the areas targeted by the Tackling Knives Action Programme and 17 per cent in other areas **(Department of Health, 2009)**.

- **Home Zones (HZ)/ Traffic calming measures**

Local authorities can now implement 'use orders' which allow rods to be used for 'purposes other than passage' allowing local residents to define how they want to use their streets (i.e. children play or other social functions). These are commonly referred to as Home Zones (HZ). Similarly

the Regulations allow local authorities to introduce 'speed orders' to set an advisory (lower) speed – 20mph or less – albeit this would not be enforceable.

HZ emerged in the Netherlands during the early 1970s. Their success and popularity resulted in the idea being widely adopted throughout Europe. The Netherlands alone has about 6,500 scheme, while the idea has also been popular in countries such as Denmark, Germany and Swefden (Hamilton-Baillie, 2001). HZs focus on creating a shared space where it is possible to drive and park, but also where both children can play and adults are freer to socialize.

By creating 'slow/ reduced' traffic streets HZ improves residents' health and, in particular, the health of children through less traffic and therefore less accidents, and more 'play area and therefore more potential for playing and physical activity **(Biddulph, 2001)**.

NICE evidence review found that traffic-calming interventions may be useful in enabling children specifically to benefit from physical activity through play outdoors in the short and long term. It also concluded that closing or restricting use of roads can lead to long-term increases in walking and cycling and a decrease in road traffic accidents. Provision of cycling infrastructure can lead to a long term increase in cycling and a reduction in cycle casualties **(Killoran & Doyle, 2008)**.

Residential streets with well-designed layouts and a 20mph speed restriction point to significant benefits. A health impact assessment (HIA) carried out on Morice Town Home Zone in Plymouth, for example, found a reduction in accidents and car fumes, and found children being able to play in a safer street. Residents also felt that the area would become a friendlier place with less disruptive traffic. Alongside the TRL evaluation there is 'softer' evidence that home zones are improving the lives of residents and supporting public policy objectives around such issues as crime and community cohesion. Annual levels of recorded crime in the Morice Town, Plymouth home zone have fallen by 90% **(Maconachie & Elliston, 2002)**.

This research on the traffic calming effects of home zones is backed up by the emerging Transport Research Laboratory evaluation reports (undertaken for DfT), the first four of which find that traffic speeds and volumes had gone down, as had accident rates.

In Copenhagen, Denmark, measures introduced over the last 30 years to reduce traffic and improve the quality of public spaces in the city centre has encouraged a 65 per cent rise in bicycle use since 1970 **(Gehl & Gemzøe, 1988)**.

- **Effectiveness of interventions to changes to the physical environment**

Evidence shows consistent, small and short term effects of changing the physical environment to increase physical activity; however, these effects are not consistent across different studies. Note that the evidence base is limited **(Croucher, Myers, Jones, Ellaway, & Beck, 2007)**.

- **US National initiatives addressing the social and built environment**

Table of US national initiatives addressing health, social and the built environment **(Brisbon, Plumb, Brawer, & Paxman, 2005)**

US Initiative	Description
Community Preventive Services Task Forces	• An independent, non federal effort studying effective community-based interventions in more than 70 target areas, including physical activity. The task forces determine the effectiveness of interventions through a systematic literature review process. Strongly recommended interventions to increase physical activity include the following: • Community-wide campaigns• School-based physical

US Initiative	Description
	education • Social support interventions in community settings • Enhanced access to places for physical activity combined with informational outreach activities
Active Living by Design (ALbD)	• A national program of the Robert Wood Johnson Foundation, administered by the University of North Carolina School of Public Health • "Active Living" is a way of life that integrates physical activity into daily routines • The goal of the ALbD program is to promote changes in design, land use, transportation and policies to cultivate active living in the context of such activity having been engineered out of daily routine • Promotes and supports research, community development, and multidisciplinary collaboration • ALbD has partnered with 25 communities around the country to put the active living concept into practice
Design for Active Living	• An American Society of Landscape Architect's theme project • A series of programs highlighting ways community design affects residents' daily activity levels and worked with students from schools around the country to assess safe walking and biking routes between schools and homes
The Smart Growth Network	• Formed in 1996, began when the US Environmental Protection Agency joined with several non profit and government organizations in response to increasing community concerns about the need for new ways to grow that boost the economy, protect the environment, and enhance quality of life • Partners include environmental groups, historic preservation organizations, professional organizations, developers, real estate interests, and local and state government entities • The Network, in its Health Focus Area, addresses the ways that community design directly affects public health • Through its work, Smart Growth is reducing health threats, particularly asthma and obesity, from exposure to pollution and indoor contaminants, improving pedestrian safety, engaging workers and residents in more active lifestyles • By promoting compact, walkable neighbourhoods with mixed uses, walking and bicycling become more viable transportation options
Project for Public Spaces	• A non profit organization dedicated to creating and sustaining public spaces that build communities • Provides technical assistance, education, and research through programs in parks, plazas, and central squares; building and civic architecture; transportation; and public markets
STEPS to a Healthier US	• The US Department of Health and Human Services' implementation of the President's Healthier US initiative, which focuses on healthy choices and prevention • Promotes community initiatives, health promotion programs, state and federal policies, and cooperation among policy makers, local health agencies, and the public to invest in disease prevention • Targets obesity, diabetes, and asthma • Funds 22 grantees in 40 communities who received more than $50 million in 2003 and 2004 • Focuses on populations at risk for the target diseases on the basis of age, income, race, and insurance status • Interventions planned illustrate the range of participating organizations (e.g., departments of education and health, school districts, health care providers, national and local health organizations, faith-based agencies, the private sector, and academic institutions) • Although focusing on individual interventions, the STEPS grantees also address environmental factors such as healthy food choices in schools and workplace settings, smoking in public spaces, and redesign of neighbourhoods to enhance physical activity, as well as organized community interventions such as walking and biking programs.

- **Jamie Oliver's healthy school dinners Campaign**

An independent study shows the performance of 11-year-old pupils eating Oliver's meals improved by up to 8% in science and as much as 6% in English, while absenteeism due to ill-health fell by 15%.

The findings, from a report by the Institute for Social and Economic Research (ISER) at Essex University, vindicate the chef's decision to banish fat-laden Turkey Twizzlers - since replaced with nutrient-rich foods such as coconut fish, and broccoli.

The ISER report focuses on schools in Greenwich, southeast London, where Oliver launched his healthy eating campaign with Channel 4 in 2004 **(Waite, 2009)**.

- **Other UK initiatives**

1) West Cumbria Health Impact Assessment Best Practice (Durham University, 2007)

South Workington and South Whitehaven in West Cumbria have high levels of deprivation. The Frostoms and Lower Westfield areas of Workington are among the worst three per cent of super output areas (SOAs) nationally, as measured by the Index of Multiple Deprivation (IMD). Many residents live in social housing on large estates. There are high levels of worklessness, dating back to the decline of local heavy industry.

West Cumbria Strategic Partnership was established in 1999 by the three councils to support economic regeneration of the area. South Workington and South Whitehaven were designated NMIAs in 2006 with funding from the neighbourhood renewal unit (NRU). Engaging the NHS had been difficult up to that point, but a senior primary care trust (PCT) public health specialist sat on the boards of both NMIAs.

The requirement for a progressive health floor target action plan (FTAP) for West Cumbria was the spur to consider a Health Impact Assessment (HIA) for the two areas – the HIA was conducted in 2007 by Durham University and found/ made the following recommendations.

Impact and outcomes

There were three recommendations with practical sub-points:

a) Economic regeneration should be at the heart of health improvement strategies for the two areas. The main elements of this approach should be:

- job creation
- improving access to employment
- engagement with employers to promote health and increase skill levels
- engagement with local residents to increase skill levels and support people into work.

b) More NHS resources need to be targeted on the two areas to prevent a growing gap in health outcomes, compared to the rest of Cumbria. This should include:

- easy access to primary care services
- increased screening and interventions such as smoking cessation
- welfare benefits and employment advice provided in primary care accommodation
- outreach of health services into community settings.

c) Improvements to the living environment should be aimed at promoting better health and encouraging people to move into and stay in the area. This should include:

- adopting a 'decent neighbourhood standard'

- access to healthy food
- prioritising home heating and insulation
- healthy primary schools; better local access to public and advice services
- schemes to take healthy living messages to the community including the most hard-to-reach groups.

2) Sheffield Decent Homes Programme (Gilbertson, Green, & Ormandy, 2006)

The report found that Sheffield's Decent Homes Programme will have a major impact on the health and quality of life of residents – reducing heart and respiratory disease, reducing the number of accidents in the home and giving greater security and mental well-being.

The report made the following recommendations

- Key partnership agencies should jointly plan to account for the impact of 'upstream' investment in housing on the 'downstream' health of residents.
- Key partnership agencies should maintain their focus on the city-wide benefits of transforming health and quality of life in Sheffield's more deprived neighbourhoods.
- A more in-depth HIA would assist key partnership agencies assess which mix of up-front capital investment reduces long term revenue costs to public services.
- Any additional funds available to the Decent Homes Programme could be invested in condensing boilers, reducing fuel poverty, raising temperatures further and reducing heart disease and excess winter deaths.
- Monitoring the impact of improved ventilation systems on levels of humidity, condensation and damp, would maximise the potential of the Decent Homes Programme for reducing childhood asthma.
- It is important (a) to maintain a clear focus on the safety aspects of improving kitchens, and (b) to consider investing any additional funds in handrails to reduce falls on steps and stairs.
- It is important to maintain a focus on improved security and mental health arising from the installation of new windows. The Police Force should be asked to validate estimates of reduced crime levels.
- During works on site, contractors should continue to address issues of 'respect' 'control', 'disorientation', 'invasion', 'expense' and 'disruption.' Lessons can be learned from the best-performing contractors.

3) The Tackling Obesities: Future Choices Project

The project modelled scenarios were health became integrated into the planning process, concluding that this would lead to positive impacts on obesity trends **(Foresight., 2007)**.

5) Healthy Cities Programme

- Aiming to bridge the gap between the built environment and public health sectors.

- CABE involved

- run through WHO in Copenhagen

6) Various

Healthy Cities examples:

- The work of Glasgow Centre for Population Health in developing a regeneration plan for Glasgow East End

- Brighton and Hove city centre development regeneration

Traffic calming

- The Active Bristol approach is a good example of how the NHS, City Council and others can work together to agree shared agendas.

Green infrastructure

- Swindon Green Infrastructure Strategy

- Forest of Avon Green Infrastructure Tool

- Bristol Greenspace Audit

- Funding – Malmo, Sweden, private developers obliged to take responsibility for on-going management of green spaces in new developments.

Energy saving and fuel poverty

- Barton Hill in Bristol and Devonport in Plymouth are examples of best practice in reducing health inequalities in concerted area programmes funded via the New Deal for Communities programme.

- Carrick Housing in Cornwall and Cheltenham Borough Homes in Gloucestershire are examples of best practice where local authorities have set up Arms Length Management Organisations using government funding successfully improving all their council homes to the Decent Homes Standard ahead of the national target date of 2010.

Part 5: what have different studies recommended to deliver better health outcomes through better built environment? (recommendations and impact of recession)

Policy implications from HOPE VI

Improvements in health may result from improvements in housing and neighbourhood quality or from residential mobility out of the neighbourhood. The extremely low incomes among this population suggest that dealing with the effects of living in such extreme poverty—such as poor nutrition, differential health care, and stress from living in neighbourhoods characterized by high crime levels—is critical. Health programs that aim to seriously combat the poor health conditions among these very poor households must address a wide range of solutions.

In addition to these broad policy concerns, our findings suggest some specific recommendations for helping these vulnerable residents cope with the stresses of relocation.

- Relocation assistance is critical, particularly for those with health problems.
- HOPE VI sites need to consider the prevalence and type of health issues when planning for redevelopment.
- Housing authorities need to have reasonable expectations for economic self-sufficiency among former HOPE VI residents **(Harris & Kaye, 2004)**.

Changes in design due to changes in demographics (ageing society)

Pullen looks at changes in designing built environments for an increasingly ageing society. It argues that the way healthcare is delivered (large-scale hospitals in big towns) is not going to be an option anymore and the way forward is smaller facilities that are more manageable and accessible – with the plan to moving in the near future to more personalized services in the home and local communities which will include:

- smaller and 'on site' pharmacies
- mobile operating units – a large articulated lorry which travels around the country as an operating unit
- healthy food-growing area on the roof
- smart card system – which will identify patients when they go in to take vitals, sugar level, blood, all before appointments
- 'assisted living' design for people suffering from Alzheimer's disease and dementia
- A range of telecare futures: sensors and monitoring devices to look at, movement, non-movement, medicine administration and the like **(Pullen, 2009)**

An HIA into housing for older people in Derbyshire Dales made the following recommendations (Derbyshire Dales District Council, 2007):

1. Opportunities should be sought to create a joint appointment between housing and health or social care, of an occupational therapist to advise on the design of all age appropriate projects. A model for this type of role already exists in the architectural liaison worker employed by the police to promote community safety.
2. Stakeholders should bench mark current policies and practices against the *Lifetime Home* standards.
3. Stakeholders should host a *Lifetime Home* standards awareness raising event for local architects, designers and developers.
4. All new purpose built schemes for older people should employ an adequately trained worker to advise on the internal and external design to ensure it is fully disabled access and older people friendly
5. Prospective tenants should be involved in the design of any future age appropriate housing for medical priority residents
6. All further new purpose built schemes for older people should consider housing sustainability issues such as water recycling, use of solar panels, ground source heat pumps and other energy saving initiatives to mitigate against fuel poverty.
7. All further new purpose built schemes for older people should consider how information technologies could further assist older people to live independently
8. Computer access should become a standard fitting in new build accommodation for older people given the increasing importance of internet access in health care
9. The impact of the suspension of use of Medical Priority Re-housing (MPR) and separate older persons housing list should be monitored by Derbyshire Dales District Council to ensure vulnerable older people with mental or physical health needs are not disadvantage in access to housing through the new Choice Based Letting system
10. Following the recent implementation of the new Choice based letting system housing officers who have been released from managing routine waiting lists should target vulnerable older adults who are unable to bid for properties themselves.

11. The Age Concern Housing Option project should be extended to ensure equity of access to this much-valued service
12. Stakeholders should consider imaginative solutions to support individuals who are unable to take up new housing options due to health or social circumstances perhaps through additional housing support workers
13. Stakeholders should consider solutions to support older people to take up new housing options and to minimise the stress of moving house. For example through the provision of practical support and financial mechanisms to enable residents to meet house moving costs.

The impact of Recession

(Carlisle, 2008)
'The most obvious way is the effect of unemployment on health. At the extreme, it doubles the risk of suicide, depression and attempted suicide.' (Danny Dorling, professor of human geography at the University of Sheffield). He expects to see health inequalities rise further as the recession deepens.

'Unemployment is bad for your health,' agrees Professor Richard Wilkinson, emeritus professor of social epidemiology at the University of Nottingham medical school. It is not just that people in poor health are more likely to be unemployed, he stresses. 'The evidence from studies looking at the closure of factories is that everybody who lost their job saw their health go down regardless of how healthy they were to start with.'

The international evidence on the health effects of a recession is pretty much unanimous: it's a bad thing. Only two studies, both from the US, seem to contradict this. One suggests that employed people become healthier in a recession, perhaps because they reduce risk-taking behaviour such as drinking and smoking. The other shows that death rates go up in times of boom as people overwork, drink and smoke too much, and are involved in car crashes and industrial accidents.

However, the weight of evidence from studies in Japan, the US and Europe shows mortality and morbidity rise in hard times, especially for those who lose their jobs.

We already know that the most economically deprived communities have the poorest health, with higher rates of smoking and alcohol use, and all the consequences of this, such as increased rates of heart disease and cancer. Professor Dorling believes rates of alcohol use, drug use and mental health problems could all rise as people lose their jobs and experience feelings of hopelessness.

Mental health
Mental health charity *Rethink* says mental health problems will manifest themselves quickly, with more referrals and admissions to mental health services. In October, it released a survey of 2,000 people, which highlighted the prospect of home repossession as their most pressing concern, with 46% saying it would damage their mental health.
Unhealthy eating
In November, celebrity chef and food campaigner *Jamie Oliver* told the health select committee that unhealthy eating would probably increase in a recession.
Fuel poverty
Help the Aged has warned that some 50% of pensioners will not be able to heat more than one room this winter as inflation eats into their income. This will mean an increase in people with respiratory conditions presenting to GPs and at A&E.

Bibliography

(UK) Blackman, T. (2006). *Placing health: neighbourhood renewal, health improvement and complexity.* Bristol: Policy Press.

Armitage, R. (2000). *An Evaluation of Secured by Design Housing within West Yorkshire*: Home Office Briefing Note, 7/00.

Armstrong, D. (2000). A survey of community gardens in upstate New York: implications for health promotion and community development. *Health & Place, 6*(319-32).

Austin, M. (2002). Partnership opportunities in neighbourhood tree planting initiatives: building from local knowledge. *J Arboriculture, 28*, 178-186.

Balfour, J., & Kaplan, G. (2002). Neighbourhood environmental and loss of physical function: evidence from the Alameda County Study. . *American Journal of Epidemiology 155*, 507-515

Bauld, L., Judge, K., Barnes, M., Benzeval, M., Mackenzie, M., & Sullivan, H. (2005). Promoting Social Change: The Experience of Health Action Zones in England. *Journal of Social Policy, 34*(3), 427–445.

BBC News. (2009). Recession thwarts healthy efforts

Bell, J., Wilson, J., & Liu, G. (2008). Neighborhood Greenness and 2-Year Changes in Body Mass Index of Children and Youth. *American Journal of Preventive Medicine, 35*(6), 547-553.

Bengoechea, E., Spence, J., & McGannon, K. (2005). Gender differences in perceived environmental correlates of physical activity. . *International Journal of Behavioural Nutrition and Physical Activity 2*(12).

Biddulph, M. (2001). *Home Zones: A Planning and Design Handbook*. Bristol: Policy Press.

Bird, W. (2008). *The Natural Health Service.* Paper presented at the CABE Health Leaders CABE.

Black, D. A., Black, J. A., Issarayangyun, T., & Samuels, S. E. (2007). Aircraft noise exposure and resident's stress and hypertension: A public health perspective for airport environmental management *Journal of Air Transport Management, 13*(5), 264-276

Booth, M., Owen, N., & Bauman, A. (2000). Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Preventative Medicine 31*, 15-22.

Brisbon, N., Plumb, J., Brawer, R., & Paxman, D. (2005). The asthma and obesity epidemics: The role played by the built environment—a public health perspective. *Journal of Allergy and Clinical Immunology, 115*(5), 1024-1028.

CAG Consulting. (2009). *Differential Social impacts of Climate Change in the UK*: SNIFFER.

Carlisle, D. (2008). Public health in recession. *Nursing Times*.

Chu, A., Thorne, A., & Guite, H. (2004). The impact of mental well-being of the urban and physical environment: an assessment of the evidence. *Journal of Mental Health Promotion, 3*(2), 17-32.

Cimprich, B. (1993). Development of an intervention to restore attention in cancer patients. *Cancer Nursing, 16*, 83-92

Cochrane, Davey , Gidlow , Smith, Fairburn, Armitage , et al. (2009). Small Area and Individual Level Predictors of Physical Activity in Urban Communities: A Multi-Level Study in Stoke on Trent, England. *Int. J. Environ. Res. Public Health, 6*, 654-677.

Cohen, S. (1973). Apartment Noise, Auditory Discrimination, and Reading Ability in Children. *Journal of Experimental Social Psychology, 9*(5), 407-422.

Costello, Abas, & Allen. (2009). Managing health effects of climate change. *The UCL Lancet Commission*.

Croucher, K., Myers, L., Jones, R., Ellaway, A., & Beck, S. (2007). *Health and the Physical Characteristics of Neighbourhoods: A critical Literature Review. Final Report*. Glasgow: Glasgow Centre for Population Health.

Croxford, B., & Penn, A. (1998). Siting considerations for urban pollution monitors. *Atmospheric Environment, 32*(6), 1049-1057.

Croxford, B., Penn, A., & Hillier, B. (1996). Spatial distribution of urban pollution: civilising urban traffic. *Science of the Total Environment, 189/190*, 3-9.

Cummings, S., Stafford, M., & Macintyre, S. (2005). Neighbourhood environment and its association with self-rated health: evidence from Scotland and England. *Journal of Epidemiology and Community Health, 59*, 207-231.

De Vries, S., Verheij, R., Groenewegen, P., & Spreeuwenberg, P. (2002). Natural environments - healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and Planning, 35*(A), 17-17-1731.

Department for Transport. (2008). *Road Safety Research Report No. 97 Widening the Reach of Road Safety – Emerging Practice in Road Safety in Disadvantaged Communities: Practitioners' Guide*.

Department of Health. (2009). *Be active Be healthy: A plan for getting the nation moving*.

Department of Social security. (1999). *Opportunities for All: tackling Poverty and Social Exclusion*.

Department of Health. (2009). *Saving lives and fighting crime together - showcase of London partnerships tackling violent crime* Retrieved. from.

Derbyshire Dales District Council. (2007). *Age Specific Housing for Older People in Derbyshire Dales - Health Impact Assessment*.

Dorling, D., Mitchell, R., Shaw, M., Orford, S., & Davey Smith, G. (2000). The Ghost of Christmas Past: health effects of poverty in London in 1896 and 1991. *BMJ, 321*.

Drakeford, M. (2006). Health policy in Wales: Making a difference in conditions of difficulty. *Critical Social Policy, 26*(3), 543-561.

Drakeford, M. (2006). Health Policy in Wales: Making a difference in conditions of difficulty. *Critical Social Policy, 26*.

Duncan, M., & Mummery, W. (2004). Psychosocial and environmental factors associated with physical activity among city dwellers in regional Queensland. *Preventative Medicine 40*, 363-372.

Duncan, M., Spence, J., & Mummery, W. (2005). Perceived environment and physical activity: a meta-analysis of selected environmental characteristics. *International Journal of Behavioural Nutrition and Physical Activity, 2* (11), DOI: 1186/1479-5868-1182-1111.

Durham University. (2007). West Cumbria Health Impact Assessment Best Practice Report.

Edwards, P., Roberts, I., Green, J., & Lutchmun, S. (2006). Deaths from injury in children and employment status in family: analysis of trends in class specific death rates. *British Medical Journal, 333*(119).

Evans, G., Saltzman, H., & Cooperman, J. (2001). Housing quality and children's socioemotional health. . *Environmental Behaviour, 33*(3), 389-399.

Evans, G. W., Bullinger, M., & Hygge, S. (1998). CHRONIC NOISE EXPOSURE AND PHYSIOLOGICAL RESPONSE: A PROSPECTIVE STUDY OF CHILDREN LIVING UNDER ENVIRONMENTAL STRESS. *PSYCHOLOGICAL SCIENCE*.

Evans GW, W. N., Chan HY, et al. Housing quality and mental health. J Consult, & 2000;68(3):526–30., C. P. (2000). Housing quality and mental health. *J Consult Clinical Psychology, 68*(3), 526-530.

Faber, T. A., Kuo, F., & Sullivan, W. (2001). Coping with ADD The surprising connection to green play settings *Environmental Behaviour, 33*(54-77).

Faber, T. A., Kuo, F., & Sullivan, W. (2002). Views of nature and self-discipline: evidence from inner city children. *Journal of Environmental Psychology, 22*, 49-64.

Foresight U. (2007). *Tackling obesities: future choices*: http://www.foresight.gov.uk/OurWork/ActiveProjects/Obesity/Obesity.asp.

Frank et al. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine, 27*.

Frank, L., Schmid, T., & Sallis, J. (2005). Linking objectively measured physical activity with objectively measured urban form: findings from SMARTRAQ. . *American Journal of Preventative Medicine, 28* (2S2), 117-125.

Friends of the Earth. (1999). *Road Transport, Air Pollution and Health*.

Fullilove, M., & Fullilove, R. (2000). What's housing got to do with it? *American Journal of Public Health, 90*(2), 183–184.

Gehl, J., & Gemzøe, L. (1988). *Public spaces, public life*.

Gilbertson, J., Green, G., & Ormandy, D. (2006). *Decent Homes Better Health - Sheffield Decent Homes Health Impact Assessment*. Sheffield: Sheffield Hallam University.

Giles-Corti et al. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space. . *American Journal of Preventative Medicine. , 28*(2S2), 169-176.

Gordon-Larsen, P., Nelson, M., Page, P., & Popkin, B. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Paediatrics 112*(2), 417-424.

Gordon-Larsen, P., Nelson, M. C., & Popkin, B. M. (2006). Inequality in the Built Environment Underlies Key Health Disparities in Physical Activity and Obesity *PEDIATRICS 117*(2), 417-424.

Gorman, D., Douglas, M. J., Conway, L., Noble, P. W., & Hanlon, P. W. (2003). Transport policy and health inequalities: a health impact assessment of Edinburgh's transport policy. *Public Health, 117*(1), 15-24.

Gorman et al. (2003). Transport policy and health inequalities: a health impact assessment of Edinburgh's transport policy. *Journal of the Royal Institute of Public Health, 117*.

Grayling, A., Hallam, K., & Graham, D. (2002). *Streets Ahead: Safe and Liveable Streets for Children*. London: Institute of Public Policy Research.

Green Space Scotland. (2007). *Transforming Urban Spaces: the links between green spaces and health- a critical literature review* http://www.greenspacescotland.org.uk/upload/File/greenspace%20and%20quality%20of%20life%20literature%20review%20aug2008.pdf.

H M Treasury. (2006). *Stern Review on the Economics of Climate Change* London: H M Treasury.

HAINES, M. M., STANSFELD, S. A., JOB, R. F. S., BERGLUND, B., & HEAD, J. (2001). Chronic aircraft noise exposure, stress responses, mental health and cognitive performance in school children. *Psychological Medicine 31*(2), 265-277.

Halpern, D. (1995). *Mental health and the built environment: more than bricks and mortar?* London: Taylor & Francis.

Harris, L., & Kaye, D. (2004). *How are HOPE Families Faring? Health*. Washington DC: Urban Institute.

Hart, J. (2009). No Friends? Blame the traffic... *Living Streets/ Street Life, Winter,* 6-7.

Hillier, B. (2004). Designing safer streets: an evidence-based approach. *Planning in London, 48*, 45-49.

Hillier, B., & Sahbaz, O. (2008). *An evidence based approach to crime and urban design Or, can we have vitality, sustainability and security all at once?* London: Bartlett School of Graduate Studies.

Hills, J. (2007). *Ends and Means: The Future Roles of Social Housing in England*. London: CASE/ LSE.

Howell, E. M., Harris, L. E., & Popkin, S. J. (2005). The Health Status of HOPE VI Public Housing Residents. *Journal of Health Care for the Poor and Underserved 16*, 273-285.

HUDU. (2007). *Delivering healthier communities in London*.

Hume, C., Salmon, J., & Ball, K. (2005). Children's perceptions of their home and neighbourhood environments, and their association with objectively measured physical activity: a qualitative and quantitative study. . *Health Education Research 20*(1), 1-13.

Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults' participation in physical activity: a review. . *American Journal of Preventative Medicine 22*(3), 188-199.

Inerfield, R., & Blom, B. (2002). A New tool for strengthening urban neighbourhoods. *J Affordable Housing, 11*(128-134).

Insall, P. (2009). Sustrans Letter to Sir Michael Marmot (04.03.2009).

Kaplan, R., & Kaplan, S. (1995). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.

Kellert, S. (2002). Experiencing nature: affective, cognitive, and evaluative development in children. In *Children and Nature: Psychological, socio-cultural and Evolutionary*

Investigations (pp. 117-151). Cambridge: Mass MIT press.

Killoran, & Doyle. (2008). *Physical activity and the environment*: NICE.

King's Fund. (2006). *Access to health care and minority ethnic groups*.

King, A., Castro, C., & Wilcox, S. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of US middle-aged and olderaged women. *Health Psychology 19*(4), 354-364.
King, W., Brach, J., & Belle, S. (2003). The relationship between convenience of destinations and walking levels in older women. . *American Journal of Health Promotion, 18*(1), 74- 82.
Kirchner et al. (2008). Designed to deter. Community barriers to physical activity for people with visual or motor impairments. *American Journal of Preventive Medicine, 34*.
Kjellstrom, T., Ferguson, R., & Taylor, A. (2008). *Health Impact Assessment of Road Transport in Sweden. Report from a research project for the Swedish Rpad Administration*.
Krause, N. (1996). Neighbourhood deterioration and self-rated health in later life. *Psychology and Aging, 11*(2), 342-352.
Kreiger, J., & Higgins, D. L. (2002). Housing and health: time again for public health action. . *American Journal of Public Health, 92*(5), 758-768.
Krenichyn, K. (2004). Women and physical activity in an urban park: enrichment and support through an ethic of care. . *Journal of Environmental Psychology, 24*, 117-130.
Kuo. (2001). Coping with poverty: impacts of environment and attention in the inner city. *Environment and Behaviour, 33*(1), 5-34.
Kuo, F. (2001). Coping with Poverty: Impacts of environment and attention in the inner city. *Environment and Behaviour, 33*(1).
Kuo, F., & Sullivan, W. (2001a). Aggression and Violence in the inner city: Effects of Environment via Mental Fatigue. *Environment and Behaviour, 33*(4), 543-571.
Kuo, F., & Sullivan, W. (2001b). Environment and Crime in the Inner City: Does Vegetation Reduce Crime. *Environment and Behaviour, 33*(4), 343-367.
Kuo, F. E. (2001). Coping with Poverty. Impacts of Environment and Attention in the Inner City *Environment and Behaviour, 33*(1), 5-34.
Lee, & Mouden. (2008). Neighbourhood design and physical activity. *Building research and Information, 36*(5), 395-411.
Leslie et al. (2008). Are perceptions of the local environment related to neighbourhood satisfaction and mental health in adults? *Preventive Medicine, 47*.
Leventhal, T., & Brooks-Gunn, J. (2003). Moving to opportunity: an experimental study of neighbourhood effects on mental health. *American Journal of Public Health, 93*(8), 1576-1582.
London School of Hygiene & Tropical Medicine. (2005). *Thames Chase Community Forest: THERAPI Research Report. Community Health and Green Spaces.*
Macintyre, S., Ellaway, A., & Cummins, S. (2002). Place effects on health: How can we conceptualise, operationalise and measure them? *Social Science & Medicine, 55*, 125-139.
Macintyre, S., Maciver, S., & Sooman, A. (1993). Area, class and health: Should we be focusing on places or people? *Journal of Social Policy 22*(2), 213-234.
Maconachie, M., & Elliston, K. (2002). *Morice Town Home Zone: a prospective health impact assessment. Health and Community Research Programme*: University of Plymouth and the South & West Devon NHS Trust.
McCormack, G., Giles-Corti, B., Lange, A. (2004). An update of recent evidence of the relationship between objective and self-measures of the physical environment and physical activity behaviours. *Journal of Science, Sport and Medicine, 7*(1 Supplement), 81-92.
Mind. (2007). *Ecotherapy: the green agenda for mental health*.
Mitchell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: an observational population study. *The Lancet, 372*(9650), 1655 - 1660.
Moore, E. (1982). A prison environments effect on health care service demands. *J Environ Syst, 1981-1982*(11), 17-34.
Morrison et al. (2004). Evaluation of the health effects of a neighbourhood traffic calming scheme. *Journal of Epidemiology and Community Health, 58*.
Newton. (2007). *Wellbeing and the Natural Environment: A brief overview of the evidence*.

NICE. (2006). *Obesity: guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children*.

Orsega-Smith, E., Mowen, A., Payne, L., & Godbey, G. (2004a). The interaction of stress and park use on psycho-phsyiological health in older adults. . *Journal of Leisure Research, 36*(2), 232-256.

Orsega-Smith, E., Mowen, A., Payne, L., & Godbey, G. (2004b). The interaction of stress and park use on psycho-physiological health in older adults. . *Journal of Leisure Research 36* (2), 232-256.

Patterson, P., & Chapman, N. (2004). Urban form and older residents' service use, walking, driving, quality of life, and neighbourhood satisfaction. . *American Journal of Health Promotion, 19*(1), 45-52.

Perpetuity Group. (2009). *One More Broken Window: The Impact of the Physical Environment on Schools*. Leicester: NASUWT Teaching Union.

Pickett, K. E., & Pearl, M. (2001). Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review *Journal of Epidemiology and Community Health 55*, 111-122.

Pikora, T., Giles-Corti, B., Knuiman, M. (2005). Neighbourhood environmental factors correlated with walking near home: using SPACES. . *Medicine and Science in Sports and Exercise 38*(4), 708-714.

Pikora, T., Giles-Corti, B., & Knuiman, M. (2005). Neighbourhood environmental factors correlated with walking near home: using SPACES. *Medicine and Science in Sport and Exercise, 38*(4), 708-714.

Popkin, S., & Cove, E. (2007). *Safety is the most important thing. How HOPE VI Helped Families*. Washington DC: Urban Institute.

Propper, C., Jones, K., Bolster, A., Burgess, S., Johnston, R., & Sarker, R. (2005). Local neighbourhood and mental health: Evidence from the UK *Social Science & Medicine, 61*(10), 2065-2083.

Prothrow-Smith, D. (2002). Youth Violence Prevention in America. Lessons from 15 Years of Public Health Prevention Work. In M. Tienda & W. J. Wilson (Eds.), *Youth in Cities. A Cross-National Perspective*. Cambridge: Cambridge University Press.

Pullen, D. (2009). Grey is the new Green: Designs on an ageing society. *SUSTAIN: Built Environment Matters, 10,* 38-39.

Rimmer, J. H., Riley, B., Wang, E., Rauworth, A., & Jurkowski, J. (2004). Physical activity participation among persons with disabilities: Barriers and facilitators. *American Journal of Preventive Medicine, 26*(5), 419-425.

Royal Commission on Environmental Pollution. (2007a). *Study on Urban Environmnets Well-being and Health*.

Royal Commission on Environmental Pollution. (2007b). *The Urban Environment*.

Royal Commission on Environmental Pollution. (2007a). *Study on Urban Environments Well-being and Health*.

Royal Commission on Environmental Pollution. (2007b). *The Urban Environment*.

Russell, C., Hill, B., & Basser, M. (1998). Older people's lives in the inner city: hazardous or rewarding? . *Aust NZ Journal Public Health, 22*, 98-106.

Saelens, B., Sallis, J., & Frank, L. (2003). Environmental correlates of walking and cycling: findings from the transportation, urban design and planning literature. *Annals of Behavioural Medicine 25*(2), 80-91.

Sallis, J., Nadir, P., & Broyles, S. (1995). Correlates of physical activity at home in Mexican-American and Anglo-American preschool children. *Health Psychology, 12*, 390-398.

SASI Research Group. (2005). *Life in Britain. Changing Rooms*. Sheffield: University of Sheffield.

Sassi, F. (2009). Health inequalities: a persistent problem. In J. Hills, T. Sefton & K. Steward (Eds.), *Towards a more equal society? Poverty, inequality and policy since 1997*. Bristol: The Policy Press.

Shaw, M., Smith, G. D., & Dorling, D. (2005). Health inequalities and New Labour: how the promises compare with real progress *BMJ, 330*, 1016-1021

Shenassa, E., Stubbendick, A., & Brown, M. (2004). Social disparities in housing and related pediatric injury: a multilevel study. *Am J Public Health 94*(4), 633-639.

Shepherd, J. (2009, 20.01.09). The neighbourhood effect*. The Guardian*.

Social Exclusion Unit. (2003). *Making the connections: Final report on transport and social exclusion*.

Spivock et al. (2007). Neighborhood-level active living buoys for individuals with physical disabilities. *American Journal of Preventive Medicine, 32*.

Spivock et al. (2008). Promoting Active Living Among People with Physical Disabilities. Evidence for Neighborhood-Level Buoys,. *American Journal of Preventive Medicine, 34*.

Stafford, M., Cummings, S., & Macintyre, S. (2004). Gender differences in the association between health and neighbourhood environment *Social Science & Medicine, 60*, 1681-1692.

Stamatakis, E., & Hamer, M. (2009, 20 February). *Is elimination of sedentary behaviour public health's best buy?* Paper presented at the DEPH Seminar.

Sustainable Development Commission. (2006). *"Stock take": delivering improvements in existing housing - UK*. London: Sustainable Development Commission.

Sustainable Development Commission. (2007). *Healthy Futures: The natural environment, health and well-being*.

Sustainable Development Commission. (2008). *Health, place and nature. How outdoor environments influence health and well-being: a knowledge base*.

Sustrans. (2008). Take action on active travel.

Sustrans Active Travel. (2008). *Active travel and health inequalities: How walking and cycling can benefit the health of the most disadvantaged people*. Bristol.

Swanwick, C., Dunnett, N., & Woolley, H. (2003). Nature, role and value of green space in towns and cities: an overview. *Built Environment, 29*(2), 94-106.

Takano, T., Nakamura, K., & Watanabe, M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. . *Journal of Epidemiology and Community Health, 56*, 913-918.

The Economist. (2008, 20 November). Can the can - The idea that graffiti-spraying and other forms of low-level delinquency promote further bad behaviour has now been tested experimentally. *The Economist*.

Timperio, A., Crawford, D., Telford, A., & Salmon, J. (2003). Perceptions about the local neighbourhood and walking and cycling among children. . *Preventative Medicine 38*, 39-47.

Transport for London. (2007). *Central London Congestion Charging: Impacts monitoring. Fifth Annual Report*.

Transportation Research Board /Institute of Medicine. (2005). *Does the built environment influence physical activity? Examining the Evidence*.

Troung, K., & Ma, S. (2006). A systematic review of relations between neighbourhood and mental health. *Journal of Mental Health Policy and Economics, 9*(137-154).

Twiss , J., & et al. (2003). Community gardens: lessons learned from California healthy cities and communities. *Am J PH, 93*, 1435-1438.

Ulrich, R. (1984). View through a window may influence recovery from surgery. *Science of the Total Environment, 224*, 420-421.

Ulrich, R., Simons, R., Losito, B., Fiorito, E., Miles, M., & Zelson, M. (1991). Stress Recovery during exposure to natural and urban environments. *Journal of Environmental Psychology, 11*, 201-230.

Van Lenthe, J., Brug, J., & Mackenbach, J. P. (2005). Neighbourhood inequalities in physical inactivity: the role of neighbourhood attractiveness, proximity to local facilities and safety in the Netherlands. *Social science & medicine 60*(4), 763-775.

Waite, R. (2009). Jamie's food fuels pupils' brain power. *The Sunday Times*.

Wells, N., & Evans, G. (2003). Nearby Nature; A buffer of life stress among Rural Children. *Environment and Behaviour, 35*(3), 311-330.

Wood, J., Hennell, T., Jones, A., Hooper, J., Tocque, K., & Bellis, M. A. (2006). *Where wealth means health: illustrating inequality in the North West*. Liverpool: Liverpool John Moores University.

Wright, R., Mitchell, H., & Visness, C. (2004). Community violence and asthma morbidity: the Inner-City Asthma Study. . *Am J Public Health . 94*(4), 625-631.