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# **The Health Impacts of the Urban Form**

## **A Review of Reviews**



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### Suggested Reference

McDonald, J., Wise, M., & Harris, P. The Health Impacts of the Urban Form: A Review of Reviews.

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This work was funded by NSW Health as part of the NSW HIA Project.

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ISBN: 978 1876054 02 1

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October, 2008



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# Summary of main findings

## Urban form

1. Re-housing or regeneration programs can be influences on improving the quality of life of residents. However evidence suggests that, although the programs mitigate the impact of social and economic disadvantage, they do not address fundamental social processes that are unjust. Their impact on the life expectancy and long-term of health of populations is, therefore, limited.
2. For people with severe mental illness, having choice over housing options is associated with greater well being, happiness, life satisfaction and quality of life. Also for this population group, long term housing stability is associated with positive health effects.
3. Improved health (including reduced anxiety and depression) is associated with housing stability and housing quality for people with mental illness.
4. Re-housing people on mental health grounds into improved quality housing has been shown to have positive impacts over time.
5. Using housing tenure as a proxy for socio-economic status, renters have poorer health than home owners/mortgagees.
6. Aspects of the design and location of housing and other buildings can have an impact on health and well-being.

## Land use mix

7. Proximity between home, work and amenities (shops and services) has positive influences on health. Separating home, work and amenities has detrimental effects on health and wellbeing.

8. Improved social capital is associated with reducing the time people spent in cars. However there is no conclusive evidence linking different mixes of land-use to social capital.
9. There are mixed but positive associations between aspects of the built environment and behavioural risk factors including physical activity, nutrition and obesity.

## Neighbourhood characteristics

10. Safe, convenient and attractive neighbourhoods have been associated with higher rates of walking by residents.
11. Access to green spaces has positive mental and physical health effects.
12. Designing the physical characteristics of neighbourhoods to be attractive, safe, and pedestrian friendly has been found to have a positive impact on health.
13. Disruptions to people's sense of belonging to a neighbourhood have been found to have adverse physical and psychological consequences.
14. Links between perceptions of neighbourhood safety and health behaviour are mixed and not yet investigated fully.
15. Behavioural and emotional problems in children linked to low socio-economic status neighbourhoods may be influenced by access to institutional resources, social support and social cohesion.

## **Purpose**

This paper summarises evidence published in reviews of the evidence of the impact of urban form on the health of populations. The paper is intended to inform the conduct of assessments of the potential impact of some features of urban form on population health.

Health Impact Assessment (HIA) is an internationally recognised mechanism to improve decision-making by predicting and making recommendations concerning the health impacts of proposed plans, projects, programs or policies before they are implemented (Harris, Harris-Roxas et al. 2007). HIA is an approach to help in analysing and understanding the potential pathways between actions proposed in a potential policy and the health effects of these. An HIA can be used to guide action to enhance or maintain positive directions and/or to mitigate detrimental health effects. This summary can be used to inform all stages of an HIA.

## **Audiences for this review have been assumed to be:**

Practitioners and policy-makers from sectors including but not limited to health, housing, planning, environment and conservation, and local government – who may be using HIA to assist in decision-making on policies relevant to urban form and health. It may also be useful for others with a general interest in HIA or healthy urban development.

## **Limitations of this review of reviews**

This summary is based on analysis of evidence reported by other authors. It is not the outcome of a systematic review. It is, rather, a report summarising evidence of associations between factors in the urban form and the health of populations. Research on the relationship between elements of urban form and the health of populations is an emerging area of research. As such, most of the studies included in these reviews have been cross-sectional and descriptive and have not been designed to test

the strength or directions of any associations found. It is recommended that this summary be used as a guide to identify original sources of evidence that can be used to provide more specific information about the research and its findings.

## **Methods**

The two questions that directed this review were:

What are the impacts of the urban form on health?

What are the impacts of different types of land use on health?

The review involved searches of MEDLINE, EMBASE, Web of Science, Scopus, Google Scholar and The Cochrane Collaboration databases. Searches were limited to articles and reports published from 1998 to April 2008, in English and available electronically. Database searches were supplemented by articles and reports identified by key informants, reviewing reference lists of selected articles, and reviews of contents pages of selected journals (e.g. Health and Place). Search terms included a) built environment, neighbourhood renewal, urban design, urban regeneration, environmental design, urban planning, neighbourhood; b) health outcomes, health impacts, well being; c) reviews, meta-analysis, synthesis.

The literature used in this summary included systematic reviews, other literature reviews, and selected expert opinion commentaries. Title and abstracts were assessed for relevance. Where recent reviews of the evidence included previous reviews, only the most recent reviews were included. A total of 29 articles and reports was included (see appendix 1 for annotated bibliography). Three of the systematic reviews applied critical appraisal tools to assess the quality and strength of the evidence (Taske N, Taylor L et al. 2005; Kyle and Dunn 2007; Spinks, Turner et al. 2008). The majority specified the designs that had been included or excluded.

Type of article	Number
Systematic reviews with explicit study design criteria specified	13
Systematic review with no information on study design criteria	2
Literature review	10
Expert commentary	4

## Definitions

### Health

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (World Health Organization 1948).

### Health Impact Assessment and Equity

HIA is a tool that can be used to identify unfair, modifiable differences in the distribution of health impacts of policy proposals (Harris, Harris-Roxas et al. 2007).

### The relationship between urban form and the health of populations

There is increasing interest in identifying the relationship between urban form and the health of populations. Evidence of the specific features of urban form that have an impact on health is limited but growing.

Macintyre et al (2002) suggest that the health of populations is influenced by both **material infrastructure** (urban form) and the **collective social functioning** that is enabled by or characteristic of urban environments. The features of the urban form that they identify include:

- physical features of the environment shared by all residents;
- home, work and recreational environments that are conducive to health;
- services provided, publicly or privately to support people in their daily lives;

- the socio-cultural features of a neighbourhood; and
- the reputation of an area (Macintyre, Ellaway et al. 2002).

Travaglia, Harris, et al. (2002) describe three characteristics of an urban environment that influence health - place, space and people (Travaglia, Harris et al. 2002).

**Space:** the physical nature of the area and the infrastructure that is available;

**Place:** the historical and social relationships that exist within the community that shape values and norms; and

**People:** the characteristics of the people and their ways of acting and interaction

There is particular interest in the features of urban form that contribute to the unequal and unfair distribution of population health outcomes. For example some of the modifiable features of urban form that can contribute to socioeconomic disadvantage and poorer health outcomes among some groups in a population are:

- the availability and quality of affordable housing stock;
- a mismatch in transportation infrastructure that connects people to where they live and work;
- access to parks and green spaces;
- the availability and accessibility of fresh food; and
- the level of environmental disorder and squalor (Frumkin 2005).

In addition to the physical features of urban form, however, the quality of built environments can also contribute to a “**sense of place**” through contact with nature, building design, the design and availability of public spaces and the mix of activities included in urban environments (Frumkin 2003).

And it is in neighbourhoods that urban form, land use mix and people interact in ways that

can have both positive and negative effects on health.

### **Urban form**

**Urban form** refers to the quality of the built urban environment and is related to the density and intensity of land uses within urban areas.

**Land use** refers to the location and grouping of activities within a geographical area such as residential, industrial, recreational and commercial. (Mead, Dodson et al. 2006). *Note: Although transportation is an additional element of 'urban form' it has not been included in this review. A separate review of the literature on the health impact of transport has been prepared to complement this summary.*

Lavin, Higgins, et al. (2006) identified multiple pathways linking the built environment and population health. This summary is a first step in identifying the evidence of some of these pathways. The summary highlights the extent of the research that is still needed to identify more explicitly, causal pathways between urban form and population health.

## Findings

### 1. What factors in the urban form have been found to have an impact on population health?

- housing quality and security of tenure
- design and location of houses and other buildings
- neighbourhood physical characteristics

### 2. What have been the effects of different types of land use mix on population health?

- access to services, shops and public amenities
- behavioural risk factors

### 3. What are the effects of the socioeconomic characteristics of neighbourhoods on population health?

- sense of belonging and emotional connection
- perceived safety and children's physical activity

## The urban form

### Housing quality and security of tenure

Housing quality and security of tenure are each associated with the health of populations.

A review of housing regeneration projects in the UK found little evidence of their impact on socio economic outcomes such as educational attainment or employment (Thomson, Atkinson et al. 2006). Nor was there conclusive evidence that re-housing or neighbourhood regeneration interventions improved health outcomes for socioeconomically disadvantaged or vulnerable groups (Taske, Taylor et al 2005). Where positive outcomes have been reported the effects have been small and negative self-reported

health outcomes were also found (Thomson, Atkinson et al. 2006).

One study found that re-housing people from slum areas had a positive impact on self-reported mental and physical health outcomes after eighteen months, but not until that much time had elapsed (Kyle and Dunn 2007).

Cave (2002) found that regeneration programs can be important influences on improving people's quality of life although it is important to recognise that regeneration and renewal programs do not address fundamental processes in society – rather they mitigate the effects of uneven development (Cave & Curtis, 2001).

People with severe mental illness who were able to exercise choice over decisions about their housing options, and to achieve housing stability were found to express greater sense of well-being and quality of life including greater happiness and life satisfaction, as well as reduced health care utilisation and length of hospital stay (Kyle and Dunn 2007; Nelson, Aubry et al. 2007). And re-housing people on mental health grounds has been found to have a positive impact on the health of the people concerned (Taske, Taylor et al 2005).

Well-designed US studies found that improving long term housing stability for people with severe mental illness, especially for previously homeless people, is associated with positive health effects, while the impact of housing quality on health had been found to be less significant for this group. (Kyle and Dunn 2007; Nelson, Aubry et al. 2007).

Housing tenure (as a proxy indicator for socio economic circumstances) has been found to be related to both mortality and morbidity, with renters having poorer health outcomes than those who own or who have a mortgage (Shaw 2004).

### Design and location of houses and other buildings

The design and location of housing and other buildings such as hospitals have been found to

have an impact on health and well being. For example, positioning front doors of high rise housing estates so that they connect to pedestrian paths or areas where people meet has been shown to influence the development and maintenance of social networks and cohesion (Lavin, Higgins et al. 2006).

### **Neighbourhood physical characteristics**

A constellation of neighbourhood physical characteristics that has been found to have a positive impact on the health of populations includes:

- aesthetic qualities of attractive and well kept environments;
- well lit and constructed footpaths and streets that are pedestrian friendly; and
- safe, and street patterns that provide opportunities for informal contact among residents (Leventhal and Brooks-Gunn 2000; Diez-Roux 2003; Jackson 2003; Mair, Mair et al. 2003; Davison and Lawson 2006; Lavin, Higgins et al. 2006; Mead, Dodson et al. 2006; Reid and Kreutzer 2006).

Neighbourhoods which are safe, convenient and attractive have been associated with higher rates of walking by residents (Mead, Dodson et al. 2006). However there is ongoing debate about the merits of grid street patterns which enhance neighbourhood connections versus cul de sacs which are perceived as being safer for children's outside play and are popular with parents.

Beyond their positive effect on levels of physical activity, the availability of, and access to, parks and gardens (green spaces) provide:

- a space for communities to meet and interact;
- a place to relax;
- a pleasant visual experience; and
- a barrier to reduce environmental noise and a filter to improve air quality (Lavin, Higgins et al. 2006).

Being able to see the natural environment, particularly green vegetation and spaces, from houses and hospitals has been associated with decreased levels of domestic violence, increased cognitive function in children from low-income families and faster recovery from surgery and illness (Jackson 2003; Lavin, Higgins et al. 2006).

### **Land use mix**

Land use mix includes the opportunities provided within a physical environment or neighbourhood for people to live, work, play, attend school, conduct their daily lives and interact with others; the extent of urban sprawl; and population density.

The built environment plays a role in providing opportunities for engagement and participation in local neighbourhood life, and in the decisions that shape people's environment and their lives (Butterworth 2000). For example the availability of civic amenities such as community centres and other public meeting spaces.

### **Access to services, shops and public amenities**

Separating home, work, and amenities such as shops and services has been found to have largely detrimental effects on health and well-being (Lavin, Higgins et al. 2006; Reid E and Kreutzer R 2006).

Conversely, people who live in close proximity to shops, work and play areas are more likely to be physically active (particularly walking). This is true, too, for people who live in localities with higher population densities, and street designs that enhance connections between activities and people (Gebel, King et al. 2005; Reid & Kreutzer 2006).

Access to public and civic amenities where people can meet, and the walkability of neighbourhoods that encourage people to have informal contact with their neighbours, has been shown to have positive effects on social interaction (Jackson 2003; Lavin, Higgins et al. 2006; Reid and Kreutzer 2006). It has also been suggested that civic amenities such as libraries, community centres and churches serve as

havens for people, provide a sense of belonging and are an important ingredient in the creation of positive levels of social capital in communities (Jackson 2003).

Reducing the time that people spend alone in their cars has a strong, positive impact on the development of social capital. But there is no conclusive evidence linking different mixes of land use, neighbourhood size and density to levels of social capital (Reid and Kreutzer 2006).

Local and convenient access to health and social services has been found to have positive influences on health (Macintyre, Ellaway et al. 2002; Vlahov, Galea et al. 2002).

### **Behavioural risk factors**

There is mixed, but encouraging evidence of positive associations between aspects of the built environment and behavioural risk factors including physical activity, nutrition and obesity.

In principle, neighbourhoods are a setting for outdoor play. They can provide opportunities for more social, less structured and inexpensive forms of physical activity including walking and cycling. In turn these forms of physical activity can then be more accessible to children who do not need to rely on parents to provide transport (Carver, Timperio et al. 2008).

Some reviewers reported associations between neighbourhood amenities such as playgrounds, open park areas, cycle ways and footpaths and levels of physical activity in both children and adults (Gebel, King et al. 2005; Davison and Lawson 2006). But other reviewers have found no or weak positive associations between neighbourhood features and physical activity (Diez-Roux 2003; Ferreira, van der Horst et al. 2007), and interventions that introduced new facilities into workplaces showed only a small increase in physical activity (Foster, Hillsdon et al. 2004).

Although some researchers reported no links (Foster, Hillsdon et al. 2004; Ferreira, van der Horst et al. 2007; Carver, Timperio et al. 2008),

other reviews have found associations between aspects of the built environment and levels of physical activity (Gebel, King et al. 2005; Davison and Lawson CT 2006; Mead, Dodson et al. 2006).

Access to fresh food, including for example supermarket proximity, has been proposed by some researchers as having an impact on consumption and dietary habits (Gebel, King et al. 2005).

It is not clear whether the relationship between the environment and obesity is mediated by physical activity, or whether there may be a direct causal relationship between features of the local food environment, such as availability and cost of food, with dietary habits. Several studies have found small or no effects (Diez-Roux 2003; Gebel, King et al. 2005).

There is some evidence that the WHO Safe Communities' model for the prevention of injury has been effective reducing injuries in populations (Spinks, Turner et al. 2005).

The placing and density of alcohol outlets is a neighbourhood level environmental strategy designed to prevent or control violence, although its effectiveness has not been evaluated (Mair, Mair et al. 2003).

### **Neighbourhood socio-economic characteristics**

There are well documented and consistent associations between socioeconomic status and health. Furthermore, people who experience low socioeconomic status tend to live in disadvantaged neighbourhoods, potentially, at least, compounding their individual or family circumstances. There is evidence that residents of socioeconomically disadvantaged neighbourhoods experience higher mortality, morbidity and higher prevalence of behavioural risk factors (Pickett and Pearl 2001; Diez-Roux 2003; Riva, Gauvin et al. 2007). A significant portion of variations in the health of populations of different neighbourhoods (whether measured by self-rated health, higher cardiovascular

mortality and morbidity or prevalence of risk factors) is positively associated with differences in social and economic circumstances (Pickett and Pearl 2001; Riva, Gauvin et al. 2007).

Some of the pathways through which neighbourhoods might influence these outcomes include access to institutional resources (for learning activities, schools, child care, health services and employment) and social support and social cohesion (Leventhal and Brooks-Gunn 2000).

However, it remains difficult to identify the independent effects of neighbourhoods on the health of populations (Diez-Roux 2003), and to identify the specific processes through which the associations occur (Shaw 2004). Associations between social cohesion and other aspects of the environment have informed the development of hypothesised pathways linking residential environments to cardiovascular risk in which a lack of social support and cohesion leads to stress and other psychosocial factors (Diez-Roux 2003).

### **Sense of belonging and emotional connection**

People may develop a powerful sense of belonging and emotional connection to their local neighbourhood (Butterworth, 2000). Disruptions to this sense of belonging by, for example, removal, relocation or other dislocations have been found to have adverse physical and psychological health consequences, especially in the short term (Taske, Taylor et al. 2005).

Neighbourhoods that enable informal social ties and social support networks that encourage and enable people to help each other can reinforce both positive and detrimental health behaviours (Shaw 2004). For example, social support and having a companion are associated positively with a range of types of physical activity, for both women and men (Wendel-Vos, Droomers et al. 2007). In contrast, social isolation is one of the adverse health effects identified for non-working mothers and military wives living on upper floors of high rise housing (Jackson 2003).

The evidence of the association between the safety of a neighbourhood and residents' perceptions of the social connectedness appears to be equivocal. Carver, Timperio et al (2008) found that parental and children's concerns about road safety and 'stranger danger' may cause parents to restrict their children's outdoor play, walking and cycling. (Carver, Timperio et al. 2008).

### **Perceived safety and children's physical activity**

However Davison and Lawson (2006) found a lack of association between perceived safety and children's physical activity. Neighbourhoods in which there was a high incidence of crime have been found to be inversely associated with physical activity amongst adolescents. But Ferreira, van der Horst et al. (2007) found that the incidence of crime was not associated with adolescents' perceptions of neighbourhood safety. This suggests that there is a complex relationship between perceptions of safety and health behaviour that has not, yet, been investigated fully.

### ***Scope of the review***

This review of reviews was not intended to encompass all aspects of the built environment. For example air, water and noise pollution, as well as internal aspects of housing, other buildings and transportation systems are all aspects of the physical environment that impact on health but were intentionally excluded as being beyond the scope of this summary. Specific measures of urban form and health were not defined; nor was the review restricted to particular study designs. Thus a broad rather than narrow spectrum of evidence was included, particularly in relation to health impacts and outcomes. The summary was restricted to articles and reports that were electronically available, and the search strategy focused mainly on published articles accessed via a limited number of health related databases. 'Grey' literature reports (publications not published in peer reviewed journals) were only

included if they were identified through personal contacts.

It is also the case that the spread of research included in the reviews is representative of the interests and priorities of those conducting the research or writing the reviews, and is not necessarily representative of policy-driven or community priorities. Developing an understanding of the effects of any one (or all) of social determinants on the health of populations is an emerging area of research interest and there are both large gaps and biases in the evidence available. For example there may be greater emphasis on physical activity and health due to the funding this receives as a research priority. And there has been greater research, to date, on the determinants of and interventions to address behavioural risk factors than on actions to redistribute the social determinants of health.

Summary data has been provided in the Appendix for each of the systematic reviews included, which enables some assessment of their quality. However this review also included a number of literature reviews which contained little or no information on their search methods, thus making it difficult to assess the strengths or limitations of those findings.

## Appendix: Annotated bibliography

Type of article:

- 1 = Review (Systematic)
- 2 = Review of the literature
- 3 = Commentary/expert opinion

Type	Author/title Focus	Methods	Findings
1	<b>(Acevedo-Garcia, Lochner et al. 2003)</b> Future directions in residential segregation and health research: a multilevel approach	<p>Aim: To examine the research evidence on the health effects of residential segregation in USA.</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: No</p> <p>Number of studies: 29</p> <p>Time frame: 1950-2002</p>	<p>Racial/ethnic residential segregation and health</p> <p>The majority of studies focused on outcomes of African-Americans. Black mortality (including infants) is positively associated with residential segregation, and with residents in predominantly Black areas. Other studies have shown a positive association between segregation and Black homicide rates; and that homicide was the major cause of life expectancy differentials.</p> <p>Income segregation</p> <p>2 studies found that residential segregation based on income is positively associated with mortality; however, these studies did not examine the contribution of racial/ethnic segregation to this finding.</p> <p>Pathways between residential segregation and health</p> <p>It is hypothesised that segregation effects health indirectly through neighbourhood characteristics, and that concentration of poverty, or shaping of the social and economic attainment of minority group members. However, there have been few multilevel study designs that have enabled these pathways to be adequately tested.</p> <p>US sociological literature also suggests that residential segregation along racial/ethnic lines has been a key factor in creating substantial inequalities in opportunity, including discrimination in the housing and mortgage market, even after controlling for income; and</p>

Type	Author/title Focus	Methods	Findings
			discrimination preventing spatial integration with Whites.
1	<b>(Davison and Lawson 2006).</b> Do attributes in the physical environment influence children's physical activity?	<p>Aim: To review the association between the physical environment (perceived or objectively measured) and physical activity among children &amp; adolescents (ages 3 to 18-years)</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Descriptive &amp; qualitative studies excluded</p> <p>Number of studies: 33</p> <p>Time frame: Not specified</p>	<p>Findings were categorized and discussed according to three dimensions of the physical environment including recreational infrastructure, transport infrastructure, and local conditions.</p> <p>Children's participation in physical activity is positively associated with publicly provided recreational infrastructure (access to recreational facilities and schools) and transport infrastructure (presence of sidewalks and controlled intersections, access to destinations and public transportation).</p> <p>In contrast, transport infrastructure (number of roads to cross and traffic density/speed) and local conditions (crime, area deprivation) are negatively associated with children's participation in physical activity.</p>
1	<b>(Ferreira, van der Horst et al. 2007)</b> Environmental correlates of physical activity in youth - a review and update	<p>Aim: To conduct a systematic review of environmental correlates of youth physical activity</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Observational studies (either longitudinal or cross sectional); exclusion criteria specified, inc quasi-experimental designs.</p> <p>Number of studies: 150</p> <p>Time frame: 1980-2004</p>	<p>Environmental variables:</p> <p>Micro (homes, schools, neighbourhoods)</p> <p>Macro (broader infrastructure, inc town planning);</p> <p>4 types: physical, socio-cultural, economic, political</p> <p>Potential determinants at neighbourhood level:</p> <p>For children, aspects of the physical environment as perceived by parents were unrelated to physical activity. Aspects of the social &amp; economic environments were unrelated to physical activity.</p> <p>For adolescents, but not children, crime incidence (measured objectively) was inversely associated with physical activity (see also Carver 2004 review for more detailed finding from Gomez 2004 study), but not associated with adolescents' perception of neighbourhood safety.</p>

Type	Author/title Focus	Methods	Findings
			<p>Aspects of the physical environment (availability/ accessibility of physical activity equipment or facilities) were unrelated to physical activity.</p> <p>No convincing evidence of an important role for many other environmental factors was found.</p>
1	<b>(Foster, Hillsdon et al. 2004)</b> Changing the environment to promote health-enhancing physical activity	<p>Aim: To conduct a systematic review of studies that used environmental interventions to increase physical activity.</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Observational studies using experimental design</p> <p>Number of studies: 17</p> <p>Time frame: until 2001</p>	<p>Most studies related to work related interventions</p> <p>Two groups of studies were found, studies that changed the physical environment by creating new physical activity facilities, policies and supporting mechanisms, and studies that used the elements of the environment as an active or sedentary 'point of choice', via educational materials to promote stair use.</p> <p>Environmental change studies (N=3)</p> <p>Showed a small increase in physical activity, but the relative impact of environment changes was not evaluated.</p> <p>Use of written media to prompt stair use (N=16)</p> <p>Several before and after studies have observed a weak effect of a simple environmental change to stimulate stair climbing while travelling or shopping.</p> <p>Current national policy has embraced the environment as an option for promoting health-enhancing physical activity, especially active travel, in spite of the lack of studies and effectiveness data.</p>
1	<b>(Gebel, King et al. 2005)</b> Creating healthy environments: a review of links between the physical environment, physical	<p>Aim: To conduct a systematic and selective review of the links between the physical environment and nutrition; and between the physical environment and physical activity</p>	<p>Relationship between the built environment and physical environment and physical activity</p> <p>The overall findings of nine reviews suggest that there are reasonably consistent associations between high population density, mixed land use and street and urban form connectivity. There are also reasonably consistent associations for accessibility of physical activities, and less</p>

Type	Author/title Focus	Methods	Findings
	activity and obesity.	<p>Search strategy described: Yes.</p> <p>Explicit study design criteria: Included correlation and intervention studies</p> <p>Number of studies: 1 physical activity &amp; environment: 9 reviews, 15 additional studies.</p> <p>2. Physical environments &amp; urban form &amp; overweight, obesity, nutrition: 8 studies</p> <p>Time frame: 1: Since 2003 2: 1991-2004</p>	<p>evidence for accessibility of recreation facilities. Two of the reviews also mentioned road safety or cycle and pedestrian safety.</p> <p>A summary of 15 studies published since the reviews, also showed the same consistent associations.</p> <p>The relationship between physical environments and urban form and overweight, obesity and nutrition.</p> <p>A summary of the main findings from eight studies indicates there is mixed evidence on the relationship between urban form and obesity. It is not clear whether this relationship is mediated by physical activity or whether there may be a direct causal relationship. Several studies found small or no effects so this is an area where the pattern is not tending in the same direction consistently.</p> <p>The relationship between physical environment access to nutrition (fruit and vegetable choices)</p> <p>The few studies which have examined the impact of supermarket proximity on availability and consumption of healthy foods suggest this may influence consumption.</p> <p>This report also identifies the urban form characteristics that tend to be associated with physical activity and possibly nutrition related obesity behaviours, including:</p> <ul style="list-style-type: none"> <li>• mixed land use and density</li> <li>• footpath and cycle ways and facilities for physical activity</li> <li>• street connectivity and design</li> <li>• transport infrastructure and systems linking residential, commercial and business areas</li> </ul> <p>They also note that whilst there is little causal evidence, the consistent associations between environmental features and health behaviours, provides promising evidence and that environmental change could be</p>

Type	Author/title Focus	Methods	Findings
			one of the components that can contribute population health benefits.
1	<b>(Kyle and Dunn 2007).</b> Effects of housing circumstances on health, quality of life and healthcare use for people with severe mental illness.	Aim: To conduct a systematic review of studies (since 1980) that investigated the relationship between housing-related independent variables and health-related dependent variables for adults with severe and persistent mental illness  Search strategy described: Yes  Explicit study design criteria: Quality assessment of strength of studies, with majority graded as weak-medium  Number of studies: 29  Time frame: Since 1980	Housing & healthcare (hospital) utilisation  For previously homeless people, housing placement is related to reduced hospitalisation, and length of stay. (USA studies)  Housing & mental status outcomes  Promising findings: long term housing may confer a mental health benefit for homeless persons; for persons not identified as being homeless, poorly delivered housing programs had a detrimental effect on their mental health; interventions to improve housing quality (structural & social environment) could affect mental health.  Housing & quality of life  Strongest evidence that life satisfaction is unrelated to housing type for previously homeless people (so broad classifications not as informative as specific factors that characterise housing type – e.g. amount of supervision & residence size)  Promising findings: perceived choice of housing has a +ve correlation with happiness & life satisfaction over time; and life satisfaction is – vely associated with number of concerns about housing quality & comfort.  More research is needed about housing solutions for individuals with SPMI who are housed, but in precarious or inappropriate housing situations.
1	<b>(Leventhal and Brooks-Gunn 2000)</b> The neighborhoods they live in: the effects of neighborhood residence on child and	Aim: To review evidence of links between neighbourhood characteristics and outcomes for children & youth  Search strategy described: Yes  Explicit study design criteria:	Behavioural & emotional problems (N=14)  Strongest evidence is adverse effect of low SES neighbours on children’s & adolescents mental health, possibly more so for externalising (i.e. acting out & aggressive) behaviours more so than internalizing behaviours.

Type	Author/title Focus	Methods	Findings
	adolescent outcomes.	<p>Studies using census track data (SES, racial/ethnic diversity, residential instability). Most studies were in USA</p> <p>Number of studies: 21</p> <p>Time frame: 1990-1998</p>	<p>Sexuality &amp; child bearing (N=7)</p> <p>Varied findings, but most consistent pattern of results is the association between neighbourhood SES (as assessed by employment indicators) &amp; coital &amp; fertility outcomes</p> <p>This article also identifies 3 pathways through which neighbourhoods might influence outcomes:</p> <ul style="list-style-type: none"> <li>• institutional resources (for learning activities, schools, child care, health services, employment),</li> <li>• relationships (inc social support),</li> <li>• norms/collective efficacy (inc social capital)</li> </ul>
1	<b>(Mead, Dodson et al. 2006)</b> Urban environments & health	<p>Aim: To conduct a systematic and comprehensive review of relationships between urban environments and health outcomes.</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: No</p> <p>Number of studies: 18 for urban forms and health</p> <p>Time frame: Not specified</p>	<p>The scope includes three aspects:</p> <ul style="list-style-type: none"> <li>• Built urban forms &amp; health</li> <li>• Transportation systems</li> <li>• Spatial access to health services.</li> <li>• Built urban forms &amp; health</li> </ul> <p>This included the external urban forms, including a the bulk &amp; proximity of buildings, circulation &amp; access systems via streets, footpaths;</p> <p>The focus included methods to measure urban form, proximities &amp; environmental factors; the concept of urban sprawl &amp; various metrics and the empirical evidence based on studies using these measures.</p> <p>They found relatively undeveloped research base , variable quality of studies only a small number of studies using the measures of interest , with most evidence on associations between urban form &amp; individual behaviour and more metropolitan than local level evidence:</p>

Type	Author/title Focus	Methods	Findings
			Neighbourhoods which provide safe, convenient, and attractive environments for walking are associated with higher levels of walking; there appears to be a possible link between suburban sprawl in mental health
1	<b>(Nelson, Aubry et al. 2007)</b> A review of the literature on the effectiveness of housing and support, assertive community treatment, and intensive case management interventions for persons with mental illness who have been homeless	<p>Aim: To review the outcomes of housing and support interventions for people with mental illness who have been homeless</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Quasi or experimental studies</p> <p>Number of studies: 16</p> <p>Time frame: up until 2004</p>	<p>Significant reductions in homelessness and hospitalization and improvements in other outcomes (e.g., well-being) resulting from programs that provided permanent housing and support, assertive community treatment (ACT), and intensive case management (ICM). The best outcomes for housing stability were found for programs that combined housing and support, followed by ACT alone, while the weakest outcomes were found for ICM programs alone.</p> <p>Housing and support interventions also showed greater reductions in the use of institutional services (e.g. hospitals and jails/prisons) than for comparison groups.</p>
1	<b>(Pickett and Pearl 2001)</b> Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review	<p>Aim: To conduct a systematic review of the effects of neighbourhood or local area social characteristics on health.</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Multilevel studies with SE information measured at both individual and area level.</p> <p>Number of studies: 25, most in UK, USA</p>	<p>All but two of the studies reported a statistically significant association between at least one measure of social environment and a health outcome (contextual effect), after adjusting for individual level socioeconomic status (compositional effect).</p> <p>However contextual effects, such as neighbourhood were generally modest and much smaller than compositional effects.</p> <p>They conclude that the evidence for modest neighbourhood effects on health is fairly consistent despite heterogeneity of study designs, substitution of local area measures for neighbourhood measures and probable measurement error.</p> <p>The varying study designs made it difficult to compare the impact of</p>

Type	Author/title Focus	Methods	Findings
		Time frame: Up until 1998	different neighbourhood characteristics. While it is plausible that some neighbourhood characteristics may be more or less related to health outcomes, many are highly correlated.
1	<b>(Riva, Gauvin et al. 2007).</b> Toward the next generation of research into small area effects on health: a synthesis of multilevel investigations published since July 1998	Aim: To review area effects on self rated health, CVD and risk factors, and mortality among adults. Search strategy described: Yes Explicit study design criteria: Multilevel studies Number of studies: 86 Time frame: 1998-2005	Small areas are most often operationalised using administrative and statistical spatial units. Most studies used indicators of area SES derived from censuses, and few provided information on the validity and reliability of measures of exposures.  A consistent finding was that a significant portion of the variation in health is associated with area context. However, area effects on health, although significant in most studies, often depend on the health outcome studied, the measure of area exposure used, and the spatial scale at which associations are examined. The authors conclude that while various health outcomes are influenced by area context, the specific processes through which such influences occur remain unclear
1	<b>(Spinks, Turner et al. 2008).</b> The 'WHO Safe Communities' model for the prevention of injury in whole populations  (Cochrane review)	Aim: To determine the effectiveness of the Safe Communities model to prevent injury in whole population, or targeted population sub-groups Search strategy described: Yes Explicit study design criteria: Before-after controlled studies & quality assessment Number of studies: 14 evaluations of 7 Safe Communities Time frame: 1996-2004	Safe Communities in Sweden and Norway have resulted in significant reductions in injury rates, not replicated in the other countries to the same level of success. Evidence suggests the model is effective in reducing injuries in whole populations, but that there were methodological limitations. The authors note the need in these types of complex interventions for detailed reports of implementation processes and impacts to help to understand successful components and barriers.  The unifying element within the Safe Communities' model is the emphasis on collaboration, partnership and community capacity building
1	<b>(Taske N, Taylor L et al. 2005)</b> Housing and public health: a review of reviews of	Aim: To identify & review housing related interventions that promote health, with particular reference to disadvantaged groups.	Re-housing and neighbourhood regeneration  Re-housing people on basis of medical need can reduce anxiety & depression

Type	Author/title Focus	Methods	Findings
	interventions for improving health.	<p>Search strategy described: Yes</p> <p>Explicit study design criteria: Applied a comprehensive critical appraisal tool to decide on studies to be included</p> <p>Number of studies: 15 review level papers, inc 4 that focused on re-housing or neighbourhood regeneration interventions</p> <p>Time frame: 1996-2004</p>	<p>Re-housing people from slum areas can improve self reported mental &amp; physical outcomes in longer term (18m), but adversely affect outcomes in shorter (9m) term.</p> <p>Lack of evidence on effectiveness of re-housing from a socially isolated area/substandard housing</p> <p>Lack of evidence on effectiveness of re-housing/housing improvement plus neighbourhood regeneration interventions.</p> <p>USA evidence that rental voucher programs can improve household safety by providing families with choice to move neighbourhoods</p> <p>- Lack of evidence of mixed-income housing developments in improving health</p> <p>Gaps in evidence:</p> <p>Overall very few studies found effectiveness of housing interventions in improving health outcomes for socioeconomically disadvantaged/vulnerable groups</p> <p>Lack of evidence on cost effectiveness for general population and disadvantaged/vulnerable groups.</p>
1	<b>(Thomson, Atkinson et al. 2006)</b> Do urban regeneration programmes improve public health and reduce health inequalities? A synthesis of the evidence from UK policy & practice (1984-2004)	<p>Aim: To synthesise data on the impact on health and key socioeconomic determinants of health and health inequalities reported in evaluations of UK regeneration programs</p> <p>Search strategy described: Yes</p> <p>Evaluations of national UK regeneration programs.</p> <p>Explicit study design criteria: Evaluations that reported impacts</p>	<p>Impacts on self reported health &amp; mortality rates (N=3)</p> <p>In 1 evaluation three of four measures of self reported health deteriorated, typically by around 4%.</p> <p>2 other evaluations reported overall reductions in mortality rates.</p> <p>Impacts on employment &amp; unemployment (N=9)</p> <p>- Improvements were found in all but 1 evaluation, but differences re type of outcome assessed, negative effects and missing data.</p> <p>Impacts on educational attainment (N=5)</p> <p>4 evaluations found improvements (but when compared with national</p>

Type	Author/title Focus	Methods	Findings
		<p>from 2+ target areas.</p> <p>Number of studies: 10</p> <p>Time frame: 1980-2004</p> <p><u>Note:</u> program evaluators reported difficulty with data collection, preventing clear conclusions around impacts</p>	<p>data, 2 evaluations reported no/little improvements similar improvements also reported across England over this time).</p> <p>Impacts on household income (N=2)</p> <p>An overall improvement was reported, but in 1 evaluation, a range of +ve &amp; -ve impacts were reported across the 4 case study sites</p> <p>Impacts on housing quality &amp; rent (N=2)</p> <p>42.5% proportion of original residents living in improved housing after investment</p> <p>Average social housing rent doubled over the 7-8 years period of investment</p> <p>There is little evidence of the impact of national urban regeneration investment on socioeconomic or health outcomes. Where impacts have been assessed, these are often small and positive but adverse impacts have also occurred.</p>
1	<p><b>(Wendel-Vos, Droomers et al. 2007)</b></p> <p>Potential environmental determinants of physical activity in adults</p>	<p>Aim: To gain insight into potential determinants of various types and intensities of physical activity among adults.</p> <p>Search strategy described: Yes</p> <p>Explicit study design criteria: Restricted to observational studies</p> <p>Number of studies: 47</p> <p>Time frame: 1980-2004</p>	<p>Social support and having a companion for physical activity were found to be convincingly associated with different types of physical activity, including neighbourhood walking, bicycling, vigorous physical activity/sports, active commuting, and leisure-time physical activity in general, sedentary lifestyle, moderately intense physical activity and a combination of moderately intense and vigorous activity. Availability of equipment was convincingly associated with vigorous physical activity/ sports and connectivity of trails with active commuting. Other possible, but less consistent correlates of physical activity were availability, accessibility and convenience of recreational facilities. No evidence was found for differences between men and women.</p>
2	<p><b>(Butterworth 2000)</b></p> <p>Relationship between the built environment</p>	<p>Aim: To summarise research relating to the importance of the built environment to health and</p>	<p>Aesthetics of place and the associated feelings of belonging</p> <p>The loss of a sense of belonging, security &amp; control over everyday life associated with removal, relocation, displacement, upheaval or other</p>

Type	Author/title Focus	Methods	Findings
	and wellbeing	<p>well being.</p> <p>No detail on methods</p>	<p>dislocations can have a profound psychological impact. This underlies the need for urban interventions to foster a sense of place through for example local access to shops &amp; services, and environments that support social networks/cohesion</p> <p>Legibility &amp; orientation: making sense of and engagement with the environment</p> <p>This underlies the importance of paying attention to the meanings that users derive through their interaction with the built environment and engaging with local communities in planning and designing interventions that impact on their local environment.</p> <p>Sense of community</p> <p>People develop a shared emotional connection to their local environment through "...the symbolic interaction in which people engage as they use aspects of the physical environment". This suggests that urban planning benefits from paying attention to interventions that foster a sense of neighbourhood including those which maximise the 'permeability' of the environment and social interactions, enhance visual coherence, afford adequate privacy, and enable ready access to amenities, parks recreation facilities, neighbourhood centres, etc</p> <p>Participation in civic life &amp; empowerment through meaningful community participation</p> <p>Participation and empowerment have been identified as being essential to the psychological health of individual and communities and are key principles of health promotion. The built environment plays a key role in influencing participation in local neighbourhood life. Health promotion interventions that aim to promote healthier built environments therefore need to include an explicit focus on enhancing community participation in the decisions that shape their surroundings and consequently their lives.</p>

Type	Author/title Focus	Methods	Findings
2	<b>(Carver, Timperio et al. 2008)</b> Playing it safe: the influence of neighbourhood safety on children's physical activity.	Aim: To explore which aspects of neighbourhood safety are associated with the physical activity of children & young people.  No detail on methods	<p>Focuses particularly on perceptions of 'stranger danger' &amp; road safety</p> <p>There is limited empirical evidence on the associations between specific aspects of neighbourhood safety &amp; children's physical activity.</p> <p>There is little empirical evidence that demonstrates direct associations between concerns about stranger danger and children's physical activity. But road safety &amp; stranger danger appear to be major causes of parental anxiety, which may cause them to restrict their children's outdoor play &amp; active transport. Parental, rather than children's, views are also stronger influences on children's physical activity.</p> <p>Some research suggests social interaction may contribute to a sense of safety (N=2)</p> <p>Subjective and objective measures of neighbourhood safety (e.g. violent crime) have been found to be inversely associated with outdoor physical activity for girls, but not for boys; and another study found an inverse association between subjective and objective (i.e. social disorder) measures of neighbourhood safety and recreational physical activity.</p> <p>Parental concerns about road safety were associated with restrictions on their children's walking and cycling activities; but there is mixed evidence in relation to objective evidence of road safety based on child pedestrian injuries. Children's concerns about road safety (inc more traffic &amp; parked cars on their local streets) also affected their perceptions about a safe local environment. Few studies have looked at adolescents' perceptions of road safety and their physical activity, and the results are conflicting.</p> <p>There is also limited empirical evidence of the impact of road safety on neighbourhood physical activity and little is known about the impact of interventions to improve neighbourhood safety on physical activity</p>

Type	Author/title Focus	Methods	Findings
			(e.g. modifications of the physical/ social environment)
2	<b>(Diez-Roux 2003)</b> Residential environments and cardiovascular risk.	Aim: To summarise three areas of empirical evidence related to residential environments and cardiovascular risk  No detail on methods	Neighbourhood socio-economic characteristics & cardiovascular risk  There are well documented associations between social and economic disadvantage neighbourhoods and higher mortality and morbidity and prevalence of risk factors. However, the literature is far from conclusive regarding the presence or strength of neighbourhood affects on cardiovascular risk; a major limitation being the inherent difficulty in accounting for multiple confounders in observational settings.  Residential environments and physical activity  The evidence remains limited, with weak associations and inconsistent results. Some studies for example have found by the no positive associations or weak associations between neighbourhood features physical activity, although this may be due to measurement limitations.  Residential environments and diet.  The focus here is on the features of the local food environment that may be related to dietary habits. Some research suggests that there are differences in the cost and availability of food across neighbourhoods: for example, healthy foods being less available in deprived communities. However, research in this area remains unclear and findings may also be highly context specific.  They conclude that key challenges in investigating the relationship between residential environments and health are discussed. These challenges include characterizing environments (including definition and geographic scale as well as conceptualization and measurement of relevant features), the limitations of observational studies, and the need to evaluate the health impact of interventions or “naturally” occurring changes in local environments.

Type	Author/title Focus	Methods	Findings
2	<b>(Galea and Vlahov 2005)</b> Urban health: evidence, challenges and directions	Aim: To review the empirical research assessing how characteristics of the urban environment (particularly cities) may affect population health  No detail on methods	The key factors affecting health in cities can be considered within three broad themes: <ul style="list-style-type: none"> <li>• the physical environment,</li> <li>• the social environment, and</li> <li>• access to health and social services.</li> </ul>
2	<b>(Jackson 2003)</b> The relationship of urban design to human health and condition	Aim: To review current understanding from diverse range of sources linking design to physical and mental well-being, environmental quality & overall quality of life.  No detail on methods	Buildings & grounds  Parks and gardens have long been known for their positive influences on mental and physical health. Research evidence supports an association between the presence and site of green vegetation and health (decreased levels of domestic violence, increased cognitive function in low-income children, faster recuperation from surgery)  Findings that living on upper floors of high-rises is associated with adverse health effects including lower physical activity, behavioural problems and respiratory illness in children, and mental health problems & social isolation for non working mothers and military wives with speculation that restricted access to the outdoors is the key factor. Mothers of children aged less than 5 years and these children are most affected and young adults and older people may find high rise living preferable.  Neighbourhoods  Notes the importance of social capital as a critical issue for neighbourhoods. Maximising informal contact among residents through the way neighbourhoods have been configured can reduce street crime, ensure better supervision of children and contribute to people's happiness with its surroundings. Jackson also argues that evidence suggests that civic amenities such as libraries, community centres and churches, not only serve as havens for people, they also provide a sense of belonging and are an important social capital

Type	Author/title Focus	Methods	Findings
			<p>ingredient.</p> <p>Jackson also argues that much of the literature advocating high residential densities, mixed land use, and street grid patterns to maximise social contact, physical activity and open space remain unsubstantiated, and that there is a multiplicity of factors that affect physical activity. For instance, whilst grid residents report higher sense of community, friendliness and convenience to shopping and schools, at least one study found that people prefer loop and cul-de-sac designs.</p>
2	<b>(Lavin, Higgins et al. 2006)</b> Health impacts of the built environment	<p>Aim: To summarise key findings from a diverse evidence base to highlight the many pathways through which the built environment may influence health.</p> <p>No detail on methods</p>	<p>Inequalities between experiences of different groups highlighted throughout document</p> <p>Design and maintenance of buildings and their location</p> <p>The immediate surroundings of buildings can positively influence health:</p> <ul style="list-style-type: none"> <li>• views of the natural environment are associated with illness recovery time, morbidity and mortality;</li> <li>• location of home entry points and their connection to major pedestrian paths or meeting areas can influence the development and maintenance of social networks &amp; cohesion;</li> <li>• other features of the environment which enhance a sense of community, (See Butterworth, 2000);</li> <li>• locality factors including availability of and access to services impacting on physical and mental health;</li> <li>• housing improvements associated with improved mental health and respiratory symptoms;</li> <li>• housing costs and impact on disposable income for food and heat.</li> </ul> <p>Public spaces &amp; networks</p>

Type	Author/title Focus	Methods	Findings
			<p>The positive impact of green spaces on health is thought to be through such things as providing:</p> <ul style="list-style-type: none"> <li>• a space communities to meet and interact,</li> <li>• a place for exercise,</li> <li>• a place to relax,</li> <li>• a pleasant visual experience,</li> <li>• a barrier to reduce environmental noise of a filter to improve air quality,</li> </ul> <p>Neighbourhood designs most likely to promote social networks are those that are mixed use and pedestrian oriented, and where there is light traffic use that also enhances road safety and encourages street playing amongst children, walking and cycling.</p> <p>Enhancing perceptions of neighbourhood safety and attractiveness through for example street lighting, well kept and maintained environments have also been associated with positive mental and physical health and wellbeing.</p> <p>Urban sprawl and land use practices that separate employment, residential, shopping and service amenities encourage car dependency, with associated problems of pollution, road traffic injuries as well as reduced levels of physical activity, increased commuting time and decreased loss of time for family, civic and community engagement.</p>
2	<b>(Mair, Mair et al. 2003)</b> Violence prevention and control through environmental modifications	Aim: To review the main environmental crime-prevention strategies, provides examples of promising interventions and discusses the contribution of environmental modifications to prevent and control violence and	This paper does not aim to evaluate the effectiveness of environmental crime prevention strategies Principles for modifying the environment to prevent and control violence include paying attention to the physical design and immediate situational factors of place which may encourage/inhibit violence. Few strategies discussed that relate to the community/neighbourhood context beyond the erection of traffic barriers at end of all streets of crime 'hotspot' area leading to freeways;

Type	Author/title Focus	Methods	Findings
		<p>crime.</p> <p>Literature review and opinion piece</p> <p>No detail on methods</p>	<p>and the placing and density of alcohol outlets.</p>
2	<p><b>(Reid and Kreutzer 2006)</b> Understanding the relationship between public health and the built environment</p>	<p>Aim: To review the current state of research regarding the links between public health and neighbourhood design.</p> <p>No detail on methods</p>	<p>The findings are presented by major health outcomes, including respiratory &amp; cardiovascular health, fatal &amp; non-fatal injuries, physical fitness, social capital, mental health, special populations.</p> <p>Social capital</p> <p>The research linking social capital to the built environment is still young. The evidence linking mixed land use, neighbourhood size, and density to social capital are mixed and inconclusive. The most conclusive evidence relates to automobile dependence and commute times and that reducing time that people spend alone in their cars is likely to have a beneficial impact on the development of social capital. In contrast, walkability of neighbourhoods is positively correlated to social capital. Diminishing social capital has also been associated with a loss of public spaces where people can meet informally and develop trust.</p> <p>This report also explores characteristics of the built environment that are associated with health:</p> <p>Regional accessibility/location of development</p> <p>Population and employment density</p> <p>Land use mix</p> <p>Access to transit</p> <p>Streetscape design/pedestrian amenities</p> <p>Bicycle amenities</p> <p>Access to recreational facilities</p>

Type	Author/title Focus	Methods	Findings
			<p>Distance from roadways</p> <p>Diversity of population/Income in communities</p> <p>Roadway network (encompassing network design, intersection traffic controls, access management and traffic calming)</p> <p>Street cross sections (encompassing street width, on-street parking, and pedestrian countermeasures)</p>
2	<b>(Shaw 2004)</b> Housing and public health	<p>Aim: To review key themes and processes related to housing and health and summarise the thrust of the evidence.</p> <p>No detail on methods</p>	<p>Household level</p> <p>Housing variables have been considered as proxy variable for more general SE circumstances and housing tenure has been found to be related to both mortality and morbidity, with renters have poorer health outcomes than those who own or who have a mortgage. While the reason for this relationship is not entirely clear, it is thought to include a range of both material and meaningful factors.</p> <p>Neighbourhood level</p> <p>Cites findings from Pickett et al review</p> <p>Culture, reputation and social capital</p> <p>The meanings that people attach to an area and the importance of social locations, situations and relations are thought to have potential impacts on health and well being. These can include cultural norms that support smoking, the difficult daily existence and environment and the lack of social support experienced by people living in public housing prevention smoking cessation and inequalities in income between people, rather than just the level of deprivation.</p>
2	<b>(Vlahov, Galea et al. 2002)</b> Urbanization, urbanicity, and health	Aim: To develop a framework of the features of the urban environment that affect health and well being drawing mainly on literature on North American cities.	<p>A review of the published literature suggests that most of the important factors that affect health in urban environments can be considered within three broad themes that relate to:</p> <ul style="list-style-type: none"> <li>• <i>the properties of the social environment</i> (including the social milieu,</li> </ul>

Type	Author/title Focus	Methods	Findings
		Literature review No detail on methods	<p>networks and stressors) that effect individual behaviour</p> <ul style="list-style-type: none"> <li>• <i>the physical environment</i>, including the built environment, air, water and noise pollution and</li> <li>• <i>access to health and social services</i>, including inequities in access, availability and quality of services</li> </ul> <p>An important contribution of this paper is the discussion on the varying ways urban is defined among countries, and lack of uniformity or consensus on what constitutes urban in different settings and over time. They suggest that a core set of characteristics influenced by population size, density, heterogeneity, and distance from other centres and that shape the living conditions within these centres.</p>
3	<b>(Frumkin 2003)</b> Healthy places: exploring the evidence	Expert opinion piece	<p>The health impact of place includes physical, psychological, social, spiritual, and aesthetic outcomes.</p> <p>Few recommendations for "good places" are based on empirical evidence, and thus there is a tension with public health evidence-based practice.</p> <p>However, aspects of the built environment that offer promising opportunities given the evidence of their associations with health include contact with nature, buildings, public spaces, and urban forms.</p>
3	<b>(Frumkin 2005)</b> Health, equity and the built environment	Expert opinion piece	<p>In this editorial, Frumkin argues that there are inequitable health impacts of aspects of the built environment including housing, transportation, food, parks and green spaces, and squalor especially for poor people and people of colour.</p> <p>While the focus is on the USA, many of the these equity concerns could be applied to the Australian context, including:</p> <p><i>Housing</i>: shortages, lack of affordability and substandard rental stock</p> <p><i>Transport infrastructure</i> : the mismatch between where poor people live and where they work and their inability to get to good jobs by public</p>

Type	Author/title Focus	Methods	Findings
			<p>transport</p> <p><i>Food</i>: the availability and affordability of fresh food</p> <p><i>Parks and green spaces</i>: the lack of access to these in some areas and the unintended effect of raising property values.</p> <p><i>The corrosive effects of disorder and squalor</i> 'the broken windows theory' which poor people are disproportionately exposed to.</p>
3	<b>(Macintyre, Ellaway et al. 2002)</b> Place effects on health: how can we conceptualise, operationalise and measure them?	<p>Aim: To highlight a lack of adequate conceptualization, operationalisation and measurement of place effects.</p> <p>An expert opinion piece</p>	<p>The authors review historical trends in the study of place effects, suggest that the distinction between "composition" (i.e. people) and "context" (i.e. features of the local social &amp; physical environments) may be more apparent than real, and that features of both material infrastructure and collective social functioning may influence health. These features include:</p> <ul style="list-style-type: none"> <li>• physical features of the environment shared by all residents;</li> <li>• availability of health environments at home, work and play;</li> <li>• services provided, publicly or privately to support people in their daily lives;</li> <li>• the socio-cultural features of a neighbourhood;</li> <li>• the reputation of an area.</li> </ul> <p>They also suggest that collective social functioning is broader than social capital/social cohesion, and includes other features of culture and practices.</p>
3	<b>(Perdue, Gostin et al. 2003)</b> . Public health and the built environment	Aim: To argue for government intervention in response to the evidence of the connection between health and the built environment	<p>Areas where there is evidence of connection between the built environment and health include: injury prevention; exposure to environmental toxins; violence and crime reduction; exercise.</p> <p>Article also suggests that a broader rather than narrow range of health impacts are considered and that by systematically appraising these, trade offs may not be as significant as might first appear and new</p>

Type	Author/title Focus	Methods	Findings
		Expert opinion piece	solutions to health issues may be found through application of public health expertise.

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