

Precarious housing and health: research synthesis



RESEARCH SYNTHESIS

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EXECUTIVE SUMMARY

About the study – Precarious housing and health: what are the links?

This research synthesis report is the first component of the VicHealth funded project, originally entitled *Mitigating negative health outcomes of precarious housing*, which explored the relationship between precarious housing and health. Led by Hanover Welfare Services and the University of Melbourne, the project was conducted in partnership with the University of Adelaide, Melbourne Citymission and the AHURI Research Synthesis Unit in 2009–10.

The three part project includes:

1. **A comprehensive research synthesis** of existing studies that examine the relationship between housing and health. The synthesis establishes the breadth of the international evidence base and interrogates current ideas and assumptions underlying housing-related health interventions.
2. **New quantitative analysis of the ABS General Social Survey and the HILDA surveys** to determine which Australians are living in precarious or vulnerable housing in Australia. It addresses two broad questions:
 - does poor health lead to precarious housing?
 - does precarious housing (including unaffordability, unsuitability and insecurity of tenure) affect people's health?
3. **New qualitative research with lone mothers aged 25 years and under**, to provide an in depth understanding of the social processes and experience of living in precarious housing, particularly how housing effects health.

The complete findings from Parts 2 and 3 are published together as a single report, entitled *Precarious housing and health inequalities: What are the links?* (2011). Part 1 is published as a report entitled, *Precarious housing and health: research synthesis* (2011). These reports are available on the websites of the participating organisations.

Synthesis: approach and aim

The research synthesis methodology is based on Ray Pawson's 'realist synthesis' approach developed at the UK Centre for Evidence-Based Policy and Practice (Pawson 2006). The approach was developed to help identify which social policy interventions work for whom, how and in what circumstances. As such it aims to identify the *contextual conditions* and *mechanisms* (or *means by which*) a social policy intervention produces a particular outcome.

This research synthesis interrogates the existing international and national evidence base on the relationship between housing and health. It examines the building blocks of effective housing-based health interventions, identifying the mechanisms which have the greatest likelihood of influencing health outcomes.

For this synthesis, almost 150 sources were appraised for their quality, rigour and relevance to the research question. They were then systematically synthesized until conceptual saturation was reached and additional research no longer provided new insights. A total of 57 studies were included in the review.

The value of this synthesis is that it demonstrates the breadth and complexity of the relationship between housing and health. It establishes there is evidence of a range of ways that housing can contribute to better health for disadvantaged Victorians.

Findings

Scope and quality of the evidence base

There is now a significant body of research evidence on the topic of housing and health outcomes. As this evidence is so diverse, employing a wide range of methods and terms, it is difficult to definitively resolve the causal relationship, if any, between housing conditions and health outcomes.

Broad strengths of the evidence base

The evidence base on the relationship between housing and health is broad, inter- and cross-disciplinary (e.g. from epidemiology, sociology, urban planning, geography) and employs a variety of research methods. It underlines the complexity of the relationships between housing and health and suggests that there are a range of ways in which different aspects of housing either support good health, or in their absence, lead to negative health consequences.

To date the greatest amount of evidence has accumulated on the health consequences of inadequate shelter, or the physical aspects of housing condition. This evidence is also the most robust. There is also another substantial body of evidence investigating the health impacts of aspects of place such as neighbourhood conditions and being in a 'good area'.

Broad limitations of the current evidence base

There are some significant gaps in the existing literature. For example, we cannot determine if particular aspects of housing are more significant in generating health impacts, positive or negative. And we do not know how the elements or components of housing interact to create health effects. For instance, we are yet to understand how trading off physical housing quality or location to achieve affordability gains may impact on health and wellbeing. Is there a threshold at which point a household will suffer the negative effects of precarious housing?

There is also no research that adequately addresses the impact of 'time-lags'. In other words, it remains unclear how various lengths of time spent in precarious housing affects health outcomes, if these health effects are immediate or delayed, and how long it takes for health effects that are caused by precarious housing to manifest and become apparent. Follow-up periods and intervals vary greatly in the few longitudinal and follow-up studies that have been completed.

While there may be a hierarchy of significance among housing elements, the complexity of their interactions with one another makes it difficult to clearly articulate. As such the question of hierarchy remains a research gap.

In addition to the questions of hierarchy and time-lags, there has been little research conducted on the effects of housing density or aspects of space other than overcrowding on health. There is also a lack of evidence about the way housing can facilitate or restrict social connectedness, known to have an impact on health and wellbeing.

Elements of housing linked to health outcomes

The literature synthesis highlighted that housing is a multifaceted concept. Five inter-related housing elements or categories, each with their own evidence base were identified: housing hardware, housing space, place (of housing), housing tenure and housing affordability. In the quantitative and qualitative components of this study we categorise housing hardware, space and place as aspects of housing suitability.

1. **Housing hardware** refers to the physical qualities of housing such as its ability to provide shelter from the outdoor environment.
2. **Space** relates to the amount of living space that housing affords residents; the literature on overcrowding and high density living falls into this category.
3. **Place or location** refers to neighbourhood quality as well as the location of housing and its ability to facilitate access to essential services and employment opportunities.
4. **Tenure** relates to the length of time and the terms and conditions under which accommodation is held. It includes a range of conditions from the profound insecurity of sleeping in public places to the relative security of home-ownership.
5. **Affordability** refers to residents' capacity to pay for their housing. 'Housing affordability stress' is a concept used to measure the effect of poor affordability. In Australia, a commonly used 'rule of thumb' defines housing affordability stress as housing costs in excess of 30 per cent of household income, where income is in the bottom 40 per cent of the income distribution, adjusted for household size (Yates et al., 2007).

While the synthesis also identified a variety of different health outcomes that have been measured and examined by researchers, these measures broadly fall into three categories: physical health, mental health and wellbeing.

Overview of findings

Overall, we found that poor or precarious housing negatively affects health outcomes in a variety of ways. The evidence does not resolve which housing element is more important in effecting health outcomes but does indicate that housing hardware is usually linked to physical health outcomes. The other elements are more strongly linked to mental health and wellbeing consequences.

Importantly the synthesis also identified *the means by* which particular housing conditions or circumstances lead to health outcomes and in which *contexts and circumstances* this is most likely to occur.

An analysis of the literature revealed that the critical means or mechanisms that lead particular housing conditions or circumstances to affect health outcomes include: identity, stability, safety, social support, control, the indoor environment and living practices. For example, when people are housed in neighbourhoods or blocks of housing where their safety is compromised this can lead to anxiety. Or people living in a neighbourhood they perceive to be stigmatised may experience an impact on their identity which in turn has an effect on their mental health and wellbeing.

The contexts or personal and social/environmental circumstances when this is most likely to occur include personal circumstances such as having access to a car, personal characteristics such as age, gender or ethnicity. So a person living in an unsafe neighbourhood may feel that they can escape unsafe housing situations because they have a car. This diminishes the sense of anxiety that might otherwise develop. Alternatively, the anxiety may be diminished by visible police presence in an unsafe neighbourhood.

Specific key findings relating to each housing element:

Suitability of housing: housing hardware

The research literature reveals that housing hardware such as insulation and heating and cooling devices, can moderate the indoor environment by affecting indoor temperatures, noise levels and air quality. Indoor temperatures and air quality are associated with physical health

outcomes, particularly respiratory conditions, while noise has been associated with mental health/wellbeing.

For example, a randomised-controlled test conducted in New Zealand found that the presence of insulation in the home during winter halved the rate of self-reported respiratory complaints in residents and reduced the number of days off from work and school. The insulation works to increase the indoor air temperature, which, in the right context (a cold winter), improved the physical health of occupants (Howden-Chapman et al. 2007).

In addition to its effect on the indoor environment, evidence suggests that housing hardware can also affect people's sense of stability, safety, sense of control, social connectedness and living practices. This, in turn, can affect their physical and mental health/wellbeing.

Housing design and home modifications can also facilitate stability, safety, control and social connectedness for an ageing or disabled population group with positive or negative effects on mental health/wellbeing.

Housing hardware such as bathrooms, flush toilets, plumbed water, ventilation to prevent dampness and cooking facilities affect living practices, which are associated with better physical health outcomes.

Suitability of housing: space

Research on housing space indicates that it has an effect on people's living practices, especially their ability to control their environment to secure privacy. If space is limited it is often more difficult to control, with consequences for physical health (e.g. respiratory effects of passive smoking for children) and mental health. While this may occur, some research highlights particular contexts or circumstances in which it is less likely to occur.

For example, the research pertaining to overcrowding indicates that if household heads can control this space then overcrowding may not affect mental or physical health negatively. Also an Australian qualitative study by Birdsall-Jones and Corunn (2008) found that 'overcrowding' was not always a negative occurrence for Indigenous Australians, often occurring for short periods of time to meet kinship obligations. In these circumstances participants readily distinguish between purposeful and harmful overcrowding.

Suitability of housing: place

Population level health inequities, especially physical health (e.g. malaria), were widely noted in places. However, the literature examining the effect of place, including neighbourhoods, on health is highly contested, reflecting the methodological difficulties of measuring changes in neighbourhoods and cities where confounding factors cannot be controlled.

The term 'neighbourhood qualities' includes two broad elements or components:

1. neighbourhood hardware (street lighting, footpaths, roads, landscaping and parks/community recreation facilities)
2. human capital/opportunities (access to social networks, levels of socioeconomic (dis)advantage, employment and educational opportunities, drug use and dealing, crime rates and rates of resident mobility).

An examination of the evidence on the neighbourhood qualities suggests that these qualities can affect real and perceived personal safety, and interact with personal characteristics and ethnicity/culture to affect social connectedness, which affects mental health/wellbeing.

Notably, the evidence also indicates that personal characteristics and circumstances may play a more significant part in affecting health outcomes than neighbourhood qualities.

Tenure/security of tenure

Analysis of the literature reveals that tenure is used to describe housing status. Typically the literature identifies three categories of tenure: home ownership, private rental and public rental. However tenure is also conceived as shorthand for security of tenure, reflecting a continuum from insecure to secure tenure. Understood in this way the term tenure can span levels or degrees of homelessness or the lack of tenure at one end of the continuum and home ownership at the other. Evidence suggests that lack of tenure or insecure tenure can have a direct effect on physical health and at least an indirect effect on mental health. Homelessness exposes people to damaging and dangerous living environments, including rough sleeping, boarding houses and emergency accommodation. The absence of housing affects personal safety and people's sense of control and mastery of their lives, shaping physical and mental health/wellbeing outcomes. Security of tenure can deliver affordability and stability, and may affect identity. These in turn influence health outcomes.

Three studies (Boyle, 2002; Harkness & Newman, 2003; Kearns, Hiscock, Ellaway, & Macintyre, 2000) examine the effect of multiple housing elements on health and aim to ascertain whether or not some housing elements affect health more than others. From these studies we theorise that for those living in private or public rental or their own home, housing hardware, affordability and personal and household characteristics may have a more significant affect on health outcomes than tenure.

Affordability

In Australia housing affordability stress is prevalent across tenures, but single persons and single parents (mostly female headed households) who rent privately experience the greatest instance and longest periods of housing affordability stress.

Housing affordability stress affects people's sense of stability and control over their lives as well as their living practices such as the ability to buy food. This in turn affects their physical and mental health/wellbeing. Households experiencing housing stress also experience higher rates of food insecurity.

Policy implications

Defining precarious housing

A number of terms have been used in the literature to link or register the relationship between housing and health and wellbeing. These include: housing stress, housing affordability stress, housing insecurity. These terms typically emphasise one housing element, most notably, housing affordability and its relation to health.

To date there has been no categorical definition of precarious housing in the research literature, however, synthesis of the evidence identifies a number of housing characteristics that alone or in interaction with one another can be associated with poorer health outcomes. The following set of elements is used in this study to define precarious housing:

- inadequate housing hardware
- housing conditions that restrict a household's control over space
- location in a neighbourhood with high levels of social disorder

- lack of rent or mortgage affordability
- lack of or insecure tenure.

A significant point to note is that these elements are largely negative characteristics: it is the *lack* of a given housing element which is associated in the literature with poorer health outcomes.

While incomplete, the evidence indicates that housing is a foundational element in health/mental health prevention and early intervention. Precarious housing affects health because it is the absence of adequate housing along a number of dimensions.

Adequate housing then can be considered a preventative health intervention.

The synthesis allowed us to map the territory of possible causal mechanisms which could be targeted by policy interventions. Based on these understandings, the synthesis suggests that effective policy interventions to reduce or mitigate the negative health effects of precarious housing could include:

- continued and concerted efforts to address the overall lack of adequate supply of affordable housing
- continued and concerted efforts to reduce homelessness through increased housing options and an effective support system
- improvements to ‘housing hardware’ – for example, standards to ensure adequate insulation and draught prevention in low-cost private rental housing
- reducing the use of shared communal area housing (such as rooming houses) through interventions to increase the supply of affordable housing for single people
- urban regeneration and renewal initiatives that address areas of concentrated socioeconomic disadvantage and/or have high levels of social disorder:
 - urban renewal that includes people-oriented (individual capacity building) as well as place-based components
 - relocation initiatives that include strategies to ensure ‘social mixing’ occurs in the new neighbourhood
 - reform to residential tenancy legislation to provide longer-term leases
 - development of alternative forms of ‘tenure’ which provide the benefits of home ownership to a greater range of households (for example, community land trust and shared equity models).

INTRODUCTION

- What effect does housing have on health?
- What role does housing play in creating good health and preventing ill health?
- Can good housing prevent or ameliorate health inequities for Victorians?
- Can housing interventions really make a difference to health-related disadvantage?

This report addresses these questions by synthesising a broad range of national and international research. It brings together evidence about five dimensions of housing that have been linked to creating good health or preventing ill health.

This report is one component of the VicHealth funded project originally titled *Mitigating negative health outcomes of precarious housing* which explored the relationship between precarious housing and health. Led by Hanover Welfare Services, the project was conducted in partnership with the University of Melbourne, Melbourne Citymission, University of Adelaide and the AHURI Research Synthesis Unit in 2009–10.

The three part project includes:

1. **New quantitative analysis of the ABS General Social Survey and the HILDA surveys** to determine which Australians are in vulnerable or precarious housing, and what is the direction and strength of the relationship between housing conditions and health outcomes for different population groups.
2. **New qualitative research with single parents aged 25 years and under** to provide an in-depth understanding of the social processes and experience of living in precarious housing especially how housing affects health.
3. **A comprehensive research synthesis of existing studies** that examine the relationship between housing and health. The synthesis establishes the breadth of the international evidence base and interrogates current ideas and assumptions underlying housing related health interventions.

The research synthesis component of the project:

- describes the breadth and quality of international research evidence in this area
- illustrates the complexity of the housing and health relationship
- constructs a framework for articulating how different aspects of housing affect health
- illustrates the methodological limitations which characterise the existing evidence base
- identifies some specific hypotheses about the mechanisms and contexts which may produce the effects of housing on health outcomes.

Currently the evidence base does not allow us to resolve questions about which aspect of housing is more significant in generating health impacts or how the elements are related. These are some of the important questions for further primary research, such as that conducted in the other parts of this project.

Structure of the report

The structure of the report is as follows:

Chapter 1 details the synthesis methodology in more depth and outlines the process undertaken in this synthesis review.

Chapter 2 discusses the scope and quality of both the broader evidence base and the selected studies.

Chapter 3 synthesises the literature on the effects of housing hardware on health.

Chapter 4 synthesises the literature on the effects of space on health.

Chapter 5 synthesises the literature on the effects of place on health.

Chapter 6 synthesises the literature on the effects of tenure/security of tenure on health.

Chapter 7 synthesises the literature on the effects of housing affordability on health.

Chapter 8 Conclusion identifies some policy implications of the synthesis.

Appendix 1 provides a table summarising the included studies.

1 METHODOLOGY

1.1 Purpose

This research synthesis aims to provide policy-makers and practitioners with an understanding of the building blocks for effective housing and health interventions. It provides an evidence-informed understanding of the mechanisms and contexts through which beneficial change is most likely to occur.

To do this it uses a theory-driven method of research synthesis, explained below, in order to integrate findings from a range of methodologically diverse evidence sources.

This method collects and then tests existing understandings and policy assumptions against the evidence by asking: do current ideas about the relation between housing and health account for all the (reliable) evidence we have? Can our ideas be refined or challenged by the evidence?

1.2 Approach

This synthesis uses an adaptation of the 'realist synthesis' approach, which was developed by UK theorist Ray Pawson as an alternative to other systematic reviews, such as 'meta-analysis' and 'narrative synthesis'. It is intended to facilitate the use of evidence in social policy making process.

While some features of the systematic review, such as using protocols to guide the review process, are adopted by Pawson, he broadly critiques the 'meta-analysis' and 'narrative synthesis' systematic review for failing to respond to the inescapable complexities of policy and policy making. These methods of review either oversimplify outcomes and conceal contexts (in the case of the 'meta-analysis') or over-contextualise the evidence and lack analysis (in the case of the 'narrative review') and fail to deal with the inherent problems of introducing evidence to policy making (Pawson, 2002).

While these models of systematic review were developed to effectively manage information about medical interventions, they are less useful in social policy since as Pawson (2006) notes: 'social interventions are always *complex systems thrust amidst complex systems.*' (p.35, original italics). This complexity he recognises puts 'profound limitations on what can be expected from evidence synthesis' (p.35).

Based on his critique, Pawson developed the 'realist synthesis' methodology in order to answer the question: '**what works for whom in what circumstances?**' The synthesis method attempts to identify the key mechanisms operating within policy interventions, and the contexts within which they are implemented, in order to understand not only what interventions work, but *why* they work.

Pawson's theory can be characterised by the following equation:

Mechanism (M) + Context (C) = Outcome (O)

Mechanisms are the explanatory factor – the 'what works and why' aspect of an intervention. The context part of the equation explains 'for whom and in what circumstances' part of the intervention.

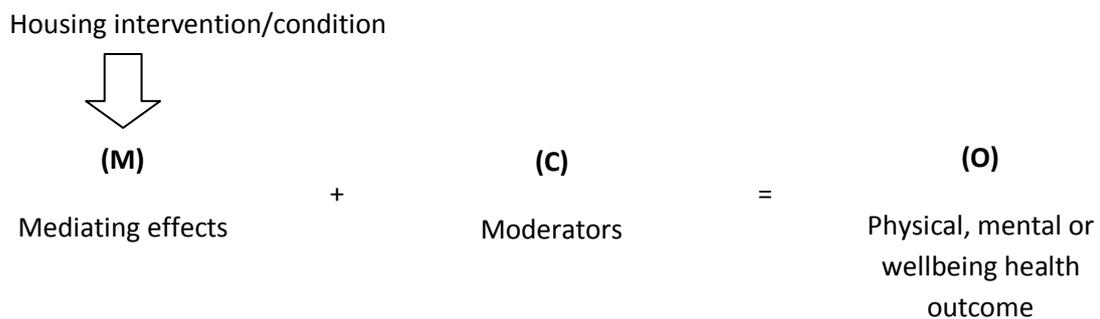
What works and why (M) + For whom and in what circumstances (C) = Outcome (O)

Therefore, the primary goal of the 'realist synthesis' reviewer is to identify the mechanism and context of a particular intervention that work together to secure the desired outcome. In order

to achieve this, the reviewer begins by identifying theories and assumptions about how an intervention works.

For Pawson, interventions *are* theories (Pawson 2006, p.26) and the purpose of the 'realist synthesiser' is to review and evaluate these theories with the aim of continually refining our understanding of what these theories are and how they work.

In the context of this synthesis that seeks to understand what is known about the relationship between housing and health there will be multiple mechanisms, contexts and health outcomes that will form a variety of theories (represented by the equation) depending on which housing condition/intervention/element is being considered. The following diagram illustrates what this looks like by drawing on one of the examples from this synthesis, which helped form a theory that explains the relationship between physical housing conditions/elements and health.



In this example, the intervention is housing insulation, which affects the indoor environment by increasing temperatures (the mechanism). This mechanism is triggered or only comes to affect health when coupled with geographic places that experience cold winters (the context). When this occurs, improved respiratory function of inhabitants is observed (the outcome).

In short, a 'realist synthesis' review allows us to ascertain not only that the presence of insulation improves respiratory function but that insulation works to affect the indoor temperature which improves respiratory function in particular contexts, like winters of places with cold climates.

Strengths of this approach

The value of the 'realist synthesis' lies in its 'realist' understanding of social policy and the evidence base that informs this policy. It values the contribution of different types of research and study designs (Wallace, Croucher, Quilgars, & Baldwin, 2003) and is a fit for purpose methodology, flexible enough to account for various policy complexities.

Limitations of this approach

An inherent limitation of this methodology is that it risks reinforcing agendas and assumptions which are implicit in the evidence base. Research is always funded by particular, interested parties and consequently must reflect a specific perspective. While the methodology seeks to manage this risk by incorporating research evidence from a range of geographic and disciplinary contexts, the risk of 'evidence capture' should be considered when interpreting the findings.

1.3 The process

The research synthesis project was conducted from August to October 2009.

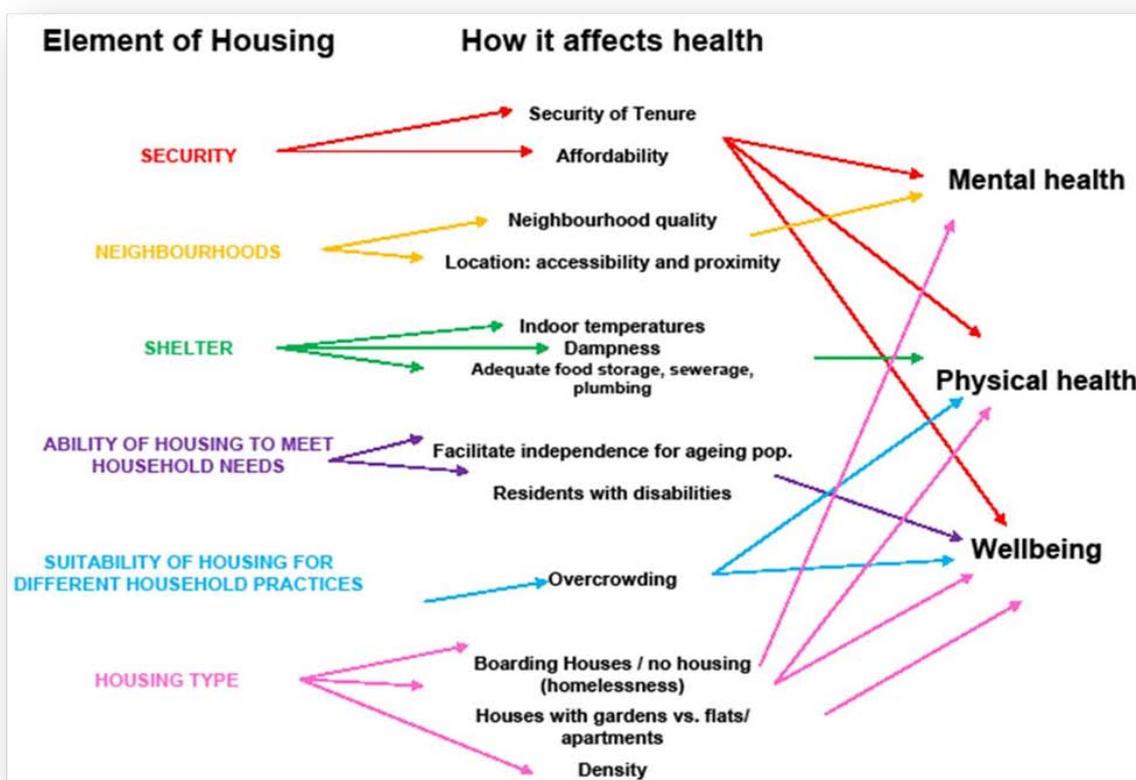
The first stage involved assessment of a broad range of academic and policy literature at the cross-section of 'housing' and 'health' in order to identify and draw out the direction of the review and program theories from the evidence base. In this initial stage it became clear that 'housing' was a multifaceted concept comprised of many different yet interconnected elements. After discussing our preliminary thoughts and observations with the research team, the following five housing element categories emerged:

1. 'housing hardware' (physical qualities of housing)
2. space (the space that housing provides to live adequately)
3. place: neighbourhood qualities (neighbourhood hardware and human capital/opportunities)
4. tenure type
5. affordability.

Most of the research we found examined the relationship between one aspect of housing and either one or more elements of health, which broadly fall into the three categories of physical health, mental health and wellbeing. However, a handful of studies did examine the relationship between multiple housing elements and their impact on health.

As a result of this first stage, we determined that there were a range of theories about how different housing elements affect various aspects of health and wellbeing. For example, one theory identified was that housing hardware (such as insulation) affects respiratory health (a physical health outcome).

The following diagram maps the program theories that emerged from this first stage.



It was clear that the evidence base covered a broad range of interventions and mechanisms and yielded a broad set of program theories.

The second stage built on this initial phase and involved more directed and detailed searches. We sought quality Australian and international empirical studies (post 2000), first searching the research database EBSCOhost, using combinations of the following search terms: housing, health, health outcomes, wellbeing, mental health, housing interventions, neighbourhood renewal, neighbourhood interventions, tenure, home ownership, affordability, low-income, overcrowding, disease, Section 8, condition(s), social mix and public health.

Assessment of abstracts identified relevant studies and their bibliographies were then mined in order to glean further resources. This method of 'snowballing' proved effective in unearthing a larger amount of research than database searching.¹

We also searched the Cochrane and Campbell libraries for relevant systematic reviews, and the Joseph Rowntree Foundation and Brookings Institutes libraries for relevant research. A number of AHURI projects were included and some preliminary searching of community agency research was also completed but yielded little results. One project conducted by the Brotherhood of St Laurence was included.

After discussions with the reference group, we conducted purposive searching for research relating to overcrowding and domestic violence. This included comprehensive searching of the Australian Domestic and Family Violence Clearinghouse.

This second search phase continued until it reached a point of saturation where articles began to reappear and no new theories or incongruous evidence emerged.

The third stage involved appraising this evidence according to Pawson's criteria of relevance and rigour. Studies were included if they were relevant to the synthesis question (i.e. examined some part of the relationship between housing and health) and contributed to the refinement of a program theory identified during the first stage.

Pawson rejects the idea of measuring relevance and rigour based on a methodological hierarchy with the 'gold standard' randomised-controlled test (RCT) at the top, which is adopted by many other systematic reviewers. Rigour relates to whether or not the research supports the conclusions drawn from it by the researchers (Pawson, Greenhalgh, Harvey, & Walshe, 2004, p. 29). Validation occurs via triangulation of findings rather than by the 'goodness' of the method (Slavin, 1986, p. 6).

Combined with the appraisal, the final and major stage involved the iterative process of extracting and synthesising the data to test and refine the program theories.

1.4 Theories about how housing affects health

As a result of methodological limitations and the complexity of the topic, research has struggled to establish causality in the area of housing and health. It was quickly apparent that much of the evidence is contested, reflecting how complex it is to measure the effect of housing on health. Methodological limitations included the inability of researchers to control for confounding factors, small, unrepresentative sample sizes and contested definitions (Evans, Wells, & Moch, 2003; Lyons et al., 2006).

In order to overcome these methodological problems and find some measure of causality, Evans, Wells and Moch (2003) identify a number of 'mediating effects' or 'facilitators' of good

¹ An audit of how a sample of empirical studies were found and identified for a systematic review conducted by Greenhalgh and Peacock (2005) established that 50 per cent of the references were identified through 'snowballing' and 30 per cent through the more traditional method of database searching.

health that may go some way in explaining *how* and *why* housing can affect health outcomes (491).

After conducting a review study of a number of articles that examined the relationship between various physical elements of housing and mental health, Evans, Wells and Moch (2003) find that the existing research establishes a clear link between housing quality and psychological health. They argue however, that researchers need to go beyond these correlations and examine the mediating effects, the underlying psychosocial processes, that link housing and mental health/wellbeing (492) in order to add value to the research. They identify several mediating effects that may assist in our understanding of the relationship between housing and health, which include:

- **Identity:** Often factors such as the stigmatization of public housing can result in public housing tenants internalizing negative community perceptions about their housing type, quality and location. This internalization of negativity may result in poor wellbeing (492).
- **Instability:** There are greater instances of mobility among low-cost housing residents. Some of these moves are not voluntary and this may contribute to poor mental health. Mobility is strongly associated with instability, which has been linked to poor mental health as has insecurity of tenure (492).
- **Safety:** The housing environment and the neighbourhood within which the house is located can impact real or perceived safety. For example, poorly lit entryways or vandalism can induce fear for safety (492-493).
- **Social support:** Social isolation and a lack of social support has been linked with poor mental health outcomes. Building design, such as a lack of communal spaces or long corridors rather than a clustered living environment, can facilitate social isolation (493).
- **Control:** Housing not only provides shelter from the elements but also shapes a social environment. Good housing provides safe, secure conditions that facilitate mastery and control over one's life. Being able to control this space is important as it facilitates privacy when required. Housing and neighbourhoods that do not facilitate this sense of security and mastery have been linked to a sense of helplessness in residents (494).

So while causality is notoriously difficult to prove *within individual studies*, by analysing a large number of studies and by drawing on Evans, Wells and Moch's work, we have been able to refine our understanding of how housing elements affect health and identified a range of mediators which emerge from the evidence base.

In addition to the mediating factors listed above, two more emerged from the literature we reviewed: the indoor environment and living practices. The indoor environment is comprised of various aspects such as indoor temperatures, noise level and air quality. Healthy living practices have been defined as practicing personal hygiene (washing and disposing of human waste safely), washing clothing and bedding, and safely preparing and storing food (Ross S Bailie & Runcie, 2001; Ross S Bailie et al., 2005; Ross S. Bailie & Wayte, 2006).

In applying Pawson's analytic framework, with the aim of identifying mechanisms and contexts, we found that other factors such as personal characteristics, circumstances and culture also affected the relationship between housing and health. We identified these as *moderators*.

Mediators are best understood as the casual link between housing and health, they account for the relationship between these two factors, whereas moderators influence the strength of this relationship. In short, a relationship can exist without the presence of moderators but not without the presence of a mediator. Mediators are the mechanism of change and moderators are the context which facilitates the change.

2 SCOPE AND QUALITY OF THE EVIDENCE BASE

2.1 The preliminary search phase and broader evidence base

It became apparent from the preliminary search phase that the research at the cross-section of 'housing' and 'health' is vast, varied and originates from a number of disciplines. Indeed, an initial search of EBSCOhost using the search terms 'housing' and 'health' yielded almost 12,000 results.

As mentioned in the previous chapter, the iterative search process, which involves broadly scanning the evidence base, reading a wide range of this literature, recording significant terms, phrases and authors, and then conducting further, more refined searching, resulted in the emergence of five elements that comprise 'housing' (housing hardware, space, place, tenure type and affordability) and three elements that comprised 'health' (physical, mental and wellbeing). This process was conducted through a 'housing lens', meaning we started the search process by looking for and at literature from the housing discipline and then expanded out into other disciplines, such as health and medicine, as the process continued.

Using other databases and desktop resources, and drawing on the knowledge of the research team, we conducted a purposive searching phase to ensure that we had comprehensively scanned as much of the literature relating to all five housing elements and all three health aspects. This resulted in a bibliography of almost 150 sources. It was from these sources that the preliminary program theories emerged (as detailed in the previous chapter).

2.2 The scope and quality of selected studies

Evidence from studies in the bibliography of almost 150 sources was appraised, extracted and synthesised until conceptual saturation was reached with the inclusion of 57 sources. These 57 studies were selected for inclusion because they were (i) relevant to the synthesis (examined some part of the relationship between housing and health) and (ii) added value to the synthesis by refining one or more of the program theories identified in the preliminary search phase.

Overall, the synthesis found that research has been conducted on a wide range of housing elements. This demonstrates the multi-dimensional character of housing and the consequent complexity of its possible relationship(s) with health.

The following sections provide an overview of information about the scope and quality of the selected studies including the geographic and methodological breadth, the research measures used and gaps in the evidence base.

In addition, Appendix 1: Table of research source characteristics, contains details of the methodology, sample, follow-up period and findings for each study in the synthesis. Each thematic chapter that follows also includes an overview of the scope and quality of the studies synthesised.

2.2.1 Range of methodologies and geographic sources

The following tables map the selected studies according to methodology, jurisdiction and their focus on physical or mental health and wellbeing.

Note that we refer to a 'study' as a discrete piece of empirical research. In some cases more than one publication is cited from the same study because they present different aspects of the study's findings.

Additionally, some studies are cited in more than one chapter and consequently the sum of studies in the individual chapters does not coincide with the total number of studies in the synthesis overall. The totals are accordingly omitted in the tables below.

A ratio is provided to represent the relative strength of research focus on physical health versus mental health and wellbeing outcomes, across the range of housing elements. Many studies examine both mental and physical health outcomes and consequently the ratio total exceeds the total number of studies.

Mental health and wellbeing were collapsed into the one category because the terms are not well-defined in the literature. For example some studies define mental health as being present only if the subject was objectively diagnosed by a professional, whereas other studies employ a far broader definition and use self-report data to conclude whether or not mental health issues are present.

Table 1: Methodologies and research focus by housing element

	Number of studies	Quantitative	Qualitative	Review	Ratio of physical health: mental health and wellbeing
Housing hardware	17	12	2	3	13:7
Space	7	4	3	-	5:4
Place	13	9	4	-	3:12
Tenure	12	6	6	-	4:9
Affordability	10	6	4	-	4:7

The ratios illustrate that research typically examined how particular housing elements correlate with particular kinds of health outcomes. For example, there are a great number of quantitative studies that look at dampness in the home (shelter) and respiratory function (physical health). While research concerned with the housing elements of place, tenure and affordability, more typically investigated mental health and wellbeing outcomes.

This weighting should be interpreted cautiously since it may reflect the practical and conceptual ease of linking physical housing elements to physical health outcomes, in other words, reflecting methodological forces rather than causal effects.

A significant number of studies were conducted in Australia, reflecting recent research investment in housing affordability and homelessness. The search outcomes also reflect an English language bias.

The mapping cannot be generalised to the broader evidence base but is intended to show how the research evidence emphasised different health outcomes depending on which housing element was the focus.

Table 2: Research source countries by housing element

	Australia	New Zealand	United Kingdom	Europe	United States	Canada
Housing hardware	5	1	5	3	3	-
Space	4	1	-	-	1	1
Place	4	-	5	-	4	-
Tenure	6	-	1	-	4	1
Affordability	4	-	3	1	1	-

The third table unpacks the methodologies further and summarises the details of the 15 longitudinal² or follow-up studies included in the synthesis. Longitudinal methodologies serve the dual purpose of identifying patterns of phenomena over time and establishing the direction and magnitude of causal relationships (Menard 2002, p.3). In the quest to establish causality in observational studies, longitudinal methodologies are preferable to cross-sectional³ methodologies because cross-sectional studies can only map the prevalence of a particular phenomenon in the sample, whereas longitudinal methodologies can establish some temporal order and direction, indicating the cause of a particular phenomenon.

A total of 15 longitudinal or follow-up (i.e. pre-post studies that compare results before and after an intervention) studies were included in the synthesis, with the remainder being review⁴ or cross-sectional studies. The following table lists these studies and identifies the dataset (if applicable), the number of waves or sweeps used and the interval period between waves or follow-up.

² Studies that draw on data observed and collected from the same subjects at multiple intervals over a long period of time.

³ Studies that observe and compare phenomena at one particular point in time.

⁴ Studies that collect and review existing research.

Table 3: Longitudinal or follow-up studies included in synthesis

Study	Dataset	Number of waves/sweeps used or follow-ups conducted	Total follow-up period
Nettleton & Burrows (1998)	British Housing Panel Study (BHPS)	2 waves: 1991–2 & 1995–6 (1 year intervals)	3 years
Marsh et al. (2000)	National Child Development Study (UK)	6 waves: 1958–1991 (various intervals)	33 years
Blackman & Harvey (2001)	-	1 follow-up	5 years
Dedman et al. (2001)	-	1 follow-up (1937–39 & 1999)	62 years
Harkness & Newman (2003)	American Panels Study of Income Dynamics	25 waves (1968–93) (1 year intervals)	25 years
Huxley et al. (2004)	-	1 follow-up (22 month interval)	22 months
Propper et al. (2004)	BHPS	10 waves (1991–2000) (1 year intervals)	10 years
Cutrona et al. (2005)	-	1 follow-up	2 years
Phibbs (2005)	-	1 follow-up	6 months
Howden-Chapman (2007)	-	2 follow-ups (1 year intervals)	2 years
Taylor, Pevalin & Todd (2007)	BHPS	13 waves (1991–2003) (1 year intervals)	13 years
Fauth, Leventhal & Brooks-Gunn (2008)	-	1 follow-up	7 years
Johnson, Gronda & Coutts (2008)	-	1 follow-up	1 year
Pevalin, Taylor & Todd (2008)	BHPS	7 waves (1996–2002) (1 year intervals)	7 years
Wood & Ong (2009)	Household, Income and Labour Dynamic Australia (HILDA) survey	6 waves (2001–2006)	6 years

Of the 15 longitudinal studies, seven examine the effect of place on health outcomes, three examine housing affordability and the remainder are spread between ‘tenure’ and ‘housing hardware’. As we can see, follow-up and interval periods vary greatly, which may account for some inconsistencies in findings. This variance also indicates that little can be surmised about the effect of ‘time-lags’ on health outcomes.

2.2.2 Measures of poor health

The table below details the metrics relating to health measurement tools and their prevalence of use. Evidently, a number of different health measures are used. This variety assists in the process of triangulation but can also make comparisons difficult.

Table 4: Health measurement tools that emerged from the literature

Health measurement tool	Prevalence of use
General Health Questionnaire 12 (GHQ12)	4
General Practitioner (GP) visits	5
Hospital admissions	3
Government health care records	3
Days off school/work	1
Presence of a chronic illness	2

Other health measures that were used in reviewed studies include:

- The Rutter Children's Behavior Questionnaire (Evans, Saltzman & Cooperman 2001)
- The Demoralization Index of the Psychiatric Epidemiology Research Instrument (Evans & Wells 2000)
- The University of Michigan Composite International Diagnostic Instrument (Cutrona, Wallace & Wesner 2006)
- US Household Food Security Scale (Meyers et al. 2005)
- Manchester Short Assessment of Quality of Life (MANSA) (Huxley et al. 2004)
- Hospital Anxiety and Depression Scale (HADS) (Hiscock et al. 2003).

2.2.3 Measures of precarious housing

There is no consensus on what constitutes precarious housing in the literature. Largely, measures fell into two categories, 'self-reported' and 'objective observed'. Most of these measures emerged from the literature that studied the physical qualities of housing. For example, Howden-Chapman et al.'s (2007) study relied on self-reported measures of housing and asked questions relating to the number of days participants felt 'cold', 'ok' or 'warm' most of the time. Two observer-based measures were identified; the Canadian National Occupancy Standard (Clark, Ribena & Nowgesic 2002), which is used to measure overcrowding and the Environmental Health Standards, which was drawn on by Bailie and Runcie (2001) to measure the adequacy of housing elements to facilitate healthy living practices such as adequacy of the dwelling to bathe children and store food safely.

2.3 Gaps in the evidence base

A variety of research has been conducted on the effects of all five housing elements and health outcomes, however, there has been little research conducted on the effects of housing density or aspects of space other than overcrowding on health. We also found no evidence examining the relationship between overcrowding and rates of domestic violence, despite extensive purposive searching in the domestic violence literature.

There is a little evidence that suggests some housing elements impact on health outcomes more significantly than other elements, however, this hierarchy is far from well understood and it remains unclear how these elements interact with one another. For example, we are yet to understand how trading off physical housing quality to achieve affordability gains will impact on health and wellbeing.

There is also no research that addresses the impact of 'time-lags'. As we can see from Table 3, follow-up periods and intervals vary greatly in the few longitudinal and follow-up studies that have been completed. It remains unclear how various lengths of time spent in precarious housing affects health outcomes, if these health effects are immediate or delayed, and how long it takes for health effects that are caused by precarious housing to manifest and become apparent.

For example, the affordability literature establishes that housing affordability stress negatively impacts people's health, and AHURI work by Wood and Ong (2009) establishes that most people who experience housing affordability stress in Australia do so for short periods of time and can lift themselves out of this situation. What remains unclear, however, is whether or not the length of time spent in housing affordability stress impacts the severity of these health impacts. Further research accounting for time-lags could deepen our understanding of how affordability stress affects health and shed light on which populations are most vulnerable.

In the following five chapters we detail the evidence that helped shape, test and refine the nine theories detailed in the previous chapter. The report is structured according to the five housing element categories: housing hardware, space, place, tenure and affordability.

3 'HOUSING HARDWARE': THE PHYSICAL QUALITIES OF HOUSING

In this chapter we present a synthesis of empirical studies that provide evidence of the relationship between health outcomes and the physical qualities of housing, which we refer to as 'housing hardware.'⁵

Scope and quality of the evidence

Research on housing hardware demonstrates the significant breadth and the problems with methodological rigour common to the overall housing and health evidence base. This area of the overall evidence base is the strongest at present.

Findings from 17 empirical studies are included in this chapter. These comprise three review studies, 12 quantitative and two qualitative studies. Research was conducted in various parts of the United Kingdom, the United States, Australia, New Zealand and pan-Europe.

There are two methodologically sound studies (a randomised controlled test conducted over a two-year period and a conclusive systematic review) that establish a reliable causal relationship between dampness in the home, a 'cold' indoor environment during winter and poor respiratory function.

However, most of these studies are cross-sectional and can only identify correlations between physical housing elements and health outcomes without demonstrating causality. For example, it remains unclear if, or how, time-lags affect health outcomes and if, or how, various lengths of time spent in poor quality housing affects health outcomes.

The majority of research evidence relates to physical health consequences associated with hardware for heating and cooling (ventilation and insulation) and also adequate access to cooking and washing facilities. This is reflected in the selection presented here with 11 studies that examined the effects of physical housing conditions on physical health outcomes.

The synthesis also found some indicative evidence linking mental health and wellbeing to adequate housing hardware, suggesting that further research may advance our understanding of the significance of housing hardware for these outcomes. Three studies demonstrating this link are included in this chapter, including a small exploratory longitudinal study.

The breadth and complexity of the evidence base is reflected in the synthesis finding of at least three different mechanisms for explaining the impact of housing hardware on health: how housing hardware affects the indoor environment, how it enables inhabitants' quality of life and how it facilitates healthy living practices.

⁵ We have adapted the term 'housing hardware' from the housing and health research of Torzillo et al. (2008). They employ the term 'health hardware' to refer to the physical attributes of housing that facilitate healthy living practices.

Key findings

Synthesis of the research presented in this chapter finds that:

- physical aspects of housing can impact on physical and mental health by affecting its adequacy as shelter and its available amenity
- there is evidence that housing hardware affects the indoor environment, stability, safety, control, social connectedness and living practices. Specifically:
 - housing hardware such as insulation and heating and cooling devices, can moderate the indoor environment by affecting indoor temperatures, noise levels and air quality. Indoor temperatures and air quality are associated with physical health outcomes, particularly respiratory conditions, while noise is associated with mental health/wellbeing.
 - housing hardware such as housing design and home modifications can facilitate stability, safety, control and social connectedness for an ageing or disabled population group, factors which are associated with better mental health/wellbeing
 - housing hardware such as bathrooms, flush toilets, plumbed water, ventilation to prevent dampness and cooking facilities affect living practices, which are associated with better physical health outcomes.

The evidence suggests that poor housing hardware is a contributor to poorer health outcomes and should be considered an aspect of precarious housing. Housing policy interventions can utilise housing hardware interventions in order to improve health outcomes where existing housing is below minimum standards for shelter, amenity and disability access.

3.1 Housing hardware interventions and health

The following two review studies demonstrate that research over time consistently found a relationship between housing hardware and health consequences, but struggled to provide the methodological design and rigour required to prove causality.

In addition to the need for better research design, the synthesis suggests that the inconclusive review results reflect lack of precision in the targeting of the research questions to the complexity of the inter-related mechanisms that produce health effects.

The third study here is a small, and essential exploratory longitudinal study, which finds evidence that housing quality interventions can affect residents' psychological health. It indicates the importance of housing quality to a person's sense of self-esteem, a finding also identified in the studies presented in chapter five on Place.

Thomson, H, Petticrew, M & Morrison, D 2001), Health effects of housing improvement: Systematic review of intervention studies, *BMJ: British Medical Journal*, 323(7306), pp.187–190.

This study reviewed research that measured the effect of major housing interventions on health. 'Major housing interventions' are defined as rehousing or infrastructure improvements such as installation of insulation or double glazing. Thomson, Petticrew and Morrison (2001) searched for studies from 1887 to the present in any language. The aforementioned criteria were met by 18 completed primary intervention studies. Of these, 11 were prospective and seven were retrospective.

The researchers found that all studies reported increased physical or mental health outcomes, however, many did not control for confounding factors and many used small sample

populations. The authors conclude that the quality of the studies is poor and it is difficult to generalise their findings.

This systematic review study establishes that by 2000, a substantial body of experimental research was conducted investigating the relationship between housing hardware interventions and health outcomes and found consistently positive results. It also identified significant methodological limitations in the evidence base which continue today and indicate the difficulties of demonstrating causality in this area.

Saegert, SC, Klitzman, S, Freudenberg, N, Cooperman-Mroczek, J & Nassar, S 2003), Healthy housing: A structured review of published evaluations of US interventions to improve health by modifying housing in the United States, 1990–2001, *American Journal of Public Health*, 93(9), pp.1471–1477.

The study reviewed evaluations of public health housing interventions in the United States between 1990 and 2000. In total, 72 articles were reviewed. While most evaluations found positive, statistically significant health improvements following the intervention, only 14 per cent reported that their intervention was 'very successful'. Saegert et al. (2003) found that technological interventions (i.e. smoke alarms) were most successful when the technology was inexpensive, effective and durable. They are particularly effective when accompanied by behavioural change/knowledge party.

This review study establishes that there is evidence for a relationship between housing hardware and health outcomes but illustrates that housing hardware does not affect health in isolation.

Evans, GW & Wells, NM 2000, Housing Quality and Mental Health, *Journal of Consulting & Clinical Psychology*, 68(3), pp.526–530.

This research found evidence of a causal relationship between improvements to housing quality and reductions in psychological distress. The researchers created and validated a Housing Quality Instrument which yielded six valid subscales: cleanliness/clutter, indoor climactic conditions, privacy, hazards, structural quality and child resources.

This research studied two different populations, one with a cross-sectional and the other with a longitudinal design, which both confirmed the hypothesis that housing quality can affect mental health. Both studies used a standardised instrument to measure low levels of psychological distress in a non-clinical population.

The cross-sectional study compared 207 low and middle-income White rural residents. It found, after controlling for income, a relationship between better quality housing and lower levels of psychological distress.

The longitudinal study assessed 31 African American and White women before and after moving to better quality housing. It found that the improvement in housing quality predicted the degree of change in psychological distress, after controlling for pre-relocation mental health.

This study provides an example of a longitudinal design to test the relationship between housing quality and mental health, and consequently provides evidence of a causal relationship.

3.2 Housing hardware affects the indoor environment

The evidence presented in this section shows how housing hardware can affect residents' health by moderating the indoor environment. Consistency of the findings across different types of housing hardware supports a general conclusion that housing hardware, which moderates the indoor environment, can prevent negative physical and mental health/wellbeing outcomes.

The first study offers methodologically strong evidence of a causal relationship between a particular housing hardware intervention (insulation) and improved health, while the subsequent studies provide supporting and indicative evidence about the significance of housing hardware for health.

Howden-Chapman, P, Matheson, A, Crane, J, Viggers, H, Cunningham, M, Blakely, T et al. 2007, Effect of insulating existing houses on health inequality: Cluster randomised study in the community, *BMJ: British Medical Journal*, 334(7591), pp.460–464.

Chapman, R, Howden-Chapman, P, Viggers, H, O'Dea, D & Kennedy, M 2009, Retrofitting houses with insulation: A cost-benefit analysis of a randomised community trial, *Journal of Epidemiology & Community Health*, 63(4), pp. 271–277.

This methodologically strong study found that retrofitting homes with insulation cost-effectively improved health outcomes for a disadvantaged population. The New Zealand study used a longitudinal, randomised controlled design to evaluate the health impact of installing insulation, draught and moisture stopping hardware. The study included a total of 1,350 homes that housed 4,407 people (a mix of children, adults and older adults), selected from three urban and four rural areas of New Zealand. Researchers randomly created a control and intervention group. Households all had at least one member who had a reported respiratory complaint in the past 12 months and all fitted a low socioeconomic profile, indicating that they were at greater risk of ill health than the general population. Maori and Pacific Islanders were overrepresented in the sample.

The dwellings in the intervention group were fitted with insulation, draught stopping around windows and moisture barriers beneath the floors. Health and housing condition surveys were completed before the intervention and then each spring for the following two years.

Howden-Chapman et al. (2007) found that adults in the insulated homes were half as likely to report 'poor' or 'fair' health, respiratory complaints (wheezing and coughing) and winter colds and flu than those in the control group. In children under the age of 13 the reports of wheezing and coughing that disturbed sleep were halved.

Fewer adults in the insulated homes reported taking days off work and children in this cohort had half as many days off from school than those in the control group. Hospital and GP records indicated little difference in visits between the intervention and control groups, however, those in the insulated housing reported fewer visits to hospital for respiratory complaints than those in the control group.

While the sample was not representative of the general New Zealand population, the results rigorously establish that insulation and draught stopping housing interventions have a statistically significant effect on the physical health of vulnerable sub-groups.

Chapman et al. (2009) also conducted a cost-benefit analysis of this intervention, monetarily enumerating environmental (carbon dioxide emissions) and health (visits to GPs and hospitalisations) impacts. They found that the total benefits outweighed the costs of retrofitting houses with insulation by a factor of one and a half (1.5) to two (2).

This study offers rare robust evidence of a causal link between housing hardware and improved health outcomes, and furthermore establishes a cost-benefit for investments in housing hardware for disadvantaged groups.

Bothwell, JE, McManus, L, Crawford, VLS, Burns, G, Stewart, MC & Michael, DS 2003, Home heating and respiratory symptoms among children in Belfast, Northern Ireland, *Archives of Environmental Health*, 58(9), pp.549–553.

This research conducted in Belfast, Ireland found that a particular type of heating (glass fronted solid fuel fires (GFF)) adversely affects children who suffer from asthma. Bothwell et al. (2003) conducted postal surveys with households that had at least one child under the age of 12 who was medically diagnosed with asthma. Data was analysed for 2,578 children who lived in 1,617 households in Belfast. Of households analysed, 30 per cent had GFF heating systems with the remainder using oil-fired, flued gas or electrical heating systems.

After controlling for other variables such as exposure to tobacco smoke in the home, social deprivation and overcrowding, the researchers found that those children living in homes heated by GFF systems were 2.47 times more likely to report wheezing, 2.2 times more likely to report coughing and 1.81 times more likely to report asthma symptoms than those living in alternatively heated homes. Respiratory symptoms were six times more likely to be triggered when GFF heating was turned on than when it was turned off.

While the actual mechanism of GFF heating resulting in these symptoms remains statistically unknown, the researchers randomly tested 19 homes that used GFF heating systems for PM₁₀ levels (levels of solid particles in the air) and found these homes had higher than average rates of PM₁₀ levels. This suggests that the level of solid particles in the air may exacerbate asthmatic symptoms.

This study indicates a specific way in which housing hardware (heating) can affect the indoor environment, namely air quality, which affects physical health outcomes.

Gemmell, I 2001, Indoor heating, house conditions, and health, *Journal of Epidemiology and Community Health*, 55(12), pp.928–929.

This Scottish study investigated the impact of inadequate home heating on the health of older adults (aged 55–60). Gemmell (2001) found that those who reported feeling cold 'most of the time' during winter were three times as likely to report a limiting health condition and five times as likely to report 'poor' or 'fair' health, even after controlling for socioeconomic factors.

The study analysed data from 858 people surveyed in 1991 as part of 'West of Scotland Twenty-07' cohort survey, which included self-report and interviewer observation. As a cross-sectional study it does not establish a causal relationship between home heating and health complaints but the statistically significant correlation between 'feeling cold' and ill health indicates that poor home heating can exacerbate existing health issues.

This study provides supporting evidence of the role that housing hardware plays in either mitigating or exacerbating health conditions.

Naughton, MP, Henderson, A, Mirabelli, MC, Kaiser, R, Wilhelm, JL, Kieszak, SM et al. 2002, Heat-related mortality during a 1999 heat wave in Chicago, *American Journal of Preventive Medicine*, 22(4), pp.221–227.

This study sought to determine the risk factors associated with 80 heat-related deaths that occurred in Chicago during a record breaking heatwave in the northern summer of 1999 (p.222). Naughton et al. (2002) found that a working air conditioner was the most significant protective factor, while living alone and not leaving the home daily were the greatest risk factors (p.224).

The study demonstrates the role of housing hardware in determining the adequacy of housing's shelter function, which in turn has consequences for health. It also shows that social and individual characteristics have a role in mediating the impact of housing on health.

Naughton et al. (2002) interviewed people (relatives, neighbours, landlords) that were in frequent contact with the deceased in order to ascertain the deceased's demographic profile, housing information, degree of mobility, medical information and any emergency measures taken during the heatwave. They examined death certificates and medical examiner and police reports. The researchers then created a control group by searching out neighbours of the deceased that matched the deceased's demographic profile as closely as possible. Finally, comprehensive data was collected for 63 deceased people and there were 77 participants in the control group. Interestingly, more than half of the case patients (the deceased) were under the age of 65 years.

Heatstroke was the most prevalent cause of death, 29 cases, and heat was cited as a contributing cause of death in the other 34 cases. The researcher's univariate analysis revealed that there was an increased risk of death among persons with a cardiac or psychiatric condition, among those who lived alone, did not leave the house regularly, lived on the top floor of an apartment building or had an annual income of less than \$10,000. Significant protective factors included having a working air conditioner, having a pet in the house, and taking extra showers or baths. Indeed, only 16 per cent of the deceased had a working air conditioner compared with 58 per cent of the control group (p.223). A working fan was not a significant protective factor.

The multivariate analysis revealed that the most significant protective factor was having a working air conditioner and the greatest risk factors were living alone and not leaving the home daily. The researchers predict that 92 per cent of the deaths were preventable with the absence of these two risk factors and the addition of a working air conditioner.

This study indicates that housing hardware (air conditioning) can protect against negative health consequences by improving the shelter function of housing. The study also demonstrates that social and individual characteristics have a mediating role in the effect of housing on health.

Bornehag, CG, Blomquist, G, Gyntelberg, F, Jarvholm, B, Malmberg, P, Nordvall, L et al. 2001, Dampness in buildings and health, *Indoor Air*, 11(2), pp.72–86.

Bornehag et al. (2001) found that the vast majority of reviewed studies reported statistically significant associations between respiratory complaints (asthma, wheezing, coughing) and 'dampness'. This paper reviewed 61 studies that examine the relationship between 'dampness' in the home or workplace and health. Studies were selected on their methodological robustness, particularly on the basis of controlling for other confounding factors. Studies that were 'inconclusive' were excluded.

The review found significant associations between poorer health and 'dampness'. This association was observed regardless of whether the health complaints and dampness were self-reported or measured objectively by a professional. Consistent health complaints were observed regardless of the degree of the dampness problem and children and adults experienced the same level of risk.

The reviewers concluded that a true association exists between dampness and poorer health outcomes because of the consistency in findings across a substantive number of studies. However, it is unclear what mechanisms related to the dampness actually cause the health effects.

This study indicates that inadequate housing hardware, housing which is unable to prevent dampness, negatively affects physical health outcomes.

Shenassa, ED, Daskalakis, C, Liebhaber, A, Braubach, M & Brown, M 2007, Dampness and mold in the home and depression: An examination of mold-related illness and perceived control of one's home as possible depression pathways, *American Journal of Public Health*, 97(10), pp.1893–1899.

This study found an independent association between dampness in the home and depressive symptoms. Shenassa et al. (2007) conducted postal surveys and then interviews with randomly selected residents in eight European cities across France, Portugal, Hungary, Slovakia, Germany, Italy, Switzerland and Lithuania. Data from a total of 5,882 people were analysed. Participants were asked to self-report on health measures and housing conditions. Interviewers also assessed housing conditions.

After controlling for confounding and mediating variables such as perception of control over one's life, physical health and socioeconomic factors, the researchers found that people living in a dwelling with a moderate amount of mould were 1.37 times more likely to have depression than those people living in a dwelling without mould.

This study identifies an independent association between dampness and poorer mental health. As with the previous study, the failure of housing hardware to keep the indoor environment dry is linked to negative health consequences. This study is one of only two found by the synthesis which links shelter aspects of housing hardware to mental health or wellbeing outcomes.

Evans, GW, Lercher, P, Meis, M, Ising, H & Kofler, WW 2001, Community noise exposure and stress in children, *The Journal of the Acoustical Society of America*, 109(3), pp.1023–1027.

This research project examined the non-auditory effects of everyday, community noise exposure on children's stress levels and provides evidence about the role of housing hardware (sound insulation) and place (neighbourhood noise levels) in children's psychological wellbeing.

Evans et al. (2001) representatively recruited 115 children from small villages in Austria, half of whom were exposed to relatively high noise levels (above 60 decibels) and the other half of whom were exposed to relatively low noise levels (below 50 decibels). All children were tested for normal hearing and they all shared the same socioeconomic status (same parental education, housing characteristics, family size, marital status, body mass index and index of body fat).

Four test measures were used to determine stress levels, which included a urine test, a behavioural questionnaire, a blood pressure test and a motivational test whereby the

participant's persistence at solving a puzzle is used as an indication of learned helplessness as employed in afore-mentioned study by Evans, Saltzman and Cooperman (2001).

Children from the noisier neighbourhoods rated their neighbourhoods as significantly noisier than those from quieter neighbourhoods. They reported experiencing greater stress levels in the past week, had marginally elevated blood pressure and exhibited greater heart rate reactivity to an acute stressor, all of which is indicative of marginally elevated psychological stress. However, the urine samples did not differ. The motivation testing found that noise had no effect on male participants but a statistically significant effect on female participants.

While this research is cross-sectional and as such cannot measure the effects of noise over time, it controls for a number of variables and indicates that noise has psychological effects on children.

This study indicates that indoor noise levels affect children's psychological stress levels. While not specifically a housing study, this research is important for the synthesis because it implicates housing hardware (sound insulation) in mental health and wellbeing. The evidence also highlights the importance of place (neighbourhood sound levels) in determining health outcomes.

3.3 Housing hardware contributes to wellbeing by enabling stability, safety, control and social connectedness

Housing for the aged is a distinct area of research that illuminates a significant role for housing hardware in people's health and wellbeing. The research shows that housing hardware has an important role in reducing the negative impact of disability on quality of life.

Evidence from recent Australian studies finds that adequate housing hardware is a critical element of successful 'ageing-in-place' which in turn can contribute to wellbeing. Ageing-in-place is widely understood to be the preferred option for ageing Australians and refers to residents' ability to remain in their own home, dwelling of choice or neighbourhood for as long as possible (Olsberg et al. 2004, p.22; Quinn et al. 2009, pp.58–59).

The research shows that home modifications and particular housing designs can facilitate stability and control (by allowing a person to choose to stay where they are), safety (by preventing accidents) and social connectedness (by maintaining a connection to a neighbourhood and providing facilities for visitors to stay). This research indicates the inter-relationship of different housing elements in affecting health because a person's access to these housing hardware benefits is influenced by the tenure of the housing.

The studies identify the significance of tenure, particularly in the absence of universal accessible design. Home owners and public housing renters are typically more able to access the home modifications required to support ageing-in-place. In contrast, private renters are typically less able to modify their dwelling and have less opportunity to age-in-place.

A further finding is that the households typically make more intensive use of their home once they retire and that the use of 'spare' bedrooms for visitors and hobbies contributes to their wellbeing.

The following section details evidence relating to the benefits of ageing-in-place and home modifications and housing design, which are both housing components that facilitate ageing-in-place. The overall finding that housing hardware can facilitate independent living and consequently improve wellbeing can reasonably be generalised to people affected by other forms of disability.

Jones, A, Jonge, D & Phillips, R 2008, *The role of home maintenance and modification services in achieving health, community care and housing outcomes in later life*, AHURI Final Report No. 123, Melbourne, Australian Housing and Urban Research Institute, Queensland Research Centre.

This small qualitative study by Jones, Jonge and Phillips (2008) interviewed older people in Queensland, Victoria and South Australia in order to examine the impact of home maintenance and modification (HMM) services on their lives. The study found that people generally preferred to stay in their own home as they aged, and appreciated HMM services for facilitating this choice.

The researchers found that older people reported an emotional connection to their homes, particularly if they had raised families there or built the dwelling themselves (p.100). Participants also appreciated the independence and autonomy living in their own home afforded them. The ambience of their property and neighbourhood was deemed important, suggesting that 'home' is more than a house and incorporates relations with neighbours, proximity to social networks and the feelings of safety this produces (p.101). The participants reported a strong reluctance to move and cited a generalised fear of alternatives, the hassle and inconvenience of moving and anticipated grief of leaving their emotional attachments behind (p.103).

The researchers discovered that older persons who accessed home maintenance and modification (HMM) services reported satisfaction at the quality and reliability of the service. They reported that it made a significant difference to their wellbeing, peace of mind and described it as a 'critical' resource (pp.114–115). Participants reported they could build a trusting relationship with providers. This encouraged them to use the service again and to recommend it to other people. Participants reported that HMM services enabled independence, heightened confidence and a greater sense of safety and security, all of which facilitated 'ageing-in-place' and an increased sense of wellbeing (pp.118–119).

Jones, Jonge and Phillips (2008) indicated that most older people found out about HMM services via word of mouth. A lack of awareness of services was cited by many participants as an access barrier (p.65). Similarly, service providers cited poor referral processes as a key access barrier (p.66).

Some service providers reported that a key mechanism in delivering positive outcomes for clients was the relationship between occupational therapist and client (Jones, Jonge & Phillips 2008, p.83), however access to and availability of occupational therapists was reported as a problem (p.86).

The study documented that tenure can also serve as an access barrier as private renters have significantly more difficulties negotiating modifications with landlords (p.72). Those in private rentals find it more difficult than owner-occupiers to be able to modify their dwellings as needed because although the *Australian Disability Discrimination Act 1992* allows them to do so, they must return the property to its original condition when they vacate (Quinn et al. 2009, p.82).

This study provides evidence that programs which improve the adequacy of housing hardware to support independent living (home modifications and housing design) affect wellbeing by facilitating ageing-in-place.

Quinn, J, Judd, B, Olsberg, D & Demirbilek, O 2009, *Dwelling, land and neighbourhood use by older home owners*, AHURI Positioning Paper No. 111, Melbourne, Australian Housing and Urban Research Institute, UNSW-UWS Research Centre.

Judd, B, Olsberg, D, Quinn, J, Groenhardt, L & Demirbilek, O 2009, *Housing, land and neighbourhood use by older home owners*, AHURI Final Report, Melbourne, Australian Housing and Urban Research Institute, UNSW-UWS Research Centre.

This research project examined the housing needs, aspirations and usage of older Australians in the context of the ageing population. Similarly to Jones, Jonge and Phillips (2008), Judd et al. (2009) found that participants overwhelmingly expressed a desire to remain in their current dwelling and neighbourhood (p.164). They cited familiarity with the neighbourhood, feeling safe, being close to family and friends and proximity to health and medical services as crucial to the 'liveability' of their home (pp.164–167).

In regards to housing design and space, the study found that an extra 'bedroom' may be significant in allowing ageing tenants to access informal support from family and friends and maintain their independence and wellbeing. While these findings were based on a national survey of older home owners, they provided evidence of the factors which may sustain tenancies for ageing social housing tenants (Judd et al. 2009; Quinn et al. 2009).

The research suggested that the existing occupancy standard which matches bedrooms to the number and relationships of persons is not appropriate for dwelling utilisation for older people (Judd et al. 2009, pp.125–126).

A number of factors are important, including the finding that more time is spent at home after people retire and therefore the space is more intensively utilised. Significantly, the study found that nearly one quarter (23 per cent) of surveyed households contained at least one temporary resident, which is nearly double the rate found in the general population (12 per cent). Temporary residents include adult children (37 per cent), grandchildren (18 per cent), other relatives (20 per cent) and friends (14 per cent) who stayed over regularly or visited for extended periods (Judd et al. 2009, pp.156–158).

This study also conducted a cost-benefit analysis and found that home modifications performed poorly compared to universal, adaptable and visitable design approaches. This finding confirms previous Australian and international analysis and establishes the cost-efficiency of ensuring accessibility at the initial construction stage (p.241). The researchers found that interviewees supported the principles behind these design approaches and the idea of moving to housing that incorporated these principles (as they may facilitate ageing-in-place) was met positively (p.240).

This study implies that the significance of housing hardware (accessibility and adequate living space) for wellbeing increases as people age.

3.4 Housing hardware affects living practices which impact on health

Synthesis of the evidence detailed in this section extends our understanding of the ways in which housing hardware can impact on health outcomes. The evidence from the studies presented in this section highlights the way that housing hardware can affect a household's living practices which in turn have implications for health.

The first two studies provide a statistical correlation between adult health outcomes and inadequate housing hardware in childhood, and specifically identify the role of sanitation facilities.

These findings are extended by three recent Australian studies which document the poor state of housing hardware in many remote Indigenous communities, and find preliminary evidence of a link between inadequate housing hardware and childhood skin infection rates, although as indicated throughout the evidence base, other social and individual factors appear to mediate the impact of housing elements on health.

Taken together, the research indicates that housing hardware that facilitates adequate sanitation (e.g. flushing toilets and hot water), can allow a household to have healthy living practices and consequently improve physical health outcomes.

Marsh, A, Gordon, D, Heslop, P & Pantazis, C 2000, Housing deprivation and health: A longitudinal analysis, *Housing Studies*, vol. 15, pp.411–428.

This study found that housing deprivation leads to a 25 per cent greater risk of disability or severe ill health once researchers controlled for other variables, such as standard of living, behaviour, genetics and socioeconomic status. It also discovered that those who experienced housing deprivation as children were at greater risk of developing ill health as an adult regardless of their present housing situation.

Marsh et al. (2000) used longitudinal data from the National Child Development Study collected in Great Britain. The first survey was conducted in 1958 and detailed health and living conditions of 17,415 babies born that year. Follow-up surveys were then conducted in 1965, 1969, 1974, 1981 and 1991 (11,407 people participated in the last sweep). The definition of housing deprivation varied between surveys and as a result the researchers created their own index based on the statistically significant associations of each sweep. The study's housing deprivation index included lack of outdoor space, overcrowding and restricted access to bathrooms, cooking facilities and hot water.

The study indicates that an absence of the housing hardware necessary for healthy living practices in childhood is associated with increased morbidity in adulthood.

Dedman, DJ, Gunnell, D, Smith, GD & Frankel, S 2001, Childhood housing conditions and later mortality in the Boyd Orr cohort, *Journal of Epidemiology and Community Health*, 55(1), pp.10–15.

This study found weak but distinguishable links between a lack of privately tapped water in childhood homes and increased risk of coronary heart disease, and between poor ventilation in the childhood home and increased 'all cause' morbidity in adulthood. These associations remain statistically significant even after controlling for confounding socioeconomic factors such as year of birth, income and food expenditure.

Dedman et al. (2001) used data collected in England and Scotland between 1937 and 1939 that detailed housing conditions and demographics of 1,343 households. Information relating to 4,973 children was recorded, 86 per cent of whom Dedman et al. (2001) were able to trace and record their health status in 1999.

The childhood housing variables selected and analysed by researchers were (i) crowding, (ii) water supply (privately tapped or other arrangement), (iii) toilet facilities (indoor flush, outdoor flush or no flush), (iv) adequacy of ventilation and (v) 'cleanliness' of the home. Causes of death were categorised as 'all causes', cancers (not lung), lung cancer and coronary heart disease. Privately tapped water supply and ventilation adequacy were the only two statistically significant relationships once the researchers controlled for other socioeconomic factors.

Similar to the previous study, this large scale statistical analysis establishes an association between inadequate housing hardware in childhood and health outcomes.

Torzillo, PJ, Pholeros, P, Rainow, S, Barker, G, Sowerbutts, T, Short, T et al. 2008, The state of health hardware in Aboriginal communities in rural and remote Australia, *Australian and New Zealand Journal of Public Health*, 32(1), pp.7-11.

This study reported on pioneering work to improve the health conditions of Indigenous Australians through housing interventions, developed by the group now known as Healthhabitat.⁶ The work began in 1985 and was adopted as a national program in 1999 under the name *Housing for Health*. The approach involved a housing 'survey-fix' program operating within Australian Indigenous communities that sought to improve 'health hardware' (physical attributes of housing that facilitate healthy living practices) in order to achieve better health outcomes.

This study differed from most of the housing and health research studies as it does not link particular housing qualities with particular health outcomes but rather assumed that 'health hardware' is a key component of health and wellbeing. This assumption is based on the evidence that major improvements in mortality during the 19th century can be attributed to improved hygiene and health infrastructure, as well as the more contemporary research performed in developing countries that indicates facilitating healthy living practices produces beneficial health outcomes.

Torzillo et al. (2008) explained that the program first assesses houses for safety, and then for their capacity to support nine documented 'Healthy Living Practices' including, in order of priority, washing children and adults, washing clothes and bedding, removing waste water safely, and improving nutrition. To determine safety and the health hardware of the house, a standard list of 250 items are checked.

Torzillo et al. (2008) reported that only 11 per cent of houses passed the electrical safety assessment, in only 50 per cent of houses was it possible to wash a child in a bath or tub, a functioning shower was only present in 35 per cent of dwellings and only 6 per cent of houses had adequate facilities to store, prepare and cook food.

The program employs and trains local Indigenous people to perform much of the survey and initial repair work, within supervised teams. Torzillo et al. (2008) reported that 78 per cent of total staff on these projects were local community Aboriginal or Torres Strait Islander people.

The authors described a number of important findings significant for the relationship between housing and health outcomes in Indigenous communities (remote Australia). The first was that maintenance programs are crucial in sustaining any health-supporting function of housing and, when maintenance programs were absent; housing infrastructure often became a health hazard. The second was that only 10 per cent of repairs were resultant from vandalism, misuse or overuse by householders implicating the design of the house in the poor maintenance outcomes.

The study finds that the condition of housing hardware in many surveyed households was physically poor and unable to support 'healthy living practices' identified as necessary for good health.

⁶ For further information see, www.healthhabitat.com

Bailie, RS & Runcie, MJ 2001, Household infrastructure in Aboriginal communities and the implications for health improvement, *Medical Journal of Australia*, 175(7), pp.363–366.

Bailie, RS, Stevens, MR, McDonald, E, Halpin, S, Brewster, D, Robinson, G et al. 2005, Skin infection, housing and social circumstances in children living in remote Indigenous communities: Testing conceptual and methodological approaches, *BMC Public Health*, 5(1), pp.128–139.

Bailie and Runcie (2001) drew on Healthabitat's early work⁷ (see previous study) and used their 'health hardware' guide to complete a survey of Indigenous housing in the Northern Territory for the Indigenous Housing Authority of the Northern Territory (IHANT) in 1998. The 'health hardware' guide identifies the key housing hardware elements required to support nine significant healthy living practices.

The evaluation found that the hardware required to store, prepare and cook food was most likely to be absent while those required for removing rubbish were most likely to be available. Of surveyed houses, 58 per cent did not have a functional refrigerator, 41 per cent did not have a stove top and 42 per cent did not have an oven. However, the authors do note that this prevalence is not evenly spread across communities with some communities reporting far greater instances of non-functioning hardware than others.

Bailie et al.'s (2005) follow-up study mapped the instance of skin infections in a sample of Indigenous children against the dwelling surveys, specifically focusing on the hardware that facilitates washing of children, washing of clothes and faeces removal (the three healthy living practices deemed most likely to prevent skin infection). An audit of health centre records and interviews with adult household members and primary carers was conducted in order to ascertain the prevalence of skin infections. The authors found that 40 per cent of children experienced no skin infections, over a third presented to a healthcare clinic more than twice for skin infection complaints and 10 per cent presented to a clinic on five or more occasions.

All three healthy living practices were associated with reported skin infections, as were other social factors (overcrowding, age of parent, flooring material). After controlling for contributing factors, the researchers found that functioning hardware to remove faeces was the most important factor of the three in preventing skin infections.

These two linked studies indicate that the absence of hardware that facilitates healthy living practices can contribute to poorer physical health outcomes such as skin infections. It also indicates that social factors mediate the effect of housing hardware on health outcomes.

⁷ (Pholeros, Rianow, & Torzillo, 1993)

4 SPACE

This chapter presents research findings that highlight the potential health impacts of the way that housing provides adequate *space* for a person or family. It frames evidence from research on overcrowding to highlight the way housing can facilitate (or reduce) a person's level of control over their own and their family's living space. This evidence suggests that an aspect of precarious housing is the lack of access to adequate indoor and outdoor space, including sufficient privacy and security and types of space.

Scope and quality of the evidence

The evidence in this area is patchy but strongly indicative. Relevant findings were identified in a range of international studies suggesting an underlying phenomenon in need of further investigation.

There are seven studies presented in this chapter: four quantitative, cross-sectional studies and three pieces of qualitative research. These studies were conducted in Australia, New Zealand, Canada and the United States. We found no longitudinal research that provided evidence of the impact of space.

The bulk of the cross-sectional research considers the relationship between housing and space by examining the effect of overcrowding on health outcomes. Six of these studies examined overcrowding and only one examined other aspects of space on health.

The importance of other aspects of space represents a significant research gap. For example, there is no evidence on the impact of high-density living or limited recreation space on health, even though these phenomena are considered important in housing research more broadly.

The literature on overcrowding tends to be conducted with Indigenous subjects because there is a higher instance of overcrowding in these populations within developed nations. This evidence is contested, which can be attributed to the lack of consensus on the definition of 'overcrowding' and the lack of longitudinal studies.

Key findings

In this chapter we find evidence that:

- space is an important element of housing that affects people's ability to control their environment and secure privacy
- lack of adequate space can affect childhood mental health and can increase the transmission of some communicable diseases
- if space is limited, it is often more difficult to control the use of that space
- the research pertaining to overcrowding indicates that if household heads can control this space then overcrowding does not affect mental or physical health negatively.

4.1 Access to space

Evans, GW, Saltzman, H & Cooperman, JL 2001, Housing quality and children's socioemotional health, *Environ Behav*, vol. 33, pp.389–399.

This US study of housing quality and health focused on measures relating to space including privacy, crowding, clutter and children's play areas. It found a correlation between children's poorer socioemotional health and lower housing quality.

Evans, Saltzman and Cooperman (2000; 2001) sought to examine the relationship between children's socioemotional development and housing quality. Independent assessors observed 277 three to five year old children's family homes using a rating scale with 88 items (p.390). The housing quality index was comprised of items relating to privacy, crowding, clutter and children's play areas and resources. These ratings were then compared to two measures of socioemotional health; the Children's Behavior Questionnaire, which assesses psychological health, and a task persistence activity, which asked children to solve two puzzles (one unsolvable and one solvable) where they were timed to see how long they spent trying to solve the unsolvable puzzle as a measure of their motivational levels.

Evans, Saltzman and Cooperman (2001) find that after controlling for household income and maternal psychological health, children living in lower-quality housing display greater symptoms of psychological distress, and that as housing quality improves children exhibit higher levels of persistence on the unsolvable puzzle.

The authors acknowledge that they have controlled for only two confounding factors but hypothesise that the only other factor likely to significantly impact results is the self-selection bias (whereby mental health may be affecting housing choice rather than housing quality affecting mental health outcomes). However, as children do not choose their housing the authors determine that this is unlikely to affect the results.

The authors speculate that lower-levels of persistence on solving the puzzle may indicate a sense of learned helplessness that resulted from living in surroundings that one feels they cannot change or improve.

This study indicates that space is an aspect of housing quality that can impact on children's health and wellbeing. It also suggests that poor housing quality is part of an overall experience of parental socioeconomic disadvantage which can negatively impact on children's cognitive development.

4.2 Overcrowding

The studies in this section demonstrate that limited space (overcrowding) affects living practices. These living practices can both negatively and positively affect health outcomes. The first two studies (Baker et al. 2008; Clark, Ribena & Nowgesic 2002) illustrate that living practices resultant from limited space negatively affect physical health because the instance of communicable diseases such as Tuberculosis is higher under these circumstances.

The subsequent studies produce mixed results and together suggest the conclusion that householder control over housing space mediates the potential health consequences of overcrowding.

Anderson and Wild (2007) and Cooper and Morris (2005) find that overcrowding can be dangerous and results in child mistreatment. Zubrick et al. (2005) and Birdsall-Jones and Corrun(2008) find that not all overcrowding is bad and that high occupancy levels may even serve as a protective factor for children's wellbeing. Despite these different results, we find that all four studies support the theory that space affects living practices.

The difference in outcomes results from the ability of the household head to control that space. The studies that find that overcrowding is not necessarily detrimental, also found that household heads had control over who entered what space (where people slept) and were able to enforce social behaviour norms that governed that space.

In Australia, Indigenous people are overrepresented in housing deemed to be 'overcrowded'. According to the Australian Institute of Health and Welfare (2006), 14 per cent of Indigenous people were living in households that required an additional two or more bedrooms compared to 1 per cent of other Australians (p.443). Overcrowding is far more prevalent in remote or very remote Indigenous communities than in urban areas, with 52 per cent of remote Indigenous households deemed overcrowded compared to 14 per cent overall (p.446). Recent AHURI case studies of discrete Indigenous settlements show that housing undersupply is one cause of overcrowding in community housing, which is aggravated by periodic sharp increases in population due to seasonal migration or special events (Fien et al. 2008, p.25, pp.30–31).

As a result of this higher prevalence, much of the research pertaining to overcrowding and health effects was conducted with remote Indigenous communities and the synthesis reflects this trend.

Baker, M, Das, D, Venugopal, K & Howden-Chapman, P 2008, Tuberculosis associated with household crowding in a developed country. *Journal of Epidemiology & Community Health*, 62(8), pp.715–721.

This research study found a positive correlation between overcrowding and tuberculosis (TB) transmission in New Zealand. Baker et al. (2008) stated that the issue remains salient because TB rates have not declined in the past two decades. Reliable research that maps the prevalence and factors influencing transmission is difficult to conduct because of the trouble controlling for confounding factors and the latency of the disease, which may stay dormant for decades.

The researchers used census data to track overcrowding and TB surveillance mandatory reporting data to map the prevalence of TB transmission. They employed a negative binomial model that could control for migration from high-TB-instance countries, income and existing TB burden.

The researchers found that after controlling for these factors there was a statistically significant association between overcrowding and TB rates. Indeed, for every 1 per cent increase in the average crowding level of a census area there would be a 5 per cent increase in the expected TB rate.

The researchers also controlled for those under the age of 40 because younger people comprise the majority of immigrants. As a result they found that while TB rates were significantly associated with immigration from high-incidence countries, they were not significantly associated with the younger cohort, which suggests that migrants are not an important source of infection. As such, the researchers conclude that minimising overcrowding could decrease the rate of TB.

Clark, M, Ribena, P & Nowgesic, E 2002, The association of housing density, isolation and tuberculosis in Canadian First Nations communities. *International Journal of Epidemiology*, 31, pp.940–945.

This epidemiological Canadian study identified a significant association between housing density, isolation, income levels and TB in First Nations communities. The results showed that TB incidence is higher in isolated communities and in those with higher than average housing density. Increase in income levels were associated with decreased TB risk.

Data was analysed from 602 communities and although some socioeconomic factors were controlled for (such as income), others were not (such as unemployment and homelessness) that may have confounded the statistics. Similar to previous studies, it is beyond the methodological capabilities of this study to prove causality.

The previous two studies help refine the theory that space affects living practices and in these cases the lack of adequate space (overcrowding) results in living practices that increase transmission of a communicable disease.

Cooper, L & Morris, M 2005, Sustainable tenancy for Indigenous families: What services and policy supports are needed? Melbourne, AHURI.

Cooper and Morris (2005) undertook this research study in order to better understand what factors initiate and sustain iterative homelessness, which is a long-term experience of moving between a range of precarious living situations (p.14). The researchers conducted focus groups and semi-structured questionnaires with service providers and Indigenous women accessing housing services in Brisbane and Darwin (p.14).

While overcrowding was not the focus of the research, it did emerge as a theme in the housing careers of the participants. The researchers found that all interviewees experienced overcrowding at some time. Many women presently experienced overcrowding and some preferred to live in substandard housing rather than overcrowded dwellings (p.25).

The authors reported that the women spoke very little about the impact of overcrowding on either physical or mental health outcomes. However, one woman disclosed her experience of sexual abuse and attributed it in part to overcrowding while another two women spoke of preventing overcrowding in their homes by ensuring their children maintained their own bedroom in fear of sexual abuse (pp.25–26). Service providers also linked overcrowding and child sexual abuse, however this is not discussed in detail by the authors (p.49).

Finally, this report indicated that overcrowding, at least in part, is an issue of housing supply shortage as some women reported being allocated social housing that was too small or had too few bedrooms for their family size (p.30).

This study finds that space affects living practices but if household heads are able to control that space, negative physical and mental health effects could be avoided.

Anderson, P & Wild, R 2007, AmpeAkelyernemaneMekeMekarle “Little Children are Sacred”: Report of the Northern Territory Board of Inquiry into the Protection of Aboriginal Children from Sexual Abuse, Darwin, Northern Territory Government.

This report was published in 2007 and provided the impetus for the Howard government's Northern Territory Emergency Intervention. It reported anecdotal evidence linking overcrowding and child maltreatment. Interviews with community members and other professionals, such as health practitioners, suggested that overcrowding results in children's exposure to pornography, sexual acts and domestic violence (p.65). In addition, the report

found that overcrowding reduces the surveillance capacity of adults charged with caring for children, which also makes behaviour management difficult (p.200).

The authors explicitly linked overcrowding with children being exposed to adults having sex. One interviewee, a clinic nurse, reported seeing a three year old girl in the clinic's waiting room behaving sexually with another little boy in the waiting room. A follow-up check resulted in no evidence of sexual abuse, suggesting the learnt behaviour came from witnessing sexual activity in the home (p.65). Similarly, the authors explicitly linked overcrowding and pornography, which is reportedly so common that it has become normalised (p.199) and the Inquiry was told that in one community 'children as young as six were regularly seen acting out sexual behaviour in groups' (p.65). Despite these explicit links, the Inquiry did not provide evidence that indicated causality. For example, it is unclear if exposure to pornography would still occur if overcrowding was not an issue but communities still had access to pornographic material.

The authors do report that many communities experienced high levels of overcrowding with as many as 20 people living in the one house where toilets and showers no longer worked because of overuse (p.195). One not-for-profit service delivery organisation reported that:

Many sites struggle with both community and family violence issues. Children and families are living in often overcrowded, under-resourced housing that does not provide safety or protection to children. There are often no lockable rooms in housing and the overcrowding results in children being exposed to violence with no respite. Many children have told us about their inability to go to sleep due to being concerned for their safety. The community has also raised this issue detailing that even if violence is not occurring in their home they have limited protection from community violence due to the lack of security in their homes (p.195).

Similarly, one community member reported that:

Overcrowding is so bad there is no privacy in people's homes, and girls have to shower in their clothes. They then walk around in wet clothes and they get fungal skin infections (p.196).

This study helps shape the theory that space affects people's privacy and control over their lives. The inability to control one's space results in negative psychological and physical health outcomes.

Birdsall-Jones, C & Corunn, V 2008, The housing careers of Indigenous urban households, AHURI Final Report No. 112, Melbourne, Australian Housing and Urban Research Institute, Western Australia Research Centre.

This Australian qualitative study found that 'overcrowding' was not always a negative occurrence for Indigenous Australians and often occurred for short periods of time as a result of kinship obligations. Birdsall-Jones and Corunn discovered that participants easily distinguished between purposeful and harmful overcrowding (pp.28–32).

Long, Memmott and Seelig (2007) suggested that overcrowding received substantial attention in quantitative statistical analysis type research, but found little evidence of research into Indigenous people's experience of overcrowding. Another weakness they noted was the occupancy standards used (Canadian standard) may not be appropriate for Indigenous household living practices.

Birdsall-Jones and Corunn suggested that within the strongly communal caring ethic in traditional Indigenous culture, the added pressures of housing shortage can reduce peoples'

capacity to protect themselves and their family. Participants clearly distinguished between culturally legitimate and destructive forms of 'living with relations'.

This study is valuable because it indicates that space is linked with control and privacy but finds that crowding is not always detrimental so long as household heads are able to maintain control over that space, governing who enters the space and for what length of time. It helps shape the theory that maintaining control over living practices when space is limited mitigates negative health outcomes.

Zubrick, S, Silburn, S, Lawrence, D, Mitrou, F, Dalby, R, Blair, E et al. 2005, The Western Australian Aboriginal Child Health Survey: The social and emotional wellbeing of Aboriginal children and young people, Perth, Curtin University of Technology and Telethon Institute for Child Health Research.

This study reported on the social and emotional wellbeing findings of the Western Australian Aboriginal Child Health Survey (WAACHS). The research was designed to give an account of education, health and justice outcomes that paint a holistic picture of factors influencing Indigenous children's outcomes and opportunities (p.xiv).

In contrast to the previous studies, Zubrick et al. (2005) found that high household occupancy levels served as a protective factor for children against experiencing emotional and behavioural difficulties (p.102). Indeed, children living in high occupancy households were half as likely to be at risk of clinically significant emotional or behavioural problems as children living in low-occupancy households (p.102). This finding was independent of family composition, primary carer's age and health, and care arrangements for the child within the household (p.139).

This study indicates that not all overcrowding is detrimental and, if it occurs in a socially appropriate way, may even be beneficial to children's wellbeing.

5 PLACE: NEIGHBOURHOOD QUALITIES AND HEALTH

This chapter presents evidence from studies that foreground the aspect of place – where people live – in the relationship between housing and health outcomes. 'Neighbourhood qualities' was found to comprise two major dimensions:

- neighbourhood hardware (street lighting, footpaths, roads, landscaping and parks/community recreation facilities)
- human capital/opportunities (access to social networks, levels of socioeconomic (dis)advantage, employment and educational opportunities, drug use and dealing, crime rates, and rates of resident mobility).

Scope and quality of the evidence

There is a considerable amount of research about the impact of neighbourhoods on residents' health and wellbeing. Largely, because areas of concentrated disadvantage were a focus of government intervention in the United States and the United Kingdom as well as Australia for over 50 years.

However the evidence base is highly unresolved, with contradictory findings and inconsistent definitions. In part, this can be attributed to methodological problems, particularly the difficulty of controlling for confounding variables, definitional inconsistencies, selection effects and varied follow-up and interval periods. For example, there is no agreed and consistent definition of a 'neighbourhood' so studies examined 'neighbourhoods' which varied in size from 500 to 6,000 people. Similarly, most studies do not specify in adequate detail the precise components of neighbourhood interventions, which can vary widely from street lighting to dwelling renovations to employment and education programs.

In this chapter 13 studies are included, with seven employing a longitudinal design, nine using quantitative and four using qualitative research methods.

Key findings

This chapter finds that:

- neighbourhood qualities affect real and perceived personal safety
- neighbourhood qualities interact with personal characteristics and culture to influence social connectedness, which affects mental health/wellbeing
- neighbourhood qualities interact with personal characteristics and circumstances to affect health outcomes
- culture, personal characteristics and personal circumstances are mediating effects and may be more important than neighbourhood qualities in affecting health outcomes.

5.1 Neighbourhood qualities and their interaction with other mediating effects

Despite many of the studies in this section coming to different conclusions about the effect of neighbourhood qualities on health outcomes, all have helped shape and refine the theory that these qualities interact with other mediating effects such as personal characteristics and circumstances to affect health.

Many also indicate that neighbourhood qualities are less important in affecting health outcomes than these other mediating effects.

Feldman, P, Warr, D, Tacticos, T & Kelaheer, M 2009, People, places and policies: Trying to account for health inequalities in impoverished neighbourhoods, *Australian and New Zealand Journal of Public Health*, 33(1), pp.17–24.

Warr, D, Feldman, P, Tacticos, T & Kelaheer, M 2009, Sources of stress in impoverished neighbourhoods: Insights into links between neighbourhood environments and health, *Australian and New Zealand Journal of Public Health*, 33(1), pp.25–33.

This research project sought to map the relationship between self-reported health and individual, household and area-level (neighbourhood) characteristics (Feldman et al. 2009). Feldman et al. (2009) and Warr et al. (2009) conducted surveys with 3,944 people in 13 areas characterised by concentrated disadvantage and earmarked for neighbourhood renewal (NR) projects by the Victorian government). A further 1,857 interviews were conducted with residents in neighbouring local government areas (LGA), which served as a comparison group. The survey collected data on residents' perceptions of their neighbourhood, housing and the physical environment as well as data pertaining to household demographics, health and wellbeing of residents and community participation.

There was a mix of metropolitan and regional sites and public tenants made up just over half of the interviewees in the disadvantaged areas and 5 per cent of the interviewees in the comparative group. According to the authors, areas earmarked for neighbourhood renewal activities were characterised by 'social incivilities' (public drinking, criminality and vandalism) and 'physical disorder' (included derelict buildings, neglected properties, graffiti and dirty streets).

The authors found that residents in the NR areas were more likely to report fair-poor health than those in the comparative areas and public housing residents within the NR areas were more likely to report fair-poor health compared to NR residents living in private housing. Residents in NR areas were also more likely to be concerned with disorders and incivilities in their local area and more likely to experience greater exposure to these occurrences than those living in the LGA areas.

Despite these strong associations, the research could not establish if the neighbourhood itself was the cause of these differences. For example, it was unclear whether the higher crime rates lead to increased stress levels among residents in NR areas or the targeted allocations policies of public housing authorities, which tend to grant housing to those in greatest need (disabled, high need clients), that result in higher levels of poor health outcomes.

Analysis of the study sample found that residents in the NR areas were more likely to have a disability, have limited education, be unemployed and be in receipt of a government benefit and were less likely to be married or in a de facto relationship than those in the comparative group. Tenants in public housing reported a greater instance of disability and socioeconomic disadvantage than their private housing counterparts.

This study indicates that poor health outcomes are associated with disadvantaged neighbourhoods, though it is unclear if the neighbourhood is a cause or consequence. It is possible that people with poorer health simply have less housing choice and are 'sorted' into disadvantaged neighbourhoods. It also identifies that residents in particular neighbourhoods experience greater exposure to social disorder, which may impact on health through increased stress.

Stafforda, M, Cummins, S, Macintyre, S, Ellaway, A & Marmot, M 2005, Gender differences in the associations between health and neighbourhood environment, *Social Science & Medicine*, 60(8), pp.1681–1692.

This study explored whether neighbourhood characteristics impact men and women's health differently (p.1681). In particular Stafforda et al. (2005) examined the relationship between infrastructural and social neighbourhood characteristics, the extent to which self-rated health varied between men and women by area of residence and whether or not particular neighbourhood characteristics affect men and women in the same ways.

The researchers collected data from postal questionnaires, government statistics, service providers, the Health Surveys for England (HSE) and the Scottish Health Surveys (SHS), which are government-funded surveys conducted annually and representative of the national populations. 'Neighbourhoods' were measured at a census ward level, which roughly contain a population of 5,000 people.

The study found that women living in neighbourhoods with low levels of trust, tolerance, political engagement or integration into wider society reported poorer health outcomes (p.1687). These characteristics were more consistently associated with women's self-rated health than men's self-rated health and men's self-rated health was more strongly associated with individual economic activity. The authors concluded that neighbourhood characteristics have a more profound effect on women's health than men's health, however, it remained unclear which particular neighbourhood characteristics affect health outcomes.

The researchers discovered that social cohesion correlated with the local political environment and crime but the association between social cohesion and physical amenities (such as access to public recreation and health services) was much smaller, suggesting social rather than infrastructure characteristics are more important to social cohesion.

This study indicates that neighbourhood qualities interact with personal characteristics, such as gender, which helps refine the theory that personal characteristics are a mediating affect.

The following three studies similarly indicate that neighbourhood qualities interact with personal characteristics, such as gender, to affect mental health outcomes and indicate that these personal and household characteristics are more important than neighbourhood qualities in affecting health outcomes.

Propper, C, Jones, K, Bolster, A, Burgess, S, Johnston, R & Sarker, R 2004, Local neighbourhood and mental health: Evidence from the UK, CMPO Working Paper Series No. 04/099, Bristol, University of Bristol.

This quantitative English study used the British Housing Panel Survey (BHPS) longitudinal dataset to examine the relationship between mental health and individual, household and neighbourhood characteristics in order to ascertain what effect neighbourhood had on mental health outcomes. Propper et al. (2004) defined a neighbourhood as consisting of 500 to 800 people (p.2).

The authors found that individual and household characteristics are more important in impacting mental health than neighbourhood determinants and that various neighbourhood characteristics impact particular populations differently (p.16). For example, women are more likely to experience poor mental health in more mobile and rural neighbourhoods than their male counterparts (p.16).

Individual characteristics associated with mental health are age, gender, ethnicity and education while household characteristics included family composition, household income, housing tenure and employment status (p.8).

Pevalin, DJ, Taylor, MP & Todd, J 2008, The dynamics of unhealthy housing in the UK: A panel data analysis, *Housing Studies*, 23(5), pp.679–695.

Pevalin, Taylor and Todd (2008) used the most recent seven waves (1996 onwards) of the British Household Panel Survey (BHPS) to ascertain whether changes in housing conditions were associated with changes in health. The survey questions included 11 pertaining to a 'housing problem', such as shortage of space, noise from neighbours, lack of light, dampness, leaky roofs and vandalism or crime in the area. The General Health Questionnaire (GHQ12) also comprised part of the BHPS; it is a 12 question self-assessed health report, which is drawn on to determine health status and problems.

The researchers found that 10 of the 11 housing problems were associated with at least one health outcome. The strongest correlation was identified between women's health and physical housing qualities such as damp, rot, condensation and lack of heating. There was also a correlation for men but this was much weaker. An increase in housing problems was associated with an increase in the number of reported health problems, but this effect was only significant for those over the age of 50.

A decrease in housing problems resulted in a decrease in health problems across all age groups. For women, a decrease in environmental problems demonstrated improved mental health outcomes, particularly over the age of 50, which suggests that improvements to women's mental wellbeing may be achieved via addressing noise pollution and vandalism in neighbourhoods. Confounding factors were controlled for in these results.

The study also found that private and social renters were more likely to experience housing problems than owner-occupiers, which provided evidence to support neighbourhood regeneration projects in areas with high populations of renters.

This study confirms findings established in the earlier chapter on 'housing hardware' and also finds health impacts associated with the neighbourhood aspects of housing. It is included here particularly to highlight the importance of personal characteristics as a mediating factor in the impact of housing on health outcomes.

Cutrona, CE, Russell, DW, Brown, PA, Hessling, RM, Clark, LA & Garder, KA 2005, Neighborhood context, personality, and stressful life events as predictors of depression among African American women, *Journal of Abnormal Psychology*, 114(1), pp.3–15.

This research project examined the extent to which neighbourhood contexts, namely economic disadvantage (fewer employment opportunities, fewer services) and social disorder (crime, drug use, delinquent youth), are associated with diagnosable depression both independent and in conjunction with personal risk factors, such as negative life events and the personality trait of negative affectivity. It found that neighbourhood effects were best understood as a vulnerability factor which could increase a person's likelihood of a poorer health outcome.

Cutrona et al. (2005) interviewed 720 African American women twice, two years apart, in order to ascertain impact over time.

Preliminary analysis demonstrated that those women living in a neighbourhood with high levels of disadvantage and/or disorder had an increased risk of experiencing depression even when demographic variables were controlled for. However, once 'negative life events' and 'negative affectivity' were controlled for, this significance became marginal. This suggests that while neighbourhood context may contribute to the onset of depressive episodes, these two personal variables may be more important in predicting an episode than neighbourhood variables.

Women who reported a high number of negative life events and lived in a neighbourhood with high disadvantage/disorder reported a disproportionately high rate of onset of major depression compared to women living in low disadvantaged neighbourhoods. Instances were also higher than for women who lived in better quality neighbourhoods. Similarly, women living in neighbourhoods with high levels of disadvantage/disorder who experience a negative life event are more likely to experience an episode of depression than those women who live in neighbourhoods without these characteristics.

The findings did not support the authors' hypothesis that negative affectivity would be associated with neighbourhood disadvantage/disorder. Similarly, neighbourhood disadvantage/disorder at the first interview did not significantly predict the onset of depression at the second interview, two years later.

The authors discovered that the onset of depression occurs for women in poor neighbourhoods when *coupled* with a negative life event. The context of a disadvantaged neighbourhood with high levels of social disorder is not enough to trigger an episode of major depression in residents.

The authors concluded that neighbourhood contexts are associated with the onset of depressive episodes when coupled with personal circumstances, however personal circumstances may be more important than neighbourhood effects in predicting depressive episodes. As a result, neighbourhood disadvantage/disorder can be understood as a *vulnerability* factor that increases susceptibility to depression in certain circumstances.

Huxley, P, Evans, S, Leese, M, Gatley, C, Rogers, A, Thomas, R et al. 2004, Urban regeneration and mental health, *Social Psychiatry & Psychiatric Epidemiology*, 39(4), pp.280–285.

This study found that an urban renewal project in South Manchester, England had no discernible effect on residents' mental health. Huxley et al. (2004) conducted postal surveys pre- and post-renewal in both the targeted area and a neighbouring area that shared similar demographics but was not the subject of a regeneration scheme.

The surveys related to participants' perceptions of their neighbourhood and their mental health. A total of 2,596 residents responded in the first wave and 65 per cent of these people responded to the follow-up survey 22 months later. The General Health Questionnaire (GQH12), GP visits and a life satisfaction survey were all used to measure mental health/wellbeing outcomes.

The study found that more people in the renewal area (42 per cent) reported improvements in their neighbourhood than the control group (32 per cent). A higher proportion also reported improvements to their dwellings, which included positive changes to heating, bathrooms and kitchens. However, there was no change to the reported mental health of the residents in the renewal area and their health satisfaction actually decreased comparatively to the control group.

This study finds no direct relationship between neighbourhood qualities and health outcomes, suggesting that other mediating effects matter. This helps refine the theory that other factors may mediate the relationship between neighbourhood qualities and health outcomes and that these other factors may be more important than neighbourhood qualities in affecting health outcomes.

5.2 Neighbourhood qualities and safety

The following two studies indicate that various neighbourhood qualities (both neighbourhood hardware and crime rates) affect residents' real and perceived personal safety.

Blackman, T & Harvey, J 2001, Housing renewal and mental health: A case study, *Journal of Mental Health*, 10(5), pp.571–583.

Blackman and Harvey (2001) found that physical improvements made over a five year period as part of a neighbourhood renewal project significantly improved the mental health outcomes of adult residents. Increased perceptions of safety and a decrease in draughty housing were cited as changes that produced the most significant outcomes.

This study sought to describe and measure the relationship between neighbourhood renewal initiatives and mental health outcomes in North East England. Household interviews were undertaken prior to the commencement of the renewal project and five years later, upon completion of the project. Renewal activities included environmental improvements such as repairs to footpaths and roads, better street lighting and landscaping of council areas. Many households were eligible for discretionary grants to refurbish their homes and repairs were also undertaken to improve heating and security conditions in individual dwellings. Many of the same residents were interviewed at both intervals, creating a longitudinal data set.

When data was first collected 749 adults were interviewed and 253 children (<16 years old), which represented 70 per cent of occupied dwellings. Five years later, 394 adults and 131 children were interviewed (representing 62 per cent of occupied dwellings), 235 of whom also participated in the first set of interviews. While the overall population decreased, the demographics and socioeconomic composition of the neighbourhood changed little. The most significant changes were environmental and related to the renewal project.

After controlling for other variables, residents reported increased satisfaction with their individual dwelling, with 'dampness' and 'draughtiness' decreasing significantly. Their perceptions of the neighbourhood 'as a nice place to live' increased significantly (49 per cent to 62 per cent for the longitudinal data set); perceived safety of the area almost doubled and actual crime fell from 25.5 per cent to 15.3 per cent.

In adults, diagnosed mental health issues and 'trouble with nerves' significantly decreased (by just over 10 per cent each) and visits to the GP decreased marginally. However, the greatest statistical health outcome for adults was a decrease in smoking, which for the longitudinal data set went from 71.6 per cent to 21.9 per cent. This is particularly interesting because the national smoking figures remained stable during the same period. While the authors cannot link the reduction in smoking to the neighbourhood renewal projects, there is evidence to suggest that those with greater mental health problems smoke more, thus a reduction in reported mental health issues may be correlated with the reduction in smoking.

After controlling for other variables, those adults who reported feeling unsafe in the neighbourhood were 2.35 times more likely to report mental health issues and those who reported serious draughts in their homes were 2.28 times more likely to experience mental health issues than those reporting no or minor draughts.

When analysing the data related to children in the study, the researchers found improvements in mental health occurred, but these were statistically unrelated to the renewal activities. The main factor in the improvement of children's mental health was an improvement in their parent/s mental health.

This study helps shape the theory that neighbourhood qualities such as street lighting and landscaping of shared spaces are associated with actual and perceived reductions in crime, which is strongly linked to feelings of safety. The study indicates that neighbourhood safety is associated with mental health/wellbeing.

Varady, DP & Walker, CC 2003, Using housing vouchers to move to the suburbs: How do families fare? *Housing Policy Debate*, 14(3), pp.347–382.

This American study examined the outcomes for those households in Oakland and Berkley, California that received Section 8 vouchers⁸ and moved to the suburbs compared with those voucher recipients who moved within their original area.

Varady and Walker (2003) found that both movers and stayers experienced very few adjustment problems in their new neighbourhoods and the vast majority of participants reported that their relationship with their neighbours and landlord was excellent (80 per cent and 83 per cent respectively). Parents (86 per cent) reported that their children's adjustment to school was excellent or good.

Of movers, 75 per cent believed their new house was superior to their old house, compared with 68 per cent of stayers. Similarly, 75 per cent of movers reported an improved neighbourhood compared with 50 per cent of stayers and 70 per cent of movers felt safer in their new location as they perceived the neighbourhood to have a lower crime rate than their previous neighbourhood, whereas only 46 per cent of stayers felt the same way. Suburban movers were also more likely to report better access to shopping facilities and job opportunities.

This study indicated households that move into neighbourhoods with less socioeconomic disadvantage felt safer and perceived that there were more educational and job opportunities.

This study shapes the theory that neighbourhood qualities (lower crime rates) affect resident's feelings of safety, which affects mental health/wellbeing outcomes.

⁸ 'Section 8' is a government subsidy that pays the difference between a certain percentage of household income and market rent, allowing recipients to find their own accommodation in the private rental market.

5.3 Neighbourhood qualities and social connectedness

Johnson, G, Gronda, H & Coutts, S 2008, *On the outside: Pathways in and out of homelessness*, Melbourne, Australian Scholarly Publishing.

This qualitative research project examined the lived experience of homelessness in Melbourne and the way in which people navigate in and out of homelessness. It highlighted the importance of location in the success of housing for people leaving emergency accommodation.

The researchers reported on interviews conducted with over 100 households as they were leaving emergency accommodation and follow-up interviews with 79 of these households 12 months later (p.8). The research focused on the life histories of the interviewees, which included their experiences before becoming homeless for the first time, during homelessness and after exiting homelessness (p.8). The 'pathways approach' provided the analytic framework for this project and five different pathways into homelessness were identified, including domestic violence, housing crisis, mental health, substance use and people who experience their first episode of homelessness before the age of 18 (p.9).

The research found that housing location was just as crucial to the success of maintaining housing as affordability for those people on the domestic violence and housing crisis pathways (p.174). While affordable housing provided those exiting homelessness with stability, more confidence, a connection with the mainstream and a renewed sense of 'normalcy' (pp.175–176), some interviewees discovered new problems when their affordable housing was located great distances from social networks or services (p.177).

For example, one participant expressed frustration at being allocated public housing that was 'miles from where she had previously lived and a long way from the shops. Sally had no car and, without one, shopping and taking the twins to the doctor was difficult' (p.177). Similarly, another interviewee felt socially isolated as he was allocated public housing on 'the wrong side of the city' and had to travel over two hours on public transport to visit family. At the time of the second interview this person had fallen back into homelessness and was living in crisis accommodation, which demonstrated the importance of location as a protective factor against homelessness (p.177).

This study illustrates that neighbourhood qualities (location) interact with personal characteristics and circumstances (not having a car, having dependent children) to affect social connectedness.

Stanley, J, Ng, CW & Mestan, K 2007, *Social exclusion in Boroondara, Stage Two: Identifying the issues for children who experience social exclusion in Boroondara*, Melbourne, Brotherhood of St Laurence.

This Australian qualitative study explored social exclusion in one of Melbourne's most affluent local government areas (LGA): Boroondara. Two relevant key findings emerged: The first is that social exclusion is often hidden because of the area's affluence and the second is that social exclusion was exacerbated by the large discrepancies in wealth between residents, which participants reported had added to their feelings of isolation and social exclusion.

Surveys and some interviews were undertaken with staff members from local service providers as well as a small group of single mothers purposively sampled from a key welfare agency in the area. Twenty-five different agencies were represented (pp.2–3).

Service providers reported that social exclusion was often hidden in Boroondara as it was 'not as viable' as it may be in other areas (p.16). Contributing factors to social exclusion cited by

interviewees were lack of part-time retail jobs for youth who may not 'present' as well as other youth in the area, a lack of service infrastructure like outreach support, heightened feelings of 'shame' as residents were consistently surrounded by fairly wealthy neighbours, parent's inability to buy presents when their children were invited to friend's birthday parties and the recreational activities in the area like shopping and sporting complexes tended to be expensive (pp.16–17).

In addition, service providers reported on two contributing factors in the interviews that seemed to be specific to wealthier areas. The first was that new migrants could be particularly excluded as Boroondara is one of the more culturally homogenous LGAs in Melbourne with few CALD residents. It does not have established migrant communities that can offer advice and support, which, in conjunction with a lack of outreach services, can result in CALD residents' needs going unmet (pp.19–20). The second was the issue of prejudice and intolerance of difference. Often it was children's dress and appearance that made them stand out and other parents expressing a desire for their children to not socialise with those from 'problematic backgrounds' (p.20).

The researchers also led a focus group discussion with mothers who had all experienced social exclusion in Boroondara. Many participants had moved into the area from other suburbs and had wanted to do so because they felt the more affluent area would be a better environment to raise their children and provide more opportunities (p.26). However, many reported their disappointment at the lack of accessible services and stated that recreational play services for children were too expensive compared to other areas (p.27). Many felt that their children were excluded from education opportunities as many preschools had waiting lists of one to two years and 'good' high schools in the area would not accept children who lived on the fringe of their catchment area (p.27).

Service providers reported that the most commonly addressed needs were family support, social integration and personal counselling (p.13). The most commonly cited reasons for children's social exclusion were: coming from a low-income family, coming from a sole parent family, having a parent with a mental illness and unemployment issues (p.17).

This study demonstrates that neighbourhood qualities, such as the comparative level of economic (dis)advantage interacts with culture and personal characteristics, such as ethnicity, to affect social connectedness.

Walker, R, Ballard, J, Taylor, C & Hillier, J 2007, *The effects of New Living on Indigenous community wellbeing: A case study on urban regeneration*, Final report 99, Melbourne, Australian Housing and Urban Research Institute.

This research project sought to evaluate the impact of the New Living urban renewal program in Western Australia on the wellbeing of affected Indigenous communities (p.4). Urban renewal activities included the refurbishment of public housing stock, deconcentration (so that suburbs contained no more than 10 to 20 per cent of public housing) and reduced dwelling density of public housing in order to achieve greater social mix (p.14). Six case studies were conducted, including three in Perth metropolitan area and three in regional centres (p.5). The researchers collected qualitative data via interviews, focus groups and document analysis (p.6).

Significantly, Walker et al. (2007) found that the urban renewal programs have the potential to improve wellbeing but also to diminish it, particularly if interventions like relocation do not respect connection to place and family relationships (pp.64–65). The study identified feelings of frustration and tokenism with the consultation process and the importance of more diverse and inclusive definitions of community, family, social capital and cultural cohesion (p.65).

Walker et al. found that wellbeing outcomes could have improved through greater understanding of the role that Indigenous relationships with place, family and extended kinship networks play in creating a sense of belonging and community (p.65).

Similarly to the previous two studies, this study indicates that neighbourhood qualities (location) interact with culture to affect social connectedness. It also suggests that policies mandating relocation may affect people's sense of control over their life.

Rosenbaum, JE, Reynolds, L & Deluca, S 2002, How do places matter? The geography of opportunity, self-efficacy and a look inside the black box of residential mobility, *Housing Studies*, 17(1), pp.71–82.

This research study examined the effects of the Gautreaux Program, a US program initiated in 1976. The intervention is a 'moving to opportunity' program that randomly relocated low-income families from areas of concentrated disadvantage to census tracts with less than 10 per cent poverty in Chicago. This study sought to ascertain which neighbourhood effects increase a person's self-efficacy. 'Self-efficacy' was defined as the degree to which an individual felt they have control over their own life and events that happen to them.

Rosenbaum, Reynolds and Deluca (2002) drew on qualitative research collected from interviews with 100 mothers and children in 1998 that were relocated in the mid-1990s. The researchers found that there were four specific features of suburbs⁹ that facilitated self-efficacy and access to opportunities: a better address, racial integration, 'middle-class-know-how' and manageable challenges.

The first was a 'better address'. A number of interviewees reported that a change of residential address meant that the family was no longer marred by the stigma of the housing projects, which resulted in family members attaining better jobs and securing credit from banks that assisted in managing debt more economically. This change of location also resulted in a move to a larger labour market with better job opportunities. The authors commented that this provides a greater sense of control over one's future employment and facilitated financial planning.

Secondly, the authors found that movement to the suburbs facilitated racial integration because it gave participants the opportunity to mix with people from other races. Many interviewees commented that their children's efficacy improved because they were exposed to white people. Often participants only exposure to white people was via celebrities and television personalities, which gave them a skewed understanding of how successful white people actually were in society.

One Gautreaux child reported that before moving to the suburbs, she thought all white people were as beautiful as the models who appeared in magazines, and so she thought she was very ugly in comparison. When she moved to the suburbs, it was a great revelation to discover that most white people did not look like magazine models. Many white people were ugly, and she felt better about herself.

Thirdly, exposure to 'middle-class know-how' fostered efficacy. Many of the participants had aspirations and wanted to better their lives, however, most had no idea of how to go about doing this. Exposure to 'middle-class know-how' (for example, teachers, neighbours and friend's parents who knew how to complete college applications or knew how to access

⁹ In the United States racial integration of neighbourhoods is rare and the 'suburbs' tend to be predominately white, middle-class family neighbourhoods while the inner-city tends to be dominated by low-income African American families.

information when they did not know an answer) enabled participants to learn these skills, which resulted in a greater sense of self-efficacy.

For example, one participant said:

most of her son's friends were 'into school, into talking about college, not gangbangers'. When these friends made visits to college, her son went along, something he would not have done otherwise.

Finally, manageable challenges encouraged efficacy. While numerous participants faced significant challenges when living in the projects, many of these challenges did not enable the participant to take control of the situation and change the outcome. For example, drug and violence problems rarely allowed the victim of such assaults to confront the perpetrator to change the situation or use formal channels (such as the police) to remedy the situation for fear of retribution and an escalation of violence. However, participants found they were able to trust police in the suburbs and their concerns were taken seriously. In addition, threats or harassment were often isolated instances and as such perpetrators could be easily identified and the situation remedied.

In contrast to the previous studies in this section, this study finds positive health outcomes from changes to neighbourhood qualities (location). In this case neighbourhood qualities interacted with personal characteristics and circumstances to facilitate rather than diminish social connectedness, which positively affected wellbeing.

Synthesis of evidence from this study with evidence from the study of social exclusion in Boroondara indicates that relocation to a low-poverty neighbourhood can have a positive impact on people's wellbeing if there is social mixing and integration in the neighbourhood. Community characteristics seem to mediate the effect of location.

Fauth, RC, Leventhal, T & Brooks-Gunn, J 2008, Seven years later: Effects of a neighborhood mobility program on poor Black and Latino adults' well-being. *Journal of Health and Social Behavior*, 49(June), pp.119–130.

This research study examined the effects of a neighbourhood mobility program on adult wellbeing in the United States (p.119). The mobility program was the Yonkers Project, which was a 1985 court ordered relocation of some public housing tenants from areas of concentrated poverty to areas experiencing less socioeconomic disadvantage in New York City. New public housing dwellings were constructed in largely white, middle-class regions of the city, which accommodated 200 randomly selected families in public housing or on the waiting list.

An initial study conducted two years after the relocation found that the adults who moved into the low-poverty neighbourhoods were more likely to work and less likely to receive welfare than those adults who remained in the original high-poverty neighbourhoods. However, those that moved reported fewer formal and informal neighbourhood social ties than the control group and while there were small improvements to the physical health of the adults who relocated, there were no reported mental health improvements.

This more recent study sought to build on this research and evaluated the physical and mental health outcomes of the relocated group seven years after their move. Most participants were in their early forties, female and three-quarters were African American with the remainder being Latino.

Similarly to the first study Fauth, Leventhal and Brooks-Gunn (2008) found that 'movers' are more likely to be employed and less likely to be receiving social security than 'stayers'. Movers

also reported significantly higher collective self-efficacy and less neighbourhood disorder and danger.

Significantly, both groups reported similar levels of physical and mental health. However, those that worked and did not collect welfare reported marginally better health outcomes and fewer depressive or anxious symptoms than those who were not in the labour force. Similarly, collective efficacy was positively correlated with better physical and mental health.

In contrast to the first study, the authors found that movers had just as many friends and relatives as stayers (albeit in different neighbourhoods) that they saw often and were supportive in times of need. However, movers still reported less strong or close ties in their neighbourhoods than the stayers.

The authors concluded that while the link between better health outcomes and neighbourhood location was weak, they expected this to strengthen over time. They also suggested that the self-reported health data may have produced downwardly biased results as 'movers' may be comparing their health status with their middle-class neighbours.

This study indicates that the way neighbourhood qualities interact with personal characteristics and circumstances is complex. This study helps refine the theory that this interaction affects social connectedness as it illustrates that those who moved to neighbourhoods with better qualities had less social ties within their new neighbourhoods. However, this did not negatively affect their mental health/wellbeing because their personal circumstance enabled them to maintain social connections in their previous neighbourhoods.

6 TENURE/SECURITY OF TENURE

Housing tenure refers to the legal and financial arrangements through which a person or household is entitled to occupy housing. Home ownership (or purchase) is the majority tenure for Australian households and both a strongly expressed aspiration as well as the most significant means of achieving wealth accumulation (Yates et al. 2008).

This chapter presents research that investigates the relationship between tenure and health outcomes. Synthesis of the studies begins to draw out what might be the underlying mechanisms generating the evidence of tenure effects. These studies confirm the theory that some housing elements affect health outcomes more significantly than others however existing evidence does not resolve the priority of elements.

Scope and quality of the evidence

There is a reasonable body of evidence that has accumulated on the topic of housing tenure and differential health outcomes, and enough depth to allow for a refinement of the theory about the importance of tenure. The literature in this category is largely characterised by comparative research evidence that looks at the differences in health outcomes of social renters, private renters and home owners. Evidence from homelessness research is also included here because of its relevance to some of the underlying mechanisms apparent in the housing tenure research and because homelessness can encompass a variety of tenure types from no tenure to short-term, insecure tenure.

In the 12 selected studies there are a mix of quantitative and qualitative research that uses both longitudinal and cross-sectional study designs. Quantitative, cross-sectional studies dominate here as in other parts of the evidence base. Studies were conducted in Australia, the United States, United Kingdom and Canada. A number of the studies of the relation between housing tenure and health, identify and measure elements of housing we discussed separately in other chapters, notably housing hardware and aspects of place. This research demonstrates the inter-connectedness and complexity of 'housing' and why it is critical that further research is conducted to distinguish the different elements and the underlying causal mechanisms.

Three studies in this chapter (Boyle 2002; Harkness & Newman 2003; Kearns et al. 2000) examine the effect of multiple housing elements on health and aim to ascertain whether or not some housing elements affect health more than others. However, the results of these studies vary and do not resolve the question of a hierarchy of importance between these elements.

Key findings

In this chapter we present evidence that:

- tenure itself may not be a causal mechanism in health outcomes, however, it is strongly associated with beneficial housing elements such as living in a good area (place), having a warm, safe home (housing hardware) and security and stability (affordability and supply)
- housing hardware, place and affordability may be more significant in predicting health outcomes than tenure per se
- personal and household characteristics are important mediators of the association between tenure and health outcomes
- there is a hierarchy of significance between different housing elements, however, the complexity of their interactions with one another makes it difficult to articulate this hierarchy

- homelessness affects stability and social connectedness, which affects health and wellbeing outcomes. The absence of housing also affects personal safety and people's sense of control and mastery of their lives, influencing physical and mental health/wellbeing outcomes.

6.1 Benefits of home ownership

The following five studies all indicated that home ownership is correlated with better health/wellbeing outcomes and helped shape and refine the theory that tenure is a factor influencing health outcomes. The studies present some contradictory findings, however, which indicated that 'tenure' itself may not be the operational mechanism.

For example, Harkness and Newman (2003) found that tenure may be more important than neighbourhood qualities in affecting health outcomes. Whereas Hisock et al. (2003) demonstrated that tenure type may be an indicator of health outcomes but that housing hardware and neighbourhood qualities may be the mechanism. Boyle (2002) reported that tenure may be less important than personal or household characteristics in affecting health outcomes.

While most studies are cross-sectional and cannot establish causality, the association between poorer health and non-home ownership does suggest a possible multiplication of disadvantage which could be a target for policy intervention.

Waters, A 2001, *Do housing conditions impact on health inequalities between Australia's rich and poor?* AHURI Positioning Paper No. 2, Melbourne, Australian Housing and Urban Research Institute, Australia National University Research Centre.

Waters (2001) analysed Australian census data in order to examine the relationship between tenure type and self-reported health outcomes. The study found that renters were 17 per cent more likely than home owners to report *serious* health conditions after controlling for socioeconomic and risk factor variables (p.12). Similarly, renters were 18 per cent more likely than home owners to visit the GP (p.13) and 2.3 times more likely to smoke (after controlling for variables) (p.14).

As a cross-sectional study, the evidence did not establish that rental tenure causes poorer health since it is also possible that households with more serious health conditions have less access to home ownership. However, this evidence of an association between tenure and health outcomes suggested the way that types of disadvantage can occur together, increasing the vulnerability of a household.

Harkness, JM & Newman, SJ 2003, *Effects of home ownership on children: The role of neighbourhood characteristics and family income*, *Economic Policy Review* (June), 9(2), pp.87–107.

This study sought to examine the relationship between neighbourhood effects, tenure and children's outcomes. The study found that home ownership is associated with children's wellbeing across the socioeconomic spectrum but that this relationship is stronger for children of low-income earners than those of higher income earners.

Harkness and Newman (2003) then further examined the relationship between neighbourhood characteristics, tenure and the outcomes of children from low-income families. This study indicated that tenure is more important to children's outcomes than neighbourhood qualities.

Harkness & Newman (2003) drew on a longitudinal dataset collected since 1968 by the University of Michigan in order to determine the long-term effects of home ownership on children. The variables they used to determine poor outcomes were: teen unwed births, idleness (not working, attending school or looking after children), low wage rates and receipt of welfare. The authors also used home ownership rates, residential stability and poverty rates as measures of neighbourhood quality and they controlled for a number of personal and household variables that may mediate results, including race, gender, educational attainment of household head, number of years in a two-parent family and years living in a city.

The analysis showed that home ownership was strongly related to better outcomes for children from families with low-incomes and was statistically significant for all outcome variables except teen unwed births. To investigate the role of neighbourhood quality, the researchers controlled for the three neighbourhood variables and found that the effect was marginal for some outcome measures and insignificant for others. The researchers found neighbourhood stability was more strongly associated with children's outcomes than other neighbourhood qualities but that any association was weak.

The researchers also discovered that children of home owners were more adversely affected by neighbourhood poverty and benefitted more from neighbourhood stability than those children whose families rent. This may suggest that children of home owners form greater neighbourhood ties and are more affected by them than those children living in rented housing.

Boyle, MH 2002, Home ownership and the emotional and behavioral problems of children and youth, *Child Development*, vol. 73, pp.883–892.

This study found small but statistically significant evidence that home ownership is inversely related to child problem behaviour after socioeconomic variables were controlled. Boyle (2002) used two Canadian data sets ($n = 3,325$ and $12,592$) in order to determine the relationship between home ownership and child problem behaviour.

The researcher found that socioeconomic factors explained half to two-thirds of the association between these two variables but the net effect of home ownership after controlling for these factors was between 0.07 and 0.17 standard units. These effects were similar for families above and below the poverty line and suggested that home ownership may improve a child's wellbeing outcomes.

While the author cites evidence that home ownership may enhance positive parental characteristics like increased self-esteem, initiative taking and hopefulness, which in theory provide a safer and more secure environment for children that will result in less behavioural problems, he does not provide empirical evidence that proves this causality. Therefore, it remains unknown what exactly it is about home ownership that produces better behaved children.

Hiscock, R, Macintyre, S, Kearns, A & Ellaway, A 2003, Residents and residence: Factors predicting the health disadvantage of social renters compared to owner occupiers, *Journal of Social Issues*, vol. 59, pp.527–546.

Hiscock et al. (2003) reviewed the extensive literature demonstrating tenure associated health inequities. They note that epidemiological research, census data analysis and nation-wide longitudinal and cross-sectional studies repeatedly found better health outcomes for home owners compared to renters. This body of evidence, however, was not able to resolve whether it is the housing or personal characteristics of the households which caused the outcomes.

The study sought to understand if tenure is simply a proxy for socioeconomic disadvantage or if there are distinct housing elements which contributed to health outcomes. The researchers found that while personal characteristics were important in predicting health outcomes, there was also evidence of contributing housing elements including housing hardware and neighbourhood safety.

Hiscock et al. (2003) analysed data from 2,838 postal surveys collected in the west of Scotland. In the sample, 20 per cent of renters were permanently sick, compared to 5 per cent of the owners (weighed against an overall sample prevalence equivalent to the population rate of 38 per cent). The analysis removed these cases to prevent bias since permanent illness is likely to significantly reduce employment and hence access to home ownership. The final sample included 1,568 home owners and 768 social renters.

The researchers found that tenure is an efficient indicator of a number of other housing variables; a simplified analysis showed that social renters were more likely than owner-occupiers to report fair or poor health and experience depression.

The research discovered that sociodemographics (gender and age) and psychological characteristics (self-esteem) were significantly associated with health outcomes, confirming other studies. Age was the most significant demographic variable. Income was a strong predictor of chronic illness and poor general health, but not a predictor of poor mental health. Housing conditions were only a significant predictor of anxiety, while area conditions were associated with most health conditions and more important than housing conditions for three of the five health measures.

While the cross-sectional study design limited the conclusions of the analysis, the researchers tentatively found that poor housing conditions in the social rented sector may lead to anxiety, and that living in a deprived neighbourhood and not feeling protected at home is associated with general poor health and depression.

Kearns, A, Hiscock, R, Ellaway, A & Macintyre, S 2000, 'Beyond Four Walls', The psychosocial benefits of home: Evidence from West Central Scotland, *Housing Studies*, 15(3), pp.387–410.

This study drew on the same data set described in the previous study (Hiscock et al. 2003), derived from 2,838 returned postal surveys collected in the west of Scotland. This analysis examined the psychosocial benefits of 'home' and found that neighbourhood qualities and problems with the individual dwelling had more impact on residents' wellbeing than tenure type (2000).

The study investigated three potential dimensions of the psychosocial benefits of housing derived from the research literature: home as a 'haven' (privacy and security), 'autonomy' (being free from surveillance and being in control) and 'status' (identity construction as a marker of success). The study found that living in an area with a poor reputation or with 'problem neighbours' prevented people from gaining any of these psychosocial benefits of housing.

The study reported that housing tenure was a predictor of 'status' benefits (reported by two-thirds of owner-occupiers but only half of social renters) (p.399), however further analysis revealed that the apparent tenure effect was actually associated with having 'nice neighbours', living in a 'good area', having less problems with the housing hardware and owning more consumer items.

Kearns et al. (2000) analysed the psychosocial benefits along with responses to dwelling type and characteristics and neighbourhood characteristics. Dwelling type (house rather than a flat),

having lower mortgage repayments and more rooms in the home correlated with positive psychosocial scores. The study found that living alone was significantly more associated with the benefits of 'home as haven' and autonomy confirming evidence in this synthesis that personal and household characteristics are an important mediator of housing effects.

Neighbourhood factors also affected psychosocial scores, with those who exchanged favours with the neighbours and not having any environmental problems, reporting greater levels of satisfaction. Once these dwelling and neighbourhood characteristics were accounted for, tenure only slightly acted as an independent indicator for 'status' outcomes.

Overall, the study found that negative impacts were more significant than positive benefits, implying that housing provided a 'baseline' of wellbeing. It seems that precarious housing can detract from psychosocial benefits but that good housing does not produce additional wellbeing.

This study shows that while tenure is typically correlated with elements of housing that provide psychosocial benefits, social status in particular, it is dwelling quality and the neighbourhood which are more significant in predicting wellbeing outcomes.

This study helps shape the theory that tenure is not a causal factor in health and wellbeing outcomes however it is strongly correlated with elements that do deliver the psychosocial benefit of greater social status.

6.2 Benefits of public rental

Mee, K 2007, "I ain't been to heaven yet? Living here, this is heaven to me": Public housing and the making of home in inner Newcastle, *Housing, Theory & Society*, 24(3), pp.207–228.

This is an Australian qualitative study that examined public housing tenants' experiences of making a home in medium density public housing in the relatively well resourced inner-city suburbs of Newcastle (Mee 2007). It found that public housing delivered significant benefits to residents' mental wellbeing through stability and empowerment. Housing elements of affordability, a good location and dwelling quality contributed to these benefits.

Questionnaires were distributed to all public housing tenants in inner-city Newcastle and returned anonymously with a response rate of 23 per cent (n=213). Recent gentrification in these areas resulted in a 'social mix' of home owners, renters and social housing tenants.

Mee (2007) reported that the vast majority (85 per cent) of tenants were very satisfied or satisfied with their neighbourhoods and between 60 and 70 per cent were very to fairly satisfied with their individual dwelling across all five criteria (design, condition inside and out, privacy and security). The majority of respondents accessed public housing because they could not afford or get into private rental while others had experienced homelessness, violent living arrangements or wanted security of tenure.

Mee (2007) stated that while many responses related to being able to afford to live in a service-rich and easily accessible neighbourhood, many responses related to 'ontological security'. Ontological security was associated with feeling comfortable in the knowledge that they could afford to pay the rent without compromising other essential purchases, feeling 'more settled' as public housing provided consistency, feeling empowered and in control because they could 'cope'. Many (40 per cent) also felt that their health improved after moving into public housing.

'Privacy' and 'security' were listed as the most important characteristics of a home, and while a majority was satisfied with these elements, a significant minority was dissatisfied. Interestingly,

the same neighbourhood or dwelling characteristic enhanced security for some but resulted in others feeling insecure. For example, older respondents felt safer in the inner-city while younger respondents reported greater fears for their safety, which demonstrated that 'home' is subjective and can be experienced both positively and negatively simultaneously.

This study helps shape the theory that the tenure of home ownership is not the operative mechanism in producing better health outcomes, since under the right circumstances, other tenures (e.g. public rental) can deliver the benefits of location, dwelling quality and stability which positively affects people's sense of control over their lives and wellbeing.

Phibbs, P 2005, *Housing assistance and non-shelter outcomes*, Final Report no. 74, Melbourne, Australian Housing and Urban Research Institute, Sydney Research Centre.

This qualitative Australian study examined the non-shelter outcomes for a select number of Brisbane public housing tenants. Phibbs (2005) interviewed 14 individuals before they were allocated a public housing dwelling and then six months after they had moved into their public housing unit (p.26) in an attempt to record changes in non-shelter outcomes over time. All households had school age children and most (12 out of 14) were lone parent families (p.27). However there was diversity among participants, with some households moving to a more advantaged area while others moved to a more disadvantaged area. Some households reported a stable housing history, while others reported high mobility rates in the past five years (p.27).

The researcher found that at Time 2 (the second survey interval) the majority (56 per cent) of interviewees reported that their children played outside more and 92 per cent reported that their children were at the same school as Time 1 (p.47), which was in stark contrast to findings at Time 1 when 40 per cent of interviewees reported that their children had moved schools three or more times over the past two years (p.37). Respondents also indicated that there was a significant improvement in their children's educational performance with 53 per cent reporting that their child/ren were performing better in subjects and 45 per cent reported better motivational performance (p.49).

The follow-up survey produced mixed results. Some participants reported that their health had deteriorated and some reported their health had improved, with 41 per cent reporting that their health had improved, 44 reporting that their health had remained the same and 15 per cent reporting that their health had become worse (p.61). Notably, the use of Medicare services declined, albeit marginally, from 1.92 average accessed services per month to 1.86 (p.61). However, these findings were unreliable due to poor data quality.

In conclusion, this study indicated that security of tenure for some people improves health outcomes and self-reported levels of wellbeing. The affordability and stability that public housing provides resulted in educational improvements for children and may enable lifestyle changes that improve health outcomes (p.70).

This study shapes the theory that the affordability and stability that public housing delivers may improve the health and wellbeing of some residents.

6.3 Lack of tenure: Homelessness and very precarious housing

There is a very significant and consistent body of evidence which links homelessness to negative health consequences. For example, Australian cross-sectional studies have demonstrated higher prevalence of poor physical health (Curtis-Fawley 2007; Kermode et al. 1998) and mental illness (Taylor & Sharpe 2008; Teesson, Hodder & Buhrich 2004) among people experiencing homelessness.

A recent Australian retrospective study established that many people develop worsening health issues, including mental illness and substance abuse, during their experience of homelessness (Johnson & Chamberlain 2008a; 2008b).

While the broad scope of this synthesis precluded an in-depth focus on homelessness research, a small number of studies were selected for inclusion because they highlight mechanisms through which housing affects health outcomes.

The studies show how homelessness exposes people to damaging and dangerous living environments, including rough sleeping, boarding houses and emergency accommodation. The absence of housing influences personal safety and people's sense of control and mastery of their lives, affecting physical and mental health/wellbeing outcomes.

Johnson, G & Chamberlain, C 2008, Homelessness and substance abuse: Which comes first? *Australian Social Work*, 61(4), pp.342–356.

This Australian research indicated the way that homelessness can lead to the negative health consequences of increased problematic substance use.¹⁰ The researchers drew on quantitative data from a sample of 4,291 homeless people that were in contact with two Melbourne agencies. They also conducted 65 in-depth qualitative interviews with homeless people, half of whom experienced substance abuse problems.

The authors found that 43 per cent of their sample had substance abuse problems, most commonly heroin abuse but also alcohol and prescription drug abuse. However, they discovered that only 15 per cent of the sample had drug abuse problems before becoming homeless for the first time and two-thirds of those who had substance abuse problems developed these problems after becoming homeless. For the vast majority of the sample, other factors resulted in individuals becoming homeless.

Johnson and Chamberlain reported that those who developed substance abuse problems after becoming homeless did so 'to cope with or escape the harsh, oppressive environment that confronts them' or in order to 'fit in' with the homelessness subculture. Some interviewees explicitly stated that their drug use resulted from initial peer pressure while others referred to becoming involved in drug use as it gave them a sense of belonging.

The authors stated that young people were particularly attracted to this subculture as they often lacked a sense of belonging after following breakdowns in their familial relationships. Indeed, 60 per cent of the sample who had their first experience of homelessness before the

¹⁰ The authors defined 'problematic substance use' as drug use that dominated the person's life and had negative physical or mental health consequences (p.345). Specifically the researchers determined that a person had a substance abuse problem if they (i) approached the agency for a referral to a drug treatment service, (ii) were in a detoxification or rehabilitation centre or (iii) the agency's case notes stated that drug abuse was an issue (p.345).

age of 18 subsequently became involved in problematic substance abuse, compared with 14 per cent of those who experienced their first episode of homelessness after the age of 18.

This study establishes that homelessness is a damaging experience and can lead to increased substance abuse that is harmful to health and wellbeing.

Johnson, G, Gronda, H & Coutts, S 2008, *On the outside: Pathways in and out of homelessness*, Melbourne, Australian Scholarly Publishing.

This qualitative research project interviewed over 100 households exiting crisis accommodation in Melbourne and then re-interviewed 79 of these households 12 months later in order to ascertain their lived experience of homelessness and their pathways in and out of homelessness.

Johnson, Gronda and Coutts (2008) found that 'boarding houses' or 'rooming houses' are a part of the homelessness subculture and that all interviewees reported that they are dangerous, of poor quality, expensive and 'bad for you'. The following two quotes illustrate how boarding houses expose people to high levels of drug use:

Andrew said "Everyone was into drugs – I mean everyone. That's all anyone talked about really – how to get drugs, what the gear was like, who had some" (p.157).

Toni commented how older people would target newcomers, offering them "free gear to get 'em hooked" (p.157).

In some cases boarding houses exacerbated underlying mental health problems:

"It was a mental institution ... I found people had psychosis, they had bipolar disorder, they had schizophrenia. I had nothing in common with them ... I was traumatised just being there." Tanya, 41 (p.29).

"It [mental health issues] started when I started living in single rooms ... It's a horrible feeling knowing you haven't got anywhere to go ... just sitting in a room every day and every night. I didn't have any friends." John, 27 (p.29).

"There's just emptiness. I can't describe it except that it's a very lonely, dark, empty place ... I'm still on antidepressants. I was put on them when I was homeless ... I was depressed all the time." Louise, 24 (p.29).

Many residents also experienced a great deal of fearfulness for their safety when living in boarding houses. The first night Maggie stayed in a boarding house: "... the noise and the smell of urine and vomit. It was terribly frightening. It had this awful vibe about it, it's hard to explain but, well, I spent the night waiting for morning to come." (p.98)

Boarding houses cause many tenants to withdraw in order to survive. Maggie remembers: "There were certain times I'd make myself scarce ... Payday was always crazy and I learnt to avoid junkies who were hanging out." (p.102)

Tim found that if he: "... stayed quiet, no one would bother me... There was always noise, but I avoided it." (p.103)

This study helps shape the theory that homelessness affects real and perceived personal safety, which influences mental health/wellbeing.

Murray, S 2009, *Somewhere safe to call home: Violence against women during homelessness*, Melbourne, Centre for Applied Social Research, RMIT University.

This qualitative research project drew on data from 29 in-depth interviews with homeless women between the ages of 19 and 54 in Melbourne (p.6). The project broadly sought to give voice to how homeless women experience violence. Of particular interest in this report is the findings relating to the impacts on women's health caused by violence experienced while homeless.

Murray (2009) found that many participants identified that the violence that occurred during their episodes of homelessness contributed to their ill health (p.27). Mental ill health emerged most strongly. One interviewee identified her experience of child sex abuse as the source of her mental health problems but explained that being homeless exacerbated these issues:

"With the homelessness and things like that, you just don't know where you're going ... if you've already got problems ... like your depression and ... anxiety, sitting there not knowing where the hell you're going to be makes it so much worse ... You just sit there every day thinking 'What the hell am I going to do?'" (p.28)

Another interviewee cited her experience in unsafe emergency accommodation when homeless as a key contributor to her poor mental health:

"It's always been refuges or unsafe places and I've always left because somebody older has tried to take advantage of me or I've been hit or I just felt unsafe and I've tried to commit suicide ... if they're going to put me in an unsafe place, well I feel unsafe anyway, why not take my own life?" (p.29)

This study establishes that a lack of control over one's life and a loss of safety resultant from homelessness leads to negative health impacts.

Padgett, DK 2007, *There's no place like (a) home: Ontological security among persons with serious mental illness in the United States*, *Social Science & Medicine*, 64, pp.1925–1936.

Tsemberis, S 1999, *From streets to homes: An innovative approach to supported housing for homeless adults with psychiatric disabilities*, *Journal of Community Psychology*, 27(2), pp.225–241.

Padgett's qualitative study found that 'ontological security', having a home of one's own, proved important to the wellbeing of formerly homeless New Yorkers with severe mental health issues.

Padgett (2007) conducted in-depth interviews with 39 people who experienced chronic homelessness and severe mental illness. Some participants were housed in their own apartments as part of a 'housing first' strategy in New York while others were negotiating more traditional options available to homeless people such as transitional housing, refuges and treatment facilities.

Ontological security was defined as a home as a place (i) of *consistency*, (ii) where day-to-day routines are performed, (iii) where people feel *in control* as they can feel *free from surveillance* and (iv) as a secure base from which people can form and *(re) construct their identities*.

Many of the themes arising from the research complemented this definition. They included control and self-determination, routines and 'the simple things', privacy and freedom from supervision, identity construction, and future planning.

Those housed in their own apartments reported that housing gave them 'freedom to' and 'freedom from' participating in various activities, for example, trading sex for somewhere to stay for the night. Participants expressed joy in performing routine, daily tasks such as doing laundry or walking in the park. Apartments were described as 'havens' from the outside world and many participants compared this new found privacy and lack of surveillance with their previous experience of treatment centres or transitional housing. Participants reported that the security permanent housing provided allowed time for self-reflection and re-evaluation of their lives, key steps in (re)constructing or restoring identities.

Those who resided in transitional housing spoke of these same things as desirable, even though many regarded them as unattainable. Many of the participants were successfully living on their own for an extended period of time and enjoyed the benefits a home afforded them.

Tsemberis' (1999) complementary study involved comparing two housing programs operating in New York during the 1990s. Both programs were designed to reduce primary homelessness and only targeted people experiencing chronic homelessness. As such, most clients experienced mental health and substance abuse issues.

The first program, Linear Residential Treatment (LRT), tied housing tenure to treatment programs. Housing was conditional on the adherence to a treatment plan whereby clients had to remain sober, take prescribed medication and participate in other activities in order to graduate through the program, which (if successful) eventually resulted in independent living arrangements.

The second program, Pathways Supported Housing (PSH) (from which many of Padgett's participants were sourced), started from the perspective that housing was a basic right and as such clients moved into independent living arrangements immediately.

Tsemberis (1999) found that over a 30 month period the PSH program recorded a tenancy retention rate of 84.2 per cent. Whereas over a shorter 24 month period the LRT program recorded a tenancy retention rate of 59.6 per cent. This suggested that a 'housing first' model, where ontological security was realised, was more successful at reducing homelessness for those chronically entrenched.

This study supports the theory that housing affects stability, identity and control over one's life.

Kushel, MB, Perry, S, Clark, R, Moss, AR & Bangsberg, D 2002, Emergency Department use among the homeless and marginally housed: Results from a community-based study, *American Journal of Public Health*, 92(5), pp.778–784.

This quantitative American study examined the relationship between Emergency Department (ED) use and homelessness. In particular, Kushel et al. (2002) explored repeated use of the ED among the homeless population who often transition between rough sleeping and marginal housing (e.g. single room occupancy hotels) in order to determine what factors are associated with repeated use.

Kushel et al. (2002) found that those with more precarious accommodation (living on the street as opposed to marginal housing) were more likely to use the ED. This holds true overall as well as for those who use the ED repeatedly (p.782). If we assume visits to the ED are a proxy for poorer health, then this study demonstrated that any housing is better than no housing for health outcomes.

The researchers recruited 2,578 participants who were a mix of rough sleepers and those marginally housed in San Francisco. Community surveys were conducted by interviewers and all data was self-reported.

Three-quarters of respondents were male and the average age was 43 years. One fifth of respondents reported spending most of the previous year living on the street or in a shelter, while 23.3 per cent of respondents reported that they spent 90 per cent of their nights in a hotel and no nights on the street and were consequently classified as 'marginally housed'. The remainder of the respondents reported a mix of street and shelter sleeping as well as being marginally housed.

Just under a third, 27.8 per cent, reported having at least one of the five assessed chronic health problems (heart disease or stroke, high blood pressure, asthma, diabetes, or chronic bronchitis/emphysema). Almost 35 per cent of respondents reported fair or poor health and 8.6 per cent were HIV positive.

Overall, 40.4 per cent of respondents reported using the ED in the past year, 18.5 per cent reported one visit, 14 per cent reported two to three visits and 7.9 per cent reported four or more visits.

This study finds an association between degrees of precarious housing (rough sleeping and marginal housing) and greater emergency department use, indicating the association between precarious housing and negative physical health outcomes.

7 AFFORDABILITY

This chapter presents evidence indicating the effect of lack of housing affordability on mental and physical health, and some of the mechanisms through which this seems to operate.

The synthesis suggests that housing affordability pressure impacts on physical and mental health because it affects people's sense of control over their lives as well as impacting on basic living practices such as regular access to food.

Scope and quality of the evidence

The research evidence on housing affordability is comprehensive and includes qualitative, cross-sectional and longitudinal analysis. Studies consistently find that affordability problems negatively impact both physical and mental health/wellbeing outcomes for men, women and children. This can be attributed to the significant amount of work that contributed towards the clear conceptualisation of 'housing affordability', which paved the way for further research that examines the effects of housing affordability stress.

In addition, a wide variety of methodologies that draw on national and international datasets were employed, resulting in a process of triangulation. Of the 10 studies included in this section, three are longitudinal, two use mixed methods and there is a mix of quantitative and qualitative methodologies.

The selected evidence examines both the relationship between housing affordability and health outcomes for a variety of people and maps the housing affordability problem in Australia. This work identifies vulnerable populations and who is most at-risk of experiencing lengthy spells in housing affordability stress. Australian research is well represented, reflecting the breadth and depth of recent research on the topic in this country.

Key findings

In this chapter we find evidence that:

- housing affordability affects stability and people's sense of control they have over their lives
- housing affordability affects living practices such as the ability to buy food. Households experiencing housing stress also experience higher rates of food insecurity
- lack of housing affordability is prevalent across tenures in Australia; sole parents and singles who rent privately experience the greatest instance and longest periods of housing affordability stress.

7.1 Affordability, stability and control

The three quantitative studies in this section, Nettleton and Burrows (1998); Taylor, Pevalin and Todd (2007) and Lauster (2008), all establish that there is an association between affordability and health outcomes. The two studies with qualitative components, Hulse and Sauger (2008) and Nettleton and Burrows (2000), add greater depth to these associations and find that affordability affects stability and people's sense of control over their lives.

Hulse, K & Saugeres, L 2008, *Housing insecurity and precarious living: An Australian exploration*, AHURI Final Report no. 124, Melbourne, Australian Housing and Urban Research Institute, Swinburne-Monash Research Centre.

This is a comprehensive Australian mixed method study that defined housing insecurity and found it is positively correlated with poor mental and physical health outcomes as well as marginal workforce participation.

The authors reviewed existing literature to ascertain a definition of 'housing insecurity' and used qualitative data collected from interviews conducted for AHURI's National Research Venture 1 and 2 in order to examine the relationship between housing insecurity and family instability, employment instability and physical or mental health outcomes (pp.6–7). Transcripts from 145 interviews were used. All interviewees were low-income social or private renters and there was a mix of men and women and various household types. Of interviewees, 20 had a disability (mobility, sensory, cognitive or mental illness) and a further 20 were carers of people with a disability (p.7).

Hulse and Saugeres (2008) found that there are six dimensions of housing insecurity (p.1). The first was mobility and in particular involuntary mobility where households were forced to move when they preferred to remain in their residence (p.20). This lack of control over their living environment, movements and time of movements resulted in feelings of insecurity (pp.20–21). The second dimension was housing instability, which related to the inability of low-income earners or pensioners to afford appropriate accommodation and resulted in limited choice of dwelling and location. This too results in people feeling their lives are beyond their control (p.21).

The third dimension was a lack of privacy, which resulted from a person's inability to exclude other people from their territory and again related to a lack of control over one's circumstances (p.23). This emerged for interviewees in both public housing and private rental, as many in the private market were forced to trade off privacy and move into a shared house in order to afford housing (p.24). The fourth element was feeling unsafe, which emerged most frequently in interviews with public housing or boarding house tenants and related to both events and people outside the home and inside the home (p.24). Fifth, a lack of belonging was linked with housing insecurity as it reduced social connectedness to the local area and neighbourhood and isolation was common (p.26). Finally, a lack of comfort, defined as the inability of housing's physical qualities to provide physical comfort, contributed to feelings of housing insecurity (p.27). Tenants had to rely on public or private landlords to repair housing faults, which they felt could undermine their tenancies (p.27).

The researchers found that all six dimensions of housing insecurity contributed to health insecurities. In particular, housing instability (affordability) and involuntary mobility were linked with increased levels of stress (p.34, p.40). In addition, a lack of privacy and feeling unsafe in the home and/or neighbourhood resulted in feelings of isolation and being trapped in the home, which often caused constant anxiety and stress in participants (p.34).

Hulse and Saugeres (2008) also found that some interviewees with existing mental and/or physical health problems experienced a deterioration of these problems after episodes of housing insecurity (pp.35–36). This suggested that while housing insecurity may not *cause* health problems in previously healthy people, it may serve to exacerbate existing problems.

While all interviewees were in some type of rental tenure, these six dimensions were not exclusively associated with rental tenures. However, it can be reasonably assumed that some dimensions (such as a lack of privacy and the inability to control who enters your personal space) are more closely associated with particular forms of rental tenures such as boarding houses.

This study helps shape the theory that housing affordability affects health by impacting on stability and control over one's life and space.

Taylor, MP, Pevalin, DJ & Todd, J 2007, The psychological costs of unsustainable housing commitments, *Psychological Medicine*, 37(7), pp.1027–1036.

This quantitative research study examined the relationship between mortgage stress and psychological health outcomes. Taylor, Pevalin and Todd (2007) used 13 waves (1991 to 2003) of the British Housing Panel Survey (BHPS) in order to comment on effects over time. Specifically, this research project drew a subsample of men and women heads of households aged between 16 and 64, and 16 and 59 respectively as it assumed that mortgage stress would affect these household members more significantly than other household members. The General Health Questionnaire (GHQ12) was used to measure shifts in self-reported mental health and wellbeing outcomes and also made up part of the BHPS.

For male heads of households being in financial hardship and not saving resulted in lower levels of mental health than usual as did marriage dissolution and employment loss. Being in arrears or having difficulty making housing payments negatively affected mental health to the same extent as the breakdown of a marriage or the loss of a job.

Female heads of households experienced negative mental health outcomes when struggling to make housing payments, an impact on stress levels which was comparable to being in the bottom quartile of the income distribution. Similarly to men, those women who were unable to save also had lower mental health outcomes than the average in the long-term. Women's mental health worsened the longer they experienced housing payment arrears whereas at the onset of payment difficulties, changes in women's mental health were statistically insignificant.

The authors concluded that housing affordability problems impact on the mental health/wellbeing of both men and women head of households, albeit slightly differently, and the magnitude of this impact was significantly larger than that associated with other financial hardship.

This longitudinal study establishes a causal relationship between losing the ability to pay for your housing and reduced mental health/wellbeing. It highlights the significance of housing affordability for maintaining good mental health.

Nettleton, S & Burrows, R 1998, Mortgage debt, insecure home ownership and health: An exploratory analysis, *Sociology of Health and Illness*, vol. 20, pp.731–758.

Nettleton and Burrows (1998) demonstrated that mortgage stress had an independent effect on men and women's wellbeing and resulted in increased visits to a general practitioner (GP) for men.

This English study drew on the British Household Panel Survey (BHPS) longitudinal dataset in order to investigate the relationship between mortgage stress (assumed to result in feelings of insecurity of tenure) and health. Two health variables were used, a self-reported wellbeing assessment and the number of visits to a GP, and two waves in the dataset were examined, 1991–92 and 1995–96. Housing foreclosures and people experiencing problems with their mortgage payments peaked in 1991–92 before steadily improving up to 1995–96.

Nettleton and Burrows (1998) found that mortgage problems reported in 1991 resulted in a statistically significant decrease in wellbeing in 1992 for both men and women, although women's wellbeing seemed to decrease at a greater rate. Once changes in employment status, changes in physical health and the birth of a new child were controlled for, the

researchers found that men's wellbeing was likely to decrease by a factor of 1.64 and women's wellbeing was likely to decrease by a factor of 2.51. The negative trend continued in 1995–96 but to a lesser extent. This indicated that the strength of the association declined as less people experienced mortgage difficulties.

Using the second health measure, reported visits to the GP, the researchers found a statistically significant positive correlation between increased visits and mortgage difficulties in 1991–92 for men only. While increases in GP visits for women in both waves, and men in the second wave, were observed as they experienced greater mortgage stress, these figures were not statistically significant.

This study and the following two studies are valuable for the synthesis because they establish a correlation between affordability and wellbeing and suggest that affordability may be more important than tenure type in affecting health outcomes.

Nettleton, S & Burrows, R 2000, When a capital investment becomes an emotional loss: The health consequences of the experience of mortgage possession in England, *Housing Studies*, vol. 15, pp.463–479.

This qualitative study built on Nettleton and Burrow's previous work and sought to explore the relationship between mortgage repossession and health in more depth. In the study, 30 households participated, two thirds lived in London and the remainder lived in various areas in Northern England. All had their mortgages repossessed during the 1990s and, at the time of the study, lived in social housing. A total of 44 adults and 17 children were interviewed.

Nettleton and Burrows (2000) found that participants attributed the loss of their house to both direct and indirect health impacts. Direct impacts included increased stress levels that resulted in disturbed sleep, hair loss and high blood pressure as well as reportedly taking longer periods of time to recover from other illnesses. Indirect impacts included increased alcohol use and disrupted eating patterns. For those that smoked, they did so more often.

Participants reported negative emotional responses to losing their home. A 'sense of loss', a feeling of being 'broken', feeling 'angry', 'cheated', 'helpless', 'numb' and isolated. Some participants reported that apart from losing a close friend or relative, mortgage possession was the most traumatic event in their lives. Fear, uncertainty and a lack of control were all shared feelings when it came to thinking about the future. Child participants also expressed these feelings for the future.

Adult participants spoke of feeling 'ashamed', 'embarrassed' and having 'failed', which concretely affected their self-esteem. They also reported a change of social status now that they were renters, all of which suggested that housing is closely tied with identity.

This study supports the theory that affordability affects control over one's life, which can adversely affect mental health/wellbeing.

Lauster, NT 2008, Better homes and families: Housing markets and young couple stability in Sweden, *Journal of Marriage & Family*, 70(4), pp.891–903.

This research suggested that a greater amount of affordable housing positively affects couple stability, which was used as a proxy for wellbeing.

The study sought to examine the relationship between aspects of the housing market and couple stability in Sweden. These aspects included affordability, the availability of detached housing and the profitability of ownership. Marriage and divorce rates were used to measure increases and decreases in stability. Data was drawn from the Swedish Family Survey

(n=3,851 cohabitating couples), a longitudinal dataset, and Sweden Statistics who supplied the real estate statistics (house prices, interest rates).

Lauster (2008) found that housing affordability (for both owner-occupiers and renters) increased the likelihood of marriage by a third and was weakly associated with the suppression of separation. There was a weak correlation between ownership and relationship stability.

This study establishes a positive correlation between affordability and wellbeing though the mechanism is unclear.

7.2 Affordability and healthy living practices

The following two studies establish an association between housing affordability problems or homelessness and food insecurity, indicating how housing subsidies can improve healthy living practices.

Meyers, A, Cutts, D, Frank, D, Levenson, S, Skalicky, A, Heeren, T et al. 2005, Subsidized housing and children's nutritional status, Archives of Pediatrics & Adolescent Medicine, 159, pp.551-556.

This study found that those children from food insecure, low-income families who did not receive a housing subsidy were more likely to have a lower weight-to-age ratio than those children from families that received a subsidy (odds ratio = 2.11).

Meyers et al. (2005) used data from the Children's Sentinel Nutrition Program gathered over a five year period (1998–2003) in six urban medical settings across the United States to examine the relationship between housing subsidies and children's nutritional status. Questionnaires were completed in hospital waiting rooms by guardians of children 36 months and younger with the assistance of researchers. The sample size analysed was 11,723 of which 27 per cent received a public housing subsidy.

The study found that those children from families without subsidies had 2.11 the odds of having a lower weight-to-age ratio than those children whose families received housing subsidies. This was after the researchers controlled for other variables such as race and ethnicity, child's age and participation in other government food programs. A similar disparity was observed between food secure families but did not reach statistical significance. There was no difference in hospitalisation rates.

While causality could not be proven by this cross-sectional study, the findings indicated that housing subsidies were independently associated with children's weight-to-age ratios for the lowest income earners in the United States, suggesting housing affordability affects health.

Murray, S 2009, Somewhere safe to call home: Violence against women during homelessness, Melbourne, Centre for Applied Social Research, RMIT University.

This qualitative research project drew on data from 29 in-depth interviews with homeless women between the ages of 19 and 54 in Melbourne (p.6). The project broadly sought to examine the relationship between homelessness for women and violence.

Of relevance to this section, the researchers found that the affordability problems experienced by the homeless population and the lack of food storage and preparation facilities negatively affected living practices such as the ability to access adequate food. The following quote demonstrates this point:

“It’s been really hard because when you’re homeless you don’t have money and you can’t eat. You can’t cook anywhere and how are you supposed to eat? And you can’t just buy junk food all the time because it just puts it out of whack.” (p.29)

Similarly, boarding houses are limited and may not facilitate healthy living practices:

“I only have a certain amount of fridge space and cupboard space. There’s a lot of things that I just can’t buy and store and things like that. So it’s usually just quick meals.” (p.29)

This study supports the theory that affordability affects living practices such as the ability to access adequate food.

7.3 Mapping the affordability problem in Australia

The three following studies map the housing affordability problem in Australia and identify which household types and tenures are at greatest risk of falling into housing stress.

National Housing Supply Council 2008, State of Supply Report.

The National Housing Supply Council (2008) used the ‘30/40 rule’¹¹ to measure housing stress and drawing on the available research evidence, this report found that affordability for first home buyers and private renters declined over the past decade (p.82). In 1996, an average earning household with a 10 per cent deposit had a sufficient repayment capacity to purchase the median-priced home bought by first home buyers (based on repayments of 30 per cent of income and a 25 year loan). However by 2008, the average earning household had less than half of the income required to meet repayments (p.84). This effectively priced low-income earners out of the home purchasing market.

Similarly, the proportion of low-income private renter households experiencing housing stress increased from 43 per cent in 1996 to 61 per cent in 2006 (p.91). In 2006, only 91,000 dwellings were deemed affordable for the 237,000 households who were in the lowest income quintile (p.98). Of these available dwellings, 56,000 were occupied by households in higher income brackets, which resulted in a 202,000 dwelling shortfall. Since 2005, vacancy rates for rental properties were lower than three per cent (the threshold recognised by industry as striking a balance between supply and demand) in every capital city (p.91), indicating supply shortages.

This study establishes that Australia has a housing affordability problem.

Yates, J, Milligan, V, Berry M, Burke, T, Gabriel, M, Pinnegar, S et al. 2007, Housing affordability: A 21st century problem, AHURI Final Report, no. 105.

This report detailed the major findings of a three year, multi-disciplinary research project that examined how we assess and address housing affordability for lower-income households in Australia.

Yates et al. (2007) found that housing affordability was a tenure-neutral term and that the ‘30/40 rule’ was the best indicator of housing stress (p.4). The researchers discovered that in

¹¹ In Australia, a commonly used ‘rule of thumb’ to identify the level of housing affordability stress is referred to as the ‘30/40’ rule. This rule defines housing stress as occurring if housing costs are greater than 30 per cent of household income for households in the bottom 40 per cent of the income distribution, adjusted for household size (Yates et al. 2007).

2002–03, 860,000 lower-income households were in housing stress and at risk of housing affordability problems (p.4).

Those in greatest housing stress could be characterised as falling into one of the following three groups: the 'stretched', 'backsliders' and 'strugglers'. The 'stretched' were generally first home buyers on modest incomes who had very little savings before purchasing and little buffer between mortgage payments and other living expenses. The 'stretched' often had young families, had to take on a second job or increased their mortgage to meet rising interest rates and were more likely to be located in the outer metropolitan suburbs (p.24).

The 'backsliders' were those people who had fallen out of home ownership due to a range of reasons, which may include separation or divorce, loss of earning capacity due to health difficulties or other major life ruptures. This group often had difficulty negotiating the rental market due to a lack of experience (p.23).

The 'strugglers' were those in the private rental market who were having difficulty making their rental payments and experienced high levels of financial stress. They could be from any age group but were more likely to be single parent households and were often not working. Despite residing in those suburbs generally deemed affordable, they spent large proportions of their incomes on housing costs, often between 50 and 60 per cent (p.23).

Those households in greatest housing stress in the lowest two income quintiles were private renters, working households and households with children (both couple and sole parent households) (p.19). The incidence of housing stress was highest for lower-income private renters, single person households under the age of 65 and lower-income home purchasers (p.19).

Affordability problems were driven by a range of factors and their interaction with one another. On the demand side, these included household growth (in turn, affected by natural increase, immigration, household formation); real incomes; real wealth; tax concessions to both owner-occupied and rental housing; concessions to first home buyers; returns on alternative investments; cost and availability of finance for housing; and the institutional structure affecting housing finance provision.

On the supply side, these included factors that affected the cost of provision, such as: the availability of land; land development processes and policies; infrastructure costs (including development charges); the cost of construction; and property-related taxes (p.13).

This study establishes that households in all tenures experience affordability problems but that private renters and households with children experience greater affordability problems than other household types.

Wood, G & Ong, R 2009, The dynamics of housing affordability: Movements in and out of housing affordability 2001–2006, AHURI Final Report, no. 133.

This research project sought to track the pattern of housing affordability stress over time in Australia using the Household, Income and Labour Dynamic Australia (HILDA) survey, which provided a longitudinal panel data set that is representative of the Australian population and collected annually (p.4).

Overall, the authors found that the majority of Australians with affordable housing could sustain their housing and if they did fall into housing stress could relatively quickly reverse their situation. However, a significant minority found this difficult, falling in and out of affordable housing throughout their housing careers (p.34). The researchers also discovered that families with young children and owner-occupiers were two groups more likely to experience extended periods of housing stress, perhaps reflecting these cohorts' additional mobility barriers.

Wood and Ong (2009) first examined the change in affordability over time of home owners. When examining individuals' housing careers over the six years they found that the percentage of those experiencing housing stress rose from 6.4 per cent to 8 per cent despite an increase in income (p.21). This trend held for all three age cohorts (15–34, 35–50 and 55+) but was more acute for the youngest cohort and less acute for those over the age of 55 (p.22).

Secondly, Wood and Ong explored the persistence of housing stress for all tenure types. They found that those entering housing stress had a high chance (66 per cent) of escaping that stress within the first year. However, the longer a household experienced housing stress, the less chance they had of escaping it; for example, at year five their chance was 21 per cent (pp.23–24). This differed markedly by tenure. For instance, an owner-occupier who experienced housing stress for five years had only a 20 per cent chance of escaping housing stress compared to a private renter who had a 40 per cent chance (pp.24–25).

The other demographic difference that was statistically significant was household type. Those without dependent children were more likely to escape housing stress within the first year (just over 80 per cent) than those households with children (just under 60 per cent) (p.25).

After controlling for various factors that may contribute to housing stress (tenure type, geography, labour market and human capital variables and socioeconomic factors) the researchers found that the odds of exiting housing stress within the first year were 2.8 times greater than exiting in subsequent years, confirming the descriptive analysis outlined above (p.41). Similarly, households with employment were 34 per cent more likely to be able to exit housing stress than those who were unemployed (p.41).

However, in contrast to the descriptive analysis this modelling suggested that tenure had no impact on housing stress and could be explained by private renters' ability to move more easily and downsize without significant costs involved (p.41).

Household type, however, proved important. Those households with dependent children under the age of four were 40 per cent less likely to escape housing stress than those households without children (p.42). In addition, the researchers found that 22 per cent of households experienced two or three spells of affordability stress, indicating a considerable amount of churning (p.31).

In conclusion, the researchers discovered that lengthy spells in housing stress were uncommon, however, families with dependent children, particularly very young children, were more likely to spend a longer period of time in this state (p.45). Similarly, owner-occupiers found it more difficult to move out of housing stress, possibly because of the higher transaction costs associated with home ownership (pp.45–46).

This study establishes that most households do not experience repeated spells of affordability stress but a significant minority does. This minority is more likely to be families with young, dependent children.

8 CONCLUSION

This research synthesis of the literature that examines the relationship between housing and health finds consistent evidence that precarious housing can negatively impact on physical and mental health/wellbeing.

There is not a categorical definition of precarious housing in the research literature, however, synthesis of the evidence identifies a number of characteristics which can be associated with poorer health outcomes and can, therefore, be used in defining precarious housing. These characteristics include:

- inadequate housing hardware
- space: housing conditions that restrict a household's control over space (indoor and outdoor)
- place: location in a neighbourhood with high levels of social disorder
- affordability: lack of rent or mortgage affordability
- security of tenure.

A significant point to note is that these elements are largely negative characteristics: it is the *lack* of a given housing element which is associated in the literature with poorer health outcome.

This suggests an overall finding that housing is a fundamental element in health prevention. Precarious housing affects health because it is the absence of adequate housing along a number of dimensions. Adequate housing then can be considered a preventative health intervention.

While causality is notoriously difficult to prove within individual studies, by analysing a large number of studies we were able to refine our understanding of how five distinct housing elements affect health. The research indicates this is often a two or three step process whereby housing conditions impact on *mediators*, which then interact with *moderators*, which then go on to affect health outcomes.

Mediators are best understood as the causal link between housing and health, whereas moderators are contextual factors that influence the strength of this relationship. Mediators that have emerged from the literature are identity, stability, safety, social support, control, the indoor environment and living practices. Moderators that emerged include personal circumstances such as having access to a car, personal characteristics such as age or gender, and culture. This does not exhaust the number and types of possible moderators but merely reflects what the evidence to date suggests are some of these moderators.

Accordingly, the synthesis has drawn out nine hypotheses, reasonably supported by the evidence base, which unpack the way in which housing has an impact on health outcomes and offer directions for moving towards an effective health oriented housing policy intervention.

These theories are listed here:

1. 'Housing hardware' affects (i) the indoor environment, (ii) stability, safety, control and social connectedness and (iii) living practices, which all go on to influence health outcomes.
2. 'Space' affects (i) people's sense of control and their ability to secure privacy and (ii) living practices, which go on to shape health outcomes.
3. Neighbourhood qualities interact with personal characteristics and circumstances to affect mental health outcomes.

4. Culture, personal characteristics and personal circumstances are moderating effects and are more important than neighbourhood qualities in influencing health outcomes.
5. Neighbourhood qualities affect real and perceived personal safety, which can go on to shape health outcomes.
6. Neighbourhood qualities interact with personal characteristics and culture to affect social connectedness, which impacts mental health/wellbeing.
7. Tenure itself does not affect health outcomes. However, it reflects lack of housing affordability and instability and may affect identity, all of which influence various health outcomes.
8. Homelessness (lack of tenure) affects stability and social connectedness, which shapes health and wellbeing outcomes. The absence of housing also influences personal safety and people's sense of control and mastery of their lives, affecting physical and mental health/wellbeing outcomes.
9. Affordability impacts on health because it affects (i) stability, (ii) control and (iii) living practices.

These hypotheses are valuable because they give us a differentiated understanding of the relationship between housing and health, and theorise *how* this relationship works, identifying causal elements.

Based on these understandings, effective policy interventions to reduce or mitigate the negative health effects of precarious housing could include:

- continued and concerted efforts to address the overall lack of adequate supply of affordable housing
- continued and concerted efforts to reduce homelessness through an effective support system and increased housing options
- improvements to 'housing hardware' – for example, standards to ensure adequate insulation and draught prevention in low-cost private rental housing
- family support programs to ensure that family heads are able to adequately control their housing space and visitors receive support to access alternative housing options
- reducing the use of shared communal area housing (such as rooming houses) through interventions to increase the supply of affordable housing for single people
- urban regeneration and renewal initiatives that address areas of concentrated socioeconomic disadvantage and/or have high levels of social disorder:
 - urban renewal that includes people-oriented (individual capacity building) as well as place-based components
 - relocation initiatives that include strategies to ensure 'social mixing' occurs in the new neighbourhood
- reform to residential tenancy legislation to provide longer-term leases
- development of alternative forms of 'tenure' which provide the benefits of home ownership to a greater range of households (for example, community land trust and shared equity models).

The synthesis project also highlighted some research gaps. First, it remains unclear if some housing elements are more important to good health or affect health more adversely than others. Second, apart from the overcrowding literature, there is little research examining the effect of space, such as high density living or a lack of outdoor play areas for children, on health. Third, it remains unclear what effect time-lags have on health outcomes.

Crucially, there is little evidence about how some housing elements impact on health outcomes more significantly than other elements, however, this hierarchy is far from well understood and it remains unclear how these elements interact with one another.

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APPENDIX 1: TABLE OF RESEARCH SOURCE CHARACTERISTICS

'Housing Hardware': the physical qualities of housing and health outcomes

<i>Study</i>	<i>Methodology</i>	<i>Follow-up period if applicable</i>	<i>Sample</i>	<i>Findings</i>
Evans & Wells 2000 , Housing quality and mental health.	Longitudinal (pre- and post-relocation to better quality housing) and cross-sectional comparison between variable housing quality. Standardised tool to measure low levels of psychological distress in a nonclinical population. Housing Quality Instrument.	Approximately 12 months between pre and post data collection Average: 4.5 months prior and 7.3 months post relocation	United States Longitudinal: 31 female African American and White urban residents. Cross-sectional: 207 female low and middle-income White rural residents.	Improvement in housing quality correlated with change in level of psychological distress.
Marsh et al. 2000 Housing deprivation and health: a longitudinal analysis.	Quantitative, longitudinal historical cohort study using the National Child Development Study.	33 years, 1 year intervals	Born in Great Britain 3–9 March 1958. Sample size varied from sweep to sweep (17,415 surveys in 1958 and 11,407 in 1991).	Experiencing housing deprivation in childhood increases the likelihood of ill health in adulthood.
Bailie and Runcie 2001; Bailie et al. 2005 , Skin infection, housing and social circumstances in children living in remote Indigenous communities.	Quantitative, cross-sectional, quasi-experimental studies using dwelling condition surveys, interviews and health care records.	-	138 indigenous children from 3 remote communities in the Northern Territory.	A lack of hardware that enables washing of children, washing of clothes and faeces removal is associated with reported skin infections.
Bornehag et al. 2001 , Dampness in Buildings and Health.	Systematic review study.	-	61 peer-reviewed articles. Reviews, case studies, studies with 'inconclusive results' and studies that did not control for confounding effects were excluded.	An association exists between dampness in the home and poor respiratory function.
Dedman et al. 2001 , Childhood	Quantitative, longitudinal,	62 years, 1 follow-	Children of families that	Poorer housing conditions in childhood were

housing conditions and later mortality.	historical cohort study using the Carnegie Survey of Family Diet and Health in pre-war Britain (1937–1939).	up.	participated in the survey (4,123).	generally associated with increased adult mortality.
Evans et al. 2001 , Community noise exposure and stress in children.	Quantitative, cross-sectional quasi-experimental study.	-	115 children, half of whom were exposed to noise levels above 60 decibels and half of whom were exposed to less than 50 decibels while they slept.	Those from noisier homes exhibited greater psychological stress than those who lived in quieter environments.
Gemmell 2001 , Indoor heating, house conditions, and health.	Quantitative, cross-sectional study that used surveys and interviews.	-	858 people in different Scottish households.	Statistically significant correlation between 'coldness' and ill health, indicating poor home heating may exacerbate health ailments.
Thomson, Petticrew & Morrison 2001 , Health effects of housing improvement	Systematic review (1887-present day)	-	18 completed primary intervention studies.	All studies report increased physical or mental health outcomes after the intervention, however study quality is poor and generalisations may not be accurate.
Naughton et al. 2002 , Heat-related mortality	Quantitative, cross-sectional, quasi experimental study using document analysis and interviews.	-	63 people who experienced a heat-related death during a particular heatwave in the USA and 77 people who were selected to form a control group.	Older (>65 years, are more likely to die from a heat-related death than younger people. The strongest risk factors were living alone or not leaving the house and the greatest protective factor was a working air-conditioner.
Bothwell et al. 2003 , Home heating and respiratory symptoms among children	Quantitative, cross-sectional study using postal surveys.	-	2,578 children from 1,617 households in Belfast.	Those children living in homes with glass fronted solid fuel fires that increase the levels of solid particles in the air (PM ₁₀ , are significantly more likely to report respiratory complaints.
Saegert et al. 2003 , Healthy housing: a structured review of evaluations of US housing interventions designed to improve health.	Systematic review (1990–2000).	-	72 peer-reviewed studies.	Most evaluations found positive improvements; however only 14% reported that the intervention was 'very successful'.

Howden Chapman et al. 2007 , Effect of insulating existing houses on health inequality.	Quantitative, longitudinal, randomised control test study.	2 years (1 year intervals).	1,350 homes that housed 4,407 people	Fewer adults and children in the insulated homes reported 'poor' or 'fair' health, respiratory complaints or winter colds and flu.
Shenassa et al. 2007 , Dampness and mould in the home and depression.	Quantitative, cross-sectional study using postal surveys.	-	5,882 surveys from across Europe.	People living in homes with mould were 1.37 times more likely to have depression than those living without mould.
Jones, Jonge & Phibbs 2008 , The impact of home maintenance and modifications on achieving health outcomes for older Australians.	Qualitative, cross-sectional study using in-depth interviews.	-	30 older Australians from Victoria, South Australia and Queensland.	Home modification services had positively impacted interviewees' wellbeing and peace of mind.
Torzillo et al. 2008 , The state of health hardware in Aboriginal communities.	Quantitative, cross-sectional, pre-post study using surveys.	-	4,343 houses across 132 remote or regional Indigenous communities in five Australian states and territories (incl. Nth Territory).	Maintenance programs are crucial in sustaining any health-supporting function of housing, only 11% of homes passed the electrical safety test, only 50% of homes had facilities to wash a child and 6% of homes had adequate food storage and preparation hardware.
Quinn et al 2009; Judd et al. 2009 , Dwelling and land use of older Australians.	Mixed method, cross-sectional study using in-depth interviews and ABS data.	-	ABS data and 70 older Australians.	Housing design (the presence of an extra bedroom for example, affects stability, control and social connectedness by facilitating ageing-in-place.

Space

<i>Study</i>	<i>Methodology</i>	<i>Follow-up period if applicable</i>	<i>Sample</i>	<i>Findings</i>
Evans, Saltzman & Cooperman 2001 , Housing quality and children's socioeconomic health.	Quantitative, cross-sectional study observation and questionnaires.	-	277 households with at least one child in grades 3 to 5.	Those children living in homes with higher levels of crowding and clutter that afford less play space and privacy display greater symptoms of psychological stress than those that don't live in these conditions.
Clark, Ribena & Nowgesic 2002 , Housing density and the instance of Tuberculosis.	Quantitative, cross-sectional study using observed housing density data and health data.	-	602 Canadian First Nations Communities.	The instance of TB is greater in isolated communities that experience a higher than average housing density.
Cooper & Morris 2005 , Sustaining Indigenous tenancies.	Mixed-method, cross-sectional study using 3 focus groups and semi-structured questionnaires.	-	104 Indigenous women recruited from Brisbane and Cherbourg, Queensland who had experienced or were presently experiencing homelessness to various degrees.	Overcrowding was not the focus of the research project. However it emerged that overcrowding affects living practices and it is the extent to which household heads can control that space (who enters it etc., that determines positive or negative health outcomes.
Zubrick et al 2005 , Social and emotional wellbeing of Aboriginal children and young people in Western Australia.	Quantitative, cross-sectional study using the Western Australia Aboriginal Child Health Survey.	-	5,289 Indigenous children living in Western Australia.	Not all overcrowding is detrimental and if it occurs in a socially appropriate way it may be beneficial to children's wellbeing. Children living in crowded houses were half as likely to develop emotional or behavioural problems.
Andersen & Wild 2007 , 'Little children are sacred' report: child sex abuse in Indigenous communities.	Qualitative, cross-sectional study using interviews.	-	Various interviews with key community members, surveys, meetings and submissions from and with Indigenous Australians in the Northern Territory.	There is a high instance of overcrowding in these homes, which the authors link to the exposure of pornography and adult sex behaviour.
Birdsall-Jones & Corrun 2008 , Housing careers of Indigenous urban households.	Qualitative, cross-sectional study using ethnographic interviews.	-	51 Indigenous people living in 45 households.	Overcrowding was not always a negative experience for participants and often occurs for short periods of time in order to meet kinship responsibilities.

Baker et al. 2008, Tuberculosis and overcrowding in New Zealand.

Quantitative, cross-sectional study using census data and government TB surveillance data.

- 1,898 TB cases were mapped against census data that tracks incidents of overcrowding.

Statistically significant association between TB and overcrowding in NZ.

Place

<i>Study</i>	<i>Methodology</i>	<i>Follow-up period if applicable</i>	<i>Sample</i>	<i>Findings</i>
Blackman & Harvey 2001 , Housing renewal and mental health.	Quantitative, pre-post follow-up study using surveys and interviews.	5 years (1 follow-up).	749 adults and 253 children were interviewed prior to the neighbourhood renewal. 394 adults and 131 children were interviewed five years later, 235 of whom were also surveyed the first time.	Significant improvements in adult mental health outcomes were observed five years after the renewal intervention. Increased perceptions of safety and decreased draughtiness made the most significant contribution to these improved health outcomes.
Rosenbaum, Reynolds & Deluca 2002 , Self-efficacy and a look inside the black box of residential mobility.	Qualitative, cross-sectional study using interviews.	-	100 mothers and children who had participated in the Gautreaux program (an initiative that randomly relocated low-income families from areas of concentrated disadvantage to census tracts with less than 10% poverty).	Relocation was reported as largely successful with reduced stigma associated with households' address and an exposure to 'middle-class-know-how' that fostered self-efficacy.
Varady & Walker 2003 , Moving to opportunity: how do households fare?	Quantitative, cross-sectional, quasi experimental study using surveys.	-	300 households that had received the 'Section 8' vouchers to move to a neighbourhood with less poverty and a comparison group who did not move.	Households that moved to areas with less poverty reported feeling safer and perceived that there were more job opportunities.
Huxley et al. 2004 , Urban regeneration and mental health.	Quantitative, pre-post follow-up study using surveys.	22 months (1 follow-up)	2,596 residents responded in the first wave, prior to the neighbourhood renewal and 65% of those people responded after 22 months. Results were compared with a neighbouring control group who did not experience neighbourhood renewal.	More residents (42%, in the intervention group reported improvements to their neighbourhood than the control group (32%, however there was no change to their mental health and their health satisfaction actually decreased comparatively to the control group.
Propper et al. 2004 , Local neighbourhood and mental health: evidence from the UK.	Quantitative, longitudinal using the BHPS dataset.	10 waves (1 years intervals)	BHPS sample.	Individual and household characteristics are more important than neighbourhood effects in impacting residents' mental health and these effects impact populations differently.

Cutrona et al. 2005 , Neighbourhood characteristics and depression.	Quantitative, longitudinal studies using questionnaires.	2 years (1 follow-up)	720 African American women.	Neighbourhood contexts are associated with the onset of depressive episodes. However, personal circumstances may be more important than neighbourhood effects in predicting depressive episodes. Therefore neighbourhood disadvantage/disorder is best understood as a <i>vulnerability</i> factor that increases susceptibility to depression in certain circumstances.
Stafforda et al. 2005 , Gender differences in the associations between health and neighbourhood environment.	Quantitative, cross-sectional study using the Health Surveys for England (HSE, and the Scottish Health Surveys (SHS).	-	Representative sample from the Health Surveys for England (HSE, and the Scottish Health Surveys (SHS).	The neighbourhood environment affects men and women differently and has a more profound effect on women.
Stanley, Ng & Mestan 2007 , Social exclusion in wealthy neighbourhoods.	Qualitative, cross-sectional study using interviews.	-	Small focus groups of single-mothers accessing welfare agencies in the local area, 30 surveys completed by agency staff from 25 different agencies.	Social exclusion exists in wealthy areas. Poverty and difference tend to stand out to a greater extent in wealthy suburbs because the areas tend to be culturally homogenous.
Walker et al. 2007 , The effects of new living on Indigenous community wellbeing.	Qualitative, cross-sectional study using case studies.	-	Case studies conducted with 6 Indigenous communities, 3 in Perth's metropolitan area and 3 in rural or remote areas of Western Australia.	Residential mobility programs need to be culturally sensitive because they have the potential to diminish community wellbeing by fracturing social cohesion and social capital.
Fauth, Leventhal & Brooks-Gunn 2008 , Effects of a neighbourhood mobility program on adult's wellbeing.	Qualitative, longitudinal quasi-experimental study using interviews.	7 years (1 follow-up)	141 interviews conducted with adults that moved to neighbourhoods with less poverty and 106 interviews with a comparable sample of adults who did not move.	Those that moved reported less neighbourhood disorder but fewer social ties than those who did not move. Movers' physical health was better but their mental health did not change.
Johnson, Gronda & Coutts 2008 , Pathways in and out of homelessness.	Qualitative, pre-, post-, follow-up study using interviews.	12 months (1 follow-up)	Interviews with 100 households presently living in emergency accommodation, Melbourne and then follow-up interviews 12 months later.	Location is just as critical to the success of maintaining housing as affordability for those people on the domestic violence and housing crises pathways.

<p>Pevalin, Taylor & Todd 2008, The dynamics of unhealthy housing in the UK.</p>	<p>Quantitative, longitudinal study using BHPS data.</p>	<p>7 waves (1 year intervals)</p>	<p>BHPS dataset.</p>	<p>10 out of the 11 identified housing problems are associated with at least one health outcome. For women, a decrease in neighbourhood problems results in improved mental health.</p>
<p>Feldman et al. 2009; Warr et al. 2009, Insights into links between neighbourhood environments and health.</p>	<p>Quantitative, cross-sectional quasi-experimental study using surveys.</p>	<p>-</p>	<p>3,944 surveys were conducted with people in neighbourhoods earmarked for renewal across 13 local government areas and 1,857 interviews were conducted with neighbouring areas that had less poverty.</p>	<p>Those living in the poorer areas reported a greater instance of fair to poor health than the second group.</p>

Tenure

<i>Study</i>	<i>Methodology</i>	<i>Follow-up period if applicable</i>	<i>Sample</i>	<i>Findings</i>
Tsemberis 1999 , An innovative approach to supported housing for homeless adults with psychiatric disabilities.	Quantitative, cross-sectional, quasi-experimental study using survey data.	-	139 previously homeless individuals with acute mental illness who had accessed supported housing. 2,864 homeless people who had accessed other forms of housing.	84.2% of those in the support housing had retained their housing over a 3 year period compared to 59.6% in other forms of housing over a 2 year period.
Kearns et al. 2000 , The psycho-social benefits of home.	Quantitative, cross-sectional study using postal surveys.	-	6,500 randomly selected Scottish households who were either owner-occupiers or social renters.	Home ownership is only significantly correlated with 'status' outcomes, which affects identity. Affordability and neighbourhood factors may be more important than tenure status in affecting health outcomes.
Waters 2001 , Housing conditions and health inequalities.	Quantitative, cross-sectional study using Australian census data.	-	Census data.	Tenure was not significantly correlated with a number of health outcomes. However, renters were 18% more likely than home owners to visit a GP and 2.3 times more likely to smoke.
Boyle 2002 , Homeownership and the emotional and behavioural problems of children and youth.	Quantitative, cross-sectional study using large scale general population surveys.	-	Two Canadian surveys: Ontario Child Health Study (n = 3,325, and the National Longitudinal Study of Children and Youth (N=12,592).	There is an inverse association between home ownership and ratings of emotional-behavioural problems. The net effects of home ownership expressed in standard units dropped from the .20 to .43 range for teacher and parent ratings to the .07 to .17 range, after controlling for socioeconomic variables.
Kushel et al. 2002 , Emergency room use among the homeless and marginally housed.	Quantitative, cross-sectional, quasi-experimental study using surveys.	-	2,578 homeless people who were a mix of rough sleepers and the marginally housed (i.e. boarding houses).	Those with less stable accommodation (rough sleepers, are more likely to use the Emergency Department than those who are marginally housed.
Harkness & Newman 2003 , Effects of homeownership on children.	Quantitative, longitudinal study using a population survey.	25 years (1968-93, (1 year intervals)	American Panels Study of Income Dynamics.	Home ownership is statistically associated with children's wellbeing across the socioeconomic spectrum but that this relationship is stronger for those of low-socioeconomic status. Tenure is more strongly associated with outcomes than neighbourhood qualities.

Hiscock et al. 2003 , Factors predicting the health disadvantage of social renters compared to owner occupiers.	Quantitative, cross-sectional study using postal surveys.	-	6,500 randomly selected Scottish households who were either owner-occupiers or social renters.	Social renters were more likely than owner-occupiers to report fair or poor health and experience depression.
Phibbs 2005 , Housing assistance and non-shelter outcomes.	Qualitative, longitudinal, pre-, post- study using interviews.	6 months (1 follow-up)	14 households living in Brisbane public housing. Most were lone parent families.	Mixed results. Some households reported that their health had improved while others reported that it had deteriorated. However, more interviewees reported that their children were able to play outside and had remained at the same school since moving to more stable housing.
Padgett 2007 , Ontological security among persons with serious mental illness.	Qualitative, cross-sectional study using interviews.	-	39 homeless New Yorkers in either supported accommodation or transitional housing with acute mental illness.	Those in supported accommodation reported a greater sense of 'ontological security', including feeling in control of their lives, having routines and consistency, and having space to reconstruct their identities (access to privacy).
Mee 2007 , Public housing and the making of home.	Qualitative, cross-sectional study using questionnaires.	-	213 public housing tenants in Newcastle.	85% of tenants reported being satisfied or very satisfied with their public housing dwelling. Affordable housing in service rich areas as well as the benefits of 'ontological security' are key contributing factors.
Johnson & Chamberlain 2008 , Homelessness and substance abuse.	Quantitative, cross-sectional study using surveys.	-	4,291 homeless people who have made contact or are accessing two homelessness services in Melbourne.	Two-thirds of the sample who had substance abuse problems developed these problems <i>after</i> becoming homeless.
Murray 2009 , Violence against women during homelessness.	Qualitative, cross-sectional study using interviews.	-	29 women in Melbourne between the ages of 19 and 54 who had been or were experiencing homelessness.	Women experience violence while homeless and this contributes to ill health.

Affordability

<i>Study</i>	<i>Methodology</i>	<i>Follow-up period if applicable</i>	<i>Sample</i>	<i>Findings</i>
Nettleton & Burrows 1998 , Insecure homeownership and health.	Quantitative, longitudinal study using survey data.	3 years (comparing 2 waves)	British Housing Panel Survey, waves 1991–92 and 1995–96.	Mortgage stress has an independent effect on men and women's wellbeing and results in increased visits to the GP for men.
Nettleton & Burrows 2000 , The health consequences of the experience of mortgage possession in England.	Qualitative, cross-sectional study using interviews.	-	44 adults and 17 children who were presently living in social housing in Northern England who had had their mortgages repossessed during the 1990s.	Repossession impacted health both directly and indirectly. Direct effects included increased stress levels that disturbed sleep, resulted in hair loss and increased blood pressure. Feelings of 'shame', embarrassment' and 'failure' affected some participants' self-esteem (indirect effects).
Meyers et al. 2005 , Subsidized housing and children's nutritional status.	Quantitative, cross-sectional study using survey data.	-	Data was collected from 11,723 guardians of children 36 months and younger participating in the Children's Sentinel Nutrition Program across 6 urban US sites. 27% of the sample received a public housing subsidy.	Children from food-insecure, low-income families who do not receive a housing subsidy are more likely to have a lower weight-to-age ratio than those children from families that do receive a subsidy (odds ratio = 2.11).
Taylor, Pevalin & Todd 2007 , The psychological costs of unsustainable housing commitments.	Quantitative, longitudinal study using survey data.	13 years (1 year intervals)	Draws a sub-sample of men and women household heads aged between 16 and 64, and 16 and 59 respectively, from the British Housing Panel Survey, waves 1991–2003.	Housing affordability problems impact the mental health/wellbeing of both men and women heads of households and the magnitude of this impact is significantly larger than that associated with other financial hardship.
Yates et al. 2007 , Housing affordability a 21 st century problem.	Mixed method, cross-sectional study.	-	Australian census data, targeted surveys and household interviews across all Australian jurisdictions.	Housing affordability is a tenure-neutral term and that the 30/40 rule is the best indicator of housing stress. In 2002–03 860,000 lower-income households were in housing stress. The incidence of housing stress is highest for lower-income private renters, single person households under the age of 65 and lower-income home purchasers.
Berger et al. 2008 , Subsidized housing and	Quantitative, cross-sectional, quasi-experimental study	-	5,396 single-mother renter households who have dependent children at home and earn less than 80 per cent of the	Those in receipt of housing assistance have lower rent burdens, longer residencies and less crowding but have more difficulties paying utilities and higher levels of food

household hardship.	using survey data.		median income. Drawn from National Survey of American Families. Some in receipt of housing assistance.	insecurity than those not receiving assistance.
Hulse & Saugeres 2008 , Housing insecurity and precarious living.	Mixed method, cross-sectional study using interviews.	-	145 interviews with a mix of men and women from various household types.	Housing insecurity is positively correlated with poor mental health and physical health outcomes as well as marginal workforce participation.
Lauster 2008 , Housing markets and young couple stability in Sweden.	Quantitative, cross-sectional study using survey data.	-	3,851 cohabitating Swedish couples drawn from the Swedish Family Survey.	Housing affordability (for both owner-occupiers and renters, increased the likelihood of marriage by a third and was weakly associated with the suppression of separation.
National Housing Supply Council 2008 , State of supply report.	Quantitative, cross-sectional study using survey data.	-	Australian Bureau of Statistics data and census data.	Affordability for first homebuyers and private renters has declined over the past decade and low-income earners are effectively priced out of the home purchasing market. The proportion of low-income private renter households experiencing housing stress has increased from 43 per cent in 1996 to 61 per cent in 2006.
Wood & Ong 2009 , Movements in and out of housing affordability	Quantitative, longitudinal study using survey data	6 years (1 year intervals)	Data from the Household, Income and Labour Dynamic Australia (HILDA), survey was drawn on from waves 1996-2001	Lengthy spells in housing stress are uncommon for the majority of Australians. However, families with young children are more likely to spend a longer period of time in this state.



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