



Final Report

The health impacts of housing: toward a policy-relevant research agenda

authored by

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ACRONYMS

AHURI	Australian Housing and Urban Research Institute Limited
CABE	Commission for Architecture and the Built Environment
CDC	Centers for Disease Control and Prevention
EPA	Environmental Protection Authority
ETS	environmental tobacco smoke (passive smoking)
FaCSIA	Australian Government Department of Families, Community Services and Indigenous Affairs
HEPA	high efficiency particulate air (filter)
LSAC	Longitudinal Survey of Australian Children
LSIC	Longitudinal Survey of Indigenous Children
NCHH	National Center for Healthy Housing
NHMRC	National Health and Medical Research Council
NRV	National Research Venture
NSW	New South Wales
SHAs	State Housing Authorities
VOC	volatile organic compound

EXECUTIVE SUMMARY

Housing is central to our lives. And while it may be seen on one level as principally about shelter, housing importantly provides other benefits. Affordable, appropriate, and adequate housing is argued to have a marked impact on people's health, their access to labour markets, and an array of other benefits. The ways in which housing impacts upon human health is considered in this report which presents a scoping study of the health impacts of housing. Our study has been undertaken using the new AHURI Investigative Panel methodology. We set out to establish the current level of knowledge and major research gaps in the housing and health field. We used a focused literature review to initiate this process. The aim of the review was to provide a foundation for the construction of a viable Australian research agenda on the relationship between housing and health. The review conceptualised the non-shelter outcomes of housing using scholarly work from both the housing and health disciplines. The latter has a well-established and widely recognised conceptual framework for engaging with the housing–health interface.

The review focused on a number of different types of literature including:

- Review articles which perform literature reviews on the relationship between housing and health.
- Systematic reviews that use a particular methodology for identifying and describing literature results.
- Intervention studies that examine the health impacts of modifying housing.

We found a substantial international literature on the connections between housing and health. Studies identified physical qualities of the dwelling that are definitely detrimental to health, as well as other factors which require further investigation. Intervention studies provide strong evidence for particular housing improvements and the health benefits that flow as a result. Leading work in this area is being conducted by public health researcher Howden-Chapman and colleagues at the Centre for Sustainable Cities, University of Otago in New Zealand. In Australia Paul Pholeros of Healthhabitat has been actively addressing health and housing issues in Indigenous communities and monitoring the results for over two decades. His focus on healthy living practices associated with washing, waste removal and safety, has yielded significant gains in Indigenous health where these often simple housing interventions have been implemented.

The review of literature encompassed newer housing–health concerns. Initiatives that link health with the built environment have important implications for residents. The housing setting needs to be supportive of healthy behaviours, such as physical activity, social interaction and access to nutritious foods, as part of everyday life. Similarly, loneliness has been identified as a serious health issue related to housing tenure. Climate change is another emerging area of research of relevance to housing and health.

We invited Australasian researchers, policy-makers and practitioners from housing and health disciplines to participate in an Investigative Panel to discuss and debate the issues identified by the literature review. This report details the panel process to ensure that it is well understood by readers and as a way of enabling future researchers to use this methodology as effectively and efficiently as possible. This was particularly important as this is one of the first Investigative Panels to be undertaken for AHURI. A critical review of our specific panel process is included. More general recommendations are made for future Investigative Panels to ensure their

effectiveness as strategic policy-relevant research framework instruments, as well as important networking opportunities for researchers and policy-makers working on contemporary housing problems.

Following an analysis of the panel's deliberations, informed by input into the literature review and presentations by panellists, we devised a set of principles to identify policy-relevant and high-priority research projects. We have also identified a possible research agenda with a listing of potential projects that bring housing and health researchers together. It is recommended that these findings be used to encourage AHURI researchers to partner with public health experts to investigate policy-relevant housing and health questions. It is also recommended that our suggestions for future Investigative Panels be considered by AHURI in refining the panel methodology. We believe that the Investigative Panel can be an effective strategic research-framing instrument, as well as an important means to bring researchers and policy-makers together on complex contemporary housing issues that demand interdisciplinary thinking and action.

1 INTRODUCTION

Commonwealth and state governments spend very large amounts of money on housing assistance. The housing or shelter impacts of these interventions are reasonably well understood. They provide housing of particular types in particular locations, with specific affordability outcomes. However, given the capacity of housing to affect many other elements of people's lives, an important question is the extent to which housing assistance can benefit a range of what the AHURI research agenda refers to as 'non-shelter outcomes'.

An understanding of these non-shelter outcomes is important for a variety of reasons. First, if it can be shown that spending on housing has a variety of non-shelter benefits that may reduce the call on other government funds in the short, medium and long-term. This is an important argument to make when negotiating with Treasuries and others for housing assistance funds. Second, the type or 'design' of housing assistance might have significant impacts on the multiplier between shelter and non-shelter benefits—this has implications for State Housing Authorities and others in the delivery of housing assistance.

In response to these important matters, AHURI has commissioned a range of projects. Phibbs and Young (2005) looked at this issue in their longitudinal study focusing on Brisbane public housing tenants. While they included research on housing and health in their study, health was only one of a number of non-shelter impacts addressed. There was a literature review by Bridge et al. (2003) and AHURI's National Research Venture 1 (NRV1)¹ focused on the non-shelter outcome of economic participation. A team led by Mike Dockery (2010) completed a scoping study on housing and child development which included a variety of child health issues.

The interest in the connection between housing and health is hardly new. Since Edwin Chadwick made the link between the ill health of the poor and their dire housing conditions in 1842 there has been a widening recognition of the impact of poor housing on health. In 1921 Christopher Addison (the English Health Minister and a medical doctor) requested that the Registrar General make a calculation of the annual cost of a number of conditions related to poor housing, notably tuberculosis. The answer was about £42 million, about £1.5 billion at today's values (Addison 1922). In an indication of a lack of progress, in that same country the distinguished epidemiologist Sir Michael Marmot stated in 2010 that, 'bad housing conditions—including homelessness, temporary accommodation, overcrowding, insecurity, and housing in poor physical condition—constitute a risk to health' (Marmot 2010, p.79).

Recently there has been growing national and international interest in the link between the broader issue of the built environment and health. There is mounting evidence that western societies have constructed urban environments that are fundamentally unhealthy for their inhabitants.

¹ 'AHURI's National Research Ventures are the flagships of the AHURI research program. Each National Research Venture is a multi-year research project that anticipates and responds to the national housing and urban research priorities of the Housing Ministers' Conference.

National Research Ventures are integrated suites of projects that extend over three years, and tackle research questions that are complex and/or longitudinal in nature. They are collaborative in nature, combining the expertise of a number of AHURI Research Centres and partners in government, industry and the community sector.' Source: AHURI web site.

Given the importance of health for well-being, the size of the health budget and the growing national and international interest in preventative health, AHURI's thin research outputs in this area need to be strengthened.

There is a real opportunity for AHURI to extend its work in the non-shelter benefits of housing areas by undertaking some robust research that investigates the link between housing and health. This area of inquiry can also take AHURI research closer to a broader urban research agenda.

This large area of research motivated the authors to undertake the current project. The objectives of this scoping study are to:

1. Establish the current level of knowledge.
2. Identify the major research gaps.
3. Prioritise these using a number of criteria, including research ability and potential impact on policy.
4. Propose a number of research projects to explore the highest priority research gaps.

The current project was undertaken using the new AHURI research strategy—that of the 'Investigative Panel'. This is defined by AHURI as follows:

Investigative Panels are designed to bring about direct engagement between experts from the research and policy communities (and potentially practitioners from industry and community sectors) to interrogate a specific policy or practice question. The Investigative Panel process draws on the experience and expertise of the members of the Investigative Panel, who may meet several times to discuss a research question of immediate practical relevance to policy development. Typically, Investigative Panels involve some literature or data review and some scenario building. Researchers are encouraged to be innovative in the form that reports take.

This report details one of the first Investigative Panels to be undertaken for AHURI. The concept of Investigative Panels emerged from a review of AHURI's work and effectiveness (Smith 2009). We had no prior panels to consult in developing our methodology, nor were there any reports of panel outcomes for us to consider. Accordingly, we reflect on the method and evaluate our panel process, as well as reporting the findings from the deliberations.

The panel used for the current project consisted of leading researchers and public policy officials from the housing and health fields across Australasia. This report presents the outcomes of the panel, identifies the current level of knowledge in both research and policy, and makes recommendations on priority research areas.

Recommendations are made to assist AHURI to refine the Investigative Panel methodology and argue for its effectiveness and benefits. The Investigative Panel is not a research product per se. Rather, it is a way of framing a strategic research agenda with input from researchers and policy-makers interacting on key issues. The interaction is key. This needs to be well facilitated and targeted. Our experience with the Investigative Panel process for housing and health has been a positive learning experience which is detailed in this report. It is hoped that the resulting recommendations will support further development of this important AHURI initiative.

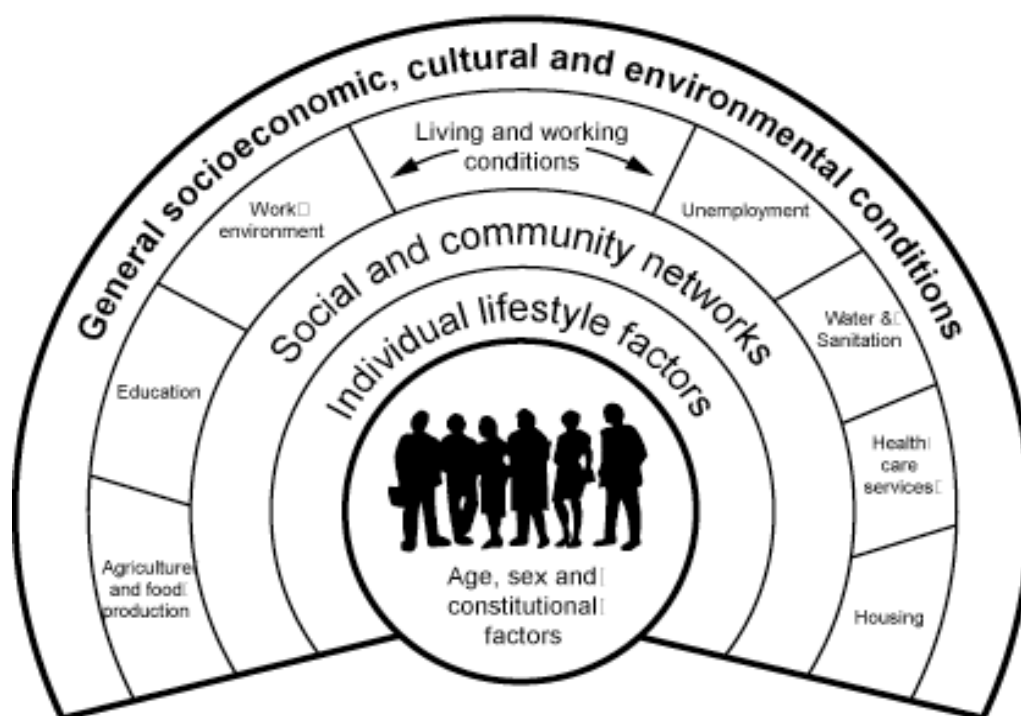
2 A FRAMEWORK FOR THE REVIEW

2.1 Conceptualising non-shelter outcomes

Shelter is widely regarded as one of the essentials of life. Housing not only provides shelter but also affordable, appropriate and adequate housing is argued to have, among many other things, a marked impact on people's health, their access to labour markets and an array of other benefits. In terms of the AHURI research agenda, these other benefits are termed non-shelter outcomes. This study focuses on the non-shelter outcomes of health.

Looking at the topic from the public health literature on housing, it is not surprising that housing is regarded as an important variable. As broadly defined by public health professionals, human health is directly affected by living and working conditions. These relationships are best summarised in the 'social determinants of health' (see Figure 1).

Figure 1: The social determinants of health



Source: Whitehead and Dahlgren 1991

There is clearly a well-established and widely recognised conceptual framework for engaging with the housing–health interface.

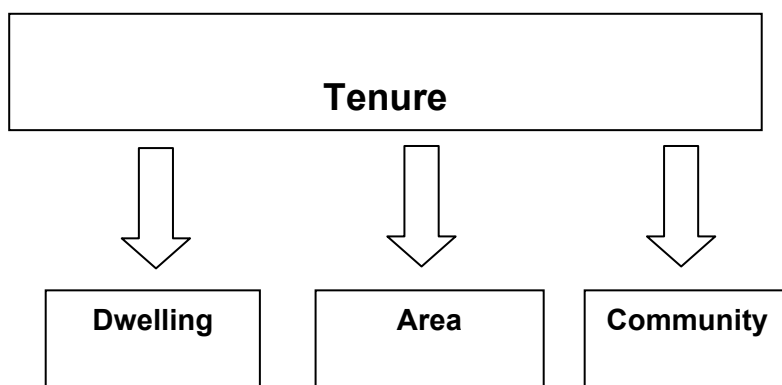
The work of Phibbs and Young (2005) established a framework for conceptualising the nature of non-shelter outcomes that was useful in the current project. The framework has two advantages. First, it helps to classify the range of possible non-shelter outcomes of housing. Second, it provides an understanding of the potential drivers of non-shelter outcomes. However, note that its main use is as a tool that assists with taxonomy rather than trying to demonstrate causal links.

This framework recognises the relatively unique nature of housing as a commodity. Housing provides not only the benefits of shelter but also, through location, access to a further bundle of goods and services. Housing is a complex good. The fact that

housing is provided in a fixed location means it can also generate a number of positive or negative local impacts. Moreover, since housing is usually the single most expensive outlay for low to middle income families, housing costs can affect a household's ability to purchase other goods and services.

In developing a framework it is useful to start with the characteristics of the dwelling. For example, a house that is cold and damp can have a direct impact on the health of its residents. The next step in the hierarchy relates to locational outcomes. These include the nature of the area in which the house is located. Some resultant factors are local in effect (e.g. the impact of traffic noise on sleep; the distance to a local park), while others are more regionally based (e.g. access to major hospitals). It is also clear from the literature that the local community can have an impact on non-shelter outcomes for households (including the neighbours). For example, the nature of the local community can have major impacts on the expectations of young people about education and employment futures. Next, it is evident that characteristics of the tenure can have a significant impact on non-shelter impacts. For example, a major non-shelter impact relates to the instability of households operating in the private rental market and the impact this might have on access to health care. A summary of this framework is shown in Figure 2.

Figure 2: A framework for examining non-shelter impacts



Source: Phibbs and Young 2005, p.4

2.2 The nature of the literature review

The aim of the literature review is not to undertake a systematic literature review of all the relevant literature—this task has already been undertaken by a variety of AHURI researchers. The focus of this review is to provide a foundation for the construction of a viable Australian research agenda by examining the relationship between housing and health.

The review focuses on a number of different types of literature, including:

- Review articles which perform literature reviews on the relationship between housing and health.
- Systematic reviews which use a particular methodology for identifying and describing literature results. For example, the 2004 AHURI study (Bridge et al.) which used the Campbell Systematic Review Protocol.
- Intervention studies that examine the health impacts of modifying housing.

One of the issues that arises from the literature is the degree to which poor housing can be shown to cause ill-health. If this can be demonstrated, then an intervention which results in improved housing should lead to improved health outcomes. Given

the size of the health budget compared to the housing budgets of many Australian governments, this could become a powerful argument for improving housing conditions. For many AHURI stakeholders, intervention studies which measure the health dividend of a particular housing intervention are likely to be the 'gold standard' of housing research.

In examining any literature on housing and health, a number of important issues are worth considering. First, while it is possible in many cases to demonstrate an association between housing and health, it is not necessarily possible to provide stronger evidence of any causal connection. This situation is well described by Wilkinson (1999, p.1), a Scottish researcher who states:

There is a correlation between poor housing and ill health but attempts to prove that poor housing actually causes ill health have often failed, and the research field is characterised by weak, and sometimes contradictory, empirical findings.

A similar view is put by Phibbs (2000, p.6) in an Australian review:

... the literature review uncovered a great deal of information on the association between housing and health however there is very little quantitative information about the direct health costs of inadequate housing. Typically, a direct link between housing and health has been assumed. There are, however, a number of studies that have attempted to demonstrate a clear causal relationship between housing conditions and health outcomes. Most of these studies conclude that housing plays an integral role in the maintenance of health. However, it is widely acknowledged that a range of interacting socio-economic factors also significantly influence health status. These socio-economic factors are difficult to control in a research setting and it is therefore difficult to isolate the specific health costs (or benefits) attributable to housing.

Part of the problem is the interconnectedness between poor health and poor housing. As Thomson et al. (2009, p.681) comment:

There is a complex interconnectedness between poor housing and poor health and their determinants. For example, vulnerable groups such as the sick, the elderly, and the unemployed are among those most likely to live in poor housing and also tend to spend long periods of time indoors exposed to potentially hazardous environments.

The second issue is that of time. This is considered by Marsh et al. (2000). They make an important distinction between current housing conditions affecting current health, and past housing conditions affecting health, even when housing conditions in later life improve. They cite a number of studies that indicate poor housing in childhood can have an impact on health in later life. For example, Britten et al. (1987) found that overcrowding (two persons per room) at the age of two was one of only four significant explanatory variables in their analysis of respiratory problems in 36-year-old men and women. Mendall et al. (1992) considered both domestic crowding and absence of a fixed hot water supply at age eight in their study of *Helicobacter pylori* seropositivity in adult life. They found that crowding and absence of hot water in childhood were powerful independent risk factors for current infection with *H. pylori*.

This point may make it difficult to measure the health impacts of interventions to improve housing in the short term if the research study does not take a long-term view.

2.3 The main elements of housing

When examining the nature of housing, a number of studies have shown strong associations between housing characteristics and a number of diseases.

Marsh et al. (2000, p.413) identify the main issues as:

- Overcrowding—infectious/respiratory disease.
- Damp/mould—respiratory disease, eczema, asthma and rhinitis.
- Indoor pollutants/infestation—asthma.
- Cold/low temperature—respiratory infection, hypothermia, bronchospasm, heart disease.
- Homelessness—a range of physical ailments.

Other studies have added the issue of accidents in the home and the relationship between some housing characteristics and mental health and the impacts of tenure.

Similar lists, with one or two variations, appear in much of the other research that is reported in this review.

3 THE LITERATURE: A FOCUSED REVIEW

3.1 Previous AHURI research

One of the first AHURI studies on this topic was 'Health Inequalities Between Australia's Rich and Poor?' prepared by the Australian National University Research Centre. This study presented an examination of the research on links between housing and health. The study concluded that:

Numerous reviews and studies in the academic literature point to an association between various aspects of housing and health. However, despite the evidence linking housing to health, the direction of causality between housing and health is often unclear (Waters 2001, p.iii).

The study also suggested that:

- Evidence suggests that overcrowded dwellings are associated with greater risk of infectious disease and poor mental health.
- People who are living in dwellings that are damp, cold or mouldy are at greater risk of respiratory conditions, meningococcal infection and asthma.
- There appears to be little quantitative work on this subject in Australia (Waters 2001, p.iii).

Another AHURI study (Mullins et al. 2001) also examined the literature on the relationship between housing and health. This study made the following conclusions.

- Poor housing has a clear negative impact on residents' health, although the illnesses tend not to be among the most serious.
- The most significant impacts result from cold, dampness and mould.
- Overcrowding can cause mental illness.
- Homelessness can be caused by poor health; it causes ill health and it aggravates poor health.
- Poorly designed housing predisposes accidents, with children and the elderly being particularly affected. Accidents took the form, for example, of falls and burns.
- There is an urgent need for far more research focusing on the causal link between housing quality and health (Mullins et al. 2001, p.24).

The two AHURI projects above undertook some empirical analysis on the linkage between housing and health. However, since they used two snapshot surveys (a previous telephone survey in one case and the 1995 National Health Survey in another) it was difficult to make strong conclusions from the analysis.

Bridge et al. (2003) undertook a systematic review of the relationship between housing assistance and non-shelter outcomes. They echoed the findings of the previous AHURI studies and again pointed out the difficulties of identifying causality when examining the relationship between housing and health.

The fact that both natural and man-made environments directly impact human health appears self-evident. Human habitation serves to mediate natural environmental extremes. As such, housing sustains and supports human life, and thus housing environments directly and indirectly impact on health, social support, absence of disease, quality of life and well-being. In this context better understanding the links between housing assistance and health are essential for better understanding how insufficient housing investment might

lead to additional costs for other services, including health, through increased need for healthcare, prescription costs and so on. Research into the relationship between health and housing, while profuse, has to contend with many confounding factors. For instance, poverty, poor nutrition, violence, exposure to weather, pest and toxins, social isolation and self-damaging behaviours, such as drug addiction, are typically observed concurrently in poorly housed populations where inequality exists, and all have been linked to poor health. These confounding factors will mediate the impact of housing on health outcomes, and as with other non-shelter outcomes, these complex interrelationships make identification of causality problematic. Indeed research on housing and health, although substantial, remains limited in its ability to reliably model causality. Failure to demonstrate causality is unsurprising given the complexity of relationships noted above and the lack of control and comparison groups, high prevalence of correlational research in combination with selection bias and poor control for demographic variables (Bridge et al. 2003, pp.133–4).

A particular strength of the report was its focus on accidents in the home.

According to Ranson (1993), deaths and injuries in the home present one of the biggest public health challenges, with the World Health Organization ranking them the fifth among the leading causes of death. Home injuries in Australia are a common occurrence, as in other countries—12 per cent of the general population when surveyed by the Australian Bureau of Statistics indicated that they had sustained an injury in the previous month. The types of injury most likely to require medical interventions were falls from less than 1 metre, which accounted for a third of injuries reported, followed by hitting or being hit by something, and bites/stings which require some treatment (Australian Bureau of Statistics 2002).

In terms of mortality and morbidity outcomes resulting from injury in the home they are worst for more vulnerable population subgroups such as young children and older adults, implying a double disadvantage situation. Fiscally, home accidents result in annual health-related expenditure estimated at \$2369 million for older persons (Hill et al. 2000), and \$660 million for children (Atech Group and Minter Ellison Consulting 2001). Apart from these substantive direct costs, there are also substantial indirect and unquantifiable human and social costs. Nevertheless, proving direct causality presents difficulties because injuries, and falls in particular, are viewed as multifactorial. Acknowledging the multifactorial nature of injury means that architectural features such as open-rise stairs, absence of guards or railings and slippery floor surfaces, may not cause injury to the able-bodied, but their presence or absence in combination with impaired reasoning or dexterity dramatically increases the risk of injury. Consequently, dwelling design appears to be indirectly causally implicated in the majority of accidents in the home (Bridge et al. 2003, p.56).

Phibbs and Young (2005) undertook a longitudinal study of households entering public housing to attempt measuring a range of non-shelter outcomes, including health.

One hundred and seventy-eight household members were interviewed just after they moved into public housing. A further 151 households were subsequently interviewed about six to 12 months later. The survey focused on changes in the lives of these tenants, particularly with regard to their health, employment and the education of their children. The study explored how the different aspects of assistance provided through public housing affected these different aspects of their lives.

As well as participating in interviews and completing a health and well-being survey, 80 per cent of participants allowed access to their Medicare records a year before and a year after they moved into public housing. A number of participants reported an improvement in their health as a result of entering public housing. They reported:

- Eating better foods as a result of increased financial resources.
- An ability to prepare their own foods rather than to buy take-away food since they had a functioning kitchen in public housing.
- Improved conditions in their dwellings, such as less dust having a particular health benefit for children.
- Increased self-esteem, often associated with independent living, meaning that people were now looking after themselves better.
- Extra income enabling them to participate in illness prevention programs such as joining a gym and getting more exercise.
- Reduced stress due to security of tenure and more income.
- Improved access to medical resources.

A significant number of households were sharing with friends and relatives prior to moving into public housing. These people often reported greatly reduced stress levels when moving into their public housing because they no longer had to endure an ongoing conflict with a parent or carer in an overcrowded dwelling.

The analysis of the Medicare data revealed some interesting trends. Overall there was a small decrease in the use of Medicare services. However, there was a marked difference between previously light users of the Medicare system and heavier users. Light users tended to *increase* their levels of usage while heavier users *reduced* both the number and cost of services after they moved into public housing. It was concluded that the increased usage of medical services reflected the enhanced ability of some people to establish a relationship with a general medical practitioner once their housing stabilised. The decreased usage by previously heavier users of medical services might have been associated with the reduced stress levels of some people which were reflected in improvements in their self-reported health status.

An issue that permeated the study was the reduction in stress reported by many participants as a result of obtaining secure and appropriate housing. It seemed that some people, especially parents, were experiencing some sort of cognitive overload because of their constant struggle to find appropriate housing.

Dockery et al. (2010) examined the issue of housing and development outcomes for children. This work intersected with many housing and health issues. The authors summarise their study as follows:

Aspects of the home that have been empirically identified by the existing literature to influence children's development include:

- environmental allergens
- toxicants
- cleanliness, housing disrepair and safety
- building height and opportunities for outdoor play
- crowding
- housing affordability
- homeownership

- frequent residential moves
- homelessness
- neighbourhoods.

The literature review conducted in this study draws from a range of disciplines, including sociology, epidemiology, economics, housing policy, social welfare, health, medicine, child development and psychology. Key findings were as follows.

- There are strong links between various housing variables and child development outcomes.
- Some of these links are irreversible and continue on into adulthood, such as the negative effects of toxicants on various childhood development stages.
- Factors shaping child development and well-being are complex, often interrelated and frequently multiplied by coincident factors. As a result housing can impact on children's development and well-being through both direct and indirect mechanisms. For example, inability to afford housing is linked to frequent moves, shared housing with other families, crowding or even homelessness. However, there are trade-offs with potentially positive neighbourhood effects.
- The majority have focused on children's educational and health outcomes and are from the United States. To-date studies have uncovered both positive and negative effects of housing assistance on children's outcomes, with no consensus on which effects dominate.

The authors note that there is a lack of research conducted in Australia and conclude that 'without empirical analysis using Australian data it is not possible to assess the causal effects of housing and housing policies on child development in Australia'.

Dockery et al. consider that the research is important because of likely risk factors in the Australian context:

- Statistical data shows that children make up a significant proportion of the homeless in Australia.
- The housing experiences of Indigenous children are significantly worse than those experienced by non-Indigenous children.
- Housing stress is particularly prevalent among households with children in Australia.

An area that has much less attention is the relationship between loneliness and housing. Two leading loneliness researchers, Franklin and Tranter, have recently completed a research essay for AHURI on the link between housing, loneliness and health. They first show that loneliness is related to tenure:

In our 2009 survey ... we discovered that housing tenure, particularly for those in private and public housing, is strongly associated with experiencing loneliness on a frequent basis. For example, only 4 per cent of those who own their own home experience loneliness on a daily basis compared to 13 per cent of private renters and 11 per cent of public housing tenants. Those in public housing however, are much more likely than other tenures to experience loneliness on a regular basis. This is clearly apparent in that only 27 per cent of public tenants rarely or never experience loneliness, compared to 39 per cent in private rental, 53 per cent of mortgagees and 62 per cent of those who own their own homes outright. It is unlikely that a tenure 'causes' loneliness per se, but we note that loneliness is being concentrated in certain tenure forms rather than others and this may also denote some spatial

concentration, with possible ramifications for the spread and compounding of loneliness and its capacity to cause poor health (Franklin & Tranter 2010, p.6).

They also provide a variety of evidence about the health impacts of loneliness.

Caciappo et al. (2009, p.978) cite scientific investigations demonstrating that loneliness is directly associated with Alzheimer's disease, obesity, increased vascular resistance, elevated blood pressure, increased hypothalamic pituitary adrenocortical activity, sleep disorders, diminished immunity, reduction in independent living, alcoholism, depression, suicidal ideation and behaviour, mortality in older adults, elevated cholesterol and blood pressure in later life among adolescents. Mellor et al. (2008, p.214) cite further studies linking loneliness negatively to life satisfaction, and subjective well-being and to a literature linking high levels of loneliness to higher levels of psychological distress and low levels of psychological wellness.

According to Geller (2000), lonely people are four times more likely than others to have a heart attack, and four times more likely to die from it. Significantly perhaps, 'smokers are only twice as likely as non-smokers to die from a heart attack' (Geller 2000, p.3). ... Lonely people use emergency services 60 per cent more often than the non-lonely and as elderly people are twice as likely to be admitted into nursing homes (Stack 2000, p.2)² (Franklin & Tranter 2010, p.5).

This emerging area of investigation could potentially become an important addition to an AHURI Housing and Health research agenda.

3.2 Major international reviews

There have been a number of significant international studies on the relationship between housing and health that should be considered when assembling an Australian research agenda on the issues.

3.2.1 Expert reviews

A good place to start in this area is the work of the World Health Organization (WHO). They have undertaken a review process to quantify the diseases from inadequate housing. Given its relevance to the current project it is worth examining the WHO process in some detail. The project report summarises the method as follows:

Experts were invited to a meeting in Bonn on November 28–30, 2005 to review and discuss the feasibility of quantifying environmental burden of diseases related to inadequate housing conditions. The main objective of the meeting, organised with the support of the German Ministry of Environment, was to identify the housing-health relationships that have sufficient evidence to be included in the first assessment of burden of disease from inadequate housing. The experts provided documentation for the selected housing-health relationships as background material for the meeting. At the meeting the experts presented the available evidence of the association between housing factors and health effects, and selected housing-health relationships to assess the feasibility of quantifying housing burden of disease. In order to look into the selected topics in more detail, the following working groups were created:

→ Working group 1: Physical effects of housing inadequacy.

² This reference to Stack 2000 is not in the Franklin and Tranter essay—it appears elsewhere in their essay as Stack 1998.

- Working group 2: Chemical effects of housing inadequacy.
- Working group 3: Biological effects of housing inadequacy.
- Working group 4: Building / equipment-related effects of housing inadequacy.
- Working group 5: Social effects of housing inadequacy.

Altogether, the meeting reviewed a total of 25 housing-health relationships that could potentially justify further analysis to estimate the burden of disease. Among these relationships, 13 were considered to have sufficient evidence, 10 to have some evidence, and two to have insufficient evidence.

The results are summarised in the box below.

<p>Housing characteristics and disease burden</p> <p>A: Linkages with sufficient evidence for estimating burden of disease</p> <p>Physical factors</p> <ul style="list-style-type: none"> → Heat and related cardiovascular effects and/or excess mortality. → Cold indoor temperatures and winter excess mortality. → Energy efficiency of housing and health. → Radon exposure in dwellings and cancer. → Neighbourhood and building noise and related health effects. <p>Chemical factors</p> <ul style="list-style-type: none"> → ETS* exposure in dwellings and respiratory and allergic effects. → Lead-related health effects. <p>Biological factors</p> <ul style="list-style-type: none"> → Humidity and mould in dwellings and related health effects. → Hygrothermal conditions and house dust mite exposure. <p>Building factors</p> <ul style="list-style-type: none"> → Building and equipment factors and injuries / domestic accidents. → Injury Database on domestic accidents and injuries. → Estimating the number of home accidents from literature. <p>Social factors</p> <ul style="list-style-type: none"> → Multifamily housing, high-rise housing, and housing quality and mental health. <p>B: Linkages with some evidence for estimating burden of disease</p> <p>Physical factors</p> <ul style="list-style-type: none"> → Ventilation in the dwelling and respiratory and allergic effects. <p>Chemical factors</p> <ul style="list-style-type: none"> → VOCs and respiratory, cardiovascular and allergic effects. <p>Biological factors</p> <ul style="list-style-type: none"> → Cockroaches and rodents in dwellings and respiratory and allergic effects. → Cats, dogs, and mites in dwellings and respiratory and allergic effects. → Pets and mites and respiratory, allergic or asthmatic effects.

Building factors

→ Sanitation and hygiene conditions and related physical health effects.

Social factors

→ Social conditions of housing and fear / fear of crime.

→ Poverty and social exclusion and related health effects.

→ Crowding and related health effects.

→ Social factors / social climate and mental health.

C: Linkages with insufficient evidence for estimating burden of disease**Physical factors**

→ Lighting conditions in the dwelling and mental and other health effects.

→ Particulate matter in indoor air and respiratory and allergic effects.

* ETS = environmental tobacco smoke (passive smoking); VOC = volatile organic compound

Source: World Health Organization 2006, pp.6–7

A second major review was undertaken in the US by the National Center for Healthy Housing. This study used a panel of experts to review the evidence on the health impacts of housing interventions at a meeting in Atlanta in December 2007. The review was the result of a co-operative agreement between the Centers for Disease Control and Prevention (CDC), National Center for Environmental Health and the National Center for Healthy Housing (NCHH).

The NCHH and CDC identified experts in five broad areas of healthy housing research:

1. Interior biological agents (toxins) interventions.
2. Interior chemical agents (toxics) interventions.
3. External exposures (drinking water and sewage treatment).
4. Structural deficiencies.
5. Intersection between housing and community.

The CDC carried out a preliminary literature review using relevant key words and search terms to search Medline, a public health database. This search covered articles added between 1990 and December 2007. Additional literature was identified from the references in the relevant papers. The expert panellists also identified additional literature.

Each publication was reviewed by at least one reviewer using a structured review instrument, similar to a systematic review. The experts assigned each of the interventions into one of four broad categories based on the evidence in the literature:

- sufficient evidence
- needs more field evidence
- needs formative research
- no evidence of effectiveness.

The reviewers followed a Community Guide published by CDC which recommends that an intervention results in 'improvements in health or leads to changes in behaviours or other factors that have been shown to result in better health'.

The four outcome categories are intended to be used as summarised below.

1. *Sufficient evidence*. Develop policy on those interventions that currently have sufficient evidence of effectiveness to recommend immediate implementation.
2. *Needs more field evidence*. Conduct research on those interventions where the evidence shows promising outcomes that need more testing and evaluation in the field.
3. *Needs formative research*. Implement formative research to examine the biologic plausibility of a link between housing and health.
4. *No evidence of effectiveness*. Identify those interventions where the evidence is clear that the interventions should not be pursued.

Table 1 summarises the results of the review.

Table 1: Summary of intervention findings

Panel	Sufficient evidence	Needs more field evaluation	Needs formative research	No evidence or ineffective
Panel 1: Interior biological agents (toxins)	Multi-faceted tailored asthma interventions Integrated pest management (allergen reduction) Moisture intrusion elimination	Dehumidification General and local exhaust ventilation (kitchens and baths) Air cleaners (to reduce asthma) Dry steam cleaning Vacuuming	Carpet treatments One-time professional cleaning Acaracides	Bedding encasement alone Sheet washing alone Upholstery cleaning alone Air cleaners releasing ozone
Panel 2: Interior chemical agents (toxics)	Radon air mitigation through active subslab depressurization Integrated pest management (pesticide reduction) Smoking bans Lead hazard control	Radon mitigation in drinking water Portable HEPA air cleaners to reduce particulates Attached garage sealing to limit VOC intrusion Particulate control by envelope sealing	Radon air mitigation using passive systems Improved residential ventilation VOC avoidance	Portable HEPA air cleaners to reduce environmental tobacco smoke and formaldehyde Air cleaners using or releasing ozone Single professional cleaning to reduce long-term lead exposure
Panel 3: External exposures (drinking water & waste treatment)	Voluntary drinking and wastewater treatment standards for small systems and private wells Training for small system personnel Guidelines for immune-compromised individuals	UV and other filtration point of use systems Location of privies and failed drinking water and wastewater systems	Training for planners and zoning officials Control of pharmaceuticals and endocrine disruptors into drinking and wastewater systems DNA analysis to track pathogen sources Surveillance studies to define system failures	UV/point of filtration research for systems that already comply with standards

Panel 4: Structural deficiencies (injury)	Installation of working smoke alarms Isolation four- sided pool fencing	Fall prevention by handrails, grab bars, stair-gates, window guards and improved lighting Temperature- controlled water faucets	Ignition source controls (GCFI & AFCI) Escape exit signage Improved smoke alarm and faucet design	Three-sided pool fencing
	Pre-set safe temperature hot water heaters	Safe ignition sources Home modification to escape fires Air-conditioning during heat waves	Behaviour modification to escape fires Automatic fire sprinkler systems for housing Pool covers and alarms Bathtub design to reduce falls Stove and stove control design to prevent burns Carbon monoxide exposure prevention through design and engineering Improved enforcement of building and housing codes Noise reduction	
Panel 5: Intersection between housing and community	Rental vouchers (Housing Choice Voucher Program)	Health impact assessment Demolition and revitalisation of poor or distressed public housing (HOPE VI) Moving people from high-poverty to lower-poverty neighbourhoods as a health intervention	Universal design Crime prevention through environmental design Smart growth and connectivity designs Residential siting away from highways Noise interventions Zoning Density bonuses Green space	

Source: NCHH 2009, Table 1

3.2.2 Health impacts of housing interventions.

Thomson and Petticrew, in conjunction with other researchers, have undertaken two major systematic reviews of the health impacts of housing improvement. This question

is obviously of great interest to policy-makers—what will be the health dividend of investing in improving housing?

The first review was published in 2001 (Thomson et al.). Here the authors identified 18 primary studies. They concluded that many studies showed health gains after the intervention, but the small study populations and lack of controlling for confounders limited the generalisability of the findings.

The second review was published eight years later (Thomson et al. 2009). This followed the method of the Campbell Collaboration and included studies of housing improvement that involved enhancement of the physical attributes of housing infrastructure, as well as interventions to increase warmth. The review excluded studies involving improvements to mobile homes, psychosocial or educational interventions, and interventions to remove or reduce exposure to lead, radon or allergens. Modifications for medical reasons, accident prevention, air quality improvement and adjustments to increase disabled occupants' mobility, were also excluded.

The authors identified 45 relevant studies and concluded that:

There is now stronger support for the hypothesis that housing improvement can improve health in the short term than there was at the time of our 2001 review. Improvements in warmth, in particular, can lead to tangible improvements in health, but the potential for health benefits may depend on baseline housing conditions and careful targeting of the intervention. The health impacts of area-based programs of housing improvement remain unclear, but there is little to suggest that housing improvement is detrimental to health (Thomson et al. 2009, p.691).

The authors noted that significant health improvements were reported in two large randomised controlled studies of energy efficiency retrofitting in New Zealand. These studies were led by Philippa Howden-Chapman (a participant in the Investigative Panel). Her team used a community-based cluster, single-blinded randomised study in seven low-income communities in New Zealand to measure the impact of a standard retrofit insulation package. The researchers recruited 1350 households involving 4407 participants (Howden-Chapman et al. 2007).

Insulation was associated with a small increase of 0.5°C in bedroom temperatures during the winter and decreased relative humidity of –2.3 per cent despite energy consumption in insulated houses being 81 per cent of that in uninsulated houses. These changes were associated with reduced odds in the insulated homes of fair or poor self-rated health, self-reports of wheezing in the past three months, self-reports of children taking a day off school, and self-reports of adults taking a day off work. Visits to general practitioners were less often reported by occupants of insulated homes.

A significant feature of the study was the large number of households involved and the high retention rate of households (84%). Details of the study method are reported in Howden-Chapman et al. (2005).

3.3 More recent concerns

Much of the research which has been the focus of the previous section has focussed on health impacts of the dwelling. More recent research has focussed on broader issues, including the location of the dwelling in the urban network and the connection between housing and loneliness. These two issues are examined in this section.

3.3.1 Initiatives linking health and the built environment

In the early 19th century urban planning and health were closely aligned to combat the infectious diseases and unsanitary conditions that plagued the overcrowded city slums. As health improved, there was a parting of the disciplines. Interest in reuniting the two emerged toward the end of the last century as chronic conditions related to modern sedentary ways of living increased. The built environment was implicated, particularly car-dependent, unsafe and unfriendly cities which made physical activity and meaningful social interaction difficult. Polluted air and water and reduced access to fresh and nutritious food compounded this unhealthy way of life. The Healthy Cities movement was started by the WHO in the late 1980s with a focus on health promotion, achieved through interagency collaboration, top-level political support and grassroots community action, emanating from the principles of the Ottawa Charter (WHO 1986). The European Healthy Cities club stretches from Russia to Portugal and Norway to Greece with 40 frontline cities and 800 linked by national city networks. Evidence from the social determinants of health reinforced this intersectoral approach (Wilkinson & Marmot 2003).

There has been an increasing interest in academic journals about the issue. The first activity began in public health journals.³ Planning journals engaged with the topic a little later. The respected UK journal, *Built Environment*, had a special edition on planning and health in 2005. In Australia, special issues on health and the built environment were published in the planning profession's journal *Australian Planner* (2007, 2009). At the same time a number of influential planning books were published including ones by: Barton and Tsourou (2000); Frank, Engelke and Schmid (2003); Frumkin, Frank and Jackson (2004); and more recently, Corburn (2009). Governments are also focussing on the issue. In Australia, the Federal government's Major Cities Unit has identified human health as a component underpinning the liveability of cities.

Urban environments are strongly associated with public health concerns, with contributing factors being water and air quality, noise, temperature, access to open and green space, opportunities to exercise, and opportunities to have social interaction (Infrastructure Australia 2010, p.94).

Much of the interest has been around the issue of how we can build cities to promote physical activity. This involves initiatives such as providing more opportunities for physical activity in people's daily lives by access to walkable destinations, more open space and increased use of active forms of transport, including cycling and public transport. In relation to the current project, one of the key issues is the impact of the location of housing in order to promote physical activity and enhance social interaction.

In 2009, the Planning Institute of Australia launched 'Healthy Spaces and Places' (www.healthyplaces.org.au). This national web-based initiative is a partnership with the Australian Local Government Association and National Heart Foundation with funding from the Commonwealth government's Department of Health and Ageing. It signals a renewed national professional interest in health and the built environment in Australia as well as the emergence of collaborative partnerships across health and the built environment.

Another key issue for health is access to fresh and nutritious food. Suburban sprawl threatens viable agricultural lands in close proximity to urban dwellers. Community gardens and edible verge planting are of increasing interest, as are farmers' markets

³ The entire September 2003 issue of the *American Journal of Public Health* addresses the relationship between the built environment and public health and safety.

and kitchen school gardens. Education in basic cooking and harvesting techniques is part of the edible landscape movement, as is sustainable gardening practice. Access to nature and open space, as well as the right to own companion animals, are also important for health as it relates to the home environment.

Currently there is considerable interest in the issue in journals⁴ and an increasing amount of research funding being directed at this area. However, like the issues covered in the previous section, there is considerable concern about the quality of the evidence. Barton (2005, p.285) provides an example in relation to the new urbanist agenda:

The new urbanist design agenda is being powerfully promoted by official agencies and the design profession. ... In this new consensus it is axiomatic that by creating a higher-density, mixed-use, pedestrian-friendly environment with accessible local facilities and social diversity, people will be healthier and global emissions reduced. But looking at the very patchy research in this field it is equivocal to say the least.

A particular problem is that much of the research into the relationship between the built environment and physical activity has used cross-sectional studies. Such studies often show that households which move into neighbourhoods designed for active living have higher physical activity levels than those who move into traditional neighbourhoods. However, recent Australian research is using a longitudinal study design to provide more reliable results (Giles-Corti 2008).

In a recent Australian review, Burke et al. (2008, p.25) reach the following conclusion:

The evidence reviewed confirms physical activity and nutrition as significant risk factors for human populations. The built environment is clearly implicated in influencing physical activity, and there is emerging evidence of associations with nutrition. The links are not always obvious or transparent, and there is considerable uncertainty as to causality. The influence of specific environmental factors is often in dispute, primarily due to the difficulties in operationalising research in real-world urban environments whilst controlling for other factors.

There is considerable scope for building on the emerging research in this area. Public health agencies are increasingly interested in working with built environment professionals in advancing this agenda. The Healthy Built Environments Program in New South Wales is one such example (www.fbe.unsw.edu.au/cf/hbep/). The issue of research quality and moving from measuring associations to measuring the impact of interventions bears a striking similarity to the discussions about data quality in the more traditional areas of housing and health research. The key issues for the AHURI research agenda relate to the impacts of the location of housing on physical activity, social interaction and nutrition.

3.3.2 Housing, health and climate change

In recent times there has been a great deal of work examining the impact of climate change on the relationship between housing and health. Mudarri (2010) in a report to the Environmental Protection Authority (EPA) illustrates the relationship between climate change and increased public health risks in indoor environments. The most obvious impact is that from the heating effects of climate change. Increased heating, when it cannot be moderated by air-conditioning and/or other strategies, is likely to

⁴ The Scopus research database contains 23 references using the search terms urban/town planning and health in 1998 compared to 91 in 2007.

lead to increased health risks, especially among the elderly. Increases in moisture are also likely to lead to increased mould issues in some environments. In addition to these more obvious impacts, climate change has the potential to produce significant increases in near-surface ozone concentrations. Ozone is known to react with many VOCs found indoors to create a variety of chemical byproducts with potentially troubling adverse health consequences that could present a significant unanticipated public health issue. Moreover, damage caused by flooding, plus the abundance of water available to pests, will likely increase the capacity of buildings to support pest infestations. Additional pests could increase exposure to pest allergens, infectious agents, and to pesticides.

This area will clearly be the subject of much scholarly attention as the Australian research on climate change adaptation grows.

3.3.3 Tenure and health

The AHURI National Research Venture on Affordable Housing for Lower Income Australians highlighted the extent to which the aged in the private rental market are at risk from affordability issues (Yates & Milligan 2007). The extent to which these affordability pressures impacted on anxiety levels and the state of their housing was clear from the focus groups which were a part of that study. A very sharp portrayal of this issue is available from three video interviews of aged private renters in Melbourne (Phibbs 2009) where the poor state of their housing has immediate and identifiable impacts on the health of the tenants. A current AHURI project on age-specific housing (Bridge et al. 2010) canvasses similar issues.

3.3.4 Health and neighbourhoods

An interesting body of scholarship has developed, including some work in Melbourne, tracking the connections between housing and neighbourhoods. The research examines the impact of neighbourhoods on health after controlling for the socio-economic status of residents.

The work of Hou and Myles (2005) highlights the impact of neighbourhood income equality. They measured a negative relationship between average neighbourhood health and neighbourhood income equality. Cohen, Farley and Mason (2003) highlight the impact of two neighbourhood variables on premature mortality. The two neighbourhood variables are collective efficacy (a measure of willingness to help out for the common good) and broken windows (boarded-up stores and homes, litter and graffiti). In an Australian study, Warr et al. (2009) use a Melbourne case to show that perceptions of neighbourhood safety were associated with poorer health. They conclude that the findings suggest incorporating complementary place-based approaches when tackling poor health outcomes in low-income communities. Using the British Household Panel Study, McCulloch (2001) employed measures of social capital at the neighbourhood level and compared these with health outcomes. The study found that people in the lowest categories of social capital had increased risk of psychiatric morbidity. Those in the lowest categories of social disorganisation had lower rates of some health problems.

3.4 A lack of Australian research

The reviews discussed in this section highlight the lack of Australian research. There is a dependence on international studies where, as many researchers point out, cultural, environmental, social and housing characteristics markedly differ from Australian conditions. Accordingly, findings of the international studies may not be relevant in an Australian context. However, one area where there has been some good research is the health impact of improving the housing of Indigenous Australians.

The first example is a landmark study of the housing conditions and health status of Indigenous Australians (Pholeros et al. 1993). This study compared the rates of infection for particular diseases before and after essential health hardware maintenance and improvements. Health hardware is the term used to describe basic sanitation requirements such as clean running water and waste drainage and removal. The study indicated that improvements to basic health hardware drastically reduced the rates of eye and skin infection. However, it must be noted that the health hardware improvements were accompanied by a comprehensive educational disease prevention campaign. Consequently, it is difficult to determine whether it was the health hardware improvements or the educational program that exerted a greater influence on improved health outcomes. It is more than likely that significant improvements in health would not have occurred without the implementation of both interventions. In this case, improvements to health hardware should be viewed as a necessary catalyst to achieve desired improvements in health rather than the sole determinant of health improvements. This has important implications for assessing the costs of housing-related health problems if the costs of poor housing are based on the cost of mitigation measures.

A more recent evaluation study examined the operation of a similar program – ‘Housing for Health’ (NSW Department of Health 2010). ‘Housing for Health’ is a survey and fix methodology for improving living conditions in community housing. The ‘Housing for Health’ process aims to assess, repair or replace health hardware so that houses are safe and the occupants have the ability to carry out healthy living practices.

‘Housing for Health’ was initially developed in the late 1980s in the far northwest of South Australia by a group known as Healthabitat (see Appendix 9 for details). They were working with the Aboriginal Health Service, and set about developing a methodology that focused on environmental changes that would lead to maximum health gains, particularly for children aged from birth to five years old.

The ‘Housing for Health’ priorities are listed below.

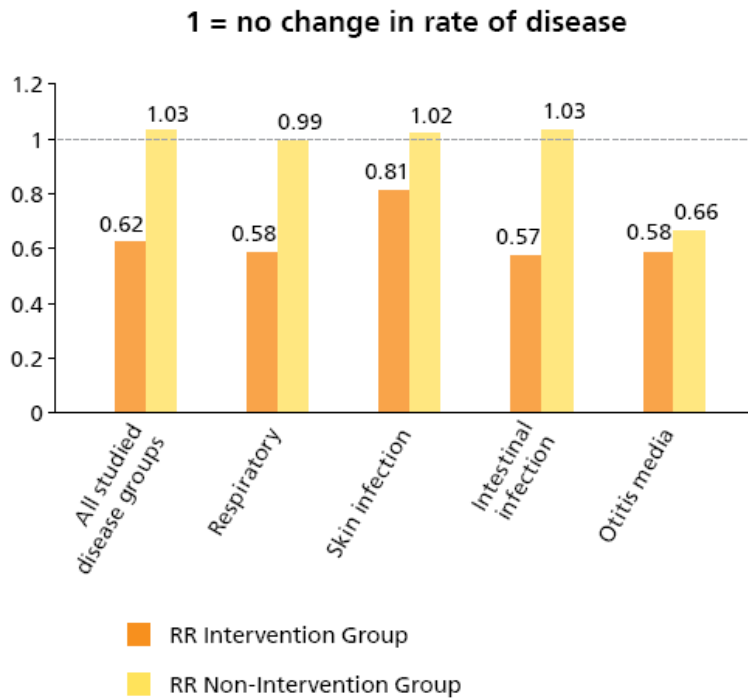
1. Safety
2. Healthy living practices
 - washing people
 - washing clothes and bedding
 - removing waste safely
 - improving nutrition
 - reducing overcrowding
 - reducing the impact of animals, vermin or insects
 - reducing dust
 - controlling temperature
 - reducing trauma.

Over the last 10 years the program has been delivering ‘Housing for Health’ projects in the Aboriginal community housing sector across NSW. During this period the program has been to 71 communities and fixed 2230 houses, encompassing over 51 700 individual items.

The evaluations of the health outcomes of the programs found that the residents of houses where the ‘Housing for Health’ intervention was implemented had a significantly reduced rate of hospital separation for infectious diseases—40 per cent

lower than for the rest of the rural NSW Aboriginal population. The information is broken down by disease types in Figure 3. This shows the 'before' and 'after' rate ratios for disease conditions in populations exposed to 'Housing for Health' compared with rural NSW Aboriginal control populations over the same period (where 1 = no change in the rate of disease).

Figure 3: Before and after rate ratios for disease conditions in intervention and non-intervention groups



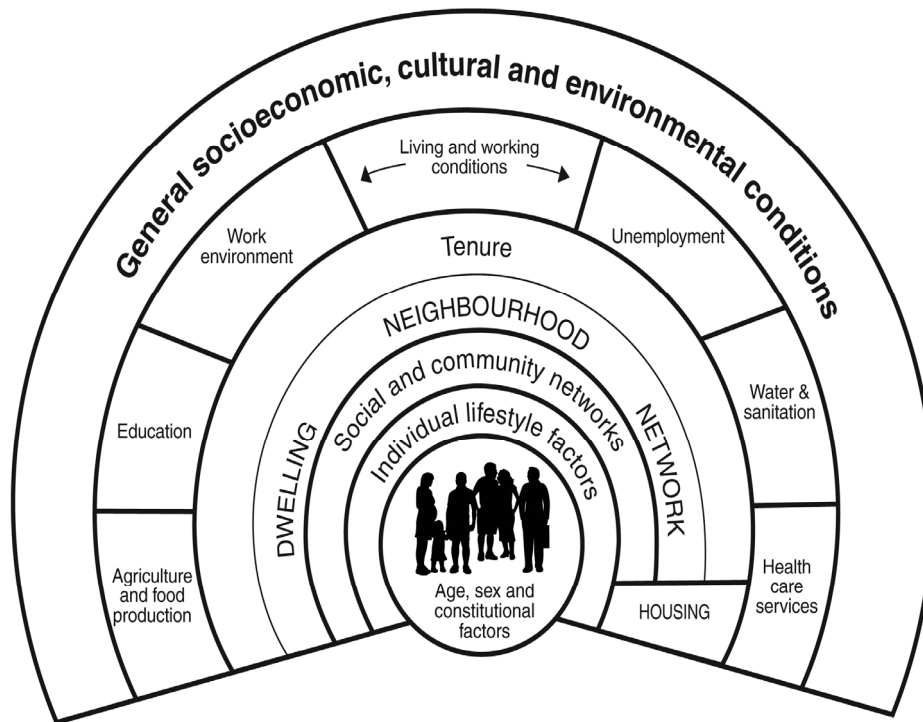
Note: Disease rate is measured by hospital separations

Source: NSW Health 2010

3.5 A conceptual framework for housing and health

It is useful to consider a conceptual framework for the relationship between housing and health which provides a way of thinking about the wide variety of research that has taken place in the last twenty years. It is considered that a start is thinking about combining the two frameworks shown at the start of the review and adding a separate 'housing' ring into the social determinants of health model. This ring is shown in Figure 4.

Figure 4: A housing ring added to the social determinants of health model



Source: Authors

3.6 Key progress in the last ten years

Despite comments in some review articles about the lack of research, particularly in Australia, a key finding of the current Investigative Panel was that considerable progress has been made over the past decade. The panel was very much of the view that this provides an excellent platform for renewed interest and activity in this research theme in Australia. The work of Thomson et al. (2001, 2009) demonstrated this same conclusion, as does the recent review of the work of Pholeros (NSW Health 2010). The time is right to undertake some significant research in this area. Section 5 of the report scopes out what a research agenda might look like by first developing a set of principles and then outlining some possible projects.

The next section provides more details of the panel process.

4 PANEL PROCESS

4.1 Introduction

In this section we detail the 'Investigative Panel process' as an important aspect of our research methodology. This level of specificity demonstrates that a rigorous approach was followed, as well as providing a useful overview of the Investigative Panel process for other AHURI researchers. Further, we include an evaluation of the panel process to assist AHURI in developing this new approach. Our critique will also be of value to future researchers wanting to use the process as effectively and efficiently as possible. The recommendations made for Investigative Panels at the conclusion of the report are derived from this detailed methodological discussion.

4.2 Process

4.2.1 Panel invitations

We drew up a list of potential panel participants in our original AHURI proposals (see Appendix 1). We reviewed and finalised this initial list from which we invited a range of research, public health and housing representatives (see Appendix 2 for 'List of Invited Participants'). Invitations were emailed to participants (non-Sydney-based and Sydney-based)—see Appendix 3a and 3b for invitations.

4.2.2 Panel participants

Participants held a range of positions within their respective organisations and brought with them a mixture of academic and professional expertise. All were either end-users of, creators of, or directly affected by the emergence of new research evidence in the public health and housing fields.

Furthermore, each participant specialised in different aspects of the broad health and housing themes. For example, Associate Professor Dockery is concerned with labour economics and social welfare dimensions of housing, while Professor Capon focuses on urban sustainability and health and has a growing interest in the effects of climate change on housing quality. See Appendix 4 for more biographical information on each participant.

Unfortunately, the invited representatives from the Commonwealth Department of Families, Housing, Community Services and Indigenous Affairs, and the NSW Department of Housing were unable to attend due to unforeseen circumstances (including the calling of the 2010 Federal election). There was initial concern that their absence would detract from the 'housing policy' focus with a greater representation of 'health policy' participants. However, the participants later stated they felt this did not detract from the process and for some, created a more open forum.

Some invitees were unable to attend due to competing demands on their time (Giles-Corti, Franklin, Khan). Other invitees were only able to attend for part of the panel (Heart Foundation representative). In some cases, an organisation was represented by several officers over the two days (Sydney South West Area Health Service). All participants whether attending in person or not were encouraged to participate by providing feedback on all aspects of the panel (including draft literature review, panel process, agenda, and post-panel materials).

Figure 5: The panel in session



4.2.3 Panel biographies

Prior to the workshop, participants were asked to submit a short biography, highlighting their work in health and housing. These were compiled and distributed to everyone before the workshop to enhance mutual understanding of expertise and interests. Many of the participants had met previously and/or had some degree of contact with one another within their fields of work/interest prior to the workshop. See Appendix 4 for ‘Invited participants’ biographies’. Additional information about organisations represented on the panel is provided in Appendix 9.

4.2.4 Literature review

A week prior to the panel a draft version of the literature review (see Sections 2 and 3 of this report for final version) was distributed. There were two motives behind this decision. The first was to give participants background on the broad range of issues that could potentially arise during the two-day workshop. The second was in order for participants to give their feedback/responses during the panel on information gaps and how to improve the literature review. All comments were noted and subsequently incorporated into the final draft version. This was distributed a second time for comment in the final draft report.

4.2.5 Panel venue

The panel meeting took place in a central location in Sydney—the Mercure Sydney Hotel. Airfares and accommodation were organised for interstate and international participants to reduce barriers to their attendance. The room was set up in a U-shape so all attendees could see each other and the presentation screen. This facilitated the free flow of conversation.

4.2.6 Panel facilitation

The panel was jointly facilitated by researchers Associate Professor Thompson and Professor Phibbs who wrote the proposal for the project funding, and undertook all subsequent organisation in relation to the panel.

They commenced proceedings by establishing an open forum in which all were encouraged to express their views as freely as possible. Confidentiality of proceedings was emphasised, as was the feedback process. Participants were informed that they would see a draft of the Final Report prior to its submission to AHURI. Comments on this draft would be considered by the researchers.

Following this introduction, questions arose regarding what the panel aims to achieve and the role of AHURI, which was answered by the facilitators and AHURI representative Mr Jim Davison, thus setting the tone for collaborative problem-solving.

The facilitators attempted to ensure that the panel did not focus on one topic for too long, or move away from the main considerations by redirecting the discussion if deemed necessary and/or appropriate.

4.2.7 Panel recording and discussion

It was also announced at the commencement of the panel that the discussions would be recorded by two research assistants on laptops who were present throughout the two days. Each research assistant took very detailed notes which they later cross-checked to ensure consistency. A single record (near to a transcript) of the panel discussions was produced. This detailed record was distributed to all participants who were in Sydney for the panel. Comments were invited. No comments or questions were received.

These detailed notes are not included in this report to ensure that privacy is maintained for the panellists. Rather, the major themes as a summary of panellists' views are included here—see Appendix 5. The panel's input informed the draft literature review, as well as the research agenda. While difficult to isolate many of the issues discussed, they have been grouped under theme headings as below.

- Research.
- Legislation.
- Economics.
- Housing conditions.
- Housing design.
- Indigenous housing.
- Public housing.
- Health issues affecting housing.
- Culture.

As well as verbal interactions and contributions, panel attendees were encouraged from the commencement of the meeting to record their individual thoughts in writing as the panel discussions proceeded. Butchers paper was available around the room for this purpose as well as individual note paper. Nevertheless, participants rarely utilised this opportunity during the two days.

4.2.8 Panel structure and timing

The panel was held over two days, from 21 July to 22 July 2010. On day 1 proceedings commenced at 3 pm and concluded at 9 pm. On day 2 proceedings commenced at 9 am and concluded at 5 pm. The agenda was distributed prior to the panel. See Appendix 6 for the agenda.

The structure of the panel was designed to facilitate both formal and informal discussions. This was intended to enhance relationship-building to enhance future research collaborations.

Figure 6: Panellists investigate a nearby 'Edible landscaped street'



4.2.9 Panel presentations

The majority of attendees were asked to present a short talk about their area of expertise (research and/or policy). These presentations were intended to increase awareness of the various issues impacting health and housing. This fed into the panel discussions, as well as informing the final literature review and recommendations for future research. With the permission of the presenters, most of the presentations have since been uploaded to the Healthy Built Environments Program website (www.fbe.unsw.edu.au/cf/hbep/research/). See Appendix 7 for the complete list of available presentations.

4.2.10 Panel process evaluations

At the conclusion of day 2, panel participants were asked to complete a simple evaluation of the Investigative Panel process. A summary of the evaluations is presented in Appendix 8.

Of the positive observations, it was noted that the open process facilitated significant exchange of information about housing and health issues, as well as current research endeavours. Of particular note was the realisation that the collaborative sharing across housing and health disciplines afforded opportunities for research and policy initiatives needed to assess contemporary problems. As one panellist stated,

The panel came up with ideas that would have been impossible without the engagement of both health and housing people in the room together. The generation of ideas would not have occurred even if the document had been circulated for comment.

The opportunity for networking afforded by the panel structure was viewed very positively.

On the negative side, some participants felt that the process could have been shortened. It was commented that an outside facilitator would have been a worthwhile investment, freeing up the lead researchers (Phibbs & Thompson) to fully participate in the panel discussions. Some negative comments were made about the pre-panel

process, suggesting that additional information about different aspects of the panel circulated to participants would have enhanced the process. There were suggestions that focused small-group interactions would have been useful. There was some concern expressed about the breadth of representation on the panel, particularly the absence of housing policy voices.

4.2.11 Post-panel process critique and recommendations

Following the panel in Sydney, review of participant evaluations and opportunities for panellist feedback, we spent time reflecting on, and critiquing both the process and its outcomes. This may not be a feature of future Investigative Panel reports, but given that ours was one of the first to be conducted, the need for such critique is, we believe, warranted. This critique has enabled the formulation of recommendations to AHURI for future Investigative Panels. These are included at the end of this report.

The Health Impacts of Housing Panel was clearly effective in introducing mainstream health and housing researchers to mainstream health policy-makers. This was evident from the collaborative and collegial conduct of the panel and the lively engagement in different networking opportunities—both during formal sessions and more informal activities such as the dinner and lunch time field trip. However, there was not, a good representation of housing policy-makers on the panel. Their absence, despite invitations and follow-ups to attend, was regrettable but outside of our control.

In relation to the panel itself, the open approach adopted enabled free-flowing discussion of ideas, as well as a good exchange between researchers and policy professionals. Nevertheless, the panellist evaluations were critical of the lack of small-group work and over-reliance on expert presentations to the entire group. This suggests that there should have been a more balanced approach, including the use of focused small-group discussion around some possible research strategies and/or specific projects. The decision to facilitate the panel ourselves was, in hindsight, not a good one. A professional facilitator would have enabled us to have been more fully engaged in the panel. Once the panel was over, there was very little feedback on the outcomes. We sent the draft report to all participants seeking feedback. Again, in hindsight, we should have scheduled a formal process to do this—such as a teleconference meeting.

Some aspects of the panel process were outside our control—the lack of participation by some key policy professionals as a consequence of the timing of the Federal election just after our panel.

Following submission of our draft report to AHURI and release of reviewers' comments, we have had fruitful discussions with senior AHURI officers about the specifics of our Investigative Panel, as well as the process more generally. These productive interactions have assisted us to refine our recommendations to AHURI for the future conduct of Investigative Panels.

Figure 7: The panel dinner—time for networking



5 GENERATING A RESEARCH AGENDA FOR HOUSING AND HEALTH

A number of the research studies identified in Section 3 have suggested what sort of research is needed, particularly Bridge et al. (2003), Dockery et al. (2010) and Thomson et al. (2001, 2009). Panellist input has also been instrumental in this endeavour.

Some of the common themes for these suggestions include:

- Larger scale studies that generate more reliable evidence.
- Studies based on some sound theoretical models of the connections between housing and health.
- Longitudinal studies that provide time for some of the longer-term health impacts of housing to be identified.

Other suggestions were that studies should:

- Be collaborative ventures which bring housing and health agencies together.
- Feature study designs which include both quantitative and qualitative research methods.
- Include evidence of the cost-effectiveness of housing interventions.
- Compare and contrast state-related policy differences (legislation and organisational) to promote greater insights into common and divergent aspects. These differences might provide some opportunities for natural experiments.
- Develop better standard measures of housing and health variables to enable more informed comparisons between studies. Continuing to develop a glossary of housing and health (Howden-Chapman 2004) might be of assistance here.

5.1 Developing a set of principles

The panel considered the issues raised by previous investigations and discussed a set of principles to identify potential research projects. The principles the panel developed are listed below.

1. Leverage the funding. Good studies that examine the connection between housing and health are expensive. Given the significant health research funding available, it is important for AHURI research funding to be supplemented by funding from other sources (e.g. NHMRC Partnership Grants⁵).
2. Given the variety of connections between housing and health, there is likely to be a broad range of potential projects, both in terms of 'content' (physical health, mental health and so forth) and methods (quantitative, qualitative, mixed methods and so forth). Accordingly, a range of projects should be identified in an emerging research agenda. However, given the responsibility of the State Housing

⁵ NHMRC Partnership Grants are a new NHMRC scheme that represent a major new focus for the NHMRC. They aim to lead to more effective connections between decision makers, who design policy, and researchers, and to improve the availability and quality of research evidence to help inform the policy process. Details are at: www.nhmrc.gov.au/grants/partnerships.

Authorities (SHAs) for the supply and maintenance of dwellings, a focus on this element of the conceptual framework shown in Figure 4 would seem appropriate.

3. Given the large size of health budgets and the amount of budget stress that is being experienced, it is important to articulate the findings of research projects in terms of the likely dollar savings in health budgets from changes in housing (see Petticrew et al. 2004).
4. The housing–health nexus is going to be an area of long-term interest. It is important that substantial research resources be directed to developing the ongoing tools to support this agenda. A number of obvious projects exist in the area of adding better housing variables to longitudinal studies and of reviewing the potential of existing longitudinal data sets to support housing–health research.
5. It is likely that good studies in this area will adopt a multi-disciplinary approach that might include public health experts and researchers, clinicians, housing researchers and economists. Lawrence, who supports a multi-disciplinary approach to examine housing and health research, champions an ecological perspective (2004, p.497).⁶
6. There is potential to use the interest in the housing–health issue in relation to public housing to develop some expertise that can be extended to other housing tenures.
7. Like all research, the Australian housing and health research agenda should learn from the findings in other countries, after adapting such findings for local variations. Of particular help might be the considerable body of research developed in recent years in New Zealand.

5.2 A possible research agenda

A set of possible research projects which could re-invigorate the Australian housing and health agenda is shown in Table 2. The third column identifies the potential project and the fourth column connects it to the principles identified above.

⁶The ecological perspective considers four main sets of interrelated factors.

The individual, who has a specific genetic code with a susceptibility and immunity to illness and disease, as well as lifestyle traits.

- a. The agent or vector of illness and disease, including not only bio-geo-physical components of the environment but also the social and psychological dimensions of human settings.
- b. The physical and social environment of the individual.
- c. The available resources used by individuals and households, including housing, nutrition, money, information, and access to health and medical services which ought to be affordable for all groups of the population.

Table 2: Possible research projects in a housing–health research stream

Project number	Project type	Project description	Connected principles
	Foundations		
1.	General	Identify health data sets and longitudinal studies that currently have, or could, develop relevant housing variables.	4,5
2.	General	Analyse existing data sets using data strategies identified by Dockery et al. (2010).	4,5
	Dwelling		
3.	General	Examine the cost-effectiveness of injury prevention programs in homes.	2,3,5,7
4.	General	Examine the health impacts of the national insulation program.	2,3,5,7
5.	Indigenous	Define a reliable overcrowding measure ⁷ .	2,3,5
6.	Indigenous	Measure the quality of housing not just the quantity.	2,3,5
	Neighbourhood		
7.	General	Develop a Healthy Built Environments Index for Public Housing.	5,6
	Tenure		
8.	General	Examine the impact of housing, particularly tenure on loneliness.	2,5

⁷ Note that an AHURI project has recently been commissioned on this area of work

6 CONCLUSIONS AND RECOMMENDATIONS

This Investigative Panel has identified a substantial international literature on the connections between housing and health. The issue has been a long-term concern of public health officials. As Lawrence (2004, p.487) states:

Since Antiquity, architects, medical practitioners, novelists and social reformers have observed relations between the housing conditions of people and their ill health.

In recent times, particularly over the past decade, there has been renewed interest in the relationship between housing and health, with the body of detailed knowledge substantially increasing. New Zealand has become a leading world centre for this interdisciplinary research, completing a number of detailed projects showing significant relationships between housing and health.

In comparison to this international activity, there has been limited research in Australia. The recent evaluation of the 'Housing for Health' Program in New South Wales has revealed the sharp connection between improved housing conditions and enhanced health for the Indigenous community. It is hoped that the work of the Investigative Panel reported here will help to stimulate renewed interest in the housing and health agenda for both Australian researchers and policy-makers. We want to encourage AHURI researchers to partner with public health experts, together with scholars from other relevant disciplines, to develop a substantial body of work in this critically important research and policy area.

The AHURI Investigative Panel process has provided an opportune vehicle to bring researchers and policy-makers together in reflecting on complex contemporary interdisciplinary housing and health issues. As this is one of the first Investigative Panels to be reported, we make the following recommendations to AHURI for the future development of this process.

Panel process guidelines

- The development of a comprehensive Investigative Panel checklist to ensure that all organisational matters are addressed by researchers—this checklist to be included as part of the AHURI guidelines to researchers.
- The development of an agenda template for the conduct of an Investigative Panel—this template to be included as part of the AHURI guidelines to researchers.
- The inclusion of a formal follow-up process after the Investigative Panel to seek feedback from participants on research outcomes and the draft report.

Panel process conduct

- Use of an expert and impartial facilitator who can work across the research–policy divide.
- Inclusion of small-group work as part of the Investigative Panel process.
- Balance between information giving (presentations) and information sharing (discussions).
- Balance between being open to a broad range of suggestions and focusing the discussion.
- Embrace the networking opportunities and benefits of the Investigative Panel by including opportunities for formal and informal interactions.

- Mandate an evaluation of the Investigative Panel process—AHURI to develop a template for an appropriate evaluation.

Reviewer guidelines

- Reviewer guidelines for Investigative Panel reports need to reflect the unique nature of the Investigative Panel, ensuring reviewers understand it is not a traditional research report or project. Particular aspects which warrant review are the mix of policy/research panellists and the ways in which contributions from participants are included in the report.

The Investigative Panel has much to offer the development of a strategic research agenda for housing policy. The Investigative Panel informs policy-relevant research that encompasses an interdisciplinary framework. It can assist in ensuring that future research is well targeted, has a good chance of success and is needed by the policy audience. The further development of the Investigative Panel process by AHURI needs to be supported by both researchers and policy-makers working in housing issues that matter for today.

REFERENCES

- Addison, C. (1922) *The Betrayal of the Slums*, Herbert Jenkins: London.
- Australian Bureau of Statistics (2002) *National Health Survey – Summary of Results, Australia* (No. 4364.0), ABS: Canberra, ACT.
- Australian Planner, (2009) Healthy Spaces and Places, *Journal of the Planning Institute of Australia*, 46(2).
- Australian Planner, (2007) Planning for Health, *Journal of the Planning Institute of Australia*, 44 (2).
- Barker, D.J.P., Coggon, D., Osmond, C. and Wickham, C. (1990) Poor housing in childhood and high rates of stomach cancer in England and Wales, *British Journal of Cancer*. 61: 575–8.
- Barton, H. (2005) Healthy urban planning: setting the scene, *Built Environment*. 31(4): 281–7.
- Barton, H. and Tsourou, C. (2000) *Healthy Urban Planning*, Spon Press on behalf of WHO Regional Office for Europe: London.
- Bridge C., Adams T., Phibbs P., Matthews M. and Kendig, H. (2010) *Reverse Mortgages and Older People: Growth Factors and Implications for Retirement Decisions*, AHURI Final Report No 146, Melbourne.
- Bridge, C., Flatau, P., Whelan, S., Wood, G. and Yates, J. (2003) *Housing Assistance and Non-shelter Outcomes*, AHURI, WA Research Centre: Western Australia.
- Britten, N., Davies, J. and Colley, J. (1987) Early respiratory experience and subsequent cough and peak expiratory flow rate in 36 year old men and women, *British Medical Journal*. 294: 1317–9.
- Burke, M., Hatfield, E. and Pascoe, J. (2008) *Urban planning for physical activity and nutrition: a review of evidence and interventions*, Working Paper no. 22, Urban Research Program, Griffith University: Queensland.
- Cacioppo, J.T., Fowler J.H. and Christakis Nicholas A. (2009) Alone in the Crowd: The Structure and Spread of Loneliness in a Large Social Network, *Journal of Personality and Social Psychology*, 97(6) 977–91.
- Cohen, D.A., Farley, T.A. and Mason, K. (2003) Why is poverty unhealthy? Social and physical mediators, *Social Science & Medicine*. 57: 1631–41.
- Corburn, J. (2009) *Toward the healthy city: people, places, and the politics of urban planning*. The MIT Press: Cambridge.
- Dockery, A.M., Kendall, L.J., Mahendran, A., Ong, R. and Strazdins, L. (2010) *Housing and Development Outcomes for Children: A Scoping Study*. AHURI Final Report, WA Research Centre: Perth.
- Frank, L.D., Engelke P.O. and Schmid T.L. (2003) *Health and community design*, Island Press: Washington, D.C.
- Franklin, A. and Tranter, B. (2010) *Housing, Loneliness and Health*, AHURI Southern Research Institute, Hobart.
- Frumkin, H., Frank, L.D. and Jackson, R. (2004) *Urban sprawl and public health*, Island Press: Washington, DC.

- Geller, J. (2000) 'Loneliness: An Overlooked and Costly Health Risk Factor' *Minnesota Medicine* 83: no pages.
- Giles - Corti, B., Knuiman, M., Timperio, A., Van Niel, K., Pikora, T.J., Bull F.C.L., Shilton, T. and Bulsara, M. (2008) Evaluation of the implementation of a state government community design policy aimed at increasing local walking: *Design issues and baseline results from RESIDE*, Perth Western Australia, Preventive Medicine. 46(1): 46–54.
- Hill, K., Smith, R., Murray, K., Sims, J., Gough, J., Darzins, P., et al. (2000) *An analysis of research on preventing falls and falls injury in older people: Community, residential aged care and acute care settings*. National Ageing Research Institute, Commonwealth Department of Health and Aged Care Injury Prevention Section: Australian Capital Territory.
- Hou, F. and Myles, J. (2005) Neighbourhood inequality, neighbourhood affluence and population health, *Social Science & Medicine*. 60: 1557–69.
- Howden-Chapman, P. (2004) Housing Standards: A glossary of housing and health, *Journal of Epidemiology and Community Health*. 58: 162–8.
- Howden-Chapman, P., Crane, J., Matheson, A., et al. (2005) Retrofitting houses with insulation to reduce health inequalities: aims and methods of a clustered, randomised community-based trial, *Soc Sci Med*. 61(12): 2600–10.
- Howden-Chapman, P., Matheson, A., Crane, J., et al. (2007) Effect of insulating existing houses on health inequality: cluster randomised study in the community, *BMJ*. 334(7591): 460.
- Infrastructure Australia, (2010) *State of Australian cities 2010*, Major Cities Unit, Infrastructure Australia: Canberra.
- Lawrence, R. (2004) Housing and health: from interdisciplinary principles to transdisciplinary research and practice, *Futures*. 36: 487–502.
- Marmot, M. (2010) *Fair Society: Healthy Lives*, Strategic review of health inequalities in England post 2010. Accessible from <http://www.marmotreview.org> (accessed July 2010).
- Marsh, A., Gordon, D., Heslop, P. and Pantazis, C. (2000) Housing Deprivation and Health: A Longitudinal Analysis, *Housing Studies*. 15(3): 411–28.
- McCulloch, A. (2001) Social environments and health: cross sectional national survey, *BMJ*. 323(7306): 208–9.
- Mellor, D., Stokes, M., Firth, L., Hayashi, Y. and Cummins, R. (2008) Need for belonging, relationship satisfaction, loneliness and life satisfaction, *Personality and Individual Differences*. 45: 213-218.
- Mendall, M.A., Goggin, P.M., Molineaux, N. et al. (1992) Childhood living conditions and *Helicobacter pylori* seropositivity in adult life, *Lancet*. 339: 896–7.
- Mudarri, D. (2010) *Public Health Consequences and Cost of Climate Change Impacts on Indoor Environments*, Report for the U.S. Environmental Protection Agency: Washington, D.C.
- Mullins, P. and Western, J. (2001) *Examining the links between housing and nine key socio cultural factors*, AHURI Final Report, Queensland Research Centre: Queensland.

- National Center for Healthy Housing (2009) *Housing Interventions and Health: A review of the evidence*. National Center for Healthy Housing: Maryland.
- NSW Health (2010) *Closing the Gap: 10 Years of Healthy Housing for Health in NSW: An evaluation of a healthy housing intervention*. Aboriginal Environmental Health Unit, Population Health Division, NSW Department of Health: Sydney.
- Petticrew, M., Whitehead, M., Macintyre, S., Graham, H. and Egan, M. (2004) Evidence for public health policymakers on inequalities: The reality according to policymakers, *J Epidemiol Community Health*. 58: 811–6.
- Phibbs, P. (2000) *The Social and Economic Impacts of Unmet Needs*, Technical Paper Number 2. Research and Policy Unit, Queensland Department of Housing: Brisbane.
- Phibbs, P. and Young, P. (2005) *Housing Assistance and Non Shelter Outcomes*, AHURI Centre: Sydney.
- Phibbs, P. (2009) Ageing in Place. Three video interviews of private tenants in Melbourne. Available from <http://www.older tenants.org.au/videos> (September 2010).
- Pholeros, P., Rainow, S., Torzillo, P. (1993) *Housing for Health: Towards a Healthy Living Environment for Aboriginal Australia*, Healthabitat: Newport Beach.
- Ranson, R. (1993) Accidents at home the modern epidemic, in R. Burrige and D. Ormandy (Eds.), *Unhealthy housing: Research, remedies, and reform* (pp. 233–54). E. and F. N. Spon: London.
- Smith S. (2009) *AHURI Research Agenda: looking forward*, Report to AHURI.
- Stack, S. (1998) Marriage, Family and Loneliness: A Cross-National Study, *Sociological Perspectives*. 41(2): 415–32.
- Thomson, H., Petticrew, M., Morrison, D. (2001) Health effects of housing improvement: Systematic review of intervention studies, *BMJ*. 323(7306):187–90.
- Thomson, H., Thomas, S., Sellstrom, E. and Petticrew, M. (2009) The Health Impacts of Housing Improvement: A Systematic Review of Intervention Studies from 1887 to 2007, *Am J Public Health*. 99: S681–92.
- Warr, D., Feldman, P., Tacticos, T., and Kelaher, 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): 25–33.
- Waters, A.M. (2001) *Do Housing Conditions Impact on Health Inequalities Between Australia's Rich and Poor?* Final Report, AHURI ANU Research Centre: Canberra.
- Whitehead, M. and Dahlgren, G. (1991) What can we do about inequalities in health? *The Lancet*. 338: 1059–63.
- Wilkinson, D. (1999) *Poor housing and ill health: A summary of the research evidence*. Scottish Office Central Research Unit: Edinburgh.
- Wilkinson, R. and Marmot, M., (Eds) (2003) *Social determinants of health: the solid facts*. 2nd edition, WHO: Copenhagen.

- WHO and the Ministry of Health, Canada (1986) *Ottawa Charter for Health Promotion*. Accessible from http://www.euro.who.int/aboutwho/Policy/20010827_2 (accessed July 2010).
- World Health Organization (2006) Technical meeting on quantifying disease from inadequate housing. Bonn, Germany. Accessible from: http://www.euro.who.int/Document/HOH/EBD_Bonn_Report.pdf (accessed July 2010).
- Yates, J. and Milligan, V. (2007) *Housing affordability: A 21st century problem*, Final Summary Report of the National Research Venture 3, Housing affordability for lower income Australians. AHURI: Melbourne.

APPENDICES

Appendix 1: List of potential panelists

The list below was included in the original grant proposal.

Academics

- Professor Billie Giles-Corti (UWA). Billie is leading research on health outcomes in new suburban developments in Perth.
- Professor Philippa Howden-Chapman from the NZ Centre for Sustainable Cities in Wellington (University of Otago, School of Medicine). Philippa has a well-established and internationally recognised research program on housing and health.
- Professor Tony Capon—participant in UNSW/NSW Department of Health project on health and the built environment.
- Professor Adrian Franklin, University of Tasmania.
- Dr Asif Khan—ex-AHURI scholar and now Lecturer in Planning, University of Auckland.

Practitioner and leading Indigenous housing expert

- Associate Professor Paul Pholeros—architect and expert on Indigenous housing and health

Public health

- Associate Professor Stephen Corbett is the Director, Center for Population Health, Sydney West Area Health Service.
- Delegate from the National Heart Foundation.

Housing policy

- Delegate from FAHCSIA.
- Dr Blair Badcock, Chief Advisor, Housing New Zealand Corporation.
- Delegate from the NSW Department of Housing.

Other

- AHURI staff member (to be nominated by AHURI).

Appendix 2: List of invited participants

Researchers—out of Sydney

- Professor Billie Giles-Corti; Director of Centre for the Built Environment and Health, Faculty of Medicine, Dentistry and Health Sciences, University of Western Australia.
- Professor Philippa Howden-Chapman; Centre for Sustainable Cities, School of Medicine, University of Otago, Wellington, NZ.
- Professor Adrian Franklin, University of Tasmania.
- Dr Asif Khan—ex-AHURI scholar; Senior Lecturer in Planning, University of Auckland.
- Associate Professor Mike Dockery, Curtin University.

Researchers and policy-makers—Sydney-based

- Professor Tony Capon (Co-Director, Healthy Built Environments Program, City Futures Research Centre, UNSW; ANU).
- Associate Professor Stephen Corbett, Director, Centre for Population Health, Sydney West Area Health Service.
- Delegate from the National Heart Foundation.
- Delegate from Sydney South West Area Health Service.
- Delegate from Sax Institute—Melanie Andersen.
- Joanne Quinn (ageing and housing researcher).

Practitioner and leading Indigenous housing expert

- Associate Professor Paul Pholeros—Sydney-based Healthabitat.

Housing policy representatives

- Delegate from FAHCSIA.
- Delegate from the NSW Department of Housing.

Other representatives

- AHURI staff member (to be nominated by AHURI).

UNSW and UWS research team

- Associate Professor Susan Thompson.
- Professor Peter Phibbs.
- Mr Devin Gibson—AHURI researcher.
- Ms Joanna York—Healthy Built Environments Program, Senior Research Officer.

Appendix 3A: Invitation to panel—non-Sydney based invitee

The Health Impacts of Housing—An Investigative Panel of Australian and New Zealand researchers, public health and housing officials

Dear _____

I am writing to invite you to participate in a workshop of experts to examine the health impacts of housing. The workshop will be held in Sydney over a day and a half in the week of July 19 (most likely towards the end of the week). We will fund your return air travel to Sydney and two nights accommodation for the workshop. This is part of an Australian Housing and Urban Research Institute (AHURI) research project which Professor Peter Phibbs and I are currently undertaking. The aim of this project is to identify potential research projects in the area of the health impacts of housing by identifying current gaps in knowledge. The outcomes will form part of the final report to be presented to AHURI. We hope that this will establish high-priority research questions for inclusion in a national housing-health research agenda.

We are inviting leading researchers and public policy officials from across Australasia to participate in this investigative workshop panel. We are currently preparing a literature review as a background paper for the panel. This will be distributed before the workshop. At this stage we anticipate that a number of themes will be addressed in the review. These include:

- The impact of dwelling design on health.
- The impact of the state of repair the dwelling on health.
- The impact of the use of the dwelling on health.
- The impact of the location of the dwelling on health.
- The impact of housing connected variables such as residential mobility on health.

The workshop will begin with a session on the literature review in order to identify any obvious omissions from the review. This will be followed by several invited presentations on the potential of different data sources to address housing and health, including specific needs of children and Indigenous communities.

Workshop participants will then consider where there are gaps in the research base and be invited to pitch potential research projects that address these gaps. We will evaluate the proposals from a research and policy perspective considering the following criteria:

1. 'Researchability'—would the research method work?
2. Value for money.
3. Potential change in health outcomes.
4. Potential to implement 'housing' change.

Following the workshop, the highest rated projects will be more fully documented and identified as high-priority research questions for inclusion in a national housing-health research agenda. This will be presented to AHURI as part of our research project.

In terms of the workshop program, we propose to commence around mid afternoon, with a working dinner that evening. The next day will be devoted to examining different project ideas, with a closing drinks session and dinner for those leaving the

following day. The venue will be a Sydney hotel in reasonable proximity to the airport. We will advise of details.

Can you please let me know if you would be able to attend the workshop and if you have any initial questions or comments about the workshop process.

I look forward to hearing from you.

Kind regards,

Susan Thompson

(for the research team of Susan Thompson and Peter Phibbs)

Appendix 3B: Invitation to panel—Sydney-based invitee

The Health Impacts of Housing—An Investigative Panel of Australian and New Zealand researchers, public health and housing officials

Dear _____

I am writing to invite you to participate in a workshop of experts to examine the health impacts of housing. The workshop will be held in Sydney over a day and a half in the week of July 19 (most likely towards the end of the week). The workshop is part of an Australian Housing and Urban Research Institute (AHURI) research project that Professor Peter Phibbs and I are currently undertaking. The aim of this investigation is to identify potential research projects in the area of the healthy impacts of housing by identifying current gaps in knowledge. The outcomes will form part of the final report to be presented to AHURI. We hope that this will establish high-priority research questions for inclusion in a national housing-health research agenda.

We are inviting leading researchers and public policy officials from across Australasia to participate in this investigative workshop panel. We are currently preparing a literature review as a background paper for the panel. This will be distributed before the workshop. At this stage we anticipate that a number of themes will be addressed in the review. These include:

- The impact of dwelling design on health.
- The impact of the state of repair the dwelling on health.
- The impact of the use of the dwelling on health.
- The impact of the location of the dwelling on health.
- The impact of housing connected variables such as residential mobility on health.

The workshop will begin with a session on the literature review in order to identify any obvious omissions from the review. This will be followed by several invited presentations on the potential of different data sources to address housing and health, including specific needs of children and Indigenous communities.

Workshop participants will then consider where there are gaps in the research base and be invited to pitch potential research projects that address these gaps. We will evaluate the proposals from a research and policy perspective considering the following criteria:

1. 'Researchability'—would the research method work?
2. Value for money.
3. Potential change in health outcomes.
4. Potential to implement "housing" change.

Following the workshop, the highest rated projects will be more fully documented and identified as high-priority research questions for inclusion in a national housing-health research agenda. This will be presented to AHURI as part of our research project.

In terms of the workshop program, we propose to commence around mid afternoon, with a working dinner that evening. The next day will be devoted to examining different project ideas, with a closing drinks session and dinner for those leaving the following day. The venue will be a Sydney hotel in reasonable proximity to the airport. We will advise of details.

Can you please let me know if you would be able to attend the workshop and if you have any initial questions or comments about the workshop process.

I look forward to hearing from you.

Kind regards,

Susan Thompson

(For the research team of Susan Thompson and Peter Phibbs)

Appendix 4: Invited participants' biographies



AHURI Investigative Panel—Health and Housing Panellist Biographies

Ms Melanie Andersen (Sax Institute)

Melanie Andersen works at the Sax Institute in Sydney, an organisation which builds partnerships between health researchers and policy agencies and facilitates population health research projects. Melanie recently commenced a PhD at the University of New South Wales with the School of Public Health and Community Medicine. Her thesis aims to describe the housing situation of Aboriginal children and families living in urban areas of NSW, particularly Western Sydney, and to explore associations between housing quality and health outcomes. This work is an extension of the Study of Environment, Aboriginal Resilience and Child Health (SEARCH), a longitudinal study of the health of approximately 2000 Aboriginal children from 800 families living in urban communities in NSW.

Melanie's interest in the links between housing and health stem from her time working as an occupational therapist in community health and hospital settings. Much of her clinical work involved designing and coordinating home modifications for clients with disabilities and chronic illnesses, many of whom lived in public housing. Thus Melanie has an interest in the role physical and social environments play in supporting and restricting human health and participation. This interest deepened while undertaking postgraduate study in epidemiology. Melanie is particularly interested in the housing issues facing vulnerable populations, namely Indigenous people, children, those on low incomes, the elderly and those with disabilities.

Professor Tony Capon (University of New South Wales/Australian National University)

Tony is a public health physician with expertise in environmental health and health promotion. He is professor of population health at the Australian National University and convenes the Australian Climate Change Adaptation Research Network for Human Health. His research focuses on urban sustainability and health. Tony co-directs the Healthy Built Environments Program in the City Futures Research Centre at the University of New South Wales.

Associate Professor Stephen Corbett (Sydney West Area Health Service)

Stephen is a public health physician currently working as Director of the Centre for Population Health in Western Sydney and was previously Director of the Environmental Health Branch within NSW Health.

In this former position he had an active interest in housing and health issues which included:

- Health impacts of indoor and outdoor air quality.
- Lead contamination in soil and roof spaces and its impacts on children's health.
- Asthma prevention through housing interventions.

→ Housing and health in Indigenous communities.

More recently these interests have broadened to include:

- Some of the potential conflicts between the need for urban densification and potential exposures to air and noise pollution.
- The resilience of our current and future housing stock to predicted increases in extremes of temperature.
- The challenges to both health and housing of densification in urban areas.

Ms Michelle Daley (Heart Foundation)

Michelle has a background in health promotion and recently commenced working as Senior Manager, Active Living with the Heart Foundation. Previously, she was Program Manager, Obesity Prevention with the Health Promotion Service in SSWAHS.

Her recent experience has been in active transport advocacy and promotion as well as physical activity and nutrition project implementation and evaluation with public housing residents and other low-income communities.

Michelle's current interest is the creation of supportive environments for active living (especially walking) through the integration and evaluation of the Heart Foundations 'Healthy by Design' principles in urban planning and development.

Mr Jim Davison (Australian Housing and Urban Research Institute)

Jim Davison has been the Assistant Director of Research at AHURI for the last six years. During that time Jim has helped to build a body of Australian research on housing and non-shelter outcomes, especially in relation to economic participation, through AHURI's research program. He is keen to see AHURI take a lead in producing high-quality empirical work examining the links between health and housing, relevant to the Australian context.

Associate Professor Mike Dockery (Curtin University)

Dr Alfred Michael Dockery is Associate Professor with the School of Economics and Finance at Curtin University, and Research Fellow with the Centre for Labour Market Research. Mike's principal expertise is the analysis of applied labour market issues, much of which has involved the use of longitudinal (panel) data. He has worked extensively as a consultant for government and private organisations, concentrating in the areas of labour economics, vocational education and training and evaluative studies. His current research focuses upon: the school-to-work transition; the effects of work and other labour market experience on 'happiness' and 'well-being'; Indigenous labour market and social outcomes and the effects of housing assistance on labour market outcomes. He recently led a multi-disciplinary scoping study on the links between housing and children's well-being. Mike has authored or co-authored around 30 papers in peer-reviewed journals, including *Social Science & Medicine*, *Housing Studies*, *Economic Record*, *International Labour Review*, *International Journal of Manpower* and the *Australian Journal of Labour Economics* plus a variety of monographs.

Ms Helen Fletcher (FaHCSIA)

Helen Fletcher is a public servant of 30 years experience, and has worked at both the Federal and state level. The first decade of Helen's career was in Indigenous affairs, where she worked in the Department of Aboriginal Affairs, Aboriginal Development Commission, National Aboriginal Conference and ATSIC. Helen then accepted a position with the ACT government, initially working in the Community Services area and then transferring to what is now Housing ACT. In the time she was in Housing ACT, Helen worked in areas such as service improvement and policy, as well as managing a Regional Office and the central Applicant Services Centre for the ACT. In 1998, Helen became the Director of Housing ACT; a position she performed until 2005. She then spent a year working at the Federal level on support to child care services and in the Office for Women. Helen returned to housing in FaHCSIA in 2006, where she is now the Manager, Housing Research. Helen is a member of the Australasian Housing Institute and the president of Capital Community Housing (formerly TAS Housing), a community housing organisation in Canberra dedicated to the provision of socially just housing and tenancy support services to people with disabilities.

Professor Adrian Franklin (University of Tasmania)

Professor Adrian Franklin trained as an urban anthropologist in the UK and has held Professorial positions at the University of Bristol and Oslo. In 2003–05 he was Head of Urban Studies at the School of Policy Studies, University of Bristol. His work on cities has focused mostly on urban culture, neighbourhood and social networks although he has also conducted work on the relationship between people and nature—and companion animals (and human health)—in the city. Inspired by the recent work of Zygmunt Bauman on the decline of the social bond in liquid modernity, he has been conducting research on mobility in contemporary societies (he founded and is Editor of *Tourist Studies*); as well as research on loneliness in contemporary societies. In the past five years he has completed theoretical analyses of loneliness and has completed two national surveys of loneliness in Australia. In 2010 Sage published his new monograph *City Life*. His PhD was on privatism, modernity and the modern home and this recent work is something of a return to an older area of interest.

Mr Devin Gibson (University of New South Wales)

Devin is completing his final year of an urban planning degree with a focus on sustainability. He seeks work in the field of sustainable development and transport. Working for a year at Sydney Water as a student planner gave him experience in infrastructure management and planning. While finishing off his studies, Devin has been volunteering at The Watershed as a Project Officer for the development of a Bike Library. He is also currently working as a Research Assistant for the Healthy Built Environments Program at the University of NSW.

Professor Billie Giles-Corti (University of Western Australia)

Professor Billie Giles-Corti is Director of the Centre for the Built Environment and Health at the School of Population Health, The University of Western Australia and an NHMRC Senior Research Fellow. For more than a decade, she and a multi-disciplinary team of researchers and postgraduate research students have been

studying the impact of the built environment on health, social and health behaviour outcomes, including walking, cycling, public transport use, overweight and obesity, social capital and dog-walking. She is a leading health promotion researcher in Australia and recognised internationally for her research on the built form.

Professor Philippa Howden-Chapman (University of Otago)

Philippa Howden-Chapman is a social scientist and Professor of Public Health at the University of Otago, Wellington, New Zealand. She is Director of He Kainga Oranga/Community Housing Intervention Research Programme and the New Zealand Centre for Sustainable Cities. She has won a number of national awards for her research into housing, energy efficiency and health, as well as for mentoring students. She is currently a member of the WHO Bonn Working Housing Group which is establishing the attributable burden of disease from housing.

Philippa was the leader of two major community trials which have been published in the *British Medical Journal*, a trial of the effectiveness of retrofitted insulation, the Housing, Insulation and Health Study and a trial of the effect of installing more effective, clean heating in the homes of children with asthma, the Housing, Heating and Health Study. These studies have led to major infrastructure investments by successive governments in insulation and clean heat. The housing research group is currently carrying out two further trials, the first related to electricity grants to encourage older people who have been hospitalised, to heat their homes, and the second to remediate home hazards to prevent injuries. The research group is also conducting a cohort study of all social housing tenants in New Zealand to see if rehousing people in social housing reduces hospitalisation. The Sustainable Cities research group is carrying out research about the link between housing and transport affordability and the link with urban form.

Professor Bin Jalaludin (Sydney South West Area Health Service)

Professor Jalaludin is an epidemiologist and a public health physician who also has 10 years of experience in clinical paediatrics. His current research interests are in the areas of environmental epidemiology, health services research, neighbourhoods and health and social epidemiology. His expertise is in quantitative research methods and biostatistics. He has received funding from Federal and state government agencies, as well as from the NHMRC and ARC. He is a Board member and member of Scientific Review Panel, Australian Paediatric Surveillance Unit, Royal College of Physicians; the Human Research Ethics Committee, SSWAHS; the Research Advisory Committee, Ingham Health Research Institute; the Lane Cove Tunnel Health Study Steering Committee, NSW Health and an ex officio member of the Air Pollution Expert Committee, NSW Health.

Dr Asif Khan (Sydney South West Area Health Service)

Asif Khan is Senior Lecturer in the School of Architecture and Planning at the University of Auckland in New Zealand. His PhD thesis investigated the role of housing in children's education, using both qualitative and quantitative approaches. His research interests include housing policy and non-shelter outcomes of housing. He is particularly interested in looking at how housing can impact on children's health.

Ms Michelle Maxwell (Sydney South West Area Health Service)

Michelle is Service Development Officer for Population Health in Sydney South West Area Health Service. In that role Michelle's responsibilities include workforce development, healthy urban development, and building capacity for evidence-based practice and Health Impact Assessment within Population Health and the Area Health Service.

Michelle was jointly responsible for the initiation and development of the Housing and Health Partnership between Greater Western Sydney Division of Housing NSW, SSWAHS Population Health and the Centre for Health Equity Training, Research and Evaluation (CHETRE) which now has a formal partnership agreement and implementation plan for the next two years. Michelle is also a co-investigator on the Evaluation of the Malcolm and Macduff Ways Regeneration Project in the public housing area of Rosemeadow.

Professor Peter Phibbs (University of Western Sydney)

Professor Phibbs is a planner/economist at the Urban Research Centre, UWS, whose main area of research concerns housing. His research in recent years has been in two main themes: the non-shelter outcomes of housing and the broad area of affordable housing.

He undertook a major AHURI study on the non-shelter outcomes of housing and has subsequently supervised a number of research degrees in the same area. He is currently the Director of the UNSW-UWS AHURI Research Centre.

Associate Professor Paul Pholeris (Healthabitat)

Paul is the Director of Healthabitat and National Program Manager of Fixing Houses for Better Health and Housing for Health projects, including several research and development projects. For over 12 years Healthabitat has worked to improve the health of Aboriginal people, particularly children, by making healthier living environments in many remote, and more recently rural and suburban, areas of Australia. Paul trained as an architect at the University of Sydney, and has run a private architectural practice working on urban, rural and remote projects throughout Australia since 1984.

Ms Joanne Quinn (University of New South Wales)

Joanne is currently completing a PhD on 'Design of the Home for an Ageing Australian Population'. Rather than age-focused housing, this research examines how all housing can be more usable, safe and accessible for people of all ages and the widest range of abilities, and flexible to accommodate different life stages, through the use of universal and flexible design approaches. This doctoral research led to the opportunity to work in the UNSW City Futures Research Centre on the recently completed project 'Dwelling, Land and Neighbourhood Use by Older Home Owners' funded by AHURI and DoHA. Included in this project was a comparative design and cost analysis of visitable, adaptable and universal design approaches in housing.

Her primary research interests include:

- Accessibility, usability and safety in the design of residential neighbourhoods, buildings and products.

- The differing, and sometimes conflicting, needs of people of different ages and abilities in residential environments.
- Anthropometric measurement of people and assistive devices in residential environments.

Associate Professor Peter Sainsbury (Sydney South West Area Health Service)

Peter Sainsbury is Director of Population Health in Sydney South West Area Health Service and Associate Professor in the School of Public Health at Sydney University. He is currently a member of the Australian Health Ethics Committee and has been a member of the National Health and Medical Research Council (2002–06) and president of the Public Health Association of Australia (2000–04). Peter's qualifications and experience cover medicine, health planning, sociology, health services management and public health.

Associate Professor Susan Thompson (University of New South Wales)

Susan Thompson has over 30 years of experience as an urban planning practitioner, teacher and researcher. She is Associate Professor of Planning and Co-Director of the Healthy Built Environments Program, City Futures Research Centre, Faculty of the Built Environment, University of NSW (<http://www.fbe.unsw.edu.au/cf/HBEP/>).

Susan's interests are wide and cross-disciplinary, encompassing healthy planning, meanings of home and belonging, the implications of cultural diversity for cities and planning practice, and the importance of everyday local environments. Her research has significantly contributed to understandings of belonging and settlement practices in contemporary urban communities, as well as the impact of cultural diversity on the city. Her research on meanings of home for migrant women made a significant contribution to understandings of migrant home-making and resettlement in an Australian urban planning context. Her use of qualitative methodologies in this research assisted the acceptance and subsequent development of qualitative methods in urban planning research and practice.

Susan's more recent work on community development and health has further developed understandings of belonging, home-making and well-being in diverse communities. Her research on the role of community gardens in enhancing the physical and psychological health of public housing tenants in inner Sydney has achieved state and national awards. This, and related work, has also illuminated the importance of food in bridging cultural difference, as well as being a critical aspect of health and well-being.

Ms Joanna York (University of New South Wales)

Joanna York is Senior Research Officer for the Healthy Built Environments Program (HBEP) in the City Futures Research Centre. In 2010 she was involved in coordinating large funding proposals in the areas of climate change and low carbon cities, and providing research support for grant projects in the Faculty of Built Environment. Joanna completed a Master of Social Development at UNSW in 2009 and is interested in applying community development principles to the provision of affordable, culturally appropriate and sustainable housing, particularly in Western Sydney.

Appendix 5: Major panel discussion themes

Research

1. Current methods (such as surveys) of capturing data regarding the conditions of people's housing have limitations, as people tend to positively overstate the conditions they live in. This is also in part due to a general belief that a person's living conditions are their own choice.
2. There are so many effects of housing stress that it's hard to say any one factor has greater adverse effects on a child. Hence, one of the many benefits to longitudinal studies in housing is to study people's movements, and thus accumulate richer data.
3. Key issue is how you frame housing and health research and engage policy-makers and community, as research has a solution focus rather than identifying problems.
4. There exists a great potential for sharing of data and ideas between Australia and NZ, particularly since urban design problems are so similar.
5. Following the [Australian] national election there will be an opportunity for collaboration between policy-makers and researchers about what can be learnt from insulation experience (benefits versus the losses). If we stop things every time there is a tragedy that we would never progress.

Legislation

1. Market failure, attrition laws and a poor appreciation of the danger to occupants of poorly designed structures, are all reasons behind landlords refusing to update their properties.
2. There is an opportunity to use the Building Code of Australia (BCA) for good, as it offers a way of turning public health research into policy. Hence, is there a suite of issues that we can include in the Code in relation to health?
3. The Universal Code which was created in 1990 is vastly outdated and therefore inappropriate to properly influence the design of healthy housing.
4. From a public policy perspective, how do you get health dollars to fix public housing, which makes the issue whether Housing Departments should fix their own housing? Hence, there is a need to measure the health impacts of housing regeneration. There is growing interest and commitment from NSW Health to not only be involved in urban development, but also housing.

Economics

1. The price of land is prohibitive. Hence, the concept of 'community land-trust', where the individual owns the dwelling and the community owns the land (allowing tenants to have partial ownership of their homes), is worth exploring.
2. There is evidence of racism in the rental market. 'We won't improve it because they'll just wreck it'.
3. Rivalry effects and competition with housing means one benefits where another suffers.

Housing conditions

1. Heating and cooling are important factors in the quality of housing conditions and is largely influenced by socio-economic status. This will increase in importance on the housing and health agendas, that is, the concept of 'fuel poverty' where a household has to spend more than 10% of income on heating or cooling.

Housing design

1. There must be more care taken in separating public space and open space. Developers have been very active in trying to create town centres, but it is a privately owned space which limits freedom of expression/access/rights to remain.
2. The universal approach to housing accommodates differences in life stage, household type and lifestyle, and thus does not require modifications in the future.
3. More research into the universal design approach is required, as a dwelling right from the start needs to appeal to everyone to be commercially viable. This is why home owners are reluctant to modify their rental properties despite government subsidies, as the modified property will then be undesirable to other groups.

Indigenous housing

1. Aboriginal people are over-represented in public housing, so all decisions will have a greater impact on them. The notion of wealth accumulation and ownership of a home is not necessarily something to which Indigenous people aspire.
2. In regards to Indigenous housing in Australia, reducing overcrowding is a recurring theme because authorities continuously fail to solve the problem by making cheap houses which fall apart. This is a complex issue, as simply providing more houses doesn't solve the problem; houses need to be fixed as well. Healthabitat is a program that endeavours to counteract this while incorporating Indigenous participation and self-determination principles.

Public housing

1. Overcrowding in public housing is. an issue.
2. In regards to regeneration projects, there needs to be a greater focus on what ends up happening to the residents once they are moved away. Regeneration and relocation of people against their will can have major impacts on physical and mental health.
3. What is the ideal social mix of private and public housing? The current trend is a good mix: 70% private/30% public housing. But is this evidence-based? This debate has been going on for many decades. The evidence should look at health, social and neighbourhood outcomes.

Health issues affecting housing

1. The literature on noise and its effects on health is surprisingly strong. Health issues can be dealt with, but most noise-related issues are raised as annoyance which doesn't take the same precedent.
2. There are different methods of defining overcrowding—which ones are correct and appropriately incorporate cultural implications? Furthermore, it is important to maintain the difference between overcrowding and the functioning of a house.
3. There was a proposal to Department of Health a decade ago to prevent asthma and heat-related illnesses with simple home modifications. The benefits of this proposal were proved using a cost-benefit exercise. However, the Director General at the time said no because he thought it would cause an avalanche of requests for rehousing. Can this be revisited?
4. Asthma and heart disease occur more regularly in hotter conditions. If climate change scenarios involve extreme temperature changes, then it is something we can't ignore.

5. Noise and air pollution outcomes in housing adjacent to major roadways are causing major illness/perverse outcomes. This issue needs research and policy development as we are far behind Europe in regards to noise abatement. Also noise is a key issue in densification.
6. Unflued gas heating is the cause of enormous health problems in Australia. How do you manage the issues surrounding these heaters when the Department of Education has installed them in almost all classrooms? There are studies from NSW Health which reveal the health problems associated with this type of heating, particularly in Sydney. A possible alternative is low 'NOx heaters'.
7. Hypothermia incidence underpins an index of isolation. As more older people are living alone this will only get worse.
8. There has been an extensive body of work on how to manage urban squalor. This is troublesome for councils as they have limited power to act. To prove there is harm is difficult, so there needs to be great evidence for authorities to act. Urban squalor represents a greater issue in high-rise inner city buildings; however, there are active community groups aiming to counteract this (e.g. Concord and Westmead).
9. Health systems often focus on diseases; however, in this forum it is preferable to focus more on broader concepts such as well-being.
10. In regards to tenure, it is important to remember mortgage stress can have an effect on health and well-being. However, is mortgage stress offset by stress caused by other factors involved in renting?

Culture

1. The merging of home and workplace changes the meaning of home, and also has an affect on children's health and educational outcomes and more broadly community interactions.
2. There is a need for more focused work regarding acculturating people to [living in] denser conditions.

Appendix 6: Panel agenda



AHURI Investigative Panel – Health and Housing
 Meeting of Researchers and Policy-Makers
 Convened by Peter Phibbs and Susan Thompson
 Agenda

Dates: Wednesday 21 and Thursday 22 July 2010

Venue: Mercure Hotel, Sydney (in close proximity to Central Station)
 818-820 George Street
 Sydney NSW 2000
 (02) 9217 6666
<http://www.mercuresydney.com.au/>

WEDNESDAY		
<i>(Approx. times)</i>	<i>Agenda item details</i>	<i>Speaker/s</i>
Afternoon tea (3.00 – 3.30)	Meet and greet with afternoon tea <i>(Coffee, tea and biscuits will be provided).</i>	N/A
Welcome and overview (3.30 – 4.00)	Welcome, formal introductions and overview of project. Aims of the Investigative Panel and process. Housekeeping.	ST and PP
Research themes (4.00 – 6.00)	Major research themes in housing and health. Literature review; areas for investigation – where there is work; where there is no work; where are the potential areas for research? Discussion. Short urban walk.	PP and ST All
Dinner and speaker (6.30 – 9.00)	Dinner and guest speaker – focus on Indigenous housing and health <i>(Attendees will be asked to choose two courses from the attached menu, drinks including wine and coffee will also be provided).</i>	Special guest – Paul Pholeros: Healthabitat

THURSDAY

<i>(Approx. times)</i>	<i>Agenda item details</i>	<i>Speaker/s</i>
Policy context (9.00 – 10.30)	<p>Policy context – presentations and discussion.</p> <p>Short presentations from policy-makers from Housing, Health and Community.</p> <p>Suggested areas of discussion: what is the policy context? What are the major issues? What is known? What needs to be researched? Research opportunities that are of specific interest to policy-makers.</p> <p>Opportunities for policy-makers and researchers to collaborate.</p>	<p>Stephen Corbett – SWAHS#; Rep. from Dept. of Housing; Rep from SSWAHS#; All # Health</p>
Morning tea (10.30 – 11.00)	<p>Morning tea</p> <p><i>(Coffee, tea and biscuits will be provided).</i></p>	
Presentations (11.00 – 12.00)	<p>Presentations from Mike Dockery and Philippa Howden-Chapman.</p> <p>Opportunities for policy-relevant research; use of existing databases for research.</p>	<p>MD PHC</p>
Discussion (12.00 – 1.00)	<p>Discussion of key research themes – start to make links with policy needs and issues; consideration of research-ability.</p>	All
Lunch (1.00 – 2.00)	<p>Lunch and informal continuing discussion.</p> <p><i>(A stand-up lunch including sandwiches, wraps and soup will be provided).</i></p>	All
Presentations (2.00 – 3.00)	<p>Presentations on ageing and housing; neighbourhood context of the dwelling.</p>	<p>JQ ST and TC</p>
Discussion (3.00 – 5.00)	<p>Interactive discussion</p> <p>Prioritise areas / themes for housing research – using the literature review and presentations – construction of draft research agenda.</p> <p>Afternoon tea.</p>	<p>All – including AHURI rep JD</p>
Close and thanks	<p>Post-panel process, questions, comments and thankyou drinks</p> <p><i>(Attendees will proceed to the Conference Bar on Level 2 for beer, wine and soft drink).</i></p>	<p>PP and ST; All</p>

Post-panel

The following will occur (to be discussed during the panel):

- Notes from the interactive panel distributed to participants for comment/approval.
- Notes finalised in consultation with other key researchers and policy-makers.
- Opportunities to frame a one-page research proposal on projects identified in the priority areas.

- Finalisation of report to AHURI.
- Recommendations to AHURI for research agenda on housing and health.

Panellists

Name	Organisation	Attending
Ms Melanie Andersen	Sax Institute	Yes
Professor Tony Capon	University of New South Wales and Australian National University	Yes
Associate Professor Stephen Corbett	Sydney West Area Health Service	Yes#
Mr Jim Davison	Australian Housing and Urban Research Institute	Yes
Associate Professor Mike Dockery	Curtin University	Yes
Professor Adrian Franklin	University of Tasmania	No
Professor Billie Giles-Corti	University of Western Australia	No
Professor Philippa Howden-Chapman	University of Otago	Yes
Dr Asif Khan	University of Auckland	No
Ms Michelle Daley	National Heart Foundation	Yes#
Associate Professor Paul Pholeros	Health Habitat	Yes#
Ms Joanne Quinn	University of New South Wales	Yes
Representative %	Department of Families, Housing, Community Services and Indigenous Affairs	No
Representative %	NSW Department of Housing	Yes
Representatives **	Sydney South West Area Health Service	Yes

Can only attend for part of the panel.

** Peter Sainsbury, Bin Jalaludin, Michelle Maxwell – at different times during the panel.

% Representatives from these organisations had been named but subsequently requested that they not be named in the report – they withdrew for unforeseen circumstances with very little notice.

Research team

Name	Organisation	Attending
Professor Peter Phibbs	University of Western Sydney	Yes
Associate Professor Susan Thompson	University of New South Wales	Yes
Ms Joanna York	University of New South Wales	Yes
Mr Devin Gibson	University of New South Wales	Yes

Appendix 7: List of available presentations

- Pholeros (Healthabitat): 'Housing for Health: 25 years of improving housing design, construction & maintenance'.
- Dockery (UWA): 'Housing and Children's Development and Well-being: A scoping study'.
- Howden-Chapman (Otago University): 'Improving Impact of Housing Research on Policy'.
- Corbett (SWAHS): 'Housing and Health: A health policy perspective'.
- Anderson (Sax Institute): 'Wiser Decisions for a Healthier Australia'.
- Thompson and Capon (HBEP): 'Housing and Health: The neighbourhood location'.

Link to presentations

<http://www.fbe.unsw.edu.au/cf/hbep/research/>

On this page, go to 'Australian Housing and Urban Research Institute (AHURI) Project—Investigative Panel to examine the impacts of housing on health'. Underneath this heading, select 'Click here to view selected presentations from the panel meeting on 21–22 July 2010'. The available presentations will appear.

Appendix 8: Panel evaluation summary

Good things

Research and policy learning

- Inform on research in Australia and NZ. Highlights common issues, potential collaboration for future research.
- Good overview of wide range of housing issues related to health—find out what other researchers/organisations are doing.
- Showed potential use of existing data sets that could be used for additional research projects.
- Opportunity to hear about work others are doing—closely related but slightly outside your particular box.
- Fantastic having people with such extensive knowledge in the area.
- Excellent cross-fertilisation of people from different disciplines/policy areas, re: methods, priorities, data sources.
- I learnt a great deal about housing and health issues.
- I learnt about different projects currently underway.
- An opportunity to find out more about the background and focus of AHURI.
- An opportunity to learn from the vast experiences and ideas of colleagues.

Panel process

- Nice to have time / a forum specifically for thinking about research agendas in this space.
- Bringing together the expertise and thoughts of a range of academics and professional that work in this area.
- Brought together a group of people who were knowledgeable about research, policy and practice and committed to trying to improve things.
- The flexible structure allowed for open and free flow of ideas.
- The amount of information exchanged and presented was relatively high for the time allocated.
- Small, collegial and informed group.
- Participants were generous.
- Combining ideas and resources.
- Networking between disciplines.
- Non-politicised discussion allowed people to speak freely.
- Great opportunity to look strategically at Australian and NZ housing research.
- Breadth of presentations. Time for discussion.
- Literature review was helpful to guide discussion.
- All the logistics worked really well, good to have scribes so can concentrate on discussion.
- Everyone well introduced and got on well, made interaction easy.

- Group was right size—big enough to have a stimulating range of contributions but small enough for everyone to be involved all of the time.
- It had a clear purpose.

Future opportunities for collaboration

- Opportunity to identify areas of joint interest and potential collaborations.
- Great scope for research into the future.
- The panel came up with ideas that would have been impossible without the engagement of both health and housing people in the room together. The generation of ideas would not have occurred even if the document had been circulated for comment.

Areas where it could have been better

Panel process—focus and content

- At times it felt a little unclear about what we were being asked to produce.
- Might have been good to come up with more concrete project plans or ideas—felt satisfying, i.e. more focused/targeted discussions.
- Lack of focus at times. Slipped into areas of irrelevance to health and housing (e.g. water policy).
- Could have structured discussions around key themes/domains of research. Needed to have clearer facilitation role in eliciting the input from participants (need clearer objectives).
- Session devoted to specific funding opportunities / grant schemes, ways of promoting further collaboration.
- Greater discussion of arising challenges such as climate change.
- Didn't get to clear outcomes that were reported back during the day (e.g. in terms of Qs on page 20).

Panel process—representation

- Is there any way to incorporate the views of the target groups themselves (e.g. elderly, health workers, etc)? Since they were absent from discussions—have we properly represented their opinions?
- A lack of policy-makers from housing and from health, planning, local government.
- Wider representation of people for more scope.
- Perhaps larger and more diverse group would have improved this.
- Representation from community housing or social welfare sector/advocacy groups (e.g. Brotherhood of St Lawrence, etc).
- Policy-makers from housing—a pity they could not attend.

Panel process—logistics

- Greater use of visual props to summarise stated ideas—there were two people taking notes but since they [the notes] weren't visible the panel was unable to reference them during discussions.
- Useful to have facilitation to enable everyone to have a say.
- Ideas on wall didn't really work- syndicate group might have worked as a better means of generating ideas.

- More sharing of thoughts through focusing on individual ideas.
- Decision not to have chair led to relaxed tone, but wonder if we could have developed research ideas more.
- In the room too long.
- Too much listening.
- Some more structured exercises would have helped.
- Smaller group discussions to brainstorm ideas.

Panel process—timing

- Would be good to condense to a single day so it is more feasible for people to attend entire workshop.
- Two mornings plus one afternoon.

Pre-panel process

- Useful to have summaries of workshop participants research prior to workshop.
- Some more lead time.

Appendix 9: Participant organisations

Panel participants were invited for their strong expertise in the areas of 'health' and 'housing'. Participation on the panel does not necessarily represent the specific views of participants' organisations. Nevertheless, it is useful to provide some general information about these housing and health organisations. Much of the material below is taken from organisational websites.

Healthhabitat (represented by Paul Pholeros)

Healthhabitat aims at improving people's living environment and consequently their health. The work has focused on Australian Indigenous people where the need has been greatest. The principles and practical techniques extend from immediate fix work of urgent faults in housing, through to research and development projects that can contribute to longer-term change. The work commenced in central Australia in 1985 and has slowly developed to become a national program since 1999.

Involvement and employment of local community people and the skill of the national team are essential in achieving housing and subsequently health improvements.

<http://www.healthhabitat.com/>

Sax Institute (represented by Melanie Anderson)

The Sax Institute is a unique organisation in Australia. The Institute builds partnerships between researchers and health policy and service delivery agencies for better health. Through these partnerships, the Institute develops research assets and programs and strengthens policy and practice-focused research. The Institute has at its foundation a coalition of university and research groups undertaking population health and health services research in NSW.

<http://www.saxinstitute.org.au/>

Healthy Built Environment Program (represented by Professor Tony Capon, Associate Professor Susan Thompson and Ms Joanna York)

The Healthy Built Environments Program (HBEP) is an initiative that brings the built environment and health together. It is situated in the City Futures Research Centre, Faculty of the Built Environment, UNSW.

As Australia faces increasing health costs from an ageing population and rising rates of obesity, diabetes and other lifestyle diseases, health workers are seeking to influence the design of cities to make them more supportive of healthy ways of living. Recent research has demonstrated links between modern epidemics and the way of life in cities. Car-dominated transport, reduced opportunities for exercise, increased fast food availability and lack of social connection are all implicated.

The NSW Department of Health is providing core funding of \$1.5 million over five years for the Program. The HBEP aims to contribute to revitalising the relationship between the built environment and health professions so that together these disciplines can create built environments that support people being healthy in their everyday lives.

<http://www.fbe.unsw.edu.au/cf/HBEP/>

Otago University Department of Public Health (represented by Professor Philippa Howden-Chapman)

The mission of the Department of Public Health is to contribute to the good health of all New Zealanders through independent, critical and innovative research, teaching,

and community service. The Department of Public Health is distinctive in its breadth of academic disciplines, research interests, and its links with national and regional health agencies.

The Department contributes to the undergraduate medical course, but the majority of its teaching is to public health postgraduate students. The Department is committed to the active learning of students, personal development of staff, openness and accountability in decision-making, and meeting its obligations under the Treaty of Waitangi.

<http://www.wnmeds.ac.nz/academic/dph/>

Sydney South West Area Health Service represented by Associate Professor Peter Sainsbury, Professor Bin Jalaludin and Ms Michelle Maxwell)

SSWAHS is one of the most populous Area Health Services in the State. SSWAHS staff treat and care for patients in public hospitals and healthcare facilities from Balmain to Bowral. SSWAHS covers a land area of 6380 square kilometers, across 15 local government areas with an estimated population of 1.3 million residents.

The SSWAHS vision is underpinned by four goals and seven strategic directions. The four goals are:

1. To keep people healthy.
2. To deliver high quality health services.
3. To provide the health care people need.
4. To manage health services well.

The seven strategic directions are:

1. Make prevention everybody's business.
2. Create better experiences for people using the health system.
3. Strengthen primary health and continuing care in the community.
4. Build regional and other partnerships for health.
5. Make smart choices about the costs and benefits of health services and health support services.
6. Build a sustainable health workforce.
7. Be ready for new risks and opportunities.

<http://www.sswahs.nsw.gov.au/>

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