



Australian Housing and Urban Research Institute

Do housing conditions impact on health inequalities between Australia's rich and poor?

Positioning Paper

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Executive summary

This paper sets the context for exploring the impact of housing conditions on health inequalities between Australia's rich and poor. Specifically, it examines the policy relevance of investigating the links between housing and health; it includes a comprehensive literature review of the association between housing and health; and it describes the methodology by which links between housing and health inequalities in Australia will be investigated.

The key issues of policy relevance include the following:

Strategies to provide housing assistance to people on low incomes or with special needs, and to prevent and reduce homelessness, are important elements of Commonwealth and State and Territory governments' social policy and welfare framework.

Research into the indirect benefits, such as health, of such strategies has been identified as one of the contemporary housing policy issues facing Australia.

Greater understanding of how housing contributes to health inequalities is important given the links between social disadvantage and health, and the fact that housing is a key factor in poverty.

While numerous studies into the association between housing and health have been undertaken overseas, mainly in Britain, there appears to have been little quantitative work done in this area in Australia.

The key findings of the literature review include the following:

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.

People living in owner occupied homes appear to have better health and longer life expectancy than those who live in rented accommodation.

Evidence suggests that overcrowded dwellings are associated with greater risk of infectious disease and poor mental health.

People living in dwellings that are damp, cold or mouldy are at greater risk of respiratory conditions, meningococcal infection, and asthma.

Key aspects of the methodology that will be used to explore the links between housing status and health inequalities in Australia include the following:

The project will analyse data from the 1995 National Health Survey, which was conducted by the Australian Bureau of Statistics.

The analysis will examine the relationship between housing tenure and overcrowding and health in the context of a range of socio-demographic and socio-economic variables.

The findings will be of value to housing policy development by addressing the current gap in knowledge in Australia, setting directions for future research and by identifying for policy makers areas of concern which may need greater attention in Australia.

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1 Introduction

Housing is fundamental to physical, mental and social well-being and quality of life (World Health Organization 1998a: 127). Poor living conditions lead to increased stress, social isolation, an unhealthy and unsafe environment, and increased risk of disease or injury (Podger 1998).

Disadvantage can take many forms such as having lower income, fewer family assets, poorer education, being stuck in a dead-end job or having insecure employment, living in poor housing or trying to bring up a family in difficult circumstances (World Health Organization 1998b). Further, these disadvantages tend to concentrate among the same people, and their effects on health are cumulative.

The National Centre for Social and Economic Modelling (NATSEM) has recently completed an extensive study of the links between health and income, using the National Health Surveys (Walker & Abello 2000). The study, commissioned by the Commonwealth Department of Health and Aged Care, analysed the linkages between health and socioeconomic status in Australia over a period of nearly two decades. The results showed that the health of low income Australians is worse than that of their better off counterparts, and that this substantial 'health gap' increased significantly over the study period. Of particular importance was the finding that aggregate income inequality in Australia over the same period remained virtually unchanged, in the face of the growing health inequality (Walker & Abello 2000).

While the health and income study did not investigate the key factors contributing to this health gap, international research suggests that various dimensions of housing are likely to be significant major determinants of relative health status.

The Australian Housing and Research Institute (AHURI) has identified research into the indirect benefits, such as health, of housing assistance as one of the contemporary housing policy issues facing Australia (AHURI 2000). In its review of the literature, the AHURI: Australian National University (ANU) Research Centre was not able to identify any studies using national data that had examined the links between health and housing tenure and overcrowding in Australia. This project, which has been commissioned by AHURI, is therefore important because it will address the current knowledge gap by examining the links between housing and health, holding income and

other explanatory characteristics constant. In particular, the study will investigate the extent to which housing tenure and over-crowding in the home contributed to health inequalities in Australia in 1995.

This Positioning Paper is the first in a series of papers that will be prepared as part of the study. It examines the policy relevance of investigating the links between housing and health; it includes a comprehensive literature review of the association between housing and health; and it describes the methodology by which links between housing and health inequalities in Australia will be investigated. Future papers in the series will include a Work in Progress Report detailing the preliminary results of this study; a Findings Paper reporting the key results and research outcomes, and identifying their implications for the development of housing and urban policy; and a Final Report describing how the key findings and research outcomes contribute to housing and urban studies and identifying the key implications for the development of housing and urban policy.

2 Policy relevance

2.1 Health and socioeconomic disadvantage

In Australia, as in other developed countries around the world, one of the major public health priorities identified for the next 5-10 years is the need to tackle inequalities in health status experienced by the socio-economically disadvantaged (Commonwealth Department of Human Services and Health 1994).

In some countries, such as the United Kingdom¹, Canada² and New Zealand³, governments have already introduced policy initiatives in these areas, and the government in Australia is currently funding research in the above areas⁴.

¹ The United Kingdom has introduced a government wide public health strategy for England that was published as a White Paper (*Saving Lives: Our Healthier Nation*) in July 1999. The strategy is an action plan to improve health and reduce health inequalities. <http://www.ohn.gov.uk/ohn/ohn.htm>

² *Toward a Healthy Future* is Canada's landmark public policy report that was published in 1999 and examines the major determinants that influence the health of Canadians as well as identifying actions to improve the health of all Canadians. <http://www.hc-sc.gc.ca/hppb/phdd/report/toward/eng/report.html>

³ *The New Zealand National Health Strategy* published in November 2000 is the New Zealand government's framework for action on health and focuses in particular on tackling inequalities in health. <http://www.moh.govt.nz/moh.nsf>

⁴ In Australia, the aim of the National Health Priority Area initiative is to focus public attention and health policy on those areas that contribute most to the burden of illness in Australia and where a concerted effort could lead to significant improvements in health status (AIHW & DHFS 1997).

More recently, the Department of Health and Aged Care (DHAC) has funded the National Centre for Epidemiology and Population Health to establish a Health Inequalities Research Collaboration (HIRC).

<http://nceph.anu.edu.au/specproj/hirc.htm>

DHAC's *Health Policy and Inequality* (1999) report discusses the current range of health strategies that are designed to alleviate poverty and improve health status, and also highlights areas for further policy development or research.

2.2 Housing and health

Given the links between social disadvantage and health, and the fact that housing is a key factor in poverty (Burke 1998: 165), greater understanding of how housing contributes to health inequalities is of interest to policy analysts and policy makers not only in the health and housing areas but also in the general welfare and support area.

The World Health Organization (1998a) has identified nine features of the housing environment that have important direct or indirect effects on the health of their occupants:

- the structure of the shelter, including the extent to which it protects the occupants from the elements;
- provision of adequate water supplies;
- provision of proper sanitation and waste disposal;
- the quality of the housing site;
- overcrowding which can lead to household accidents and increased transmission of airborne infections such as acute respiratory infectious diseases, pneumonia and tuberculosis;
- the presence of indoor air pollution associated with fuels used for cooking and heating;
- food safety standards, including adequate provision for storing food to protect it against spoilage and contamination;
- vectors and hosts of disease associated with the domestic and peri-domestic environment; and
- the home as a workplace—where the use and storage of toxic or hazardous chemicals and unsafe equipment may present health hazards.

As well, housing units create the physical infrastructure for group life, which when disrupted can result in many changes in individual and group functioning (Fullilove and Fullilove 2000). Studies in developed countries show that people spend more than 90% of their time indoors (World Health Organization 1997: 12). A home therefore has psychological importance as an object of attachment, a source of identity, and a refuge from stress (Fullilove and Fullilove 2000; Health Canada 1997: 146). A home should also be affordable, so that enough money is left over for food, clothing and other needs (Health Canada 1997: 146).

2.3 Housing and health policy in Australia

In Australia, community groups have stressed the negative impact that poor quality housing can have on health because of overcrowding, poor building maintenance, damp and the presence of toxins (ACOSS 1993: 17). They have also stressed the vulnerability of the homeless to poor health and illness, and identified homelessness as an issue that did not receive adequate attention through the National Health Strategy (ACOSS 1993: 17). The transient lifestyle of homeless people results in social disadvantage and creates a barrier to health service access and to receiving health promotion messages. One way of tackling the health effects of social disadvantage is for public health interventions to remove barriers to access to health care, social services and affordable housing (World Health Organization 1998b).

The National Housing Strategy (1992: 8) concluded that while there was not an overall crisis in housing in Australia, the provision of good quality, affordable and appropriate housing for Australians was a major challenge for government. The Strategy therefore recommended that a housing affordability benchmark of income to housing costs for low-income households be introduced and fully implemented by the year 2000. Under this benchmark, households are considered to be in financial housing stress if their income is in the bottom 40% of income distribution and they have housing costs of 25% or more of gross income (AIHW 1997: 171).

Strategies to expand the range and supply of secure, affordable and appropriate housing choices accessible to all Australians, particularly those on low incomes included (National Housing Strategy 1992: 46):

- improving access to home ownership;
- expanding the quality, choice and supply of public and community housing;
- making rented accommodation more affordable, appropriate and secure;
- providing housing assistance to meet the requirements of people with distinctive needs;
- promoting consumer awareness and informed housing choices through a National Housing Information Strategy; and
- conducting further research.

In the early 1990s, Nutbeam et al. (1993) developed a comprehensive set of national health goals and targets that included measures for housing. The proposed goals and targets for housing related to the areas of safe housing; adequate housing; secure and affordable housing; and appropriate housing.

Housing assistance to people on low incomes or with special needs is an important element of Commonwealth and State and Territory governments' social policy and welfare framework (AIHW 1999: 128). The 1999-2003 Commonwealth-State Housing Agreement (CSHA) provides more than \$4 billion for housing assistance such as public and community housing, Indigenous housing, crisis accommodation, home purchase assistance and private rental assistance (FaCS 2000a). The aim of the Agreement is to 'provide appropriate, affordable and secure housing assistance for those who most need it, for the duration of their need' (Commonwealth of Australia 1999). The Agreement has the potential to reduce health inequalities by assisting those most in need to offset high housing costs and by providing access to housing that enables people with special needs to live as independently as possible.

In April 2000, the Prime Minister announced the *Stronger Families and Communities Strategy* (FaCS 2000b). The aim of the strategy is to support and strengthen Australian families and communities. The strategy provides the framework for policy and program development under the Department of Family and Community Services *Stronger Communities Outcome*. This outcome focuses on rural and regional issues; assistance to low and moderate income households to access appropriate and affordable housing; supporting people to move out of homelessness; improving the living conditions of Indigenous people; and issues around pressures within communities and their capacity to respond positively to changing circumstances and emergency situations. Of particular relevance to addressing the housing-health link are the initiatives related to housing and homelessness assistance, and improving the living conditions of Indigenous people. Policies directed towards strengthening communities and families may also enhance social networks which in turn could have lead to other potential benefits to health (Acheson 1998).

The Government also provides assistance to homeless people and those at risk of homelessness through programs such as the Supported Accommodation Assistance Program (SAAP) and the Youth Homelessness Early Intervention Program (AIHW 1999). In May 2000, the Commonwealth Government launched the first National Homeless Strategy (Newman 2000) and released a discussion paper outlining the Government's framework for preventing and reducing homelessness (FaCS 2000c). The aim of the discussion paper and following national community consultations is to seek practical ideas for developing future policies and programs. Development of the Strategy is a major step towards addressing homelessness in a holistic and strategic way across the breadth of the family and community service delivery system and across government jurisdictions (FaCS 2000c). As such it has the potential to reduce the health effects of social disadvantage. The Independent Inquiry into Inequalities in Health Report for England (Acheson

1998) recommended that policies to reduce homelessness would ‘meet a basic health need of groups already vulnerable to poverty and ill-health’.

There are several reasons why policy for healthy housing presents challenges to policy makers (Environmental Epidemiology Unit 1999: 1):

1. the health effects of poor housing are diverse;
2. primary responsibility for housing generally lies outside the health arena; and
3. required interventions can be complex and slow to implement.

There is evidence of some success with overseas interventions aimed at improving the living and working conditions of lower occupational groups and the socially and economically disadvantaged. Turrell et al. (1999: 71–72) cite a review of the following interventions:

In 1985, Finland introduced a policy aimed at, among other things, ensuring that inadequate housing conditions were brought up to an acceptable standard by 2000. Measures have been jointly implemented by the housing, social welfare and health sectors and have brought about some improvements;

In Glasgow, the city council and electricity board collaborated to improve damp housing in deprived neighbourhoods. The evidence suggests that children in improved housing were protected against the health risks associated with damp housing; and

In Liverpool, a “Better Housing, Better Health” scheme was established. An evaluation showed that fully improved houses were linked to fewer symptoms of ill health and lower levels of emotional distress.

In December 2000, the British Government released its Housing Policy Statement *The Way Forward for Housing* (DETR 2000a). The Statement is a comprehensive package of policies which aim ‘to offer everyone the opportunity of a decent home and so promote social cohesion, well-being and self-dependence’ (DETR 2000: 5). One key measure being introduced is the Housing Health and Safety Rating Scale (HHSRS) designed to assess the condition of homes in all tenures by rating the severity of hazards in dwellings (DETR 2000b). The HHSRS will replace the Housing Fitness Standard which was used by local authorities as the basis for action against unfit homes.

2.4 Housing in Australia

The 1999 Australian Housing Survey, conducted by the Australian Bureau of Statistics (ABS), found that 70% of Australian families were homeowners (with or without mortgages) (ABS 2000). Couples (with or without dependent children) were more likely than other family types to own their own home, with an ownership rate of around 80%. In contrast, only 40% of sole parent families were homeowners.

Twenty seven per cent of Australian families rent their dwelling (ABS 2000). The majority (74%) of renters are private renters. Twenty one per cent of sole parent families rent State Housing Authority homes. This compares with 9% of single-persons and around 2% of couples (with or without dependent children).

Table 1: Incidence of housing problems, by tenure type and type of problems, 1994

Tenure type	Affordability	Overcrowding	Inadequate amenities	Requires repairs	Poor access to services	Total with problems	Number
			Per cent				('000)
Owner without mortgage	5.9	2.7	3.1	4.1	4.1	16.2	2,793.9
Owner with mortgage	14.6	3.9	4.3	8.6	2.8	27.8	1,890.3
Private rental	28.8	8.5	5.1	19.0	2.8	48.4	1,271.4
Public rental housing	12.8	6.6	8.0	23.2	6.6	44.7	414.8
Other	5.0	6.5	8.7	13.4	6.2	31.6	307.6
Total	13.3	4.6	4.4	9.8	3.8	28.4	6,677.9

Notes:

1. Affordability is measured using the equivalent National Housing Strategy (NHS) affordability ratio.
2. Overcrowding is measured using the Canadian National Occupancy Standard. Households where one or more bedrooms are needed are defined as overcrowded.
3. Households with inadequate amenities are those that do not have access to a least one of the following basic amenities: working cooking facilities, a kitchen sink, a working refrigerator, and a working sewerage system and access to an internal bathroom.
4. Households requiring repairs are those that required urgent or essential repairs inside or outside or to heating, cooling, plumbing or electricity facilities.

Source: AIHW 1997, Table 5.23

Households can experience a range of housing problems including affordability, overcrowding, inadequate amenities, needing repairs and poor access to services. Analysis by the Australian Institute of Health and Welfare of data from the ABS 1994 housing survey indicated that around 28% of

households reported some financial or non-financial problems with their housing⁵ (Table 1) (AIHW 1997: 183). Private renter households were the most likely tenure type to experience housing problems in 1994 (48%), closely followed by public housing renters (45%).

Data from the Australian Housing Survey indicate that the prevalence of overcrowding in 1999 was similar to that in 1994. Around 8% of both private renters and State or Territory housing authority renters required one or more additional bedrooms, compared with 2.5% of owners without a mortgage, 4% of owners with a mortgage and 4.8% of others (ABS 2000).

Private renters, particularly those on low incomes, are more likely than those in other tenures to pay more than 30% of their income on housing costs (ABS 2000). In 1995–96, almost one quarter of all private renters were experiencing housing affordability problems, that is their household housing costs exceeded 30% of household disposal income (AIHW 1999: 137). In comparison, 11% of public housing renters and 10% of owners with mortgages had poor housing affordability.

The data relating to financial and non-financial housing problems indicate that private renters and public housing renters are the most likely tenure types to experience housing problems, particularly overcrowding, affordability and living in dwellings requiring urgent or essential repairs. As will be discussed in Section 3, these problems could put them at greater risk of ill health.

In the year to June 2000, the average level of home purchase affordability⁶ fell nationally, i.e. housing has become less affordable (FaCS 2000d). This continues the downward trend that has occurred since the peak in housing affordability in 1997.

Indigenous people are significantly more disadvantaged than other Australians with respect to socioeconomic factors such as education, employment, income and some aspects of housing (ABS & AIHW 1999: 2).

⁵ It should be noted that there is currently no official housing affordability measure applicable to all tenure types in Australia (AIHW 1999). Nor are there nationally agreed uniform occupancy standards, an official poverty line, or nationally accepted equivalence scales for adjusting income to account for the needs of household of different sizes and compositions. This means that alternative measures of housing problems such as affordability and overcrowding can produce different results, making comparisons difficult.

⁶ As measured by the Commonwealth Bank-HIA Housing Affordability Index. A higher value for this Index indicates more affordable housing (FaCS 2000d).

These disadvantages mean that they are at greater risk of poor health and reduced well-being.

The 1996 Census showed that only 31% of Indigenous households live in homes owned or being purchased by their occupants (ABS 1998). This is well below the corresponding proportion for non-Indigenous households (71%). Indigenous households also tend to be larger (3.7 people per household) than other households (2.7 people per household) and are more likely to be crowded (i.e. 10 or more people living in the dwelling), although this must be viewed in the context of what is seen to be appropriate by Aboriginal communities (National Health Strategy 1992: 88). Nearly one third of households living in improvised dwellings⁷ in 1996 were Indigenous households and, on average, Indigenous households living in improvised dwellings were larger (4.9 people per household) than other households living in improvised dwellings (2.0 people per household) (ABS 1998).

⁷ Improvised dwellings include sheds, humpies, tents (other than in caravan parks), park benches, etc. This measure underestimates homelessness because it does not include people staying in shelters or those staying with other people.

3 Literature review of the evidence for links between housing and health

3.1 Overview

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 (Ranson 1991: 8–9). That is, if a particular housing factor is found to be associated with a disease, it is often not clear whether the housing factor gave rise to the disease or vice versa (i.e. health selection effects), or whether a third set of determinants responsible.

Owning one's home is associated with a healthier and longer life; damp and mould with wheezing, breathlessness, cough, phlegm, meningococcal infection, and respiratory diseases and asthma; overcrowding with infectious disease and poor mental health; inadequate home heating with excess winter morbidity; and unsustainable home ownership and personal debt with social isolation and mental stress (Environmental Epidemiology Unit 1999: 1, Shaw et al. 1999: 216). In addition, poor housing can increase risk of fire and accidents, and poor maintenance of dwellings can lead to infestations that spread infection and exacerbate allergies (Howden-Chapman & Wilson 2000: 139). Insecurity of tenure also impacts upon health because of factors such as lack of continuity of health service provision and increased stress due to frequent moves (Phibbs 1999: 11).

Housing can have both a positive and a negative effect on health (Howden-Chapman & Wilson 2000: 134–135). For example, rehousing the sick or vulnerable can have a positive effect in terms of reduced use of health and other social services although studies undertaken in the United Kingdom suggest that the evidence for health improvement in people who are rehoused on the grounds of their ill health is mixed (Dunn 2000).

Housing affordability has also been found to be a key factor in relation to health. If a greater proportion of income being absorbed by higher rents, this can result in a deterioration of health status because of reduced capacity to buy essential food items and visit the doctor (Phibbs 1999: 11).

Homelessness has a significant impact on health (Best 1999: 52). In general, homeless people have been found to have much poorer health status than the

general population (Dunn 2000). Homeless people are more likely than others to suffer from bronchitis, tuberculosis, arthritis, skin diseases and infections, frequent headaches, musculoskeletal problems, visual impairment, alcohol and drug related problems and mental disorders (Best 1999: 52).

The majority of studies examining the associations between health and housing have concentrated on housing tenure, overcrowding or dampness, mould and cold. A review of the evidence relating these factors to health is provided below.

3.2 Housing tenure

Various models have been developed in an attempt to explain the association between housing tenure and health (Macintyre et al. 1998). One is that housing tenure is a marker for underlying causal factors such as income or social position, rather than directly promoting or damaging health. In Britain, housing tenure is increasingly being used as an indicator of social position (Shaw et al. 1999: 214). Alternatively, housing may be a health promoting resource accessed through income, i.e. income allows one to choose to buy a dwelling, probably in better condition and in a better physical and social environment than dwellings in the public rented sector (Macintyre et al. 1998).

Another model suggests that there is a direct relationship between psychological traits such as self-efficacy or self-esteem and health, and that housing tenure is simply a marker for these psychological traits, i.e. people with these traits are more likely to have bought their homes (Macintyre et al. 1998). Alternatively, owning a home may increase health promoting psychological characteristics such as self-esteem. Howden-Chapman and Wilson (2000: 137) suggest that 'it is likely that home ownership provides a degree of control over accommodation - a secure sense of home - that is crucial to wellbeing'. This theme is explored in detail in Saunders (1990: 290–304) and Winter (1994: 81–140).

Several studies have provided evidence that, irrespective of the cost of housing, housing tenure has a direct impact on the health and life expectancy of occupants (Howden-Chapman & Wilson 2000: 137). Specifically, people in rented properties, particularly those in the publicly rented sector, have higher death rates than people in owner occupied households (Macintyre et al. 1998). The British Health and Lifestyle Survey found that owner occupiers had better health than tenants, irrespective of social class, and consultation rates in general practice have also been shown to be related to tenure, with lower rates among owner occupiers after controlling for a wide range of socio-

demographic characteristics and health status (Macintyre et al. 1998, Carr-Hill 1996).

In their analysis of the West of Scotland Twenty-07 Study, Macintyre et al. (1998) found that housing tenure may have some directly health promoting or damaging effects. They used multivariate analysis to examine the association of various health measures with housing tenure (and car access) after controlling for potential confounders (i.e. age, sex, the interaction of age and sex, income and self-esteem). The results showed that, after controlling for the potential confounding factors, owner occupation predicted better recent mental health, better respiratory function, smaller waist/hip ratio, fewer long-standing illness conditions, fewer symptoms in the previous month, and lower systolic blood pressure. In other words, that housing tenure was associated with a range of health measures, independently of income or self-esteem. The authors concluded that their findings suggest the need for further research into the health promoting or damaging effects of housing tenure.

In another analysis of the West of Scotland Twenty-07 Study, Ellaway & Macintyre (1998) examined whether an association between housing tenure and various housing and neighbourhood conditions (i.e. housing stressors such as overcrowding, dampness, hazards and difficulty heating the home; housing type; and neighbourhood conditions such as amenities, problems, crime, neighbourliness, area reputation and satisfaction) might explain why housing tenure appears to predict health. They found that housing tenure and income were not significantly associated with any of the health measures examined once housing stressors, housing type and neighbourhood conditions were considered simultaneously. The results suggested that housing tenure might have an effect on health because it is predictive of housing conditions, which are themselves health damaging or health promoting. In other words, owner occupiers tend to be able to afford homes that are in better condition and in less threatening environments and are therefore less stressful to live in.

Woodward et al. (1992) used data from the Scottish Heart Health Study to examine whether the least advantaged social groups in Scotland were at greatest risk of coronary heart disease (CHD). Housing tenure was one of four measures of social class used (the others were level of education, years of education, and the Office of Population Censuses and Surveys' definition of social class based on occupation). Housing tenure was the best measure at discriminating between the presence and absence of CHD for men and women. The authors suggested that the finding might be due to important characteristics of the accommodation, such as ventilation, dampness, or insulation; or to a health-related psychological boost due to home ownership;

or because home ownership is a better indicator of wealth than occupation or education and hence of opportunity for healthy behaviour.

Data from the British Household Panel Survey 1990–1992 indicated that housing tenure and structural housing problems were both independently associated with the prevalence of common mental disorders after adjustment for other measures of material standard of living (Weich and Lewis 1998). Housing tenure, overcrowding (i.e. more than two household members per bedroom) and the presence and number of structural housing problems (i.e. damp, condensation, leaking roof, and/or rot in wood) were three of seven variables selected to provide an assessment of each subject's material standard of living. Common mental disorders were assessed using the self administered 12 item General Health Questionnaire (GHQ). Logistic regression modelling was used to adjust for the following potential confounders—age, sex, social class (household head); the interactions between sex and social class and between age and social class; and employment status, household size, responsibility for dependent children, education, ethnicity, marital status, number of physical health problems, and region of residence. Living in rented accommodation and having two or more minor or any major structural housing problems were both independently associated with higher odds of common mental disorders after adjusting for potential confounders.

In a similar study, Lewis et al. (1998) analysed data from the 1993 UK Office of Population Censuses and Surveys (OPCS) National Surveys of Psychiatric Morbidity to examine the association between housing tenure (as a measure of standard of living) and the prevalence of neurotic psychiatric disorder. Using logistic regression, the authors calculated odds ratios for neurotic disorder, both before and after adjustment for other variables (age, economic activity, family unit, car access, education, social class, and the interaction of sex and social class). The results showed that both men and women who owned their own homes had a lower prevalence of neurotic disorder than those who rented their homes, even after adjustment for confounders.

An Australian study (The Health Status of Older People) of non-institutionalised persons aged 65 years and over living in Melbourne found that, after adjusting for age and sex, homeowners were more than twice as likely as non-home owners to be non-smokers (Kendig et al 1998). Housing tenure was not, however, significantly associated with any of the other health actions examined (physical activity, dietary adequacy, alcohol intake and social activity). The study used housing tenure as one of four indicators of socio-economic status. The other indicators of socio-economic status included were occupational status, income and education. As the analysis did not simultaneously control for all four indicators of socio-economic status it is not

possible to say whether there is evidence that housing tenure associated with smoking status independently of income, occupational status or education.

In another Australian study, Slade et al. 1996 found that non-institutionalised persons aged 60+ years who did not own their own home had higher rates of edentulism (loss of all teeth) and were also more likely to have more missing teeth than those who owned their own residence. The greater likelihood of edentulism among people who did not own their own residence was independent of other socio-demographic factors including annual household income. Overall, the study found that edentulism and missing teeth were more frequent among the oldest and most socio-economically disadvantaged people. It is likely therefore that the finding with respect to housing tenure reflects the fact that home ownership is an indicator of higher socio-economic status and hence of opportunity for healthy behaviour such as control of dental caries and periodontal disease.

Geddes et al. (1993), in their study of the impact of socioeconomic disadvantage on health in Adelaide, found that socio-economically disadvantaged people with access to public housing tended to have better health outcomes than those in private rental accommodation. Phibbs (1999: 7) suggests that this indicates a possible association between health and housing affordability and/or security of tenure.

Sundquist and Johansson (1997a; 1997b) found that renting an apartment was associated with an increased risk of mortality in Sweden after controlling for age, marital status, educational status and health status. In an analysis of data from the OPCS Longitudinal Study, Filakti and Fox (1995) found that people living in local authority housing had a higher mortality rate than owner occupiers, and that the differentials across tenure types had widened between the 1970s and 1980s. This finding is consistent with evidence that variations in mortality by socioeconomic status are widening (Shaw et al. 1999: 212) and, given that Filakti and Fox did not control for other socioeconomic characteristics, suggests that the role tenure plays here is one as an indicator of socioeconomic status. An earlier British study found that standardised fatality ratios for all malignant neoplasms in men were highest amongst those in local authority housing and lowest in owner occupiers (Leon & Wilkinson 1989). A similar result was observed for women.

While the literature indicates that there is an association between housing tenure and health, it is not entirely clear whether housing tenure is directly related to health or whether it is an intervening variable for factors such as housing conditions, self-esteem or income. Clearly, more work needs to be done to determine the pathways by which housing tenure affects health. In the Australian context, there appear to have been very few studies which

have examined the links between housing tenure and health. In the absence of such research, it is difficult to say whether the relationship between housing tenure and health in Australia would be consistent with the international experience. However, factors such as the high level of home ownership in Australia and the fact that we have a relatively newer housing stock may affect the likelihood of an association.

3.3 Household overcrowding

The relationship between health and overcrowding is complicated by factors such as time actually spent in the home, cultural differences and the condition of the housing (Environmental Epidemiology Unit 1999: 27). Currently, few studies have shown an independent effect of crowding on physical health because the links are confounded by generally poor living conditions.

People living in overcrowded homes are more likely to have low socioeconomic status and higher unemployment (Howden-Chapman & Wilson 2000: 133). Overcrowded housing increases the risk of infectious diseases such as meningococcal disease, rheumatic fever, tuberculosis and respiratory infections. It also impacts upon mental health through factors such as high noise levels and lack of privacy (Shaw et al. 1999: 216; Hopton & Hunt 1996a) and it may also affect the educational achievement of children in the household (Howden-Chapman & Wilson 2000: 133).

Howden-Chapman and Wilson (2000: 140–144) examined the association between crowded housing and health in New Zealand using data from the 1996–97 New Zealand Health Survey (NZHS) and the 1997 National Nutrition Survey. The Canadian National Occupancy Standard was used as the definition for overcrowding (see section 4.2).

The results showed that crowded housing was more likely in rental housing, where there is a greater likelihood that people will be unemployed, have lower incomes and be partially reliant on government benefits. With respect to health and risk factors, crowded housing was associated with significantly poorer self-reported mental and physical health in adults, and significantly higher prevalence rates of smoking and hazardous drinking. Asthma tended to be reported more frequently by adults living in a crowded household, but not at a statistically significant level. The authors also cite a study by McNicholas et al. (2000) that found that the risk of meningococcal disease was strongly associated with household crowding.

It should be noted that the analysis did not control for household income or explore the relationship between ethnicity and housing, both of which are

considered likely to have a strong prior impact on crowding. In addition, only permanent households were sampled in the NZHS and the exclusion of people in temporary accommodation, who have on average lower incomes than those in permanent accommodation, means that the impact of overcrowding on health is likely to have been underestimated.

There is some evidence that overcrowding in childhood may be associated with adult disease (Environmental Epidemiology Unit 1999: 27–28). In a retrospective cohort study, Coggon et al. (1993) examined the influence of domestic crowding and household amenities in early life on later mortality from all causes and from stomach cancer, chronic obstructive pulmonary disease, and rheumatic heart disease. The results indicated that death rates among subjects who were children in the 1930s were higher in those whose houses were crowded. However there was no clear relationship between overcrowding and mortality for the full cohort. Other studies have linked overcrowding in childhood to deaths from stomach cancer, respiratory problems and heart disease (Environmental Epidemiology Unit 1999: 27–28).

Not all studies have shown an adverse effect of overcrowding on health. Hopton and Hunt (1996a) examined the impact of different aspects of poor housing on mental health in a local authority housing estate in Glasgow. Mental health was measured using the 30-item *General Health Questionnaire*⁸. Poor housing was assessed by self-report using a checklist of problems including dampness, cold, noise and crowding. Respondents were also asked whether their house was an easy target for burglars and vandals, whether it was in poor repair or badly designed. Logistic regression analysis revealed that overcrowding was not significantly associated with poorer mental health.

As noted above, few studies have shown an independent effect of overcrowding on physical health because the links are confounded by other factors such as generally poor living conditions. This implies that there is a need for more research into the impact of overcrowding on health which takes into account potential confounding factors. In undertaking this literature review, no Australian studies that examined the links between overcrowding and health were identified. It is difficult to speculate on whether overcrowding in Australian homes is likely to have a direct effect on

⁸ The General Health Questionnaire (GHQ) was developed in England by David Goldberg in 1972 (McDowell & Newell 1987: 139). It is a self-administered screening test designed to detect current, diagnosable psychiatric disorders. It can be used in general population surveys, or clinical settings and has high validity and reliability. The GHQ-30 is a short form (30 item questionnaire) of the full 60 item questionnaire with items relating to physical illness removed (<http://assess.nelson.com/nelson/assess/test-ind/ghq.html>).

health, particularly as data from the 1999 Australian Housing Survey indicate that the overall prevalence of overcrowding is only 4.5% (ABS 2000). The fact that the housing stock in Australia is relatively newer than that in England and Scotland may also affect the likelihood of any association between overcrowding and health in Australia.

3.4 Dampness, mould and cold

Damp housing is often associated with poor maintenance of the dwelling and socio-economic disadvantage of the occupants (Environmental Epidemiology Unit 1999: 15).

In relation to health, cold housing and dampness and mould in the home are associated with wheezing, breathlessness, cough, phlegm, meningococcal infection, and respiratory diseases and asthma (Shaw et al. 1999: 216). In particular, there appears to be a dose-response relationship⁹ between dampness and increased respiratory infection and asthma, independent of socio-economic conditions and other confounding factors (Williamson et al. 1997 cited in Welch 1997). Excess winter mortality from respiratory disease, heart disease or stroke in older people may also be linked to cold housing (Best 1999: 52; Clinch & Healy 2000).

In their analysis of data from the Oxford Healthy Life Survey, Evans et al. (2000) found that being unable to keep the home warm enough in winter was more strongly associated with ill health (i.e. the self-reported prevalence of longstanding illness, and asthma specifically; and perceived health status measured using the SF-36¹⁰ and health service use than was damp housing. Although the authors suggest that the close relationship between cold and damp housing may mean that their combined effects are shown in the results.

In their study referred to in the previous section, Hopton and Hunt (1996a) found that reporting a problem with dampness was significantly and

⁹ A dose-response relationship occurs when changes in the level of a possible cause are associated with changes in the prevalence or incidence of the effect (Beaglehole et al. 1993).

¹⁰ The Short Form 36 questions Health Survey (SF-36) was developed by the Medical Outcomes Trust, Boston, USA (Ware et al. 1992). The questionnaire measures overall health and wellbeing across eight dimensions of health—physical functioning, role limitations due to physical problems, social functioning, bodily pain, general mental health, role limitations due to emotional problems, vitality, and general health perceptions. The SF-36 items and scales are scored so that a higher score indicates a better health state (ABS 1996).

independently associated with poorer mental health after controlling for possible confounding factors (i.e. having a chronic illness, living in a low income household, living with children under 16 years of age, and being unemployed).

Evidence of links between damp mouldy housing and respiratory illness is strongest for children as the results are less likely to be confounded by smoking or occupational respiratory problems (Environmental Epidemiology Unit 1999: 15). In a Canadian study, Dales et al. (1991) found that homes with dampness and mould were associated with significantly higher prevalence rates of various respiratory symptoms in children. The association was independent of age, sex, race, education of parent/guardian, gas cooking, number of household smokers and region of residence. Further, a dose-response relationship was observed between the number of mould sites and health outcomes, i.e. as the number of mould sites increased the odds ratios for the respiratory symptoms also increased.

There is evidence that eliminating dampness and cold might be beneficial to children's health. In a longitudinal study designed to evaluate the effects of an improved heating system on the health symptoms of children living in a deprived housing estate in Scotland, Hopton and Hunt (1996b) found that reducing dampness and cold prevented a further deterioration in children's symptomatic health.

The international literature appears to provide more conclusive evidence of the health effects of dampness, mould and cold than that existing for either housing tenure or overcrowding. However, it is difficult to speculate on whether dampness, mould and cold have a significant impact on health in Australia. Factors such as our milder climate and relatively newer housing stock may affect the likelihood of any association between dampness, mould and cold, and health here.

4 Methods

4.1 Overview

The Health of the Nation (Department of Health 1992 quoted in Hopton & Hunt 1996a) acknowledged that although “good housing is important to good health, the interdependence between factors such as occupational class, income, unemployment, housing and lifestyle makes it difficult to assess which health effects are specifically attributable to it”. In fact, although numerous studies have tried to examine whether there is a relationship between housing and health, many have not taken into account confounding variables that also affect health (Ranson 1991: 8).

This project will analyse data from a national cross-sectional survey—the 1995 National Health Survey (NHS), which was conducted by the Australian Bureau of Statistics (ABS). The analysis will address the issue of confounding factors by examining a range of factors, including housing, which may have contributed to the considerable health inequalities measured in Walker and Abello (2000). In particular, multivariate regression analysis will be used to determine the relative importance of families’ housing status in contributing to health inequalities in Australia by adjusting for potential confounding factors.

Health questions in the 1995 NHS were asked and recorded at an individual level. However, as information identifying the families and households to which individuals belong was also recorded, the analysis could be undertaken at both an individual and a household level. For example, the health of an individual could be explained as a function of a set of characteristics, including family based characteristics, such as housing and family income. In this analysis, the health of individuals with similar characteristics except for their housing circumstances would be compared. The ‘health’ of a household could be explained by relating an aggregate household health measure (for example, the average number of serious health conditions accounting for all persons in the household) to a second set of explanatory variables. In this analysis, the ‘health’ of households would be compared, after allowing for other differences in household composition (this would require the classification of households into a set of types, eg. elderly couples, young couples with dependents, young single persons, etc.)—thus allowing a comparative contribution of housing circumstances to health outcomes to be assessed.

4.2 Data

The 1995 NHS was conducted during the 12-month period from January 1995 to January 1996 (ABS 1996). It involved Australia-wide interviews with approximately 54,000 respondents from some 23,800 non-institutionalised households. This sample corresponds to around one third of one per cent of the Australian population.

The survey included:

A household questionnaire used for collecting basic demographic data (e.g. gender, age, country of birth, occupation, housing and relationship between individuals in each household); and

A personal interview to obtain details on each individual about illnesses, health service and pharmaceutical use, and health risk factors.

Housing variables

Information related to housing was obtained at the household level (ABS 1996). Housing data publicly available from the 1995 NHS unit record file include:

‘nature of occupancy’—renter, purchaser or owner;

‘type of landlord’—private landlord, person in same household, employer, housing co-operative/community/church group, or other; and

‘number of bedrooms’—one, two, three, four or more.

Health variables

The health outcomes data collected in the 1995 NHS that will be used in this study include:

Health status

Recent illness/injury;

Long-term conditions;

Self-assessed health status (persons aged 15+ years only);

General health and well-being (SF-36) (approximately half of the respondents aged 18+ years¹¹);

Health-related actions (service use)

Doctor consultations;

Other variables

Other data collected in the 1995 NHS that are relevant to this study because they may be confounding factors include:

Demographic

Age;

Sex;

Marital status;

Country of birth;

Geographic

State;

Geographic area;

Income unit characteristics

Income unit type;

Equivalent family income decile/quintile;

Index of relative socio-economic disadvantage;

Labour force

Employment status (persons aged 15+ years only);

Occupation (persons aged 15+ years only);

¹¹ In order to maximise the capacity of the survey within acceptable interview time and cost limits, some sections of the survey—i.e. those relating to education, alcohol consumption, private health insurance, women's health and the General Health and Well-Being Form (SF-36)—were administered to half the sample only (as appropriate to their age) (ABS 1996: 9).

Education

Highest educational qualifications (approximately half of the respondents¹¹);

Income

Gross personal annual income (persons aged 15+ years only);

Whether government pension/benefit received (persons aged 15+ years only);

Health insurance

Whether have private health insurance (approximately half of the respondents aged 15+ years¹¹);

Risk factors

Exercise level index (persons aged 15+ years only);

* Smoker status (persons aged 18+ years only);

Drinker status (approximately half of the respondents aged 18+ years);

Body mass index (persons aged 15+ years only);

Derived variables

Overcrowding

An 'over-crowding' index, based on the Canadian National Occupancy Standard, can be derived from the 1995 NHS. Both the Australian Bureau of Statistics and the Australian Institute of Health and Welfare have used this index.

The Canadian National Occupancy Standard for housing appropriateness was considered by the National Housing Strategy and the Australian Institute of Health and Welfare to conform reasonably to social norms in Australia (ABS 2000). It is sensitive to both household size and composition. The measure assesses the bedroom requirements of a household by specifying that:

there should be no more than two persons per bedroom;

children less than 5 years of age of different sexes may reasonably share a bedroom;

children 5 years of age or older of opposite sex should have separate bedrooms;

children less than 18 years of age and of the same sex may reasonably share a bedroom; and

single household members 18 years or over should have a separate bedroom, as should parents or couples.

Households living in dwellings where this standard cannot be met are considered to be overcrowded.

Limitations of the 1995 NHS

There are several limitations of the 1995 NHS that are important to note here:

information on type of dwelling structure (i.e. separate house; semi-detached/row or terrace/town house; flat attached to house; other flat/unit/apartment; caravan; houseboat; improvised home/campers out; or house or flat attached to shop) was included in the survey but was not made available in the unit record file. Therefore it will not be possible to include this information in the analysis;

information State housing commission landlords was included in the survey under 'type of landlord' but was not made available in the unit record file. This means that it will not be possible to identify public renters in the analysis, which will limit the explanatory power of the project particularly given that public renters are one of the two groups (the other being private renters) most likely to experience housing problems;

although factors such as housing affordability, housing assistance (e.g. rent assistance¹²) and adequacy/appropriateness of housing would be of enormous relevance to this project and of great interest to policy makers, it is not possible to directly measure any of these factors from the survey. Again this limits the analysis in terms of the types of housing variables that can be examined.

homeless people were excluded from the scope of the survey and therefore it will not be possible to examine associations between homelessness and health;

information relating to health conditions was essentially self-reported and was not medically verified (ABS1996a, p120). This means that health conditions data from the NHS needs to be interpreted with some care. There is evidence to suggest some under-reporting of health conditions in

¹² While it might be possible to impute which households are receiving Rent Assistance using other information on the survey, the degree of accuracy would be uncertain as would any conclusions drawn based on this imputation.

the NHS (ABS1996a, p122). However, it is believed that any under-reporting would be highest amongst the less serious recent illness conditions. Under-reporting of health conditions may limit the explanatory power of the project to detect any associations between the housing variables and health conditions if they exist; and

data from the ABS survey of private medical practitioners conducted in 1995 suggests that doctor consultations data in the NHS could be under-reported by at least 10% (ABS 1996a, p44). As for health conditions, this may have the effect of diluting the strength of any associations between the housing variables and doctor consultations if they exist.

4.3 Statistical methods

The academic literature reviewed in Chapter 3 indicates that other researchers in studying the associations between housing and health have predominantly used two levels of statistical analysis:

1. bivariate associations between health outcomes and housing have been examined using chi-square (χ^2) tests; and
2. multivariate analysis, specifically logistic or linear regression modelling, has then been used to examine the associations between health outcomes and housing while controlling for other potential confounders.

On this basis, the AHURI: ANU Research Centre will also undertake both types of analysis for this project. Chi-square (χ^2) tests will be used initially to test for significant associations between the housing variables (i.e. housing tenure and overcrowding) and health outcomes. Then logistic or linear regression modelling will be undertaken to further test the associations while controlling for potential confounding factors.

5 Conclusion

The Commonwealth and State and Territory governments have initiated a wide range of housing strategies to provide housing assistance to people on low incomes or with special needs, and to prevent and reduce homelessness. The links between social disadvantage and health mean that these strategies have the potential to result in indirect benefits in terms of health. It is therefore important to understand how housing impacts on health.

While numerous studies into the association between housing and health have been undertaken overseas, mainly in Britain, there appears to have been little quantitative work done in this area in Australia.

Data collected in the 1995 NHS provide an opportunity to examine the effects of housing tenure and overcrowding on health and health inequalities in Australia. Unfortunately, the limitations of the NHS mean that it is not possible to examine the impact of a wider range of housing variables on health.

The strength of this study will be its ability to examine the relationship between housing tenure and overcrowding and health in the context of a range of socio-demographic and socio-economic variables. While the study will not be able to specifically address questions of causality or aetiology, the analysis will allow an assessment to be made of whether housing tenure and overcrowding are likely to have a direct relationship with health in Australia. The findings will be of value to housing policy development by addressing the current gap in knowledge, setting directions for future research and by identifying for policy makers areas of concern which may need greater attention in Australia.

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