

Chapter 7: Housing and Health

Philippa Howden-Chapman and Nick Wilson

Introduction

Shelter is a fundamental human need, and housing is one of the key material determinants of health (United Nations Conference on Human Settlements 1995; Howden-Chapman et al 1996; National Health Committee 1998). Affordable and appropriate housing protects people from hazards and promotes good health and wellbeing (WHO 1989). Poor housing can increase susceptibility to disease, injury and death. This chapter summarises the results of New Zealand research on housing and health and presents new data from national surveys on overcrowding and health.

Both isolation and household crowding are problematic for health. People living in crowded homes are more likely to have low socioeconomic status and higher unemployment. Infectious diseases such as meningococcal disease, rheumatic fever, tuberculosis, respiratory infections, *Haemophilus influenzae* and *Helicobacter pylori* infection have been identified as more prevalent and difficult to contain in overcrowded households (McNicholas 1999). Privacy and personal space are often compromised and may affect the educational achievement of children in the household, as well as the mental health of both adults and children.

Various models have been proposed to explain the inter-relationship between housing, housing costs and health. Many physical features of the house can have an impact on the health of the residents, such as the structure, maintenance and location of the house, as well as the lifestyle of the residents.

Economic factors (such as the household budget) and social factors (such as the number of families living in the house) are also key factors in the relationship of housing to health. Economic factors can also affect housing indirectly; for example, through high rents leading to rent arrears, which may be one of the factors leading to tenants moving frequently. Residential mobility, such as how many moves have been made in the past six months, is a commonly used indicator of low socioeconomic status, since each move potentially disrupts social networks and children's schooling and immunisation schedules (Jackson et al 1998). Recent work in New Zealand has shown that sole parents, who are predominantly women, and their children are particularly detrimentally influenced by housing policies that often neglect the impact of stable housing on employment, social support, access to transport and educational opportunities (S Milne 1999).

Most of the evidence suggests that frequent moves are detrimental to health and wellbeing (Blaxter 1990). Wilkinson (1996) reports a study that indicated the health impact of housing insecurity, whereby the number of tenants attending their GP changed according to whether the council threat to demolish their housing estate was currently 'on' or 'off'. Nettleton and Burrows (1998) discuss a similar insecurity facing vulnerable home owners, who, largely through rapid changes in the labour market, find rising mortgage rates difficult to service. A comparison of women living alone with children and women living with partners indicated that lone women were slightly poorer, had less access to private transport and reported higher levels of residential mobility (Kearns et al 1995). However, they reported that the condition of their housing was

significantly better and the characteristics of the neighbourhood, such as safety and proximity to friends, were more important influences on their housing satisfaction than for partnered women. Further analysis of these data indicated that social support played a role in mitigating the adverse effects of housing stressors, but only for moderate and not for severe problems (Smith et al 1993). There is also some indication that primary care providers can mitigate some of the negative effects of housing stressors (K Milne 1999).

In the Dunedin Multidisciplinary Health and Development Study, adolescents who stayed with others because they had no place to stay were more likely to come from broken families, have weak parental attachments, have changed residences frequently, show signs of delinquency and have been in trouble with the police (Enter Wright et al 1998). However, neither mental illness nor substance abuse predicted housing problems, though in adults these two factors have consistently been linked.

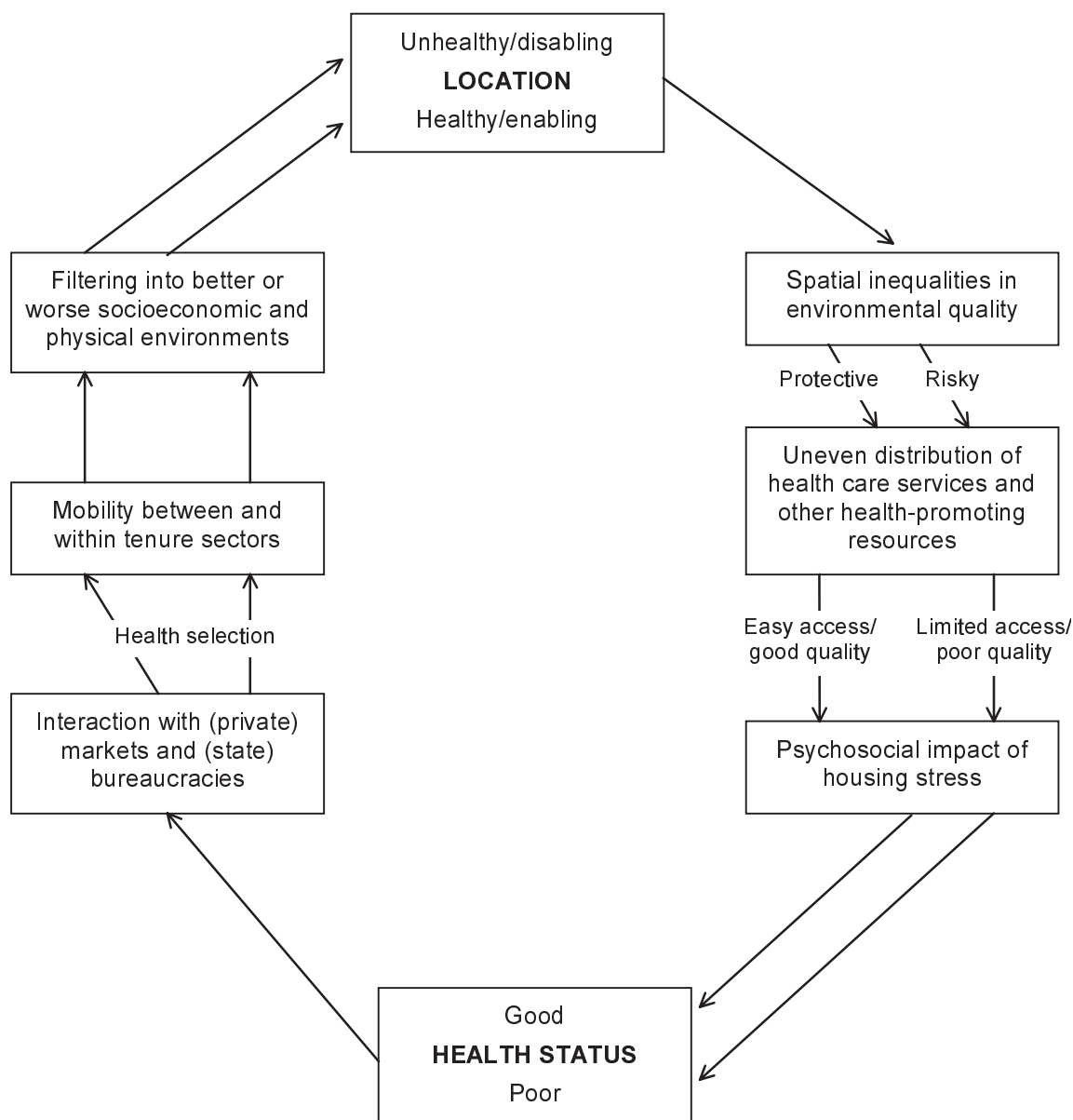
There are many household amenities that indirectly have an impact on health, but have to be discretionary items for households with low incomes. For example, telephones can be vital for maintaining social networks. While the last Census showed that 95.1 percent of households had access to a telephone, 15.5 percent of those with incomes less than \$10,000 did not. Rates of access to a telephone were also low for Māori (86.3 percent), Pacific peoples (84.6 percent) and unemployed people (86.6 percent) (SNZ 1998c).

Housing is increasingly being seen as part of an interlocking network of markets and institutions which have an impact on socioeconomic inequalities (SJ Smith 1990). Housing can have both a negative and positive impact on health (see Figure 1). Societies can be to varying degrees both racist and sexist, and the institutional rules that result from such inequalities can have a negative impact on housing and hence on health (SJ Smith 1989; Milne and Kearns 1999). Housing can also have a positive impact on health, as when public housing is used to rehouse the vulnerable or those who are already suffering from ill-health. SJ Smith's (1999) research in Scotland showed that people who had a pre-existing health condition reduced their use of health and other social services after they had been rehoused in public housing.

A model illustrating these relationships between housing markets, physical and psychological impacts of housing, and health is shown in Figure 7.1.

Similar results have been found in New Zealand by Kearns, who demonstrated that the stress among people diagnosed with a psychiatric disorder decreased when they were rehoused, with improved living conditions, into state-subsidised rental housing (Kearns et al 1992). However, this research was carried out in the late 1980s when state rentals were set as a proportion of income. Under a policy of maintaining market rentals for state houses in the 1990s it is possible that the results of the study could have been different (although it is also conceivable that the accommodation supplement provided more choice, which might benefit low-income families). For example, in Britain during the 1930s an influential study of a group of families who were moved from slum houses to a new housing estate showed that their health status *deteriorated* relative to those who stayed behind, largely because a greater proportion of their income was absorbed by the higher rents charged on the new estate (McGonigle and Kirby 1936).

Figure 7.1: Exploring the links between housing and health



Source: SJ Smith (1999)

As an indication of a possible similar scenario in New Zealand, the 1996 Census showed that Housing New Zealand tenants paid more rent on average than other state sector tenants, with a median weekly rent level of \$150, the same as for private sector rentals (SNZ 1998c). These comparisons do not adjust for location and size and clearly there can be trade-offs between the quality, locality and cost of housing, which can have an impact on residents' health (New Zealand Council of Christian Social Services 1999).

Another possible similarity between Britain and New Zealand is that recent similar policies in both countries of deregulation in the housing market occurred at the same time as the rapid sale of state and council housing at discount rates, ostensibly in order to expand owner occupation. However, British research, which has not been replicated in New Zealand, showed an increase in

the unsustainability of home ownership, as mortgage rates increased along with unemployment (Nettleton and Burrows 1998).

Box 6: Housing in New Zealand

Housing is the largest component of household expenditure in New Zealand (SNZ 1998c). Home ownership is the main financial asset for most New Zealanders and the level is comparable to that in other countries with similar social structures and culture. However, the provision of relatively low-cost rental housing on a large scale has been a key public policy since the Second World War. People in households with mortgages are more likely to be employed, and less likely to be crowded, than those in households who rent (SNZ 1998c.)

There has not been a national survey of our housing since 1988 (National Housing Commission, *Housing New Zealand* 1988), although the Building Research Association of New Zealand has carried out a national survey of home maintenance (Saville-Smith and Amey 1998). There is detailed information available from the 1996 Census about the nature of occupancy, the pattern of housing tenure and the cost of housing.

In 1991 the Government announced the Housing Accommodation Supplement, which was introduced in 1993 and shifted New Zealand's housing policy from a variety of housing assistance measures, such as subsidised public housing and income support, to one of income support alone. The stated aim was to provide equity of assistance between private and state tenure. These measures were part of a shift in housing policy that saw housing need as primarily an affordability problem and considered that market mechanisms were the best way of setting rents, government subsidies should be tenure neutral, and there should be a reduction in government investment in the housing stock.

As a consequence, while the proportion of households renting remained largely unchanged between 1986 and 1996 (23.5 percent to 24.6 percent), the 1996 Census showed that the proportion of dwellings rented from the state sector decreased from 36.4 percent in 1991 to 27.9 percent in 1996 (SNZ 1998c). In some metropolitan areas, such as Auckland, the commercial mandate of Housing New Zealand, in conjunction with the sale of City Council houses, has helped to reshape the geography of low-income housing to the urban periphery (Murphy and Kearns 1998).

The impact of these policy changes on households and the rental market has been exacerbated by the significant changes in the formation and dissolution of households in the last decades. There have been two significant trends in opposite directions: a rise in people living alone and a rise in multi-family households. There was a 30.5 percent increase in one-person households in the 10 years leading up to the 1996 Census (SNZ 1998c). The increase has been caused by both social phenomena in those aged 30 to 54 (such as increased rates of people not marrying or marrying and divorcing) as well as the demographic effect of the changing age structure (for example, the increase in the number of the very elderly – those aged 85 and over). In general, living alone has been shown not to be good for health (Berkman and Syme 1979). However, when the alternative to living alone is residential care, changes in home support and health care have enabled more elderly people to beneficially retain their independence by staying in their own homes (SNZ 1998b).

In addition to the growth of single households, there were 168,255 one-parent families at the 1996 Census, an increase of 10.9 percent on the 1991 figure. This represents an increase of over a third (35.2 percent) in the 10 years preceding the 1996 Census (SNZ 1998c). Overall, 17.7 percent of families had sole parents, up from 14.3 percent in 1986 (SNZ 1998b). Lone mothers face a disproportionate loss of disposable income through housing expenditures (SJ Smith 1990; Kearns et al 1995).

By contrast, the nuclear family – a couple with children – while remaining the most common household type, fell both proportionately and in absolute numbers. While the number of households containing families, of all types, has remained constant over this period at 73.9 percent, the impact of economic and housing changes has been particularly severe on low-income households with children (SNZ 1998b).

The other significant trend is that there has been an increase in the number of families sharing a single dwelling. Between 1991 and 1996 there was a 62.5 percent increase in multi-family households. There were 32,196 multi-family households in 1996, 2.6 percent of households overall (SNZ 1998b). There are indications from research in the Wellington Tokelau community that multi-family households are formed partly as a result of cultural preferences, but more strongly because of economic necessity (Pene et al 1999, Howden-Chapman, Pene and Crane 2000).

Review of housing factors that affect health

Tenure

There is considerable British evidence that irrespective of the cost of housing, housing tenure has been shown to have a direct impact on the health and life expectancy of occupants. People in rented properties, particularly those in the publicly rented sector, have higher death rates than people in owner-occupied households (Goldblatt 1990; Filakti and Fox 1995). In Scotland, people in rented accommodation have been shown to have higher rates of cardiovascular and all-cause mortality compared to people who own their homes, even after adjustment for other socioeconomic variables (Woodward et al 1992; Sundquist and Johansson 1997). Further investigations have also shown that both rental housing and not having access to a car were independently related to a range of risk factors, even after controlling for other variables such as income and self-esteem (Macintyre et al 1998). Thus, owning a home seems to confer direct health advantages and is not just a proxy for greater income, higher social class or the protection and prestige that these confer.

In the United Kingdom, there are more marked differences in health between owner-occupiers and tenants in any given occupational social class than between social classes of either tenants or owners (Filakti and Fox 1995). Similar relations are also observable within grades of the civil service in the United Kingdom (GD Smith et al 1990).

It is likely that home ownership provides a degree of control over accommodation – a secure sense of home – that is crucial to wellbeing. Chapman (1982) found that a desire for autonomy was an important factor in tenure choice. This may be particularly true of older people who are no longer in the paid work force. A sense of control over personal circumstances seems to be as important in housing as it is in the workplace.

Review of New Zealand data: serious housing need

The extent of serious housing need – defined according to categories of lack of affordability, poor structure and maintenance, overcrowding and other associated problems such as violence – has been assessed on several occasions. There have been three surveys of serious housing need in New Zealand in recent years. These have shown a significant increase in the percentage of households experiencing serious housing need. In 1988 the National Housing Commission estimated that there were 17,500 households with children who had serious housing needs.

Using the Housing Corporation of New Zealand's Serious Housing Need Index (Housing Corporation of New Zealand 1990; Saville-Smith and Yeoman 1990), Waldegrave and Sawrey (1994) found that there had been a 22 percent increase in serious housing need between March 1992 and August 1993. In 1992 this was estimated at 40,000 households, rising to 48,800 in 1993. As in many aspects of housing, there were regional differences: the highest increases were in South Auckland and Northland (24 percent), followed by Wellington and Christchurch, which ranged between 10 and 14 percent. This indicates that both rural and urban areas have high and increasing levels of serious housing need. Overall, single-parent families headed by women were the largest group experiencing serious housing needs, but Māori and Pacific peoples were also disproportionately represented. Using a different method, in 1994, the Ministry of Housing assessed the number of households in serious housing need at between 20,000 and 30,000.

The key factor identified in relation to serious housing need has been affordability. Some of the possible impacts of the lack of affordability of good-quality housing were indicated by a 1995 survey, which assessed the impact of the Housing Accommodation Supplement by interviewing more than a thousand people who received food-bank parcels. The survey found that most respondents (94 percent) spent 30 percent or more of their income on accommodation costs and more than half (52 percent) spent half or more of their income (Young 1995). Both Māori (46 percent in the sample compared to 14.5 percent identifying as Māori in the 1996 Census) and Pacific peoples (13.2 percent in the sample compared to 5.9 percent of the total population) were over-represented in these categories. However, those who lived in smaller households paid the highest proportion of their income on accommodation. The largest group experiencing difficulties were single-parent households headed by women (Young 1995).

A recent, national random sample of 401 low-income New Zealand households also found that housing costs were the major item of household expenditure for low-income families (Waldegrave et al 1999). Forty-four percent paid 40 percent or more of their income (after tax) on rent or a mortgage, and the majority of those paying 40 percent or more of their income were Housing New Zealand tenants. There were strong indications that these families' ability to buy essential food items and visit the doctor were curtailed as a result.

Another vulnerable group in relation to housing comprises people who have been deinstitutionalised from psychiatric hospitals and frequently end up living in public housing. The National Housing Commission (1988) survey found that between 2000 and 3500 'psychiatric survivors' (20 to 35 percent of those with chronic psychiatric illness who were living in the community) occupied inappropriate or sub-standard housing. Other surveys have also found that the mental wellbeing of people with psychiatric disorders was correlated with the quality of their housing (Kearns 1993). There have been consistent indications in New Zealand that landlords discriminate against prospective tenants on grounds such as ethnicity and perceived social desirability, which further limits the housing choices of such groups (Macdonald 1986).

Research carried out by the Māori Women's Housing Research Project, which examined the housing conditions of Māori women in Gisborne/East Coast, South Auckland and Christchurch, also found that Māori women were commonly subject to discrimination by private landlords (Māori Women's Housing Research Project 1994). Most of the Māori women interviewed did not think that it was financially feasible for them to own a home or raise the bond necessary for renting from private landlords. Overcrowding, both temporary and permanent, and varying degrees of homelessness were common among the families studied.

Temporary homes

Not living in a permanent dwelling is likely to increase the number of housing hazards occupants face, such as open fires and cold temperatures. In the 1996 Census, 11,208 people lived in 7338 temporary private dwellings such as tents, caravans in motor camps, mobile vans or temporary dwellings (SNZ 1998b; 1998c). Temporary private dwellings made up 0.6 percent of total private dwellings. However, in certain regions the proportion of temporary private dwellings was higher (for example, 3.1 percent in Tasman, 2 percent in the West Coast and 1.7 percent in Northland). It is likely that these figures underestimate the number of people who live in dwellings that are not intended for permanent occupation because baches and cribs are classified as private permanent dwellings in the Census.

The National Health Committee (1998) highlighted that there is a lack of empirical research into the numbers of households living in so-called 'temporary accommodation' which may be their home on a long-term basis. There are an estimated 1000 households in Northland and 350 on the East Cape living in 'unacceptable substandard housing', but there has been no national survey, only limited surveys in a few areas (Social Services Select Committee 1997).

Temporary accommodation, by definition, is likely not to conform to any building codes. For example, lack of safe heating in temporary accommodation may be related to the fact that Māori, who are disproportionately sole parents and disproportionately live in temporary accommodation, are over-represented in deaths and injuries from house fires (Duncanson et al 1999). This parallels the British trend, where children in the lowest social class are 16 times more likely to die in fires than children in the highest social class as a result of being more likely to live in temporary accommodation and substandard housing (Roberts 1997).

Design and maintenance

Housing design affects injury rates in children and older people (National Health Committee 1998). Problems of construction and maintenance mean that there are pockets of relatively new owner-occupied stock that are in a very poor state of repair (Saville-Smith and Amey 1999).

Poor maintenance of dwellings can lead to infestations that spread infection and exacerbate allergies (National Health Committee 1998). In a small survey of housing in Glen Innes, 80 percent of the households reported infestations of pests such as cockroaches, mice or fleas and 16 percent reported infestations of rats and mice (Williams et al 1999). The recent Report on Housing in Otara highlighted infestations of rats from the Otara Creek as a problem that had been reported to the Council for many years without remedial action (Otara Housing and Health Local Solutions Project 1999).

The indoor environment

There are a number of health conditions associated with indoor environmental conditions. For example, the predominant sensitising environmental allergens for asthma in New Zealand are believed to be house dust mites and domestic cats. In those with asthma sensitive to mites, a dose-response relationship has been observed between the risk of current symptoms and the reservoir levels of the major allergen Der p 1 in homes (Peat et al 1996). High levels of Der p 1 have been found on fine dust on living-room floors in Wellington homes (Wickens et al 1997). However, despite this established link, attempts to reduce exposure to mite allergens of both the general population and sensitised symptomatic people with asthma have not been successful. Ventilation units fitted to 10 houses in Wellington did not significantly reduce humidity or allergens in those houses (Crane et al 1998).

Another health risk that is also related to humidity levels is fungal growth. Internal dampness, which can cause the growth of moulds, can be affected by whether windows are opened in the bathroom and clothes are dried inside. Indoor air fungal spore counts are positively associated with occupants reporting their home as being damp and that children in the household had respiratory symptoms (Douwes 1998).

Cold, dampness and housing

Both children and the elderly are vulnerable to low temperatures, because they have less efficient body temperature-regulating mechanisms (Collins 1983; Howden-Chapman et al 2000). Excess winter mortality can arise from the combined effects of acute exposure to outdoor temperatures, as well as more prolonged (though less severe) cold indoors. New Zealand has greater seasonal mortality than the less temperate countries with more extreme climates, particularly in those aged 65 and over (Isaacs and Donn 1993). Effects of the climate on health have also been demonstrated in Christchurch (Hales, Salmond et al 1999). These effects may be related to the relatively high humidity of the New Zealand climate and the poor insulation of older New Zealand houses. A pilot project is presently being carried out to examine the impact of insulating pensioner housing on the health and wellbeing of the residents (Howden-Chapman, Crane and Woodward 2000).

Because of New Zealand's relatively high rainfall and the construction of New Zealand homes, housing surveys have consistently shown an ongoing problem with dampness and mould. Recent examples have included a community survey of 42 Housing New Zealand-owned homes in Glen Innes (Williams et al 1999). Most of the homes surveyed were uninsulated (62 percent), and almost all (98 percent) reported problems with excess condensation, dampness, mould or cold draughts. Half the households thought that their health problems such as asthma and respiratory infections were exacerbated as a result. Because of insufficient disposable income, few of the householders in the survey could afford to heat their homes. Moreover, existing fireplaces in the houses were poorly maintained.

Box 7: Crowding in New Zealand

Nationally, between 1986 and 1996 households became less crowded according to the Crowding Index (SNZ 1998c). However, a national random survey of 401 low-income households, which also used the Crowding Index, found that 40 percent of these households were overcrowded (22 percent of European households, 51 percent of households with Māori

occupants and 60 percent of households with Pacific peoples as occupants (Waldegrave et al 1999).

According to the Canadian occupancy model,* which provides a measure of physical and social requirements, in 1996 5.7 percent (69,200) of New Zealand households required one additional bedroom and 1.4 percent required two or more additional bedrooms (SNZ 1998c). This latter group represents 3.4 percent of the New Zealand resident population (115,300 people). By contrast, 70 percent of households had spare bedrooms. While multi-family households are relatively uncommon in New Zealand (2.6 percent of households overall), such households represent a large proportion (41.5 percent) of crowded homes (SNZ 1998c).

A regional analysis of overcrowding in New Zealand indicates that overcrowding is not just an urban experience and that there are rural areas with overcrowding problems (Saville-Smith and Amey 1999).

Crowded households compared to all households were more than twice as likely to have children under 18 years of age. Put another way, children were present in over 90 percent of crowded homes (5.3 percent of all children in New Zealand live in crowded homes) (SNZ 1998c).

Unemployment rates were two to four times higher than average in crowded homes, depending on the age and sex of the respondents. Similarly, labour force participation was lower than average (SNZ 1998c). Income levels for those aged 15 and over were also lower: 79.1 percent of those in crowded homes earned \$20,000 or less per annum, compared to 58.6 percent of all adults. In the 1996 Census, fewer than one in every five adults received income assistance (excluding New Zealand Superannuation and ACC) during the previous year, compared to more than half of those in crowded homes.

* While there is no official statistic or index of overcrowding in New Zealand, in this analysis the Canadian National Occupancy Model, which is sensitive to both household size and composition, is used. In the Canadian model it is considered reasonable for two children under five to share a bedroom, children of the same sex to share between 5 and 17, but at 18 young adults should have their own room.

Analysis of the 1996–97 health and nutrition surveys: crowding and health

Health outcome data for this chapter were obtained from the 1996–97 New Zealand Health Survey (NZHS) and the 1997 National Nutrition Survey (NNS). The data were analysed using STATA to adjust for cluster sampling within strata. Damp, cold housing and overcrowding are the three main risk factors in housing for ill health. However, the available surveys only provide data on crowding, which indeed is probably the main risk factor for health.

Data on crowding were calculated from the household demographic sheets which precede the NZHS and are not usually coded. In this analysis, the Canadian definition of overcrowding (described above) was used. This definition assumes that being short of one bedroom or more is equivalent to being in a ‘crowded house’. The number of bedrooms needed could not be calculated for 165 of the 7869 households (2 percent) due to missing data relating to age, sex, marital or relationship status of one or more members of the household.

In the NZHS, 7.8 percent of respondents aged 15 to 64 years were from households where there was a shortage of bedrooms relative to the number of people in the house. Of this group, 75.3 percent were short of just one room. Crowding varied significantly by the ethnic group of the household as represented by the respondent. Only 3.2 percent of households where a European or person of 'other' ethnicity were respondents were crowded, compared to 15.6 percent of households where Māori were respondents and 34.9 percent of households where Pacific people were respondents.

Table A7.1a (in Appendix 7) shows that residents living in crowded houses were significantly more likely to reside in a deprived locality. This was particularly so for Māori and Pacific peoples. Among these ethnic groups, the crowding was particularly concentrated among the most deprived households as measured by NZDep96 scores (Salmond et al 1998a). However, these results are somewhat difficult to interpret as NZDep96 includes a measure of overcrowding and Māori are very over-represented in the most deprived decile.

Only permanent households were sampled in the NZHS. The exclusion of those in temporary accommodation, who have on average lower incomes than those in permanent accommodation, is likely to have the effect of underestimating the impact of overcrowding on health.

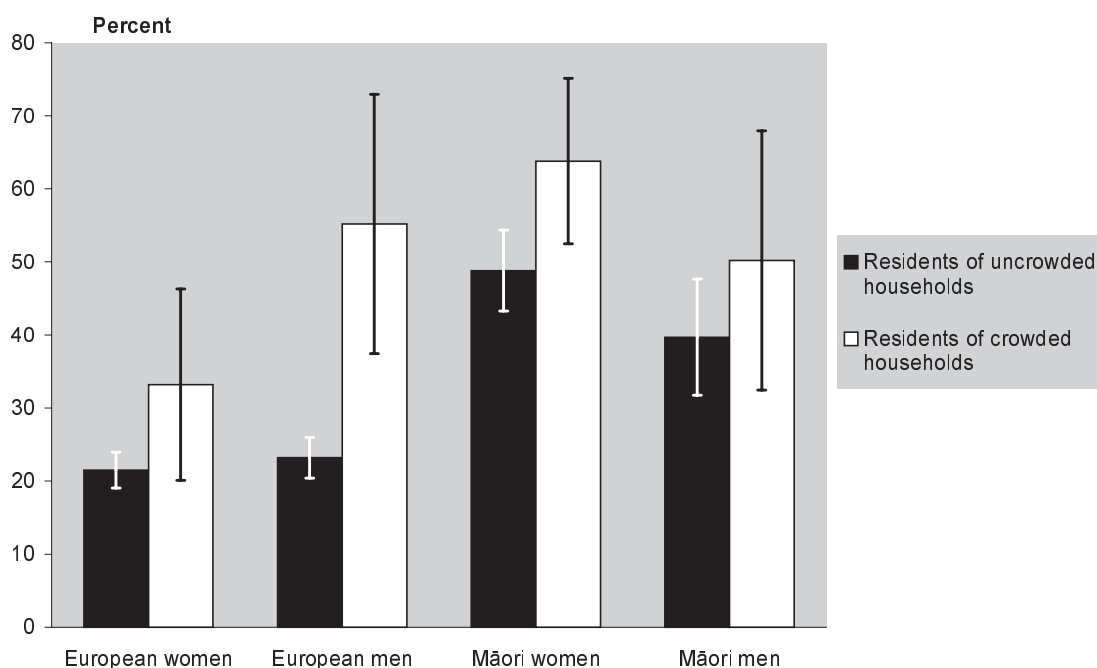
Self-reported health

Self-reported mental health using the SF-36 summary score was significantly poorer (lower scores) in adults living in crowded houses (PRR = 0.96). This was also true for Māori women (PRR = 0.91). Similarly, the SF-36 physical summary scores were lower among adults who lived in crowded houses (PRR = 0.97). The SF-36 results are shown in more detail in Table A7.1b (in Appendix 7).

Risk factors

Smoking was significantly more common among all those living in crowded houses (PRR = 1.75) and among European men (PRR = 2.38). Higher levels of smoking in crowded houses is also likely to lead to higher levels of exposure to second hand smoke.

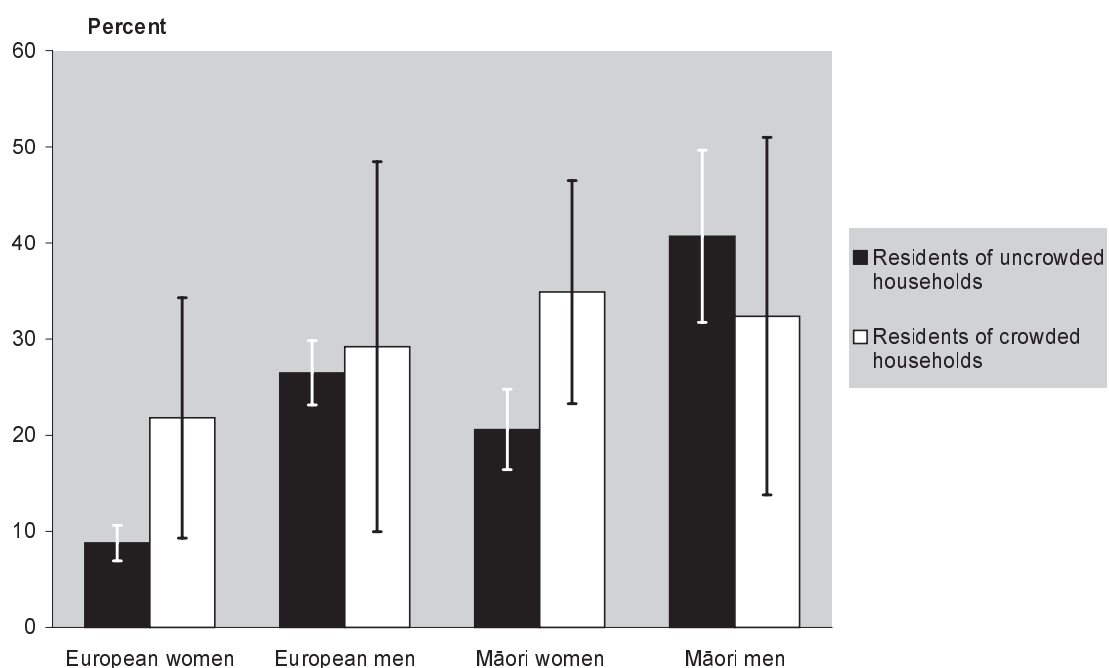
Figure 7.2: Smoking prevalence, by household crowding, 1996–97



Source of base data: New Zealand Health Survey 1996–97

More hazardous drinking patterns were also apparent among adults in crowded houses (PRR = 1.37), and there were significant results for European (PRR = 2.48) and Māori women (PRR = 1.69).

Figure 7.3: Hazardous alcohol consumption, by household crowding, 1996–97



Source of base data: New Zealand Health Survey 1996–97

Health outcomes

Asthma: This tended to be reported more frequently by adults living in a crowded household, but not at a statistically significant level. However, these results are consistent with the positive relationship between smoking and asthma. There were no significant results for high blood pressure, injury or poisoning and crowding.

Meningococcal disease: This was not examined in the NZHS, but has been the subject of a recent major case-control study (McNicholas et al 2000). New Zealand is now in the ninth year of a serogroup B meningococcal disease epidemic, with highest incidence rates being found among Pacific and to a lesser extent Māori infants and children in the Auckland region. The study examined 202 cases and 313 controls, frequency matched for age and ethnicity. Controlling also for season and a range of socioeconomic variables in a multiple regression model, risk of disease was found to be strongly associated with household crowding (odds ratio 10.7). The authors concluded that alleviating crowding among households at high risk (for example, Pacific families with young children in South Auckland) could substantially alter the future course of the epidemic.

Conclusion

Despite a substantial amount of research internationally on the impact of housing on the physical and mental health of occupants, there is a paucity of research evidence in New Zealand. Many of the studies to date have been based on opportunistic sampling of low-income households, yet the consistency of the results strengthens the conclusions. The general association is clear, although the relative effect size of different aspects of housing (for example, socioeconomic factors, location and occupant behaviour) remains unclear. Further research is needed to clarify causal mechanisms, if an appropriate policy response is to be developed and implemented.

New data analysed in this chapter have focused on crowding because it is the factor most consistently associated with ill-health in the literature. However, the analyses do not control for household income or explore the relationship between ethnicity and housing, both of which are likely to have a strong prior impact on crowding. For example, researchers have shown a consistent prejudice among private landlords, which is likely to lead to the residential segregation of Māori and Pacific tenants, but the impact of such racism and the resultant residential segregation on the health of tenants has been largely unexplored in New Zealand (Milne and Kearns 1999).

Crowding is 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. Both economic factors and cultural attitudes contribute to the marked differences in overcrowding among income and ethnic groups (Pene et al 1999). Nevertheless, the relationship between low income and poor housing is not inevitable, but can be influenced by housing policy. The reduction in the quantity of public housing and loss of the link between rent and disposable income over the past decade have increased the proportion of disposable income paid in rent by many low-income tenants. This has major implications for the amount of disposable income that is then available for food, health care and other essential goods.

There are indications from the NZHS that people living in crowded households are more likely to smoke and drink alcohol excessively and report symptoms of mental and physical stress. As this survey only sampled people in permanent accommodation, these results are likely to underestimate the relationship between overcrowding, risk behaviour and ill-health. The meningococcal case control study revealed a very strong link between household crowding and risk of this serious infectious disease (odds ratio of almost 11).

There is a need to monitor the extent of serious housing need, including crowding, in New Zealand. It has been over a decade since there has been a national housing survey in New Zealand, despite indications that the situation has deteriorated. There are consistent indications that families with young children, whose health and welfare are particularly vulnerable, are more likely to be poorly housed (Hassall 1996).

