

Final Report

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

authored by
Anne-Marie Waters

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EXECUTIVE SUMMARY

This paper presents the key results and research outcomes from a study 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 describes the methodology by which links between housing and health inequalities in Australia were investigated; it presents the results of the study; and it describes the implications of these results for the development of housing and urban policy.

The key issues of policy relevance identified by the study include:

- 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, particularly in relation to housing affordability.
- 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 were that:

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

The key aspects of the methodology used to explore the links between housing status and health inequalities in Australia were that:

- The project analysed data from the Australian Bureau of Statistics 1995 National Health Survey, the most recent national source of both health and housing information.
- The analysis examined the relationship between housing tenure and overcrowding and health in the context of a range of socio-demographic and socio-economic variables.

The key results and research outcomes of the study were that:

- Housing tenure was found to be independently associated with self-assessed health status, number of serious health conditions reported, health service use and smoking. In particular, after adjustment for confounding variables and cluster sample design:
 - Renters were significantly more likely than outright owners to report fair or poor health status;
 - Renters reported a significantly higher average number of serious health conditions compared with outright owners;
 - Renters were significantly more likely than outright owners to have visited a doctor in the last two weeks as well as in the last 12 months;
 - Renters were significantly more likely than outright owners to be smokers;
 - Purchasers were also significantly more likely than outright owners to be smokers; and

- There was also some evidence that purchasers reported a significantly higher average number of serious health conditions compared with outright owners, and that purchasers were significantly more likely than outright owners to have consulted a doctor in the last 12 months, however after controlling for clustering these associations were no longer statistically significant.
- Overcrowding was found to be independently associated with the number of health conditions reported. That is, after adjustment for confounding variables and cluster sample design:
 - Persons living in overcrowded households reported a significantly lower average number of health conditions compared with individuals living in non-overcrowded households;
 - There was also some evidence of an independent association between overcrowding and self-assessed health status, with persons living in overcrowded households being significantly more likely than those in non-overcrowded households to have reported fair or poor health, however after controlling for clustering this association was no longer statistically significant; and
 - Similarly, there was some evidence that persons living in overcrowded households were significantly less likely than those living in non-overcrowded households to have consulted a doctor in the last two weeks, however this association also ceased to be significant after adjusting for sample clustering.

The key implications identified for housing and urban policy development were that:

- The study is a first step in addressing the current gap in knowledge in Australia.
- The results have identified areas of concern that may need greater attention in Australia as well as indicating directions for future research. These include further research:
 - to determine the pathways by which housing tenure, particularly renting, affects health;
 - into the relationship between overcrowding and health and to determine whether 'extreme' overcrowding is associated with poorer health.
- The limitations of the study point to the need for further research into a whole range of issues such as the effect of homelessness on health, and the relationship between housing and health among Indigenous peoples.

INTRODUCTION

1.1 Purpose

This Final Report presents the findings of research undertaken by the Australian Housing and Research Institute (AHURI): Australian National University (ANU) Research Centre to examine the links between housing and health inequalities in Australia. It is the third in a series of papers prepared as part of the study. The key aspects of the first and second papers in the series, the Positioning Paper and the Work in Progress Paper, are summarised below. The Final Report will be followed by a Findings Paper, which will summarise the findings and draw out the implications for policy development.

1.2 Background

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.

Research into the linkages between health and socioeconomic status in Australia since the late 1970s has shown that low income Australians have poorer health than that of their better off counterparts, and that the 'health gap' between the rich and poor increased significantly over time (Walker & Abello 2000). 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.

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 was commissioned by AHURI, is therefore important as it is a first step in addressing the current knowledge gap by examining the links between housing and health, holding income and other explanatory characteristics constant. Specifically, the study investigates the extent to which housing tenure and over-crowding in the home contributed to health inequalities in Australia in 1995.

1.3 Summary of the Positioning Paper

The Positioning Paper¹, which was published by AHURI in February 2001, set the context for exploring the impact of housing conditions on health inequalities between Australia's rich and poor (AHURI 2001). Specifically, it:

- examined the policy relevance of investigating the links between housing and health;
- included a comprehensive literature review of the association between housing and health; and
- described the methodology to be used to investigate the links between housing and health inequalities in Australia.

¹ The Positioning Paper is published at http://www.ahuri.edu.au/pubs/positioning/pp_ausrichpoor.pdf.

Policy relevance

Evidence of the links between socio-economic disadvantage and health is overwhelming and developed countries, including Australia, have introduced policy initiatives to reduce these health inequalities. Given that housing is a key factor in poverty (Burke 1998: 165), particularly in relation to housing affordability, 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 Commonwealth and State and Territory governments have developed and implemented strategies aimed at providing housing assistance to people on low incomes or with special needs, and preventing and reducing homelessness. These include the Commonwealth-State Housing Agreement, the Stronger Families and Communities Strategy and the National Homelessness Strategy. The links between social disadvantage and health mean that these strategies have the potential to result in indirect benefits in health. Therefore it is important to understand how housing relates to health in Australia.

Literature review

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.

Some of the key findings identified in the literature review were that:

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

In reviewing the literature, it became clear that, while a great deal of research into the links between housing and health has been undertaken overseas, very little quantitative work has been done in Australia. Therefore research into this area is needed to address the current knowledge gap, set directions for future research and identify areas of concern for policy makers.

Data collected in the 1995 National Health Survey (NHS), conducted by the Australian Bureau of Statistics (ABS), provide an opportunity to examine the effects of housing tenure and overcrowding on health and health inequalities in Australia.

1.4 Summary of the Work in Progress Paper

The Work in progress Paper² presented early findings of the preliminary bivariate chi-square (χ^2) analysis undertaken for this study. This analysis indicated that there was evidence of significant associations between various indicators of health status, health service use and risk factors, and both housing tenure and overcrowding.

With respect to housing tenure the early findings indicated that individuals living in rented dwellings were more likely than owner-occupiers³ to:

- have reported poor or fair health status;
- have consulted a doctor in the two weeks prior to interview; and
- be smokers.

² The Work in Progress Paper is published at <http://www.ahuri.edu.au/pubs/progress.html>

³ In the preliminary analysis dwellings that were either owned or being purchased were defined as owner-occupied. Note, however, that for the analysis undertaken and presented in this Final Report housing tenure has been classified into three categories—renter, purchaser and outright owner.

In contrast, owner-occupiers were more likely than renters to:

- have reported four or more health conditions;
- be overweight; and
- to be sedentary.

With respect to household overcrowding the early findings indicated that persons living in overcrowding 0–3 bedroom dwellings were more likely to:

- be smokers; and
- be underweight; and
- be sedentary.

In contrast, those living in non-overcrowded 0–3 bedroom dwellings were more likely to:

- have reported four or more health conditions;
- have reported at least one serious health condition;
- have consulted a doctor in the two weeks prior to interview; and
- be overweight or obese.

However, it should be noted that the preliminary analysis did not adjust for other factors, such as age, which are known to be strongly related to health. Therefore, it is not possible from these results to assume an independent association between these housing variables and health status. Adjusting for confounding factors was the focus of the analysis undertaken for this Final Report.

2 STATISTICAL METHODS

2.1 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).

In this study, data from a national cross-sectional survey—the Australian Bureau of Statistics (ABS) 1995 National Health Survey (NHS)—were analysed. Multivariate regression analysis was used to determine the relative importance of an individual’s housing status (measured as housing tenure and household overcrowding) in contributing to health inequalities in Australia by adjusting for potential confounding factors.

2.2 Data source

The 1995 NHS was a national cross-sectional survey conducted during the 12-month period from January 1995 to January 1996 (ABS 1996a). 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. sex, 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.

2.3 Variables to be used in the analysis

Housing variables

Information related to housing was obtained from either the reference person or their spouse/partner in each household (ABS 1996a). Housing data publicly available from the 1995 NHS unit record file include:

- ‘nature of occupancy’—renter, purchaser, owner, or other. This variable is referred to as ‘housing tenure’ in the analysis, results and discussion below;
- ‘type of landlord’—private landlord, person in same household, employer, housing co-operative/community/church group, or other; and
- ‘number of bedrooms’—zero, one, two, three, four or more. This variable was used to derive an ‘overcrowding index’ for households with 0–3 bedrooms (see below for more details).

For most households, the ABS only attached housing data to the record of the reference person or their spouse/partner. As we could not be sure that every member of the household had the same housing status⁴ (i.e. housing tenure and type of landlord) the following assumptions and exclusions were made:

⁴ It was assumed that the number of bedrooms reported by the reference person or their spouse/partner was the same for all household members.

- Persons who belonged to the same income unit and lived in the same household were assumed to have the same housing tenure and type of landlord (where relevant) as the reference person or their spouse/partner. This resulted in housing status being available for 47,141 (87.6%) individuals out of the original sample of 53,828 individuals. Further, housing status was available for every member of the household for 15,914 (77.3%) of the 20,585 households.
- Persons who lived in the same household but did not belong to the same income unit as the reference person or their spouse/partner (6,687 persons) were excluded from the analysis as it could not be assumed that their housing status was the same as the reference person or their spouse/partner.

The housing variables included in this study were:

- Housing tenure—renter, purchaser and outright owner. As noted above, the preliminary analysis combined purchasers and outright owners into one category however it was decided that purchasers were of interest in their own right and so the analysis undertaken for this Final Report examined the three categories;
- Overcrowding index—derived from the number of bedrooms for dwellings with 0–3 bedrooms (see below for details).

Indicators of health status, health service use and risk factors

The variables used as indicators of health status, health service use and risk factors in this study were:

Health status

- Recent illness/injury and long-term conditions⁵—used to determine total number of health conditions reported and number of serious health conditions reported; and
- Self-assessed health status (data collected from persons aged 15+ years only)—categorised in this study as 'excellent, very good or good'; and 'fair or poor'.

Health service use

- Whether a doctor was consulted⁶ in the two weeks prior to interview; and
- Period since last doctor consultation (used to determine whether a doctor had been consulted at least once in the last 12 months).

Risk factors

- Smoker status (data collected from persons aged 18+ years only)—categorised as 'smoker'; 'ex-smoker'; and 'never smoker'.

Note that, although body mass index and exercise level index were included in the preliminary analysis they were not examined in the final analysis due to resource constraints.

Other variables

Other data collected in the 1995 NHS that were included in the analysis as confounding factors were:

Demographic

- Age—categorised as '0–15 years'; '16–17 years'; '18–24 years'; '25–44 years'; '45–64 years'; and '65+ years';

⁵ The NHS allowed for up to 14 health conditions (i.e. recent illness/injury and long-term conditions) to be reported by each respondent. Recent illness was defined as a medical condition that was experienced in the two weeks prior to interview. Long-term conditions were defined as medical conditions which had lasted a least six months, or which the respondent expected to last for six months or more. Each health condition reported was classified as either serious, non-minor or minor using the classification adopted by Walker & Abello (2000) and largely based on the classifications of non-minor and serious conditions established by Australian Institute of Health and Welfare (Moon et al. 1998; Mathers 1994).

⁶ Includes consultations with general practitioners and specialists, as well as consultations by telephone or having someone else consult a doctor on behalf of the respondent (such as a relative or friend, or doctor's nurse or receptionist).

- Sex; and
- Country of birth (used to determine region of birth)—categorised as Australia; UK and Ireland; Europe; Asia and Other).

Geographic

- State; and
- Geographic area— categorised as 'capital city/other metropolitan centres'; and 'rural/remote areas (including NT)'.

Income unit characteristics

- Income unit type (i.e. couple with dependent children; couple without dependent children; single parent with dependent children; and single person);
- Quintile of equivalent family income; and
- Index of relative socio-economic disadvantage⁷ (the 1995 NHS unit record file contains quintiles for this variable ranging from most disadvantaged (first quintile) to least disadvantage (fifth quintile)).

Labour force

- Employment status and occupation (data collected from persons aged 15+ years only); and
- Occupation (data collected from persons aged 15+ years only).

Risk factors

- Exercise level index (data collected from persons aged 15+ years only)—categorised as 'vigorous'; 'moderate'; 'low'; and 'sedentary';
- Smoker status (data collected from persons aged 18+ years only)—categorised as 'smoker'; 'ex-smoker'; and 'never smoker'; and
- Body mass index (data collected from persons aged 15+ years only)—categorised as 'underweight'; 'acceptable weight'; 'overweight'; and 'obese'.

Derived variables

Overcrowding

An 'over-crowding' index⁸, based on the Canadian National Occupancy Standard, was derived. The Canadian National Occupancy Standard for housing appropriateness is considered 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.

⁷ The Index of relative socio-economic disadvantage is a measure of socio-economic disadvantage (ABS 1998a). The index covers all areas of Australia and is derived from attributes such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations. The higher an area's index value, the less disadvantaged that area is compared with other areas.

⁸ This index has been used by both the Australian Bureau of Statistics and the Australian Institute of Health and Welfare (for example see ABS 2000 and AIHW 1997 & 1999).

Households living in dwellings where this standard cannot be met are considered to be overcrowded⁹.

It should be noted, however, that as the ABS categorised the number of bedrooms on the 1995 NHS unit record file as—0; 1; 2; 3; 4+—it was only possible to derive an overcrowding index for households with 0–3 bedrooms. Households with 0–3 bedrooms accounted for 79% of all households participating in the 1995 NHS.

Occupation/employment status

One of the occupation categories in the NHS95 unit record file combined people in the armed forces, the unemployed, people who were not in the labour force, and children and the retired for whom occupation was not applicable. Therefore, in the multivariate analysis undertaken for this study, occupation and employment status were combined to separately identify the unemployed, those in the armed forces, children and persons not in the labour force. The categories used in the analysis were 'not applicable/not in labour force/armed forces'; 'unemployed (looking for work)'; 'managers and administrators, and professionals'; 'para-professionals, tradespersons, clerks and salespersons and personal service workers'; 'plant and machinery operators and divers, and labourers and related workers'.

Excluded records

As discussed above, individuals for whom no housing data were available were excluded from the analysis. In addition, individuals with the following characteristics were also excluded from the analysis:

- housing tenure = 4 (i.e. other);
- income unit type = 5 (i.e. scope/coverage/visitor/special dwelling) or 9 (i.e. incomplete unit);
- quintile of equivalent family income = 0 (i.e. not determined);
- Index of relative socio-economic disadvantage = 0 (i.e. insufficient information to calculate);
- Occupation = 9 (i.e. not stated); and
- Body mass index = 9 (i.e. not known/not stated).

These exclusions meant that 37,054 records (69% of all records) were available for the analysis of housing tenure and 30,564 records (57% of all records) were available for the analysis of household overcrowding¹⁰.

2.4 Data analysis

The following statistical analyses were undertaken using the SAS software package:

1. Bivariate analysis to test for significant associations between the housing variables (i.e. housing tenure and overcrowding) and indicators of health status. Chi-square (χ^2) tests were used to analyse dichotomous health status variables (i.e. self-assessed health status, whether a doctor was consulted in the last two weeks, whether a doctor was consulted in the last 12 months, and smoker status). Analysis of variance was used to analyse the total number of health conditions reported and the number of serious health conditions reported.
2. Multivariate analysis to further test the associations while controlling for potential confounding factors. Logistic regression was used to analyse the dichotomous health status variables and poisson regression modelling was used to analyse the total number of health conditions reported and the number of serious health conditions reported.

⁹ It should be noted that bedsitters are classified as overcrowding under this definition as they have no bedrooms.

¹⁰ Overcrowding status could not be determined for persons living in dwellings with 4 or more bedrooms.

The NHS95 sample is very large (53,828 records). Each record carries a weight, which when applied to the record enables calculation of estimates relating to the entire population (i.e. 18 million persons). However, when χ^2 tests, analysis of variance, and regression modelling are carried out using these weights a significant result is nearly always returned because the weighted number of observations is so large. To remedy this, the weights can be adjusted (i.e. normalised) by a given proportion. In this study, the weight for each record was adjusted according to the following formula (Wilson 1999):

$$\text{Adjusted weight for record} = \frac{\text{weight for record}}{\text{weighted sample size (i.e. 18,061,076)}} \times \text{unweighted sample size (i.e. 53,828)}$$

The effect of this adjustment is to make the sum of the weights the same as the actual number of observations. This does not affect the weighted proportions or means in each category (i.e. the proportions and means are identical to those calculated using the unadjusted (i.e. original) weights) but ensures that the significance of results is not artificially increased.

The 1995 NHS is a complex survey based on a stratified cluster design. The clustering of respondents within households means that variances from the survey are likely to be larger than those obtained from surveys based on simple random sampling (Walker & Abello 2000). It is possible to control for the effect of clustering, however, for confidentiality reasons the ABS does not make the necessary information available to researchers. To account for this, Walker and Abello (2000) undertook sensitivity testing to determine whether the significance of their results changed if variances were inflated by 2 to 10 times those occurring under simple random sampling. The ABS advised that, for national results and most NHS variables, if the correct variances were calculated on the basis of cluster sampling, they would be unlikely to exceed two times the variances calculated on the basis of simple random sampling. When they undertook the sensitivity analysis, Walker and Abello found that overall the significance of the Australia-wide results did not change when they applied a factor of '2' to the variance calculated on the basis of simple random sampling, i.e. the cluster design effect did not have an impact on the robustness of the findings.

In undertaking the analysis for this study, an assumption of simple random sampling was made but sensitivity testing of significant results was undertaken to gauge the possible effect of clustering.

3 RESULTS

3.1 Housing tenure

For those persons for whom housing status was known, just over one quarter lived in rented dwellings in 1995 and 72% lived in owner-occupied (with or without mortgages) dwellings (Table 1). Of the households for which housing status was known for every household member, 28% were rented and 69% were owner-occupied. These results are consistent with those reported in the ABS 1994 and 1999 Australian Housing Surveys (ABS 1996b; 2000).

Table 1 **Distribution of individuals and households by type of housing tenure, 1995**

Type of housing tenure	Individuals		Households ^(a)	
	Number ('000)	Per cent	Number ('000)	Per cent
Renter	3,206	25.8	1,257	28.0
Purchaser	4,374	35.2	1,332	29.7
Owner	4,580	36.8	1,776	39.6
Other	277	2.2	117	2.6
Total ^(b)	12,438	100.0	4,481	100.0

(a) Only includes households where housing status is known for all household members

(b) Components may not add to totals due to rounding.

Note: Weighted estimates.

Source: ABS 1995 NHS.

There were significant differences in the socio-demographic composition of rented households compared with those that were being purchased or were owned outright (Table 2). Compared with outright owners, persons living in rented households were more likely to be:

- Aged 44 years and under;
- Single parents with dependent children and single persons;
- In the bottom two quintiles of relative socio-economic disadvantage (i.e. the most socio-economically disadvantaged);
- In the bottom quintile of equivalent family income (i.e. the lowest equivalent family incomes); and
- Born in Asia.

Table 2 **Per cent distribution of selected socio-demographic characteristics by type of dwelling, individuals, 1995**

	Type of dwelling		
	Rented %	Purchased %	Owned Outright %
Sex			
Male	49.2	51.5	48.1
Female	50.8	48.6	51.9
Age group (years)			
0–14	30.0	33.8	15.2
15–24	15.0	7.6	5.4
25–44	37.2	42.3	16.1
45–64	12.2	14.9	36.2
65+	5.6	1.5	27.1
Income unit type			
Couple with dependent children	39.8	69.3	37.8
Couple without dependent children	17.0	18.2	44.1
Single parent with dependent children	18.3	6.3	2.5
Single person	24.9	6.2	15.7
Index of relative socio-economic disadvantage			
1 st quintile (most disadvantaged)	34.6	13.0	14.2
2 nd quintile	22.0	17.3	19.9
3 rd quintile	16.6	16.8	18.3
4 th quintile	15.7	24.9	22.4
5 th quintile (least disadvantaged)	11.1	28.1	25.2
Quintile of equivalent family income			
1 st quintile (lowest equivalent family income)	26.3	10.6	16.5
2 nd quintile	25.0	11.5	25.2
3 rd quintile	20.3	19.8	19.7
4 th quintile	15.2	27.6	17.7
5 th quintile (highest equivalent family income)	13.2	30.5	20.9
Employment status			
Employed	40.4	51.0	34.7
Unemployed (looking for work)	5.8	1.5	1.6
Not in the labour force/not applicable	53.8	47.4	63.7
Occupation			
Not applicable/armed forces	59.5	49.0	65.3
Managers/administrators/professionals	8.1	15.0	10.7
Para-professionals/trades/clerks/sales	21.8	27.2	16.9
Plant & machinery operators & drivers/labourers	10.5	8.9	7.1
Region of birth			
Australia	76.8	80.9	75.5
UK & Ireland	6.4	7.1	7.8
Europe	4.1	3.7	10.6
Asia	7.6	4.3	3.6
Other	5.2	4.0	2.6
Region			
Capital city/metropolitan	69.9	73.6	67.3
Rural/remote (includes NT)	30.2	26.4	32.7

Note: Weighted estimates.

Source: ABS 1995 NHS.

Compared with outright owners, persons living in households that were being purchased were more likely to be:

- Aged 44 years and under;
- Couples with dependent children;
- In the top two quintiles of equivalent family income (i.e. the highest equivalent family incomes);
- Born in Australia; and
- Living in capital city/metropolitan areas.

Self-assessed health status

The bivariate χ^2 analysis indicated that both renters and purchasers were less likely to report poor or fair health than outright owners (Table 19, Appendix A). This result was also reflected in the unadjusted odds ratios, which showed that the odds of reporting fair or poor health status was 14% lower for renters, and 58% lower for purchasers, than for outright owners (Table 3). However, the odds ratio for renters reversed once age was controlled for, and renters remained significantly more likely than outright owners to report poor or fair health status even after adjustment for a wide range of socio-economic variables, number of health conditions reported and risk factors (odds ratio of 1.29).

Table 3 Odds ratios for reporting fair or poor health status^(a) by housing tenure

Housing tenure	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(b)	Adjusted ^(c)
Renter	0.86 (0.80–0.93)	1.67 (1.53–1.82)	1.41 (1.27–1.55)	1.29 (1.16–1.43)
Purchaser	0.42 (0.39–0.46)	0.85 (0.78–0.94)	1.15 (1.04–1.28)	1.08 (0.97–1.21)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Persons aged 15+ years only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source: ABS 1995 NHS

Sensitivity testing indicated that the cluster sample design effect did not impact on the robustness of the finding for renters. The 95% confidence interval did not include 1.00 when the variance was multiplied by a factor of two (95% confidence interval 1.10–1.50).

Interestingly, purchasers remained significantly less likely than outright owners to report fair or poor health status when only age was adjusted for but this result was reversed once other socio-economic variables and total number of health conditions reported were controlled for (odds ratio of 1.15). However, after risk factors were included in the model the association was no longer statistically significant.

Health conditions

The 1995 NHS allowed for up to 14 health conditions (i.e. recent illness/injury and long-term conditions) to be reported by each respondent. On average, each respondent reported 3.4 health conditions.

Analysis of variance indicated a significant relationship between housing tenure and number of health conditions reported, with renters reporting an average of 3.2 conditions, purchasers reporting 2.9 conditions and outright owners reporting 4.4 conditions (Table 23, Appendix A). The results of the unadjusted poisson regression model showed that the average number of

health conditions reported by renters and purchasers were 28% and 44%, respectively, lower than the average number reported by outright owners (Table 4).

Table 4 Rate ratios for average number of health conditions reported by housing tenure

Housing tenure	Rate ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Renter	0.72 (0.71–0.73)	1.03 (1.02–1.05)	1.01 (1.00–1.03)	1.00 (0.99–1.02)
Purchaser	0.66 (0.65–0.67)	0.98 (0.97–1.00)	1.01 (0.99–1.02)	1.00 (0.98–1.01)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(b) Adjusted for all variables in (a) plus smoker status, body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

The rate ratio for renters was significantly higher than that for outright owners after adjusting for age (rate ratio of 1.03) but the relationship was not statistically significant once other socio-economic variables and risk factors were included in the model.

There was no evidence of a significant difference in the average number of health conditions reported between purchasers and outright owners after adjustment for confounding factors.

Each health condition reported was classified as either serious, non-minor or minor. Overall, the average number of serious health conditions reported was 0.5. Renters, purchasers and outright owners reported an average of 0.5, 0.3 and 0.7, respectively, serious health conditions (Table 24, Appendix A).

Making no adjustment for confounding factors, the average number of serious health conditions reported by renters was 24% lower than the average number reported by outright owners (Table 5). However, after adjustment for age, renters reported an average number of serious health conditions that was 29% higher than that reported by outright owners. While adjustment for other socio-economic variables and risk factors reduced the rate ratio for renters compared with outright owners to 1.17, the association remained statistically significant.

Table 5 Rate ratios for average number of serious health conditions reported by housing tenure

Housing tenure	Rate ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Renter	0.76 (0.73–0.78)	1.29 (1.24–1.34)	1.21 (1.16–1.27)	1.17 (1.12–1.22)
Purchaser	0.53 (0.51–0.55)	0.99 (0.95–1.03)	1.09 (1.04–1.14)	1.06 (1.02–1.11)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(b) Adjusted for all variables in (a) plus smoker status, body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

Sensitivity testing yielded 95% confidence intervals of (1.10–1.25) when the variance was multiplied by a factor of two. This suggested that the cluster sample design effect does not impact on the robustness of the finding for renters.

The unadjusted rate ratio for purchasers also suggested that they reported fewer serious health conditions than outright owners (rate ratio of 0.53) however this result was reversed after adjusting for all the confounding variables (rate ratio of 1.06). Sensitivity testing yielded a 95% confidence interval of (1.00–1.13) when the variance was inflated by a factor of two. As the 95% confidence interval includes 1.00, this implies that once clustering was controlled

for there was no evidence that purchasers report a significantly higher average number of serious health conditions than outright owners.

Doctor consultations

The bivariate χ^2 analysis indicated a highly significant association between housing tenure and whether a doctor had been consulted in the two weeks prior to interview (Table 20, Appendix A). Proportionately more outright owners had visited a doctor in the last two weeks (27%) than renters (25%) and purchasers (21%).

Once age, other socio-economic variables, risk factors and total number of health conditions reported were taken into account, however, renters were significantly more likely than owners to have visited a doctor in the last two week (odds ratio 1.18 with 95% confidence interval 1.09–1.27) (Table 6). Further, this association was still significant after sensitivity testing for cluster sampling bias with a 95% confidence interval of (1.05–1.31) when the variance was multiplied by a factor of two.

While purchasers were 7% more likely than outright owners to have visited a doctor in the last two weeks, after adjusting for all confounding variables (odds ratio of 1.07), this association was not statistically significant.

Table 6 Odds ratios for visiting a doctor at least once in the last two weeks by housing tenure

Housing tenure	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Renter	0.92 (0.87–0.98)	1.24 (1.16–1.33)	1.18 (1.10–1.27)	1.18 (1.09–1.27)
Purchaser	0.71 (0.67–0.75)	1.01 (0.94–1.07)	1.08 (1.01–1.15)	1.07 (1.00–1.15)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(b) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source: ABS 1995 NHS

As only 22% of NHS respondents had visited a doctor in the last two weeks, the probability of having visited a doctor in the last 12 months was also examined. Overall, 85% of individuals included in this analysis had visited a doctor in the last 12 months. The proportion visiting a doctor was significantly associated with housing tenure, with 86% of outright owners, 85% of renters and 83% of purchasers having visited a doctor in the last 12 months (Table 21, Appendix A).

The direction and significance of the relationships between renters and outright owners and purchasers and outright owners were similar to those found for a doctor visit in the last two weeks. Renters were significantly more likely than outright owners to have visited a doctor in the last 12 months (odds ratio 1.18 with a 95% confidence interval of 1.08–1.29) (Table 7). Sensitivity testing suggested that the cluster sample design effect did not impact on the robustness of this finding as the association was still significant when a factor of two was applied to the variance (95% confidence interval of 1.04–1.34).

Purchasers were also just significantly more likely than outright owners to have visited a doctor in the last 12 months (odds ratio 1.10 with a 95% confidence interval of 1.02–1.18) (Table 7). However, after adjustment for clustering, this association was no longer statistically significant (95% confidence interval of 0.98–1.22).

Table 7 Odds ratios for visiting a doctor at least once in the last twelve months by housing tenure

Housing tenure	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Renter	0.88 (0.82–0.95)	1.14 (1.05–1.24)	1.14 (1.04–1.24)	1.18 (1.08–1.29)
Purchaser	0.76 (0.71–0.82)	1.05 (0.98–1.13)	1.08 (1.00–1.17)	1.10 (1.02–1.18)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(b) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source: ABS 1995 NHS

Smoker status

The bivariate χ^2 analysis indicated that housing tenure was significantly associated with the probability of being a current smoker (Table 22, Appendix A). Unadjusted odds ratios showed that the odds of smoking were 3.5 times higher for renters compared with outright owners, and 1.7 times higher for purchasers compared with outright owners (Table 8).

Even after adjusting for socio-economic variables and other risk factors, the estimated odds of smoking among renters and purchasers were still 2.3 times and 1.4 times, respectively, higher than those of outright owners.

Table 8 Odds ratios for being a smoker^(a) by housing tenure

Housing tenure	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(b)	Adjusted ^(c)
Renter	3.49 (3.24–3.75)	2.91 (2.68–3.15)	2.32 (2.12–2.53)	2.34 (2.14–2.56)
Purchaser	1.69 (1.57–1.82)	1.34 (1.24–1.46)	1.41 (1.29–1.54)	1.41 (1.30–1.54)
Outright Owner (R)	1.00	1.00	1.00	1.00

(a) Persons aged 18+ years only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

There was no evidence that the cluster sample design effect impacted on the significance of the relationship between housing tenure and smoking. Inflating the variance by a factor of two still yielded significant results for both renters (95% confidence interval of 2.06–2.66) and purchasers (1.25–1.60).

Summary of results for housing tenure

Housing tenure was found to be independently associated with self-assessed health status, number of serious health conditions reported, health service use and smoking. In particular, after adjustment for confounding variables and cluster sample design:

- Renters were significantly more likely than outright owners to report fair or poor health status;
- Renters reported a significantly higher average number of serious health conditions compared with outright owners;
- Renters were significantly more likely than outright owners to have visited a doctor in the last two weeks as well as in the last 12 months;
- Renters were significantly more likely than outright owners to be smokers; and

- Purchasers were also significantly more likely than outright owners to be smokers.

There was also evidence that purchasers reported a significantly higher average number of serious health conditions compared with outright owners, and that they were more likely than outright owners to have consulted a doctor in the last 12 months, however after controlling for clustering these associations were no longer statistically significant.

3.2 Overcrowding

Almost 7% of individuals living in dwellings with 0–3 bedrooms lived in over-crowded households in 1995 (Table 9). In terms of households, 4% of households with 0–3 bedrooms were overcrowded. Bearing in mind that only households with 0–3 bedrooms were included here, the proportion of overcrowded households is consistent with results from the Australian Housing Surveys which indicated that 4.6% of households were overcrowded in 1994 and 4.5% were overcrowded in 1999 (ABS 1996b; 2000).

Table 9 Distribution of individuals^(a) and households by overcrowding index^(b), 1995

Overcrowding index	Individuals		Households	
	Number ('000)	Per cent	Number ('000)	Per cent
Overcrowded	669	6.6	181	3.9
Not overcrowded	9,471	93.4	4,472	96.1
Total ^(c)	10,140	100.0	4,653	100.0

(a) Excludes persons with unknown/not reported income and whose equivalent family income could not be determined.

(b) Includes 0–3 bedroom dwellings only.

(c) Components may not add to totals due to rounding.

Note: Weighted estimates.

Source: ABS 1995 NHS.

There were significant differences in the socio-demographic composition of overcrowded households compared with households that were not overcrowded (Table 10). Persons living in overcrowded households were more likely to be:

- Male;
- Aged 24 years and under;
- Couples with dependent children;

Table 10 Per cent distribution of selected socio-demographic characteristics by overcrowding index^(a), individuals, 1995

	Overcrowding index	
	Overcrowded	Not overcrowded
	%	%
Sex		
Male	55.1	49.7
Female	44.9	50.3
Age group (years)		
0–14	34.7	20.1
15–24	22.6	12.6
25–44	28.2	32.6
45–64	11.5	20.0
65+	2.9	14.6
Income unit type		
Couple with dependent children	66.8	35.3
Couple without dependent children	4.1	28.6
Single parent with dependent children	2.6	9.1
Single person	26.5	27.0
Index of relative socio-economic disadvantage		
1 st quintile (most disadvantaged)	21.9	22.3
2 nd quintile	24.5	21.7
3 rd quintile	21.5	18.0
4 th quintile	17.5	21.5
5 th quintile (least disadvantaged)	14.6	16.5
Quintile of equivalent family income		
1 st quintile (lowest equivalent family income)	31.5	19.3
2 nd quintile	22.9	21.7
3 rd quintile	23.4	20.4
4 th quintile	14.8	20.0
5 th quintile (highest equivalent family income)	7.4	18.5
Employment status		
Employed	38.2	45.1
Unemployed (looking for work)	5.6	3.9
Not in the labour force/not applicable	56.2	51.1
Occupation		
Not applicable/armed forces	61.8	54.9
Managers/administrators/professionals	6.1	10.5
Para-professionals/trades/clerks/sales	19.7	24.7
Plant & machinery operators & drivers/labourers	12.3	10.0
Region of birth		
Australia	70.8	77.7
UK & Ireland	3.4	7.1
Europe	5.5	6.6
Asia	15.0	4.9
Other	5.3	3.6
Region		
Capital city/metropolitan	74.9	70.4
Rural/remote (includes NT)	25.1	29.6

(a) Includes 0–3 bedroom dwellings only.

Note: Weighted estimates.

Source: ABS 1995 NHS.

- In the bottom three quintiles of relative socio-economic disadvantage (i.e. the most socio-economically disadvantaged);
- In the bottom three quintiles of equivalent family income (i.e. the lowest equivalent family incomes);
- Born in Asia; and
- Living in capital city/metropolitan areas.

Self-assessed health status

The bivariate χ^2 analysis indicated that the relationship between self-assessed health status and overcrowding was not significant (Table 19, Appendix A). Interestingly, however, controlling for age and other socio-economic variables and risk factors in the model resulted in the finding that persons living in overcrowded households were significantly more likely to report fair or poor health status than those living in dwellings that were not overcrowded (Table 11).

Table 11 Odds ratios for reporting fair or poor health status by overcrowding index

Overcrowding index ^(a)	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	1.00 (0.87–1.16)	1.44 (1.24–1.68)	1.28 (1.10–1.51)	1.28 (1.08–1.52)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source: ABS 1995 NHS

However, there was evidence that the cluster sample design impacted on the robustness of this finding as the 95% confidence interval included 1.00 when the variance was multiplied by a factor of two (1.00–1.63).

Health conditions

Analysis of variance indicated a significant relationship between overcrowding and the number of health conditions reported, with persons living in overcrowded households reporting an average of 2.5 conditions compared with 3.7 conditions for persons living in non-overcrowded households (Table 23, Appendix A). Further, even after adjustment for socio-economic and risk factors persons living in overcrowded households reported significantly fewer health conditions than their non-overcrowded counterparts (rate ratio of 0.95) (Table 12). Clustering did not appear to alter the robustness of this finding as sensitivity testing to account for the cluster sample design yielded a 95% confidence interval of (0.91–0.99), implying the association was just statistically significant, when the variance was multiplied by a factor of two.

Table 12 Rate ratios for average number of health conditions reported by overcrowding index

Overcrowding index ^(a)	Rate ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	0.70 (0.68–0.72)	0.89 (0.86–0.91)	0.95 (0.92–0.98)	0.95 (0.92–0.98)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

At the bivariate level, there was also a significant relationship between overcrowding and the number of serious health conditions reported. Persons living in overcrowded households reported an average of 0.39 serious health conditions compared with 0.54 for those living in non-overcrowded dwellings (Table 24, Appendix A). However, after adjustment for age and other socio-economic variables and risk factors, overcrowding was no longer significantly associated with the number of serious health conditions reported (Table 13).

Table 13 Rate ratios for average number of serious health conditions reported by overcrowding index

Overcrowding index ^(a)	Rate ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	0.72 (0.66–0.77)	0.99 (0.91–1.06)	1.03 (0.95–1.12)	1.02 (0.95–1.11)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

Doctor consultations

The bivariate χ^2 analysis indicated a highly significant association between overcrowding and whether a doctor had been consulted in the two weeks prior to interview (Table 20, Appendix A). One quarter of people living in non-overcrowded dwellings had visited a doctor in the last two weeks compared with 20% of those living in overcrowded dwellings.

Adjustment for age, other socio-economic variables, risk factors and total number of health conditions reported also indicated that individuals living in overcrowded households were significantly less likely than those living in non-overcrowded dwellings to have visited a doctor in the last two weeks (odds ratio 0.85 with 95% confidence interval 0.75–0.96) (Table 14). However, this association was no longer statistically significant after sensitivity testing for cluster sampling bias, as the 95% confidence interval was (0.72–1.01) when the variance was multiplied by a factor of two.

Table 14 Odds ratios for visiting a doctor at least once in the last two weeks by overcrowding index

Overcrowding index ^(a)	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	0.75 (0.67–0.83)	0.88 (0.78–0.98)	0.84 (0.75–0.95)	0.85 (0.75–0.96)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source: ABS 1995 NHS

Table 15 Odds ratios for visiting a doctor at least once in the last twelve months by overcrowding index

Overcrowding index ^(a)	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	0.77 (0.69–0.87)	0.85 (0.75–0.96)	0.89 (0.79–1.01)	0.92 (0.81–1.05)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, quintile of equivalent family income, employment status, occupation, income unit type, quintile of socioeconomic disadvantage, region of birth, state and region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index, exercise level index and total number of health conditions reported.

(R) indicates reference group.

Source:

ABS

1995

NHS

The probability of having visited a doctor in the last 12 months was also examined. In keeping with doctor visits in the last two weeks, bivariate analysis indicated that persons living in overcrowded households were significantly less likely than those living in non-overcrowded dwellings to have visited a doctor in the last 12 months (82% compared with 86%) (Table 21, Appendix A).

In the model adjusting for age, overcrowding was still significantly associated with doctor consultations in the last 12 months (Table 15). However once other socio-economic variables, risk factors and total number of health conditions reported were controlled for in the model, the relationship ceased to be statistically significant.

Smoker status

The bivariate χ^2 analysis indicated that overcrowding was significantly associated with the probability of being a current smoker (Table 22, Appendix A). However, in models adjusting for age, other socio-economic variables and risk factors, this finding was reversed, that is people living in overcrowded households appeared less likely than those living in non-overcrowded households to be smokers although the relationship was not significant (Table 16).

Table 16 Odds ratios for being a smoker by overcrowding index

Overcrowding index ^(a)	Odds ratios (95% confidence intervals)			
	Unadjusted	Adjusted for age	Adjusted ^(a)	Adjusted ^(b)
Overcrowded	1.15 (1.01–1.31)	0.96 (0.84–1.10)	0.95 (0.83–1.10)	0.94 (0.82–1.08)
Not overcrowded (R)	1.00	1.00	1.00	1.00

(a) Includes 0–3 bedrooms dwellings only.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region.

(c) Adjusted for all variables in (a) plus smoker status, body mass index and exercise level index.

(R) indicates reference group.

Source: ABS 1995 NHS

Summary of results for overcrowding

Overcrowding was found to be independently associated only with the number of health conditions reported. That is, after adjustment for confounding variables and cluster sample design:

- Persons living in overcrowded households reported a significantly lower average number of health conditions compared with individuals living in non-overcrowded households.

There was also evidence of an independent association between overcrowding and self-assessed health status, with persons living in overcrowded households being significantly more likely than those in non-overcrowded households to have reported fair or poor health, however after controlling for clustering this association was no longer statistically significant. Similarly, there was evidence of a significant association between overcrowding and doctor consultations in the last two weeks but after adjustment for clustering this association was no longer statistically significant.

3.3 Discussion of results

This study has shown that housing tenure, and to a lesser extent overcrowding, are independently associated with various measures of health status, health service use and smoking, after adjusting for a large number of other potential confounding factors.

Housing tenure

In comparison to outright owners, renters were significantly more likely to report fair or poor health status, to visit the doctor and to smoke (Table 17). Renters also reported a higher average number of serious health conditions than owners. These relationships were independent of age, sex, equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status (where relevant), body mass index, exercise level index and total number of health conditions reported (where relevant).

The results for renters are consistent with those of several international studies. Analysis of the British Health and Lifestyle Survey indicated 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).

Macintyre et al. (1998) found that, after controlling for age, sex, income and self-esteem, 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. Lewis et al. (1998) found that home owners had a lower prevalence of neurotic disorder than renters even after adjustment for other variables (age, economic activity, family unit, car access, education, social class, and the interaction of sex and social class).

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).

Table 17 Summary of health status, health service use and risk factor differentials by housing tenure, adjusted^(a) odds/rate ratios estimated using multivariate models

Variable	Housing tenure		
	Renter	Purchaser	Outright Owner (R)
Reporting fair or poor health status ^(b)	1.29 (1.16–1.43)	1.08 (0.97–1.21)	1.00
Average number of health conditions reported	1.00 (0.99–1.02)	1.00 (0.98–1.01)	1.00
Average number of serious health conditions reported ^(c)	1.17 (1.12–1.22)	1.06 (1.02–1.11)	1.00
Doctor consultation in the last 2 weeks ^(b)	1.18 (1.09–1.27)	1.07 (1.00–1.15)	1.00
Doctor consultation in the last 12 months ^{(b) (c)}	1.18 (1.08–1.29)	1.10 (1.02–1.18)	1.00
Smoker ^(d)	2.34 (2.14–2.56)	1.41 (1.30–1.54)	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status, body mass index and exercise level index.

(b) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status, body mass index, exercise level index and total number of health conditions reported.

(c) For purchasers this association was not statistically significant after controlling for clustering.

(d) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, body mass index and exercise level index.

(R) indicates reference group.

Various models have been developed in an attempt to explain the association between housing tenure and health (Macintyre et al. 1998). One theory is that housing tenure is a marker for (i.e. is confounded with) underlying causal factors such as income or social position, rather than directly promoting or damaging health. However, this study has shown housing tenure in Australia to be associated with various health measures, independently of

equivalent family income or socio-economic status, suggesting that tenure is not simply acting as a marker of income or social position here.

An alternative model suggests that housing may be a health promoting resource accessed through income, i.e. a higher income allows a person to choose to buy a dwelling, probably in better condition and in a better physical and social environment than dwellings in the rented sector (Macintyre et al. 1998). For example, Ellaway & Macintyre (1998) found evidence to suggest housing tenure might have an effect on health because it is predictive of housing conditions, which are themselves health damaging or health promoting. However, Weich and Lewis 1998 found that living in rented accommodation was independently associated with higher odds of common mental disorders after adjusting for potential confounders including structural housing problems. Further, results from the 1998 Tasmanian Healthy Communities Survey suggest that people with 'very inadequate housing' have poorer self-assessed health than those who assessed their housing as 'very adequate' (Department of Health and Human Services 1999).

Analysis, by the Australian Institute of Health and Welfare, of the ABS 1994 Housing Survey indicated that around 28% of households reported some financial or non-financial problems¹¹ with their housing in 1994 (AIHW 1997: 183). Private renter households were the most likely tenure type to experience housing problems (48%), closely followed by public housing renters (45%). The 1995 NHS did collect 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), however the data were not made available in the unit record file. Further, the 1995 NHS did not collect information related to housing conditions or housing affordability. Therefore it was not possible to control for the effects of factors such as type of dwelling, housing conditions or housing affordability in this study.

Yet another model of the association between housing tenure and health 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). As the 1995 NHS did not measure psychological traits such as self-efficacy and self-esteem it was not possible to examine their potential confounding effect on tenure in this study.

In their study of the impact of socioeconomic disadvantage on health in Adelaide, Geddes et al. (1993) 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. Easterlow et al. 2000 also discuss the indirect health effects in terms of stress resulting from mortgage arrears and security of tenure.

Although not included in this study, it would be possible to examine, to a limited extent, the results for renters in relation to the type of landlord. The 1995 NHS collected information on type of landlord including State housing commission landlords, however the data made available on the unit record file was categorised as—private landlord; person in same household; employer; housing co-operative/community/church group; other; and not applicable. That is, it is not possible to identify public renters separately on the unit record file. Despite the fact that public renters cannot be identified it would be useful to undertake further work to examine the effect of type of landlord for renters.

While the results of this study indicate that there is an association between housing tenure and health, and that this association appears to be independent of a large number of confounders, the study has not been able to address questions of aetiology or the direction of

¹¹ Households can experience a range of housing problems including affordability, overcrowding, inadequate amenities, needing repairs and poor access to services.

causality between housing and health. That is, it has not been able to examine whether renting gives rise to poorer self-assessed health status, greater likelihood of doctor consultations and higher prevalence of smoking or whether health selection effects mean that sicker people are more likely to be renters than owners. Further, as discussed above, there may be other confounding factors, such as self-esteem and poor housing conditions, that might explain the relationship but were not included in the analysis.

Another limitation of the current study is that the measures of health used were self-reported. For example, information relating to health conditions was not medically verified (ABS1996a, p120) and there is evidence to suggest some under-reporting of health conditions in the 1995 NHS (ABS1996a, p122). However, it is believed that any under-reporting would be highest amongst the less serious recent illness conditions. There is also evidence to suggest that doctor consultations data in the 1995 NHS could be under-reported by at least 10% (ABS 1996a, p44). These limitations could affect some of the study's results if owners were more likely than renters to under-report health conditions or doctor consultations.

It should also be noted that the use of total number of health conditions reported as an indicator of health status may be inappropriate as it is an aggregate of minor, non-minor and serious health conditions. However, this limitation would not apply to the number of serious health conditions reported.

A further limitation of the study is that of the reliability of self-assessed health status as a measure of health. While self-assessed health status has been shown to be a reliable measure of health rating (e.g. McCallum et al. 1994), Crossley & Kennedy (2000) found evidence of respondent uncertainty with respect to self-assessed health in the 1995 NHS. These researchers analysed data from the random sub-sample of respondents in the NHS who answered the self-assessed health question twice¹² and found that 28% of these respondents changed their reported health status. Further, uncertainty in response was related to age, income and occupation.

There were several other measures of health that could have been included in the analysis but were not due to timing and resource constraints. These were measures such as general health and well-being (SF-36), specific medical conditions, visits to other health professionals, use of medications and other risk factors. It would be interesting and useful to include such variables in any further research.

Although the analysis reported here has controlled for confounders such as age, sex and family income, it would also be interesting for future research to examine the associations between housing tenure and health for, for example, males and females separately, different age groups and family income quintiles to determine where inequalities might lie.

Further, as it was not possible to identify Indigenous persons on the NHS unit record file, it was not possible in this study to examine the effects of housing tenure on health for this population group. Such research needs special attention as only 31% of Indigenous households live in homes owned or being purchased by their occupants compared with 71% of non-Indigenous households (ABS 1998b).

While the results are a first step towards improving our knowledge of the links between housing tenure and health in Australia, it is clear that more work needs to be done to determine the pathways by which housing tenure affects health.

Household overcrowding

In comparison to persons living in non-overcrowded (0–3 bedroom) households, persons living in overcrowded (0–3 bedroom) households reported significantly fewer health conditions on average (Table 18). This relationship was independent of age, sex, equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status, body mass index, and exercise level index.

¹² This sub-sample was the Short Form 36 health status questionnaire (SF-36) sub-sample and included approximately half the adult respondents to the 1995 NHS. Respondents in this sub-sample self-completed the SF-36 questionnaire before undertaking the standard interview. The first question on the SF-36 was the self-assessed health status question. This question was again asked by an interviewer in the standard interview.

Table 18 Summary of health status, health service use and risk factor differentials by overcrowding index, adjusted^(a) odds/rate ratios estimated using multivariate models

	Overcrowding index ^(b)	
	Household overcrowded	Household not overcrowded (R)
Reporting fair or poor health status ^{(c) (d)}	1.28 (1.08–1.52)	1.00
Average number of health conditions reported	0.95 (0.92–0.98)	1.00
Average number of serious health conditions reported	1.02 (0.95–1.11)	1.00
Doctor consultation in the last 2 weeks ^{(c) (d)}	0.85 (0.75–0.96)	1.00
Doctor consultation in the last 12 months ^(c)	0.92 (0.81–1.05)	1.00
Smoker ^(e)	0.94 (0.82–1.08)	1.00

(a) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status, body mass index and exercise level index.

(b) Includes 0–3 bedrooms dwellings only.

(c) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, smoker status, body mass index, exercise level index and total number of health conditions reported.

(d) This result was not significant after controlling for clustering.

(e) Adjusted for age, sex, quintile of equivalent family income, occupation/employment status, income unit type, quintile of socioeconomic disadvantage, region of birth, state, region, body mass index and exercise level index.

(R) indicates reference group.

This result was contrary to that expected given that the hypothesis being tested was that overcrowding is associated with poor health. While there was evidence that persons living in overcrowded households were significantly more likely than those in non-overcrowded households to have reported fair or poor health, this result was no longer significant after controlling for clustering.

Some international studies have indicated that overcrowded housing increases the risk of infectious diseases such as meningococcal disease, rheumatic fever, tuberculosis and respiratory infections. It has also been shown to impact upon mental health through factors such as high noise levels and lack of privacy (Shaw et al. 1999: 216; Hopton & Hunt 1996a). In New Zealand, crowded housing (based on the Canadian National Occupancy Standard) was found to be associated with significantly poorer self-reported mental and physical health in adults, and significantly higher prevalence rates of smoking and hazardous drinking (Howden-Chapman & Wilson 2000: 140–144). However, these results were not adjusted for household income or ethnicity, both of which are considered likely to have a strong prior impact on crowding.

While the results of the current study were not as expected, not all studies have shown an adverse effect of overcrowding on health. Hopton and Hunt (1996a) found that overcrowding was not significantly associated with poorer mental health. Similarly, a study undertaken in Thailand found that while subjective indicators of household crowding (i.e. lack of privacy and perceived crowding) were significantly related to poorer health, objective crowding (measured as persons per room) was not (Fuller et al. 1993). It should be noted however that variations in the definition of ‘overcrowding’ used by different studies make comparisons very difficult.

Despite the fact that the current study found virtually no evidence of an adverse effect of overcrowding on health in Australia, it cannot be assumed that such effect does not exist. This is because the limitations of the study are such that this assumption could not be readily accepted in the absence of further research.

For example, 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 and other factors such as the health practices of residents (Gray 2001). Given that data related to living conditions were not collected as part of the 1995 NHS, it was not possible to control for such factors in the analysis.

The analysis undertaken here for overcrowding suffers from many of the same limitations that were described above for the analysis of housing tenure. However one very specific limitation of the current study is that the overcrowding index could only be applied to households with 0–3 bedrooms as households with four or more bedrooms were grouped together. Households with 0–3 bedrooms accounted for 79% of all households participating in the 1995 NHS. Further, only 3% of households with four or more bedrooms had more than six people living in them so it is very unlikely that ‘crowded’ 4+ bedroom households would have affected the results.

Another limitation of the overcrowding index used here is that households requiring only one more bedroom were considered overcrowded¹³. Of the overcrowded households in this study, 87% required only one more bedroom while the remaining 13% required two or more additional bedrooms. If only ‘extremely’ crowded households (e.g. requiring two or more additional bedrooms) are associated with poorer health then it is very likely that the measure of overcrowding used here was too crude.

It should be noted that the models for overcrowding and health did not include housing tenure as a confounding factor. It would be useful to examine the effect of housing tenure on overcrowding as data from the 1995 NHS indicated that proportionately more renters lived in overcrowded dwellings than owner-occupiers (7.5% of renters lived in overcrowded dwellings compared with 4.7% of owner-occupiers).

While the 1995 NHS included residents of both private and certain non-private dwellings as well as some visitors¹⁴ it is possible that people living in temporary accommodation may have been less likely to participate in the survey. If this is the case and temporary accommodation is more likely to be crowded then this means that the impact of overcrowding on health is likely to have been underestimated in this study. It would be very important to examine this issue in further studies.

As discussed for housing tenure, it was not possible to identify Indigenous persons on the NHS unit record file. Therefore it was not possible in this study to examine the effects of overcrowding on health for Indigenous peoples. Such research needs special attention, given that Indigenous households tend to be larger (an average of 3.7 people per household compared with non-Indigenous households (2.7 people per household)).

¹³ This definition is consistent with the Canadian National Occupancy Standard.

¹⁴ Visitors to selected dwellings were included if they did not usually live in a private dwelling or had not been at their own usual private dwelling for any part of the previous month and would not be at their own usual dwelling for any part of the month of interview.

3 CONCLUSION AND IMPLICATIONS FOR POLICY DEVELOPMENT

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 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. However, data collected in the 1995 NHS have provided an opportunity to examine the effects of housing tenure and overcrowding on health and health inequalities in Australia. Unfortunately, the limitations of the 1995 NHS mean that it is not possible to examine the impact of a wider range of housing variables on health. For example, the impact on health of homelessness or poor housing conditions could not be examined in this study.

This study has examined 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 was not able to specifically address questions of causality or aetiology, the findings provide a starting point in determining the importance of housing tenure and overcrowding on health in Australia. The findings are of value to housing policy development because they begin to address the current gap in knowledge and therefore indicate directions for future research and identify, for policy makers, areas of concern, which may need greater attention in Australia.

What has this study added to current knowledge about housing and health in Australia?:

1. The results suggest that renters have poorer health status, have more serious health conditions (in terms of numbers reported), are more likely to consult the doctor and are more likely to smoke than outright owners, even after adjusting for a large number of socio-economic and risk factors. This implies that renters are a group worthy of greater attention and research to determine how and why there is a link between renting and poorer health. Such research might include examining the effects of type of landlord (i.e. public renters versus private renters), type of dwelling and housing conditions, housing affordability, neighbourhood factors, and psychological traits such as self-esteem. As the 1995 NHS does not include most of these factors, and future NHSs are unlikely to include information on housing, further research also implies establishing or tapping into suitable data collections. Such data collections would preferably be longitudinal rather than cross-sectional to assist in addressing questions of causality and to facilitate examination of the effects of interventions.
2. The results also suggest that apart from a higher prevalence of smoking among home purchasers compared with outright owners, there is limited evidence of a difference in health status or health service use between the two groups.
3. The results for overcrowding did not suggest that overcrowding is associated with poorer health. In fact, people living in overcrowded households reported fewer health conditions on average than those living in non-overcrowded households. While this result was not expected it suggests the need for further research into the effects of overcrowding on health that account for factors such as housing conditions, time spent in the home and cultural differences. Further, the possibility that the measure of overcrowding used in this study was too crude, suggests the need for further research that examines the effect of more extreme overcrowding on health.
4. By their exclusion from this study, the need for research into the effects of homelessness and poor housing conditions on health is also indicated as well as research into the relationship between housing and health for Indigenous peoples.
5. Also by their exclusion from this study, the need is indicated for further research into the relationship between housing and specific health conditions and other measures of health such as the SF-36, use of allied health services and use of medications.

APPENDIX A STATISTICAL TABLES

Table 19 Percentage of persons reporting fair or poor health status(a) by various socio-demographic variables

Variable	Category	Weighted number ^(b)	% reporting fair/poor health status	χ^2_p
Housing tenure ^(c)	Renter	6,686	19.1	< 0.0001
	Purchaser	8,636	10.4	
	Owner	11,574	21.5	
Overcrowding index ^(d)	Overcrowded	1,302	18.6	0.9901
	Not overcrowded	22,549	18.6	
Age group (years)	15–24	6,190	9.0	< 0.0001
	25–44	13,172	10.5	
	45–64	8,466	20.8	
	65+	4,805	36.3	
Sex	Male	16,467	16.9	0.2338
	Female	16,167	16.5	
Smoker status ^(e)	Smoker	7,588	20.4	< 0.0001
	Ex-smoker	8,519	20.0	
	Never smoker	14,895	14.1	
Body Mass Index	Underweight	3,629	15.7	< 0.0001
	Acceptable weight	15,036	12.9	
	Overweight	10,100	18.3	
	Obese	3,868	28.2	
Exercise level index	Vigorous	2,626	4.6	< 0.0001
	Moderate	8,022	12.3	
	Low	11,377	15.2	
	Sedentary	10,609	24.7	
Quintile of equivalent family income	First (lowest incomes)	6,123	23.0	< 0.0001
	Second	6,331	29.5	
	Third	6,296	14.4	
	Fourth	6,595	10.4	
	Fifth (highest incomes)	7,289	7.9	
Employment status	Employed	19,326	9.0	< 0.0001
	Unemployed (looking for work)	1,495	18.4	
	Not in the labour force	11,812	29.1	

(continued)

Table 19 Percentage of persons reporting fair or poor health status^(a) by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(b)	% reporting fair/poor health status	χ^2_p
Occupation	Not applicable/armed forces	13,292	27.9	< 0.0001
	Managers/admin/professionals	4,845	8.1	
	Para-professionals/trades/clerks/sales	10,417	8.3	
	Plant & machinery operators & drivers/labourers	4,080	12.2	
Income unit type	Couple with dependent children	10,518	10.4	< 0.0001
	Couple without dependent children	10,342	22.0	
	Single parent with dependent children	1,502	13.3	
	Single person	10,272	18.4	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	6,040	23.0	< 0.0001
	Second	6,540	19.8	
	Third	5,652	17.0	
	Fourth	7,075	14.3	
	Fifth (least disadvantaged)	7,326	10.9	
Region of birth	Australia	23,976	15.9	< 0.0001
	UK & Ireland	2,751	17.9	
	Europe	2,526	27.0	
	Asia	1,903	13.6	
	Other	1,477	14.5	
State/Territory	NSW	11,249	17.7	< 0.0001
	Vic	7,943	15.7	
	Qld	6,049	17.2	
	SA	2,621	17.3	
	WA	3,029	14.4	
	Tas	878	19.2	
	NT	248	12.1	
	ACT	617	13.3	
Region	Capital city/metropolitan	23,483	16.5	0.1157
	Rural/remote (includes NT)	9,151	17.2	

(a) Excludes persons aged 0–14 years and persons who did not report their health status.

(b) Weights normalised to the actual sample size and number rounded to nearest integer.

(c) Excludes persons with unknown or 'other' housing tenure.

(d) Includes 0–3 bedroom dwellings only.

(e) Includes persons aged 18+ years only.

Source: ABS 1995 NHS

Table 20 Percentage of persons visiting a doctor in the last two weeks by various socio-demographic variables

Variable	Category	Weighted number ^(a)	% visiting a doctor in last 2 weeks	χ^2_p
Housing tenure ^(b)	Renter	9,555	25.1	< 0.0001
	Purchaser	13,036	20.6	
	Owner	13,651	26.7	
Overcrowding index ^(c)	Overcrowded	1,994	20.3	< 0.0001
	Not overcrowded	28,226	25.5	
Age group (years)	0–14	9,832	19.3	< 0.0001
	15–24	6,190	19.3	
	25–44	13,172	21.7	
	45–64	8,466	26.6	
	65+	4,805	39.6	
Sex	Male	21,490	21.3	< 0.0001
	Female	20,975	26.4	
Smoker status ^(d)	Smoker	7,588	24.2	< 0.0001
	Ex-smoker	8,519	29.5	
	Never smoker	14,895	24.2	
Body Mass Index ^(e)	Underweight	3,629	24.6	< 0.0001
	Acceptable weight	15,036	23.6	
	Overweight	10,100	25.9	
	Obese	3,868	29.7	
Exercise level index ^(e)	Vigorous	2,626	18.0	< 0.0001
	Moderate	8,022	23.9	
	Low	11,377	25.1	
	Sedentary	10,609	27.9	
Quintile of equivalent family income	First (lowest incomes)	8,146	24.9	< 0.0001
	Second	8,395	31.0	
	Third	8,600	22.6	
	Fourth	8,647	20.4	
	Fifth (highest incomes)	8,677	20.2	
Employment status	Employed	19,326	19.8	< 0.0001
	Unemployed (looking for work)	1,495	21.6	
	Not in the labour force	21,644	27.4	
Occupation	Not applicable/armed forces	23,124	27.1	< 0.0001
	Managers/admin/professionals	4,845	18.5	
	Para-professionals/trades/clerks/sales	10,417	20.6	
	Plant & machinery operators & drivers/labourers	4,080	19.6	

(continued)

Table 20 Percentage of persons visiting a doctor in the last two weeks by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(a)	% visiting a doctor in last 2 weeks	χ^2_p
Income unit type	Couple with dependent children	18,529	20.2	< 0.0001
	Couple without dependent children	10,342	29.1	
	Single parent with dependent children	3,321	23.8	
	Single person	10,273	24.9	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	8,013	26.5	< 0.0001
	Second	8,384	24.2	
	Third	7,354	23.4	
	Fourth	9,145	23.3	
	Fifth (least disadvantaged)	9,569	21.9	
Region of birth	Australia	33,245	23.3	< 0.0001
	UK & Ireland	2,859	26.2	
	Europe	2,592	28.7	
	Asia	2,148	21.1	
	Other	1,621	24.9	
State/Territory	NSW	14,512	25.5	< 0.0001
	Vic	10,288	23.7	
	Qld	7,918	22.7	
	SA	3,430	23.9	
	WA	4,006	21.9	
	Tas	1,162	22.2	
	NT	351	15.6	
	ACT	799	20.8	
Region	Capital city/metropolitan	30,162	25.0	< 0.0001
	Rural/remote (includes NT)	12,304	20.9	

(a) Weights normalised to the actual sample size and number rounded to nearest integer.

(b) Excludes persons with unknown or 'other' housing tenure.

(c) Includes 0–3 bedroom dwellings only.

(d) Includes persons aged 18+ years only.

(e) Includes persons aged 15+ years only.

Source: ABS 1995 NHS

Table 21 Percentage of persons visiting a doctor in the last 12 months by various socio-demographic variables

Variable	Category	Weighted number ^(a)	% visiting a doctor in last 12 months	χ^2_p
Housing tenure ^(b)	Renter	9,555	85.3	< 0.0001
	Purchaser	13,036	83.4	
	Owner	13,651	86.8	
Overcrowding index ^(c)	Overcrowded	1,994	82.3	< 0.0001
	Not overcrowded	28,226	85.8	
Age group (years)	0–14	9,832	83.7	< 0.0001
	15–24	6,190	82.6	
	25–44	13,172	82.0	
	45–64	8,466	86.3	
	65+	4,805	94.8	
Sex	Male	21,490	81.3	< 0.0001
	Female	20,975	88.4	
Smoker status ^(d)	Smoker	7,588	82.4	< 0.0001
	Ex-smoker	8,519	88.1	
	Never smoker	14,895	85.5	
Body Mass Index ^(e)	Underweight	3,629	84.7	< 0.0001
	Acceptable weight	15,036	84.3	
	Overweight	10,100	85.4	
	Obese	3,868	88.3	
Exercise level index ^(e)	Vigorous	2,626	81.4	< 0.0001
	Moderate	8,022	84.7	
	Low	11,377	86.3	
	Sedentary	10,609	85.2	
Quintile of equivalent family income	First (lowest incomes)	8,146	84.3	< 0.0001
	Second	8,395	88.9	
	Third	8,600	83.6	
	Fourth	8,647	83.8	
	Fifth (highest incomes)	8,677	83.5	
Employment status	Employed	19,326	82.4	< 0.0001
	Unemployed (looking for work)	1,495	78.5	
	Not in the labour force	21,644	87.4	
Occupation	Not applicable/armed forces	23,124	86.9	< 0.0001
	Managers/admin/professionals	4,845	81.1	
	Para-professionals/trades/clerks/sales	10,417	83.9	
	Plant & machinery operators & drivers/labourers	4,080	80.0	

(continued)

Table 21 Percentage of persons visiting a doctor in the last 12 months by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(a)	% visiting a doctor in last 12 months	χ^2_p
Income unit type	Couple with dependent children	18,529	82.5	< 0.0001
	Couple without dependent children	10,342	88.7	
	Single parent with dependent children	3,321	86.9	
	Single person	10,273	84.3	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	8,013	85.9	0.0215
	Second	8,384	84.1	
	Third	7,354	84.7	
	Fourth	9,145	85.0	
	Fifth (least disadvantaged)	9,569	84.4	
Region of birth	Australia	33,245	85.1	0.0002
	UK & Ireland	2,859	84.4	
	Europe	2,592	85.1	
	Asia	2,148	81.5	
	Other	1,621	83.8	
State/Territory	NSW	14,512	86.2	< 0.0001
	Vic	10,288	84.9	
	Qld	7,918	83.7	
	SA	3,430	84.4	
	WA	4,006	83.3	
	Tas	1,162	83.1	
	NT	351	81.8	
	ACT	799	84.0	
Region	Capital city/metropolitan	30,162	86.0	< 0.0001
	Rural/remote (includes NT)	12,304	81.8	

(a) Weights normalised to the actual sample size and number rounded to nearest integer.

(b) Excludes persons with unknown or 'other' housing tenure.

(c) Includes 0–3 bedroom dwellings only.

(d) Includes persons aged 18+ years only.

(e) Includes persons aged 15+ years only.

Source: ABS 1995 NHS

Table 22 Percentage of smokers^(a) by various socio-demographic variables

Variable	Category	Weighted number ^(b)	% smokers	χ^2_p
Housing tenure ^(c)	Renter	6,444	38.1	< 0.0001
	Purchaser	8,092	23.0	
	Owner	11,059	15.0	
Overcrowding index ^(d)	Overcrowded	1,210	28.7	0.0302
	Not overcrowded	21,816	25.9	
Age group (years)	18–24	4,558	30.4	< 0.0001
	25–44	13,172	28.9	
	45–64	8,466	21.6	
	65+	4,805	12.0	
Sex	Male	15,630	28.0	< 0.0001
	Female	15,372	20.9	
Body Mass Index	Underweight	3,064	30.2	< 0.0001
	Acceptable weight	14,179	24.6	
	Overweight	9,929	23.7	
	Obese	3,829	21.5	
Exercise level index	Vigorous	2,284	19.4	< 0.0001
	Moderate	7,516	21.5	
	Low	10,843	22.7	
	Sedentary	10,359	29.6	
Quintile of equivalent family income	First (lowest incomes)	5,667	28.6	< 0.0001
	Second	6,073	24.0	
	Third	6,020	27.4	
	Fourth	6,292	23.5	
	Fifth (highest incomes)	6,949	19.9	
Employment status	Employed	19,095	25.6	< 0.0001
	Unemployed (looking for work)	1,431	42.9	
	Not in the labour force	10,476	19.9	
Occupation	Not applicable/armed forces	11,892	22.6	< 0.0001
	Managers/admin/professionals	4,844	16.8	
	Para-professionals/trades/clerks/sales	10,253	25.7	
	Plant & machinery operators & drivers/labourers	4,012	36.1	

(continued)

Table 22 Percentage of smokers^(a) by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(b)	% smokers	χ^2_p
Income unit type	Couple with dependent children	9,464	23.5	< 0.0001
	Couple without dependent children	10,341	19.1	
	Single parent with dependent children	1,238	40.4	
	Single person	9,958	29.1	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	5,788	31.3	< 0.0001
	Second	6,266	26.9	
	Third	5,398	24.6	
	Fourth	6,717	23.7	
	Fifth (least disadvantaged)	6,832	17.2	
Region of birth	Australia	22,519	25.4	< 0.0001
	UK & Ireland	2,719	24.4	
	Europe	2,505	22.7	
	Asia	1,822	15.0	
	Other	1,436	25.4	
State/Territory	NSW	10,719	24.0	0.0004
	Vic	7,563	24.0	
	Qld	5,705	26.6	
	SA	2,495	23.5	
	WA	2,878	23.8	
	Tas	830	25.1	
	NT	231	32.2	
	ACT	582	23.2	
Region	Capital city/metropolitan	22,381	24.5	0.9736
	Rural/remote (includes NT)	8,620	24.5	

(a) Includes persons aged 18+ years only.

(b) Weights normalised to the actual sample size and number rounded to nearest integer.

(c) Excludes persons with unknown or 'other' housing tenure.

(d) Includes 0–3 bedroom dwellings only.

Source: ABS 1995 NHS

Table 23 Average number of health conditions reported by various socio-demographic variables

Variable	Category	Weighted number ^(a)	Average no. of health conditions reported	Significance ^(b)
Housing tenure ^(c)	Renter	9,555	3.2	< 0.0001
	Purchaser	13,036	2.9	
	Owner	13,651	4.4	
Overcrowding index ^(d)	Overcrowded	1,994	2.5	< 0.0001
	Not overcrowded	28,226	3.7	
Age group (years)	0–14	9,832	1.6	< 0.0001
	15–24	6,190	2.5	
	25–44	13,172	3.2	
	45–64	8,466	4.9	
	65+	4,805	6.6	
Sex	Male	21,490	3.1	< 0.0001
	Female	20,975	3.8	
Smoker status ^(e)	Smoker	7,588	3.7	< 0.0001
	Ex-smoker	8,519	4.7	
	Never smoker	14,895	3.9	
Body Mass Index ^(f)	Underweight	3,629	3.6	< 0.0001
	Acceptable weight	15,036	3.7	
	Overweight	10,100	4.2	
	Obese	3,868	4.9	
Exercise level index ^(f)	Vigorous	2,626	3.2	< 0.0001
	Moderate	8,022	4.0	
	Low	11,377	4.0	
	Sedentary	10,609	4.2	
Quintile of equivalent family income	First (lowest incomes)	8,146	3.4	< 0.0001
	Second	8,395	4.2	
	Third	8,600	3.2	
	Fourth	8,647	3.1	
	Fifth (highest incomes)	8,677	3.4	
Employment status	Employed	19,326	3.4	< 0.0001
	Unemployed (looking for work)	1,495	3.2	
	Not in the labour force	21,644	3.6	
Occupation	Not applicable/armed forces	23,124	3.5	< 0.0001
	Managers/admin/professionals	4,845	3.7	
	Para-professionals/trades/clerks/sales	10,417	3.3	
	Plant & machinery operators & drivers/labourers	4,080	3.0	

(continued)

Table 23 Average number of health conditions reported by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(a)	Average no. of health conditions reported	Significance ^(b)
Income unit type	Couple with dependent children	18,529	2.5	< 0.0001
	Couple without dependent children	10,342	5.0	
	Single parent with dependent children	3,321	2.6	
	Single person	10,273	4.0	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	8,013	3.6	< 0.0001
	Second	8,384	3.5	
	Third	7,354	3.4	
	Fourth	9,145	3.4	
	Fifth (least disadvantaged)	9,569	3.4	
Region of birth	Australia	33,245	3.4	< 0.0001
	UK & Ireland	2,859	4.5	
	Europe	2,592	4.1	
	Asia	2,148	2.5	
	Other	1,621	3.6	
State/Territory	NSW	14,512	3.4	< 0.0001
	Vic	10,288	3.2	
	Qld	7,918	3.6	
	SA	3,430	3.6	
	WA	4,006	3.6	
	Tas	1,162	3.5	
	NT	351	2.6	
	ACT	799	3.6	
Region	Capital city/metropolitan	30,162	3.4	0.0099
	Rural/remote (includes NT)	12,304	3.5	

(a) Weights normalised to the actual sample size and number rounded to nearest integer.

(b) Pr > F from analysis of variance.

(c) Excludes persons with unknown or 'other' housing tenure.

(d) Includes 0–3 bedroom dwellings only.

(e) Includes persons aged 18+ years only.

(f) Includes persons aged 15+ years only.

Source: ABS 1995 NHS

Table 24 Average number of serious health conditions reported by various socio-demographic variables

Variable	Category	Weighted number ^(a)	Average no. of serious health conditions reported	Significance ^(b)
Housing tenure ^(c)	Renter	9,555	0.50	< 0.0001
	Purchaser	13,036	0.34	
	Owner	13,651	0.68	
Overcrowding index ^(d)	Overcrowded	1,994	0.39	< 0.0001
	Not overcrowded	28,226	0.54	
Age group (years)	0–14	9,832	0.29	< 0.0001
	15–24	6,190	0.28	
	25–44	13,172	0.34	
	45–64	8,466	0.64	
	65+	4,805	1.34	
Sex	Male	21,490	0.48	0.0118
	Female	20,975	0.50	
Smoker status ^(e)	Smoker	7,588	0.54	< 0.0001
	Ex-smoker	8,519	0.74	
	Never smoker	14,895	0.49	
Body Mass Index ^(f)	Underweight	3,629	0.49	< 0.0001
	Acceptable weight	15,036	0.47	
	Overweight	10,100	0.60	
	Obese	3,868	0.83	
Exercise level index ^(f)	Vigorous	2,626	0.31	< 0.0001
	Moderate	8,022	0.52	
	Low	11,377	0.52	
	Sedentary	10,609	0.68	
Quintile of equivalent family income	First (lowest incomes)	8,146	0.54	< 0.0001
	Second	8,395	0.78	
	Third	8,600	0.44	
	Fourth	8,647	0.37	
	Fifth (highest incomes)	8,677	0.34	
Employment status	Employed	19,326	0.34	< 0.0001
	Unemployed (looking for work)	1,495	0.42	
	Not in the labour force	21,644	0.64	
Occupation	Not applicable/armed forces	23,124	0.62	< 0.0001
	Managers/admin/professionals	4,845	0.34	
	Para-professionals/trades/clerks/sales	10,417	0.34	
	Plant & machinery operators & drivers/labourers	4,080	0.35	

(continued)

Table 24 Average number of serious health conditions reported by various socio-demographic variables (continued)

Variable	Category	Weighted number ^(a)	Average no. of serious health conditions reported	Significance ^(b)
Income unit type	Couple with dependent children	18,529	0.31	< 0.0001
	Couple without dependent children	10,342	0.76	
	Single parent with dependent children	3,321	0.41	
	Single person	10,273	0.58	
Quintile of socioeconomic disadvantage	First (most disadvantaged)	8,013	0.58	< 0.0001
	Second	8,384	0.53	
	Third	7,354	0.49	
	Fourth	9,145	0.47	
	Fifth (least disadvantaged)	9,569	0.41	
Region of birth	Australia	33,245	0.49	< 0.0001
	UK & Ireland	2,859	0.64	
	Europe	2,592	0.58	
	Asia	2,148	0.28	
	Other	1,621	0.46	
State/Territory	NSW	14,512	0.51	< 0.0001
	Vic	10,288	0.46	
	Qld	7,918	0.53	
	SA	3,430	0.50	
	WA	4,006	0.47	
	Tas	1,162	0.54	
	NT	351	0.32	
	ACT	799	0.41	
Region	Capital city/metropolitan	30,162	0.48	< 0.0001
	Rural/remote (includes NT)	12,304	0.52	

(a) Weights normalised to the actual sample size and number rounded to nearest integer.

(b) Pr > F from analysis of variance.

(c) Excludes persons with unknown or 'other' housing tenure.

(d) Includes 0–3 bedroom dwellings only.

(e) Includes persons aged 18+ years only.

(f) Includes persons aged 15+ years only.

Source: ABS 1995 NHS

Table 25 Results of logistic regression, probability of reporting fair or poor self-reported health status and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Housing tenure					
Renter	0.2521	20.82	<.0001	1.29	(1.15–1.43)
Purchaser	0.0784	2.02	0.1555	1.08	(0.97–1.21)
Owner (R)				1.00	
Age group (years)					
15–17	-1.5599	82.81	<.0001	0.21	(0.15–0.29)
18–24	-0.7620	37.92	<.0001	0.47	(0.37–0.59)
25–44	-0.7686	66.09	<.0001	0.46	(0.39–0.56)
45–64	-0.7216	75.30	<.0001	0.49	(0.41–0.57)
65+ (R)				1.00	
Sex					
Male	0.5648	181.00	<.0001	1.76	(1.62–1.91)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.6625	81.82	<.0001	1.94	(1.68–2.24)
Second	0.6086	78.10	<.0001	1.84	(1.61–2.10)
Third	0.2798	16.23	<.0001	1.32	(1.15–1.52)
Fourth	0.1066	2.37	0.1240	1.11	(0.97–1.27)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.9250	139.76	<.0001	2.52	(2.16–2.94)
Unemployed (looking for work)	0.3612	9.89	0.0017	1.44	(1.15–1.80)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	-0.0229	0.09	0.7598	0.98	(0.84–1.13)
Plant and machinery operators and drivers, and labourers and related workers	0.1918	4.95	0.0261	1.21	(1.02–1.43)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.0598	0.89	0.3466	0.94	(0.83–1.07)
Couple without dependent children	0.0692	1.76	0.1849	1.07	(0.97–1.19)
Single parent with dependent children	-0.2738	6.95	0.0084	0.76	(0.62–0.93)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.4387	45.81	<.0001	1.55	(1.37–1.76)
Quintile 2	0.3935	38.21	<.0001	1.48	(1.31–1.68)
Quintile 3	0.2786	17.99	<.0001	1.32	(1.16–1.50)
Quintile 4	0.1562	6.09	0.0136	1.17	(1.03–1.32)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 25 Results of logistic regression, probability of reporting fair or poor self-reported health status and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0416	0.40	0.5259	0.96	(0.84–1.09)
Europe	0.4404	50.60	<.0001	1.55	(1.38–1.75)
Asia	0.0812	0.82	0.3663	1.08	(0.91–1.29)
Other	-0.1352	1.97	0.1602	0.87	(0.72–1.05)
Australia (R)				1.00	
State/Territory					
Vic	-0.0312	0.39	0.5325	0.97	(0.88–1.07)
Qld	-0.1241	5.22	0.0223	0.88	(0.79–0.98)
SA	-0.1750	6.00	0.0143	0.84	(0.73–0.97)
WA	-0.3428	22.53	<.0001	0.71	(0.62–0.82)
Tas	0.1187	1.13	0.2878	1.13	(0.90–1.40)
NT	0.0997	0.17	0.6845	1.10	(0.68–1.79)
ACT	0.0340	0.05	0.8241	1.03	(0.77–1.40)
NSW (R)				1.00	
Region					
Rural/remote (including NT)	-0.1116	6.43	0.0112	0.89	(0.82–0.97)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	-0.3273	39.32	<.0001	0.72	(0.65–0.80)
Never smoker	-0.3948	61.57	<.0001	0.67	(0.61–0.74)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.2266	8.58	0.0034	0.80	(0.69–0.93)
Acceptable weight	-0.5629	104.27	<.0001	0.57	(0.51–0.63)
Overweight	-0.3781	46.42	<.0001	0.69	(0.61–0.76)
Obese (R)				1.00	
Exercise level index					
Vigorous	-1.4637	146.70	<.0001	0.23	(0.18–0.29)
Moderate	-0.8352	269.61	<.0001	0.43	(0.39–0.48)
Low	-0.4891	127.46	<.0001	0.61	(0.56–0.67)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.2871	1778.90	<.0001	1.33	(1.31–1.35)
Intercept	-2.5180	406.04	<.0001		

Likelihood ratio = 5766.78, df = 43, Pr > χ^2 < 0.0001, R^2_{MAX} = 0.32

Number of observations = 26,832

(R) indicates reference group.

Source: ABS 1995 NHS

Table 26 Results of logistic regression, probability of visiting a doctor in the last two weeks and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Housing tenure					
Renter	0.1628	16.74	<.0001	1.18	(1.09–1.27)
Purchaser	0.0662	3.37	0.0662	1.07	(1.00–1.15)
Owner (R)				1.00	
Age group (years)					
0–14	0.3402	15.27	<.0001	1.41	(1.18–1.67)
15–17	-0.5703	21.44	<.0001	0.57	(0.44–0.72)
18–24	-0.0610	0.45	0.5033	0.94	(0.79–1.12)
25–44	-0.2000	7.93	0.0049	0.82	(0.71–0.94)
45–64	-0.4890	57.61	<.0001	0.61	(0.54–0.70)
65+ (R)				1.00	
Sex					
Male	-0.0281	1.00	0.3177	0.97	(0.92–1.03)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.0706	2.00	0.1571	1.07	(0.97–1.18)
Second	0.1590	11.47	0.0007	1.17	(1.07–1.29)
Third	0.0325	0.53	0.4669	1.03	(0.95–1.13)
Fourth	-0.0003	0.00	0.9937	1.00	(0.92–1.09)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.5377	85.55	<.0001	1.71	(1.53–1.92)
Unemployed (looking for work)	0.2695	8.22	0.0041	1.31	(1.09–1.57)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.1954	14.33	0.0002	1.22	(1.10–1.35)
Plant and machinery operators and drivers, and labourers and related workers	0.2167	11.10	0.0009	1.24	(1.09–1.41)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	0.1574	10.30	0.0013	1.17	(1.06–1.29)
Couple without dependent children	0.0831	3.63	0.0568	1.09	(1.00–1.18)
Single parent with dependent children	0.1461	5.11	0.0238	1.16	(1.02–1.31)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.1640	13.60	0.0002	1.18	(1.08–1.29)
Quintile 2	0.1181	7.34	0.0067	1.13	(1.03–1.23)
Quintile 3	0.0742	2.82	0.0928	1.08	(0.99–1.17)
Quintile 4	0.1019	6.23	0.0125	1.11	(1.02–1.20)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 26 Results of logistic regression, probability of visiting a doctor in the last two weeks and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0356	0.47	0.4919	0.97	(0.87–1.07)
Europe	0.1176	4.67	0.0307	1.12	(1.01–1.25)
Asia	-0.0153	0.06	0.8143	0.98	(0.87–1.12)
Other	0.0977	2.08	0.1492	1.10	(0.97–1.26)
Australia (R)				1.00	
State/Territory					
Vic	-0.0377	1.16	0.2806	0.96	(0.90–1.03)
Qld	-0.2296	34.86	<.0001	0.79	(0.74–0.86)
SA	-0.1565	9.56	0.0020	0.86	(0.77–0.94)
WA	-0.2862	34.02	<.0001	0.75	(0.68–0.83)
Tas	-0.1655	3.90	0.0483	0.85	(0.72–1.00)
NT	-0.1365	0.65	0.4197	0.87	(0.63–1.22)
ACT	-0.3609	12.18	0.0005	0.70	(0.57–0.85)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.3346	110.84	<.0001	0.72	(0.67–0.76)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.1237	7.98	0.0047	1.13	(1.04–1.23)
Never smoker	0.0273	0.43	0.5103	1.03	(0.95–1.11)
Smoker (R)				1.00	
Body mass index					
Underweight	0.1029	2.49	0.1145	1.11	(0.98–1.26)
Acceptable weight	0.0624	1.67	0.1969	1.06	(0.97–1.17)
Overweight	0.0553	1.25	0.2645	1.06	(0.96–1.16)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.2428	12.22	0.0005	0.78	(0.68–0.90)
Moderate	-0.1462	12.89	0.0003	0.86	(0.80–0.94)
Low	-0.1091	8.90	0.0028	0.90	(0.83–0.96)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.2922	2824.06	<.0001	1.34	(1.33–1.35)
Intercept	-2.4989	658.41	<.0001		

Likelihood ratio = 4724.76, df = 44, Pr > χ^2 < 0.0001, R^2_{MAX} = 0.18

Number of observations = 37,054

(R) indicates reference group.

Source: ABS 1995 NHS

Table 27 Results of logistic regression, probability of visiting a doctor in the last 12 months and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Housing tenure					
Renter	0.1644	12.60	0.0004	1.18	(1.08–1.29)
Purchaser	0.0921	5.51	0.0190	1.10	(1.02–1.18)
Owner (R)				1.00	
Age group (years)					
0–14	0.0261	0.05	0.8253	1.03	(0.81–1.29)
15–17	-0.6434	20.60	<.0001	0.53	(0.40–0.69)
18–24	-0.3043	6.50	0.0108	0.74	(0.58–0.93)
25–44	-0.6480	44.67	<.0001	0.52	(0.43–0.63)
45–64	-0.8293	81.16	<.0001	0.44	(0.36–0.52)
65+ (R)				1.00	
Sex					
Male	-0.3540	115.60	<.0001	0.70	(0.66–0.75)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.0197	0.12	0.7242	1.02	(0.91–1.14)
Second	0.1427	6.31	0.0120	1.15	(1.03–1.29)
Third	-0.0400	0.67	0.4148	0.96	(0.87–1.06)
Fourth	0.0496	1.14	0.2864	1.05	(0.96–1.15)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.3577	26.58	<.0001	1.43	(1.25–1.64)
Unemployed (looking for work)	-0.0822	0.69	0.4058	0.92	(0.76–1.12)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.1823	11.65	0.0006	1.20	(1.08–1.33)
Plant and machinery operators and drivers, and labourers and related workers	0.0937	2.07	0.1501	1.10	(0.97–1.25)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	0.1404	6.31	0.0120	1.15	(1.03–1.28)
Couple without dependent children	0.1999	12.39	0.0004	1.22	(1.09–1.37)
Single parent with dependent children	0.2524	10.59	0.0011	1.29	(1.11–1.50)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.1513	8.18	0.0042	1.16	(1.05–1.29)
Quintile 2	0.0391	0.61	0.4342	1.04	(0.94–1.15)
Quintile 3	0.0698	1.92	0.1655	1.07	(0.97–1.18)
Quintile 4	0.0994	4.50	0.0339	1.10	(1.01–1.21)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 27 Results of logistic regression, probability of visiting a doctor in the last 12 months and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.2735	19.45	<.0001	0.76	(0.67–0.86)
Europe	-0.1619	5.69	0.0171	0.85	(0.74–0.97)
Asia	-0.0887	1.58	0.2085	0.92	(0.80–1.05)
Other	-0.1351	2.77	0.0962	0.87	(0.75–1.02)
Australia (R)				1.00	
State/Territory					
Vic	-0.0694	2.74	0.0980	0.93	(0.86–1.01)
Qld	-0.2436	29.28	<.0001	0.78	(0.72–0.86)
SA	-0.2526	18.10	<.0001	0.78	(0.69–0.87)
WA	-0.2906	27.19	<.0001	0.75	(0.67–0.83)
Tas	-0.2266	6.23	0.0126	0.80	(0.67–0.95)
NT	0.1049	0.42	0.5176	1.11	(0.81–1.53)
ACT	-0.3229	8.31	0.0040	0.72	(0.58–0.90)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.4250	143.61	<.0001	0.65	(0.61–0.70)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.2314	19.27	<.0001	1.26	(1.14–1.40)
Never smoker	0.1786	14.25	0.0002	1.20	(1.09–1.31)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.2662	10.18	0.0014	0.77	(0.65–0.90)
Acceptable weight	-0.1277	3.99	0.0457	0.88	(0.78–1.00)
Overweight	-0.0615	0.88	0.3491	0.94	(0.83–1.07)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.0205	0.08	0.7771	0.98	(0.85–1.13)
Moderate	-0.0069	0.02	0.8893	0.99	(0.90–1.09)
Low	0.0815	3.19	0.0739	1.08	(0.99–1.19)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.3467	1377.39	<.0001	1.41	(1.39–1.44)
Intercept	3.2291	738.95	<.0001		

Likelihood ratio = 3097.931, df = 44, Pr > χ^2 < 0.0001, R^2_{MAX} = 0.14

Number of observations = 37,054

(R) indicates reference group.

Source: ABS 1995 NHS

Table 28 Results of logistic regression, probability of being a smoker and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Housing tenure					
Renter	0.8505	346.75	<0.0001	2.34	(2.14–2.56)
Purchaser	0.3462	60.74	<0.0001	1.41	(1.30–1.54)
Owner (R)				1.00	
Age group (years)					
18–24	0.4251	19.78	<0.0001	1.53	(1.27–1.85)
25–44	0.6406	63.46	<0.0001	1.90	(1.62–2.22)
45–64	0.3703	23.43	<0.0001	1.45	(1.25–1.68)
65+ (R)				1.00	
Sex					
Male	0.5042	215.81	<0.0001	1.66	(1.55–1.77)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.2030	11.46	0.0007	1.23	(1.09–1.38)
Second	0.1963	11.58	0.0007	1.22	(1.09–1.36)
Third	0.1341	6.53	0.0106	1.14	(1.03–1.27)
Fourth	-0.0033	0.00	0.9473	1.00	(0.90–1.10)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.5611	80.17	<0.0001	1.75	(1.55–1.98)
Unemployed (looking for work)	0.9788	123.84	<0.0001	2.66	(2.24–3.16)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.4373	70.73	<0.0001	1.55	(1.40–1.72)
Plant and machinery operators and drivers, and labourers and related workers	0.7922	168.86	<0.0001	2.21	(1.96–2.49)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.3590	55.77	<0.0001	0.70	(0.64–0.77)
Couple without dependent children	-0.2659	33.86	<0.0001	0.77	(0.70–0.84)
Single parent with dependent children	0.2010	6.83	0.0090	1.22	(1.05–1.42)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.5233	90.67	<0.0001	1.69	(1.52–1.88)
Quintile 2	0.4874	81.25	<0.0001	1.63	(1.46–1.81)
Quintile 3	0.3718	45.77	<0.0001	1.45	(1.30–1.62)
Quintile 4	0.3230	38.44	<0.0001	1.38	(1.25–1.53)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 28 Results of logistic regression, probability of being a smoker and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	0.0448	0.67	0.4114	1.05	(0.94–1.16)
Europe	-0.0712	1.44	0.2296	0.93	(0.83–1.05)
Asia	-1.2481	224.90	<0.0001	0.29	(0.24–0.34)
Other	-0.1713	5.36	0.0206	0.84	(0.73–0.97)
Australia (R)				1.00	
State/Territory					
Vic	0.0619	2.11	0.1468	1.06	(0.98–1.16)
Qld	-0.0033	0.01	0.9422	1.00	(0.91–1.09)
SA	-0.0893	2.12	0.1454	0.92	(0.81–1.03)
WA	-0.0899	2.38	0.1232	0.91	(0.82–1.03)
Tas	-0.0226	0.06	0.8141	0.98	(0.81–1.18)
NT	0.1715	0.97	0.3248	1.19	(0.84–1.67)
ACT	0.0513	0.18	0.6738	1.05	(0.83–1.34)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.1210	10.34	0.0013	0.89	(0.82–0.95)
Capital city/metropolitan (R)				1.00	
Body mass index					
Underweight	0.7128	107.00	<0.0001	2.04	(1.78–2.34)
Acceptable weight	0.3771	53.51	<0.0001	1.46	(1.32–1.61)
Overweight	0.2364	19.86	<0.0001	1.27	(1.14–1.41)
Obese (R)					
Exercise level index					
Vigorous	-0.8703	139.42	<0.0001	0.42	(0.36–0.48)
Moderate	-0.5434	160.98	<0.0001	0.58	(0.53–0.63)
Low	-0.4052	115.75	<0.0001	0.67	(0.62–0.72)
Sedentary (R)					
Total number of health conditions reported					
	0.2871	1778.90	<.0001	1.33	(1.31–1.35)
Intercept	-2.8009	803.10	<0.0001		

Likelihood ratio = 2749.45, df = 39, Pr > χ^2 < 0.0001, R²_{MAX} = 0.15

Number of observations = 25,547

(R) indicates reference group.

Source: ABS 1995 NHS

Table 29 Results of poisson regression, average number of health conditions reported and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Rate ratio	95% confidence interval
Housing tenure					
Renter	0.0034	0.16	0.6875	1.00	(0.99–1.02)
Purchaser	-0.0018	0.06	0.8104	1.00	(0.98–1.01)
Owner (R)				1.00	
Age group (years)					
0–14	-1.3317	5948.55	<0.0001	0.26	(0.26–0.27)
15–17	-1.0022	1455.93	<0.0001	0.37	(0.35–0.39)
18–24	-0.6918	1320.25	<0.0001	0.50	(0.48–0.52)
25–44	-0.5689	1722.61	<0.0001	0.57	(0.55–0.58)
45–64	-0.2363	372.46	<0.0001	0.79	(0.77–0.81)
65+ (R)				1.00	
Sex					
Male	-0.1424	553.16	<0.0001	0.87	(0.86–0.88)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	-0.0265	6.20	0.0128	0.97	(0.95–0.99)
Second	0.0333	11.17	0.0008	1.03	(1.01–1.05)
Third	-0.0086	0.82	0.3651	0.99	(0.97–1.01)
Fourth	-0.0161	3.21	0.0732	0.98	(0.97–1.00)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.1107	93.64	<0.0001	1.12	(1.09–1.14)
Unemployed (looking for work)	-0.0016	0.01	0.9362	1.00	(0.96–1.04)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	-0.0599	36.26	<0.0001	0.94	(0.92–0.96)
Plant and machinery operators and drivers, and labourers and related workers	-0.1534	132.60	<0.0001	0.86	(0.84–0.88)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.1495	228.48	<0.0001	0.86	(0.84–0.88)
Couple without dependent children	-0.0345	16.23	<0.0001	0.97	(0.95–0.98)
Single parent with dependent children	-0.0611	18.92	<0.0001	0.94	(0.92–0.97)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	-0.0223	5.30	0.0213	0.98	(0.96–1.00)
Quintile 2	-0.0342	13.04	0.0003	0.97	(0.95–0.98)
Quintile 3	-0.0257	7.60	0.0058	0.97	(0.96–0.99)
Quintile 4	-0.0143	2.85	0.0914	0.99	(0.97–1.00)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 29 Results of poisson regression, average number of health conditions reported and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Rate ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0248	6.41	0.0113	0.98	(0.96–0.99)
Europe	-0.1434	171.56	<0.0001	0.87	(0.85–0.89)
Asia	-0.2759	299.30	<0.0001	0.76	(0.74–0.78)
Other	-0.0202	1.82	0.1775	0.98	(0.95–1.01)
Australia (R)				1.00	
State/Territory					
Vic	-0.0540	34.11	<0.0001	0.95	(0.93–0.96)
Qld	0.0631	35.49	<0.0001	1.07	(1.04–1.09)
SA	0.0364	13.76	0.0002	1.04	(1.02–1.06)
WA	0.0754	43.89	<0.0001	1.08	(1.05–1.10)
Tas	-0.0218	2.28	0.1312	0.98	(0.95–1.01)
NT	-0.0588	13.96	0.0002	0.94	(0.91–0.97)
ACT	0.0766	41.80	<0.0001	1.08	(1.05–1.10)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	0.0027	0.14	0.7103	1.00	(0.99–1.02)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.0890	102.95	<0.0001	1.09	(1.07–1.11)
Never smoker	-0.0177	4.41	0.0358	0.98	(0.97–1.00)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.1294	95.94	<0.0001	0.88	(0.86–0.90)
Acceptable weight	-0.1584	291.01	<0.0001	0.85	(0.84–0.87)
Overweight	-0.1128	141.08	<0.0001	0.89	(0.88–0.91)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.0242	3.07	0.0796	0.98	(0.95–1.00)
Moderate	-0.0098	1.43	0.2313	0.99	(0.97–1.01)
Low	0.0213	8.37	0.0038	1.02	(1.01–1.04)
Sedentary (R)				1.00	
Intercept	2.0700	11233.50	<0.0001		

Log likelihood = 44730.81

Number of observations = 37,054

(R) indicates reference group.

Source: ABS 1995 NHS

Table 30 Results of poisson regression, average number of serious health conditions reported and housing tenure

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Housing tenure					
Renter	0.1575	49.86	<0.0001	1.17	(1.12–1.22)
Purchaser	0.0609	7.89	0.0050	1.06	(1.02–1.11)
Owner (R)				1.00	
Age group (years)					
0–14	-1.8113	1635.72	<0.0001	0.16	(0.15–0.18)
15–17	-1.8606	597.32	<0.0001	0.16	(0.13–0.18)
18–24	-1.3866	620.50	<0.0001	0.25	(0.22–0.28)
25–44	-1.3052	1052.88	<0.0001	0.27	(0.25–0.29)
45–64	-0.8648	595.95	<0.0001	0.42	(0.39–0.45)
65+ (R)				1.00	
Sex					
Male	0.0641	15.54	<0.0001	1.07	(1.03–1.10)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.1371	20.91	<0.0001	1.15	(1.08–1.22)
Second	0.2343	71.66	<0.0001	1.26	(1.20–1.33)
Third	0.1013	13.47	0.0002	1.11	(1.05–1.17)
Fourth	0.0624	5.31	0.0212	1.06	(1.01–1.12)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.4885	201.47	<0.0001	1.63	(1.52–1.74)
Unemployed (looking for work)	0.1690	9.13	0.0025	1.18	(1.06–1.32)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	-0.0031	0.01	0.9242	1.00	(0.94–1.06)
Plant and machinery operators and drivers, and labourers and related workers	-0.1182	8.07	0.0045	0.89	(0.82–0.96)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.1797	39.80	<0.0001	0.84	(0.79–0.88)
Couple without dependent children	-0.0124	0.30	0.5823	0.99	(0.95–1.03)
Single parent with dependent children	0.0088	0.06	0.8138	1.01	(0.94–1.09)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.0789	9.15	0.0025	1.08	(1.03–1.14)
Quintile 2	0.0460	3.14	0.0762	1.05	(1.00–1.10)
Quintile 3	0.0466	3.26	0.0709	1.05	(1.00–1.10)
Quintile 4	0.0625	6.79	0.0092	1.06	(1.02–1.12)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 30 Results of poisson regression, average number of serious health conditions reported and housing tenure (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0815	9.29	0.0023	0.92	(0.87–0.97)
Europe	-0.2241	60.57	<0.0001	0.80	(0.76–0.85)
Asia	-0.4577	90.49	<0.0001	0.63	(0.58–0.70)
Other	-0.0960	4.99	0.0255	0.91	(0.84–0.99)
Australia (R)				1.00	
State/Territory					
Vic	-0.0558	5.32	0.0211	0.95	(0.90–0.99)
Qld	0.0346	1.57	0.2105	1.04	(0.98–1.09)
SA	-0.0772	8.83	0.0030	0.93	(0.88–0.97)
WA	-0.0304	0.98	0.3228	0.97	(0.91–1.03)
Tas	-0.0687	3.34	0.0675	0.93	(0.87–1.00)
NT	-0.1518	11.87	0.0006	0.86	(0.79–0.94)
ACT	-0.0269	0.65	0.4200	0.97	(0.91–1.04)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	0.0174	0.87	0.3519	1.02	(0.98–1.06)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.0950	16.44	<0.0001	1.10	(1.05–1.15)
Never smoker	-0.1376	34.76	<0.0001	0.87	(0.83–0.91)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.2775	62.84	<0.0001	0.76	(0.71–0.81)
Acceptable weight	-0.3890	263.68	<0.0001	0.68	(0.65–0.71)
Overweight	-0.2903	143.59	<0.0001	0.75	(0.71–0.78)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.3044	49.27	<0.0001	0.74	(0.68–0.80)
Moderate	-0.1755	63.11	<0.0001	0.84	(0.80–0.88)
Low	-0.1035	27.66	<0.0001	0.90	(0.87–0.94)
Sedentary (R)				1.00	
Intercept	0.4725	83.84	<0.0001		

Log likelihood = -26951.91

Number of observations = 37,054

(R) indicates reference group.

Source: ABS 1995 NHS

Table 31 Results of logistic regression, probability of reporting fair or poor self-reported health status and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Overcrowding index					
Overcrowded	0.2460	7.90	0.0049	1.28	(1.08–1.52)
Not overcrowded (R)				1.00	
Age group (years)					
15–17	-1.6166	72.87	<.0001	0.20	(0.14–0.29)
18–24	-0.6321	32.39	<.0001	0.53	(0.43–0.66)
25–44	-0.6850	49.70	<.0001	0.50	(0.42–0.61)
45–64	-0.6725	53.89	<.0001	0.51	(0.43–0.61)
65+ (R)				1.00	
Sex					
Male	0.5139	141.93	<.0001	1.67	(1.54–1.82)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.7715	88.21	<.0001	2.16	(1.84–2.54)
Second	0.7201	86.62	<.0001	2.05	(1.77–2.39)
Third	0.3359	18.51	<.0001	1.40	(1.20–1.63)
Fourth	0.2218	7.92	0.0049	1.25	(1.07–1.46)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.9134	108.85	<.0001	2.49	(2.10–2.96)
Unemployed (looking for work)	0.4572	15.92	<.0001	1.58	(1.26–1.98)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	-0.0074	0.01	0.9300	0.99	(0.84–1.17)
Plant and machinery operators and drivers, and labourers and related workers	0.2193	5.45	0.0196	1.25	(1.04–1.50)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.1452	5.46	0.0195	0.86	(0.77–0.98)
Couple without dependent children	0.0258	0.26	0.6104	1.03	(0.93–1.13)
Single parent with dependent children	-0.2175	4.37	0.0366	0.80	(0.66–0.99)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.4088	36.06	<.0001	1.51	(1.32–1.72)
Quintile 2	0.3501	26.28	<.0001	1.42	(1.24–1.62)
Quintile 3	0.2487	12.22	0.0005	1.28	(1.12–1.47)
Quintile 4	0.0908	1.68	0.1945	1.10	(0.95–1.26)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 31 Results of logistic regression, probability of reporting fair or poor self-reported health status and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.1227	2.99	0.0838	0.88	(0.77–1.02)
Europe	0.3888	34.88	<.0001	1.48	(1.30–1.68)
Asia	-0.0818	0.79	0.3733	0.92	(0.77–1.10)
Other	-0.0246	0.06	0.8033	0.98	(0.80–1.18)
Australia (R)				1.00	
State/Territory					
Vic	-0.1102	4.61	0.0317	0.90	(0.81–0.99)
Qld	-0.2086	13.54	0.0002	0.81	(0.73–0.91)
SA	-0.2831	14.88	0.0001	0.75	(0.65–0.87)
WA	-0.3838	24.17	<.0001	0.68	(0.58–0.79)
Tas	-0.0019	0.00	0.9870	1.00	(0.79–1.25)
NT	0.0731	0.09	0.7624	1.08	(0.67–1.73)
ACT	0.0464	0.08	0.7836	1.05	(0.75–1.46)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.1453	9.92	0.0016	0.86	(0.79–0.95)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	-0.3179	35.00	<.0001	0.73	(0.65–0.81)
Never smoker	-0.4335	74.14	<.0001	0.65	(0.59–0.72)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.2387	9.20	0.0024	0.79	(0.68–0.92)
Acceptable weight	-0.4883	70.68	<.0001	0.61	(0.55–0.69)
Overweight	-0.3197	29.30	<.0001	0.73	(0.65–0.82)
Obese (R)				1.00	
Exercise level index					
Vigorous	-1.4401	144.13	<.0001	0.24	(0.19–0.30)
Moderate	-0.8345	253.98	<.0001	0.43	(0.39–0.48)
Low	-0.5082	126.37	<.0001	0.60	(0.55–0.66)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.2805	1569.34	<.0001	1.32	(1.31–1.34)
Intercept	-2.3661	312.28	<.0001		

Likelihood ratio = 5214.31, df = 42, Pr > χ^2 < 0.0001, R^2_{MAX} = 0.32

Number of observations = 23,543

(R) indicates reference group.

Source: ABS 1995 NHS

Table 32 Results of logistic regression, probability of visiting a doctor in the last two weeks and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Overcrowding index					
Overcrowded	-0.1607	6.61	0.0101	0.85	(0.75–0.96)
Not overcrowded (R)				1.00	
Age group (years)					
0–14	0.4784	27.36	<.0001	1.61	(1.35–1.93)
15–17	-0.5803	17.32	<.0001	0.56	(0.43–0.74)
18–24	0.0755	0.80	0.3711	1.08	(0.91–1.27)
25–44	-0.0678	0.85	0.3579	0.93	(0.81–1.08)
45–64	-0.3963	30.74	<.0001	0.67	(0.58–0.77)
65+ (R)				1.00	
Sex					
Male	-0.0694	5.20	0.0226	0.93	(0.88–0.99)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.1978	12.20	0.0005	1.22	(1.09–1.36)
Second	0.2204	16.93	<.0001	1.25	(1.12–1.38)
Third	0.1046	4.13	0.0422	1.11	(1.00–1.23)
Fourth	0.0313	0.38	0.5356	1.03	(0.93–1.14)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.4982	57.40	<.0001	1.65	(1.45–1.87)
Unemployed (looking for work)	0.1429	2.30	0.1297	1.15	(0.96–1.39)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.1543	6.99	0.0082	1.17	(1.04–1.31)
Plant and machinery operators and drivers, and labourers and related workers	0.2005	8.06	0.0045	1.22	(1.06–1.40)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	0.1512	10.22	0.0014	1.16	(1.06–1.28)
Couple without dependent children	0.0701	2.74	0.0980	1.07	(0.99–1.17)
Single parent with dependent children	0.0712	1.20	0.2739	1.07	(0.95–1.22)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.1276	6.87	0.0088	1.14	(1.03–1.25)
Quintile 2	0.0797	2.66	0.1028	1.08	(0.98–1.19)
Quintile 3	0.0461	0.84	0.3582	1.05	(0.95–1.16)
Quintile 4	0.1007	4.45	0.0349	1.11	(1.01–1.21)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 32 Results of logistic regression, probability of visiting a doctor in the last two weeks and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0496	0.75	0.3874	0.95	(0.85–1.06)
Europe	0.0775	1.73	0.1884	1.08	(0.96–1.21)
Asia	0.0264	0.15	0.6944	1.03	(0.90–1.17)
Other	0.0372	0.24	0.6239	1.04	(0.89–1.20)
Australia (R)				1.00	
State/Territory					
Vic	-0.0629	2.81	0.0938	0.94	(0.87–1.01)
Qld	-0.2313	29.92	<.0001	0.79	(0.73–0.86)
SA	-0.2069	14.84	0.0001	0.81	(0.73–0.90)
WA	-0.3594	38.94	<.0001	0.70	(0.62–0.78)
Tas	-0.1911	4.62	0.0316	0.83	(0.69–0.98)
NT	-0.1627	0.91	0.3398	0.85	(0.61–1.19)
ACT	-0.3239	7.12	0.0076	0.72	(0.57–0.92)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.3199	85.02	<.0001	0.73	(0.68–0.78)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.0686	2.27	0.1322	1.07	(0.98–1.17)
Never smoker	-0.0404	0.93	0.3344	0.96	(0.88–1.04)
Smoker (R)				1.00	
Body mass index					
Underweight	0.1041	2.36	0.1246	1.11	(0.97–1.27)
Acceptable weight	0.0731	1.99	0.1589	1.08	(0.97–1.19)
Overweight	0.0987	3.40	0.0651	1.10	(0.99–1.23)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.2583	12.64	0.0004	0.77	(0.67–0.89)
Moderate	-0.1774	16.85	<.0001	0.84	(0.77–0.91)
Low	-0.0629	2.64	0.1041	0.94	(0.87–1.01)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.2900	2393.26	<.0001	1.34	(1.32–1.35)
Intercept	-2.4271	525.06	<.0001		

Likelihood ratio = 4069.26, df = 43, $\text{Pr} > \chi^2 < 0.0001$, $R^2_{\text{MAX}} = 0.18$

Number of observations = 30,564

(R) indicates reference group.

Source: ABS 1995 NHS

Table 33 Results of logistic regression, probability of visiting a doctor in the last 12 months and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Overcrowding index					
Overcrowded	-0.0821	1.56	0.2115	0.92	(0.81–1.05)
Not overcrowded (R)				1.00	
Age group (years)					
0–14	0.1440	1.30	0.2546	1.15	(0.90–1.48)
15–17	-0.5321	12.50	0.0004	0.59	(0.44–0.79)
18–24	-0.2974	6.95	0.0084	0.74	(0.60–0.93)
25–44	-0.6720	43.89	<.0001	0.51	(0.42–0.62)
45–64	-0.8665	74.14	<.0001	0.42	(0.35–0.51)
65+ (R)				1.00	
Sex					
Male	-0.4483	144.45	<.0001	0.64	(0.59–0.69)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.0427	0.43	0.5128	1.04	(0.92–1.19)
Second	0.1610	6.09	0.0136	1.17	(1.03–1.33)
Third	-0.0291	0.25	0.6142	0.97	(0.87–1.09)
Fourth	0.0101	0.03	0.8550	1.01	(0.91–1.13)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.3377	19.81	<.0001	1.40	(1.21–1.63)
Unemployed (looking for work)	0.0339	0.12	0.7278	1.03	(0.85–1.25)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.2921	23.98	<.0001	1.34	(1.19–1.51)
Plant and machinery operators and drivers, and labourers and related workers	0.1970	7.87	0.0050	1.22	(1.06–1.40)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	0.1710	10.90	0.0010	1.19	(1.07–1.31)
Couple without dependent children	0.1732	10.06	0.0015	1.19	(1.07–1.32)
Single parent with dependent children	0.2041	6.82	0.0090	1.23	(1.05–1.43)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.1158	3.84	0.0502	1.12	(1.00–1.26)
Quintile 2	0.0228	0.16	0.6936	1.02	(0.91–1.15)
Quintile 3	0.0725	1.49	0.2220	1.08	(0.96–1.21)
Quintile 4	0.1058	3.44	0.0637	1.11	(0.99–1.24)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 33 Results of logistic regression, probability of visiting a doctor in the last 12 months and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.3369	23.26	<.0001	0.71	(0.62–0.82)
Europe	-0.2321	9.95	0.0016	0.79	(0.69–0.92)
Asia	-0.1969	7.36	0.0067	0.82	(0.71–0.95)
Other	-0.0441	0.24	0.6273	0.96	(0.80–1.14)
Australia (R)				1.00	
State/Territory					
Vic	-0.0861	3.49	0.0619	0.92	(0.84–1.00)
Qld	-0.2974	34.62	<.0001	0.74	(0.67–0.82)
SA	-0.2566	15.66	<.0001	0.77	(0.68–0.88)
WA	-0.3813	32.56	<.0001	0.68	(0.60–0.78)
Tas	-0.2872	8.40	0.0037	0.75	(0.62–0.91)
NT	0.0896	0.30	0.5870	1.09	(0.79–1.51)
ACT	-0.3243	5.51	0.0189	0.72	(0.55–0.95)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.4014	101.01	<.0001	0.67	(0.62–0.72)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.1425	6.41	0.0113	1.15	(1.03–1.29)
Never smoker	0.0970	4.05	0.0443	1.10	(1.00–1.21)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.1724	3.84	0.0502	0.84	(0.71–1.00)
Acceptable weight	-0.1336	3.83	0.0502	0.87	(0.77–1.00)
Overweight	-0.0295	0.17	0.6766	0.97	(0.85–1.12)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.0597	0.64	0.4245	0.94	(0.81–1.09)
Moderate	-0.0690	1.73	0.1879	0.93	(0.84–1.03)
Low	0.0415	0.72	0.3964	1.04	(0.95–1.15)
Sedentary (R)				1.00	
Total number of health conditions reported					
	0.3656	1207.24	<.0001	1.44	(1.41–1.47)
Intercept	1.4188	99.37	<.0001		

Likelihood ratio = 2847.71, df = 43, $\text{Pr} > \chi^2 < 0.0001$, $R^2_{\text{MAX}} = 0.16$

Number of observations = 30,564

(R) indicates reference group.

Source: ABS 1995 NHS

Table 34 Results of logistic regression, probability of being a smoker and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Overcrowding index					
Overcrowded	-0.0594	0.70	0.4035	0.94	(0.82–1.08)
Not overcrowded (R)				1.00	
Age group (years)					
18–24	0.7745	79.96	<0.0001	2.17	(1.83–2.57)
25–44	0.8693	118.22	<0.0001	2.39	(2.04–2.79)
45–64	0.4172	27.01	<0.0001	1.52	(1.30–1.78)
65+ (R)				1.00	
Sex					
Male	0.5389	240.91	<0.0001	1.71	(1.60–1.84)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.1091	2.93	0.0868	1.12	(0.98–1.26)
Second	0.1884	9.75	0.0018	1.21	(1.07–1.36)
Third	0.1569	8.09	0.0045	1.17	(1.05–1.30)
Fourth	-0.0139	0.07	0.7945	0.99	(0.89–1.10)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.6314	88.03	<0.0001	1.88	(1.65–2.15)
Unemployed (looking for work)	1.0692	153.16	<0.0001	2.91	(2.46–3.45)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.4351	59.56	<0.0001	1.55	(1.38–1.73)
Plant and machinery operators and drivers, and labourers and related workers	0.8354	167.96	<0.0001	2.31	(2.03–2.62)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.3722	68.28	<0.0001	0.69	(0.63–0.75)
Couple without dependent children	-0.3377	60.13	<0.0001	0.71	(0.66–0.78)
Single parent with dependent children	0.3481	20.62	<0.0001	1.42	(1.22–1.65)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.5881	109.18	<0.0001	1.80	(1.61–2.01)
Quintile 2	0.4200	55.47	<0.0001	1.52	(1.36–1.70)
Quintile 3	0.3092	28.45	<0.0001	1.36	(1.22–1.53)
Quintile 4	0.2647	22.25	<0.0001	1.30	(1.17–1.45)
Quintile 5 (least disadvantaged) (R)				1.00	

(continued)

Table 34 Results of logistic regression, probability of being a smoker and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	0.1139	3.82	0.0505	1.12	(1.00–1.26)
Europe	-0.0819	1.75	0.1861	0.92	(0.82–1.04)
Asia	-1.1496	204.58	<0.0001	0.32	(0.27–0.37)
Other	-0.1440	3.50	0.0615	0.87	(0.75–1.01)
Australia (R)				1.00	
State/Territory					
Vic	-0.0126	0.09	0.7679	0.99	(0.91–1.07)
Qld	0.0656	2.02	0.1557	1.07	(0.98–1.17)
SA	-0.0994	2.66	0.1031	0.91	(0.80–1.02)
WA	-0.1193	3.56	0.0593	0.89	(0.78–1.01)
Tas	-0.0582	0.36	0.5512	0.94	(0.78–1.14)
NT	0.3138	3.46	0.0629	1.37	(0.98–1.91)
ACT	0.1642	1.59	0.2072	1.18	(0.91–1.52)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	-0.1424	13.64	0.0002	0.87	(0.80–0.94)
Capital city/metropolitan (R)				1.00	
Body mass index					
Underweight	0.6275	84.36	<0.0001	1.87	(1.64–2.14)
Acceptable weight	0.2972	31.47	<0.0001	1.35	(1.21–1.49)
Overweight	0.1947	12.62	0.0004	1.22	(1.09–1.35)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.8538	148.91	<0.0001	0.43	(0.37–0.49)
Moderate	-0.5339	152.73	<0.0001	0.59	(0.54–0.64)
Low	-0.3835	99.15	<0.0001	0.68	(0.63–0.74)
Sedentary (R)				1.00	
Intercept	-2.4784	580.15	<0.0001		

Likelihood ratio = 2177.67, df = 38, Pr > χ^2 < 0.0001, R^2_{MAX} = 0.13

Number of observations = 22,686

(R) indicates reference group.

Source: ABS 1995 NHS

Table 35 Results of poisson regression, average number of health conditions reported and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Rate ratio	95% confidence interval
Overcrowding index					
Overcrowded	-0.0513	11.07	0.0009	0.95	(0.92–0.98)
Not overcrowded (R)				1.00	
Age group (years)					
0–14	-1.3696	5410.14	<0.0001	0.25	(0.25–0.26)
15–17	-1.0515	1286.98	<0.0001	0.35	(0.33–0.37)
18–24	-0.7656	1945.06	<0.0001	0.47	(0.45–0.48)
25–44	-0.6048	1771.57	<0.0001	0.55	(0.53–0.56)
45–64	-0.2404	307.27	<0.0001	0.79	(0.77–0.81)
65+ (R)				1.00	
Sex					
Male	-0.1632	613.79	<0.0001	0.85	(0.84–0.86)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	-0.0038	0.10	0.7506	1.00	(0.97–1.02)
Second	0.0306	7.42	0.0064	1.03	(1.01–1.05)
Third	0.0017	0.02	0.8755	1.00	(0.98–1.02)
Fourth	-0.0140	1.77	0.1836	0.99	(0.97–1.01)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.1255	92.15	<0.0001	1.13	(1.11–1.16)
Unemployed (looking for work)	-0.0308	2.38	0.1226	0.97	(0.93–1.01)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	-0.0602	27.49	<0.0001	0.94	(0.92–0.96)
Plant and machinery operators and drivers, and labourers and related workers	-0.1514	106.87	<0.0001	0.86	(0.84–0.88)
Managers and administrators, and professionals (R)				1.00	
Income unit type					
Couple with dependent children	-0.1242	153.76	<0.0001	0.88	(0.87–0.90)
Couple without dependent children	-0.0094	1.26	0.2624	0.99	(0.97–1.01)
Single parent with dependent children	-0.0354	5.92	0.0150	0.97	(0.94–0.99)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	-0.0193	3.39	0.0658	0.98	(0.96–1.00)
Quintile 2	-0.0240	5.23	0.0222	0.98	(0.96–1.00)
Quintile 3	-0.0128	1.48	0.2240	0.99	(0.97–1.01)
Quintile 4	-0.0031	0.10	0.7567	1.00	(0.98–1.02)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 35 Results of poisson regression, average number of health conditions reported and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Rate ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0129	1.43	0.2320	0.99	(0.97–1.01)
Europe	-0.1535	167.15	<0.0001	0.86	(0.84–0.88)
Asia	-0.2825	271.51	<0.0001	0.75	(0.73–0.78)
Other	-0.0484	8.35	0.0039	0.95	(0.92–0.98)
Australia (R)				1.00	
State/Territory					
Vic	-0.0580	33.18	<0.0001	0.94	(0.93–0.96)
Qld	0.0810	49.07	<0.0001	1.08	(1.06–1.11)
SA	0.0420	15.87	<0.0001	1.04	(1.02–1.06)
WA	0.0988	58.49	<0.0001	1.10	(1.08–1.13)
Tas	0.0055	0.13	0.7219	1.01	(0.98–1.04)
NT	-0.0516	9.77	0.0018	0.95	(0.92–0.98)
ACT	0.0975	50.68	<0.0001	1.10	(1.07–1.13)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	0.0142	3.36	0.0668	1.01	(1.00–1.03)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.0822	79.18	<0.0001	1.09	(1.07–1.11)
Never smoker	-0.0422	23.45	<0.0001	0.96	(0.94–0.98)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.1241	81.03	<0.0001	0.88	(0.86–0.91)
Acceptable weight	-0.1561	244.30	<0.0001	0.86	(0.84–0.87)
Overweight	-0.1094	113.31	<0.0001	0.90	(0.88–0.91)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.0141	0.93	0.3336	0.99	(0.96–1.01)
Moderate	-0.0086	0.96	0.3262	0.99	(0.97–1.01)
Low	0.0141	3.19	0.0742	1.01	(1.00–1.03)
Sedentary (R)				1.00	
Intercept	2.0573	9273.94	<0.0001		

Log likelihood = 39426.30

Number of observations = 30,564

(R) indicates reference group.

Source: ABS 1995 NHS

Table 36 Results of poisson regression, average number of serious health conditions reported and overcrowding index

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Overcrowding index					
Overcrowded	0.0246	0.37	0.5443	1.02	(0.95–1.11)
Not overcrowded (R)				1.00	
Age group (years)					
0–14	-1.7980	416.65	<0.0001	0.17	(0.15–0.18)
15–17	-1.9340	508.96	<0.0001	0.14	(0.12–0.17)
18–24	-1.4531	789.06	<0.0001	0.23	(0.21–0.26)
25–44	-1.3077	921.46	<0.0001	0.27	(0.25–0.29)
45–64	-0.8836	471.39	<0.0001	0.41	(0.38–0.45)
65+ (R)				1.00	
Sex					
Male	0.0347	3.95	0.0467	1.04	(1.00–1.07)
Female (R)				1.00	
Quintile of equivalent family income					
First (lowest incomes)	0.2160	39.81	<0.0001	1.24	(1.16–1.33)
Second	0.2598	66.99	<0.0001	1.30	(1.22–1.38)
Third	0.1271	15.83	<0.0001	1.14	(1.07–1.21)
Fourth	0.0624	3.76	0.0524	1.06	(1.00–1.13)
Fifth (highest incomes) (R)				1.00	
Occupation/employment status					
Not applicable/not in labour force/armed forces	0.5513	189.98	<0.0001	1.74	(1.60–1.88)
Unemployed (looking for work)	0.1848	10.23	0.0014	1.20	(1.07–1.35)
Para-professionals, tradespersons, clerks and salespersons and personal service workers	0.0504	1.76	0.1844	1.05	(0.98–1.13)
Plant and machinery operators and drivers, and labourers and related workers	-0.0354	0.59	0.4418	0.97	(0.88–1.06)
Managers and administrators, and professionals (R)					
Income unit type					
Couple with dependent children	-0.2253	59.34	<0.0001	0.80	(0.75–0.85)
Couple without dependent children	-0.0101	0.21	0.6467	0.99	(0.95–1.03)
Single parent with dependent children	0.0177	0.21	0.6482	1.02	(0.94–1.10)
Single person (R)				1.00	
Quintile of socio-economic disadvantage					
Quintile 1 (most disadvantaged)	0.1207	18.21	<0.0001	1.13	(1.07–1.19)
Quintile 2	0.0675	5.52	0.0188	1.07	(1.01–1.13)
Quintile 3	0.0772	7.01	0.0081	1.08	(1.02–1.14)
Quintile 4	0.0996	12.98	0.0003	1.10	(1.05–1.17)
Quintile 5 (least disadvantaged) (R)				1.00	

Table 36 Results of poisson regression, average number of serious health conditions reported and overcrowding index (continued)

Variable	Coefficient	Wald χ^2	Significance	Odds ratio	95% confidence interval
Region of birth					
UK & Ireland	-0.0497	3.03	0.0817	0.95	(0.90–1.01)
Europe	-0.2491	66.21	<0.0001	0.78	(0.73–0.83)
Asia	-0.4765	86.86	<0.0001	0.62	(0.56–0.69)
Other	-0.1148	5.84	0.0157	0.89	(0.81–0.98)
Australia (R)				1.00	
State/Territory					
Vic	-0.0634	5.97	0.0146	0.94	(0.89–0.99)
Qld	0.0355	1.42	0.2333	1.04	(0.98–1.10)
SA	-0.0734	7.08	0.0078	0.93	(0.88–0.98)
WA	-0.0110	0.10	0.7485	0.99	(0.92–1.06)
Tas	-0.0062	0.02	0.8747	0.99	(0.92–1.07)
NT	-0.1334	8.32	0.0039	0.88	(0.80–0.96)
ACT	0.0396	1.10	0.2943	1.04	(0.97–1.12)
NSW (R)				1.00	
Region					
Rural/remote (includes NT)	0.0456	5.14	0.0234	1.05	(1.01–1.09)
Capital city/metropolitan (R)				1.00	
Smoker status					
Ex-smoker	0.0748	9.51	0.0020	1.08	(1.03–1.13)
Never smoker	-0.1815	58.36	<0.0001	0.83	(0.80–0.87)
Smoker (R)				1.00	
Body mass index					
Underweight	-0.2583	52.46	<0.0001	0.77	(0.72–0.83)
Acceptable weight	-0.3882	235.54	<0.0001	0.68	(0.65–0.71)
Overweight	-0.2830	121.04	<0.0001	0.75	(0.72–0.79)
Obese (R)				1.00	
Exercise level index					
Vigorous	-0.2783	38.48	<0.0001	0.76	(0.69–0.83)
Moderate	-0.1932	69.39	<0.0001	0.82	(0.79–0.86)
Low	-0.1234	35.34	<0.0001	0.88	(0.85–0.92)
Sedentary (R)				1.00	
Intercept	0.4730	70.48	<0.0001		

Log likelihood = -22254.63

Number of observations = 30,564

(R) indicates reference group.

Source: ABS 1995 NHS

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Australian Housing and Urban Research Institute
Level 7 20 Queen Street, Melbourne Victoria 3000
Phone +61 3 9629 5033 Fax +61 3 9629 8536
Email information@ahuri.edu.au Web www.ahuri.edu.au