Original Contribution

Association Between Housing Affordability and Mental Health: A Longitudinal Analysis of a Nationally Representative Household Survey in Australia

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Evidence about the mental health consequences of unaffordable housing is limited. The authors investigated whether people whose housing costs were more than 30% of their household income experienced a deterioration in their mental health (using the Short Form 36 Mental Component Summary), over and above other forms of financial stress. They hypothesized that associations would be limited to lower income households as high housing costs would reduce their capacity to purchase other essential nonhousing needs (e.g., food). Using fixed-effects longitudinal regression, the authors analyzed 38,610 responses of 10,047 individuals aged 25–64 years who participated in the Household, Income, and Labour Dynamics in Australia (HILDA) Survey (2001–2007). Respondents included those who remained in affordable housing over 2 consecutive waves (reference group) or had moved from affordable to unaffordable housing over 2 waves (comparison group). For individuals living in low-to-moderate income households, entering unaffordable housing was associated with a small decrease in their mental health score independent of changes in equivalized household income or having moved house (mean change = −1.19, 95% confidence interval: −1.97, −0.41). The authors did not find evidence to support an association for higher income households. They found that entering unaffordable housing is detrimental to the mental health of individuals residing in low-to-moderate income households.

Australia; housing; longitudinal studies; mental health

Abbreviations: CI, confidence interval; HILDA, Household, Income, and Labour Dynamics in Australia; MCS, Mental Component Summary; SD, standard deviation; SF-36, Short Form 36.

Housing is the place where we spend the majority of our lives and one of the main settings that affect human health (1). Although a relation between housing and health is well established and housing is widely regarded as a key determinant of health (2), gaps remain in our understanding of the multiple potential pathways between housing and health (3–5). Existing evidence has focused mainly on more direct "pathways" (3) between physical dwelling characteristics, such as exposure to toxins (2), poor insulation (4), or dampness (6), and physical health outcomes, such as asthma (4, 7), skin infections (8), or cardiovascular disease (9). Less is known about how the social and economic aspects of housing relate to health, particularly mental health, a finding highlighted in recent reviews (10, 11).

The relation between housing affordability and mental health has been established in a number of studies (6, 7,

12–14); affordability may influence health via the quality (12, 13), location (15), and tenure (14, 16, 17) of dwellings that households can access. Furthermore, in extreme cases, poor housing affordability can result in homelessness that is likely to be both a consequence and a determinant of poor mental health (18). Importantly for this current study, recent work in the United Kingdom (19) that builds on earlier work (10) has indicated that the experience of poor housing affordability appears to influence mental health directly, over and above general financial hardship. The current analysis adds to this body of work to improve understanding of the influence of housing affordability on mental health.

In a great majority of countries, including Australia (20), the United States (3), and the United Kingdom (21), housing is a principal means for households to create and store wealth. For many households, housing costs (mortgage, rent,

and insurance) are their largest category of expenditure, on average accounting for just under 20% of all consumption expenditure in Australia and New Zealand, 18% in the United Kingdom and the United States, and almost 24% in Canada (22). The cost of housing, therefore, has a significant effect on a household's ability to access nonshelter requirements, such as food, transport, and medical care. This is especially the case for low income households as they are likely to pay a greater proportion of their income in housing costs (23).

A number of recent studies and reviews have highlighted the potential of longitudinal studies (10, 22, 24) to explore the relation between housing and health. Longitudinal approaches are able to address a number of key limitations of cross-sectional studies, such as the direction of causation (3, 6, 25, 26) and the role of subjective influences on health, such as the sense of well-being (10, 24). In addition, previous studies have insufficiently separated housing affordability from income, meaning that the effects of housing affordability cannot be distinguished from broader financial stress. This final point is critical because, if housing affordability has an effect on mental health that is distinct from the effects of financial stress, then policy interventions to reduce housing costs may be effective health interventions.

Our research uses a longitudinal approach that considers changes *within* people over time (comparing individual housing affordability and mental health at 2 time points). We account as much as possible for underlying financial stress driving observed associations by both stratifying and adjusting for income. In Australia, housing affordability has most typically been examined by using a ratio approach, which focuses on households in the bottom 40% of the income distribution paying more than 30% of their income for housing costs (the "30/40 rule") (27–30). The usefulness of this ratio has been recently reinforced in the analysis by Nepal et al. (31), who analyzed the sensitivity of the 3 most widely used Australian indicators of poor housing affordability and concluded that the 30/40 rule most robustly allowed housing affordability to be examined over time. The structure of the Australian housing system means that affordability is a means by which housing acts as a social determinant of health, leading to housing being regarded as a "health promoting resource accessed through income" (32, p. 25). The research and policy focus on housing affordability among lower income Australians is grounded in the premise that the costs of housing among those with lower incomes result in reduced ability to meet other nonhousing basic needs (e.g., food or medical). Correspondingly, people from higher income households are more likely to have social and material resources that would buffer their health from the negative consequences associated with having high housing costs relative to income (33). Consequently, we hypothesized that the effects of poor housing affordability on mental health would be limited to lower income households.

In this article, we therefore address 2 research questions:

1. Does self-perceived mental health worsen for people whose housing becomes unaffordable?
2. Do observed effects differ between low to moderate and high income households?

MATERIALS AND METHODS

Data

The Household, Income, and Labour Dynamics in Australia (HILDA) longitudinal study follows Australian households and individuals over time. The HILDA data set is based upon a nation-wide probability sample of households and individuals, focused on income, employment, health, and well-being. Information is collected from household members aged 15 or more years by using face-to-face interviews and self-completion questionnaires. All annual waves between 2001 and 2007 were included in these analyses. The initial household response rate at wave 1 was 66%. Retention of responding individuals at subsequent waves was 87% at wave 2 and >90% thereafter (34).

The analysis described in this paper is based upon the 38,610 responses of 10,047 HILDA participants aged 25–64 years who met the following criteria:

- Had at least 2 consecutive waves of data on housing affordability, mental health, and income, and
- Had spent 2 consecutive waves in affordable housing (reference group) or 1 wave in affordable housing followed by 1 wave in unaffordable housing (comparison group).

Outcome variable

The Mental Component Summary (MCS) of the Short Form 36 (SF-36) measure was used as the primary outcome measure for these analyses. The SF-36 is one of the most widely used self-completion measures of health status (35), and it has been validated for use in the Australian population (36) and to detect within-person change over time (37). The MCS relates most directly to 4 subscales generated from the 36 items that comprise the SF-36: vitality, social functioning, role limitations due to emotional problems ("role-emotional"), and mental health. A higher score on this 0–100 scale reflects better mental health and well-being.

Predictor variable

"Unaffordable housing" was defined as occurring when a household paid more than 30% of gross household income in rent or mortgage costs (33, 38, 39). Rent, mortgage, and household income were self-reported and refer to the time at which the survey was conducted.

Confounders

Potential confounders were identified from existing literature and consideration of the likely relation between each and change in housing affordability and change in mental health. Models were adjusted for age (centered at the mean), change in residence between waves, and equivalized disposable household income. Disposable income was based on income, investments, and expenditure for the financial year and equivalized for each household. Equivalization adjusts for the size and composition of the household by using the modified equivalence method of the Organisation for Economic Co-operation

and Development (40). The analytical sample was restricted to individuals whose housing was affordable in 1 survey wave but unaffordable in the next wave and to those who remained in affordable housing over 2 consecutive survey waves (reference category).

Missing data

Of the 64,937 data points recorded in the HILDA data set between waves 1 and 7 for people aged 25–64 years, 59.46% are included in these analyses. Cases could not be included where the MCS score was not available or where there was missing information on covariates (reducing the sample to 43,642). The analysis was restricted to people who had spent 2 consecutive survey waves in affordable housing or had 1 wave in affordable housing followed by a wave in unaffordable housing (38,610 observations).

Analysis

We calculated summary statistics of the outcome (MCS) by age group, sex, if moved house between waves, and equivalized disposable income, for both categories of the affordable housing predictor variable (remained in affordable housing/housing became unaffordable). Household income and changes in household income between waves are likely to be strong confounders of the association between housing affordability and mental health. To examine the association between household income and housing affordability, we used 2007 data to plot the relation between quintiles of equivalized income and the proportion of people spending more than 30% of income on housing costs, excluding individuals who did not have any housing costs.

We used longitudinal linear regression models with fixed-effects estimators to estimate the association between unaffordable housing and mental health. Analyses were performed by using STATA, version 11.0, software (StataCorp LP, College Station, Texas). Taking account of repeat observation of individuals, we used the following models (where $i =$ individuals within the sample, and $t =$ time periods):

$$MCS_{it} = a + \beta X + v_i + \varepsilon_{it}.$$

MCS was modeled as a function of a constant term (a) and a set of covariates (X) with associated vector of coefficients (β), while v_i is an individual-specific error term that controls for unobserved individual fixed effects (effects that are constant over time), and ε_{it} is an error term that varies across individuals and over time. Because we want to control for omitted variables that differ between individuals but are constant over time (including family background, education), we used a fixed-effects rather than a random-effects estimator in the models. Fixed-effects models remove variability between people that is equivalent to including each person in the model as a covariate (i.e., a fixed effect). This approach removes unobserved heterogeneity (between people). The coefficients generated from these models describe changes within individuals only and therefore provide an estimate of associations that are not confounded by differences between people that cannot be accounted for in the models.

The sampling design of HILDA resulted in more than 1 individual per household being included in the analysis. Therefore, robust standard errors were calculated to account for clustering of individuals within households.

We estimated the association between change in housing affordability and change in mental health, initially adjusted for age (referred to as "unadjusted models"), and then further adjusted for equivalized disposable household income. Because the fixed-effects approach measures within-person change over time, by adjusting for an equivalized (by household structure) measure of income, we capture change in both disposable income (which might arise from a change in job or labor force participation) and household structure (an increase or decrease in people in the household).

We also tested the hypothesis that effects would be restricted to lower income households by including in the model an interaction term between housing affordability and level of household income (dichotomized into the lowest 40% and the highest 60% of the national income distribution) (41). We then stratified models according to household income.

Finally, to test the sensitivity of our findings to the outcome measure used, we repeated our primary analysis using each subscale of the MCS (mental health, role-emotional, social functioning, and vitality) as outcomes, stratifying the analysis by household income.

RESULTS

Overall, people who had not experienced unaffordable housing had an average MCS of 49.0 (standard deviation (SD) = 9.9), whereas those whose housing had become unaffordable had an average MCS of 46.5 (SD = 11.3) (Table 1). Across each age, sex, and income group, people whose housing had become unaffordable had worse mental health than people whose housing had remained affordable. People who had moved from one house to another had a lower average MCS score than people who had not moved between waves, and if their housing had also become unaffordable, their average MCS score was the lowest observed at 44 (SD = 12.3) points (Table 1).

Housing becoming unaffordable was more likely for people in the lowest 40% of the income distribution and those who had moved. The majority of occurrences of housing becoming unaffordable were not related to moving from one house to another, implying that changes in household structure, housing costs, or household income were the main reasons for housing becoming unaffordable.

Housing affordability was strongly associated with income. In the lowest income quintile, 43% of individuals spent more than 30% of their income on housing compared with only 3% in the highest income group (Figure 1).

On average, the MCS of people whose housing became unaffordable decreased by 0.54 points after age, equivalized disposable income, and moving from one house to another had been accounted for (95% confidence interval (CI): −0.95, −0.14) (Table 2). Fitting an interaction term in the model showed evidence of effect modification by level of household income ($P = 0.008$). Stratification of models by household income shows that the associations of poor housing affordability with mental health appear to be restricted to

Table 1.   Description of Analytical Data Set for Adults Aged 25–64 Years, Australia, 2001–2007

|	Housing Remained Affordable		Housing Became Unaffordable	
	SF-36 MCS, Mean (SD)	No. of Observations	SF-36 MCS, Mean (SD)	No. of Observations
Age, years				
25–34	48.13 (10.02)	7,986	45.42 (11.29)	691
35–44	48.34 (9.91)	10,906	47.25 (10.69)	669
45–54	49.17 (9.75)	10,150	46.89 (11.24)	430
55–64	50.85 (9.84)	7,554	46.74 (12.85)	224
Sex				
Males	49.63 (9.50)	17,264	47.57 (10.89)	885
Females	48.52 (10.26)	19,332	45.65 (11.52)	1,129
Changed residence				
No	49.24 (9.82)	31,576	46.76 (11.16)	1,305
Yes	47.84 (10.48)	5,020	46.00 (11.51)	709
Weekly equivalized disposable household income				
Lower 40%	47.17 (11.11)	7,853	45.08 (11.95)	1,082
Upper 60%	49.56 (9.51)	28,743	48.13 (10.24)	932
All observations	49.04 (9.93)	36,596	46.49 (11.29)	2,014

Abbreviations: MCS, Mental Component Summary; SD, standard deviation; SF-36, Short Form 36.

individuals living in low-to-moderate income households (mean change = −1.19, 95% CI: −1.97, −0.41).

Mental health and social functioning worsened in low-to-moderate income households when housing became unaffordable (mean change = −1.49, 95% CI: −2.75, −0.22 and mean change = −4.33, 95% CI: −6.19, −2.47, respectively) (Table 3). No significant relation with housing affordability was observed for the role-emotional or vitality subscales of the SF-36. Again, there was no evidence of an effect of housing affordability for people in the upper 60% of the income distribution.

DISCUSSION

We find evidence to support our hypothesis that poor housing affordability is associated with deterioration in mental health in Australia, a finding that is consistent with research in other resource-rich countries, including the United Kingdom (19). Our findings also suggest that decreases in mental health associated with poor housing affordability appear to be limited to individuals living in households in the bottom 40% of the income distribution. We suggest that the concentration of the effect in low-to-moderate income
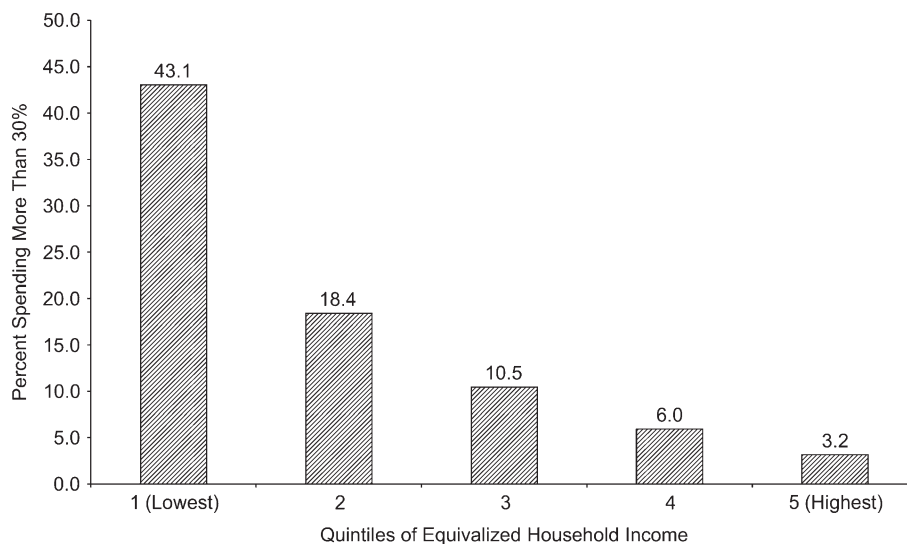
Figure 1.   Percentage of adults aged 25–64 years spending more than 30% of their equivalized household income on housing payments, by income quintile, Australia, 2007.

Table 2. Mental Health Effect of Moving Into Unaffordable Housing, Stratified by Household Income, for Adults Aged 25–64 Years, Australia, 2001–2007

	Mean Change in MCS Score[a]	95% CI	P Value
Unaffected[b]	−0.59	−0.99, −0.19	0.004
Adjusted[c]	−0.54	−0.95, −0.14	0.008
Lowest 40% of income distribution			
Unadjusted[b]	−1.22	−1.98, −0.46	0.002
Adjusted[c]	−1.19	−1.97, −0.41	0.003
Upper 60% of income distribution			
Unadjusted	−0.15	−0.69, 0.38	0.572
Adjusted	−0.11	−0.65, 0.43	0.694

Abbreviations: CI, confidence interval; MCS, Mental Component Summary; SF-36, Short Form 36.

[a] Regression coefficients representing the mean change in SF-36 score in individuals whose housing became unaffordable compared with those who remained in affordable housing.

[b] Unadjusted models were adjusted for age only.

[c] Adjusted models were adjusted for age, residential change, and equivalized disposable household income.

Table 3. Effect on Mental Health, Role-Emotional, Social Functioning, and Vitality of Moving Into Unaffordable Housing, Stratified by Household Income, for Adults Aged 25–64 Years, Australia, 2001–2007

	Mean Change in MCS Score[a]	95% CI	P Value
Lowest 40% of income distribution			
Mental health	−1.49	−2.75, −0.22	0.021
Role-emotional	−2.56	−5.43, 0.31	0.080
Social functioning	−4.33	−6.19, −2.47	<0.001
Vitality	−1.01	−2.24, 0.22	0.106
Upper 60% of income distribution			
Mental health	0.15	−0.71, 1.01	0.739
Role-emotional	−0.23	−2.04, 1.58	0.806
Social functioning	−0.29	−1.48, 0.89	0.625
Vitality	−0.20	−1.13, 0.73	0.673

Abbreviations: CI, confidence interval; MCS, Mental Component Summary; SF-36, Short Form 36.

[a] Regression coefficients representing the mean change in SF-36 score in individuals whose housing became unaffordable compared with those who remained in affordable housing, adjusted for age, having moved residence since last wave, and equivalized disposable household income.

households is due to the dominance of housing as a principal life expenditure. Higher housing costs for those with low incomes are known to affect the household's ability to meet other essential needs (11, 23), for example, to purchase food, pay for transport costs (which may limit participation in employment and education), pay for utilities (heating, cooling), or meet health costs. For many higher income households, high housing costs are likely to be less deleterious to mental health because they may be the result of rational and voluntary housing investment choices as discussed (42, 43). Such choices are beneficial within the Australian taxation system (44), which effectively promotes home ownership through the tax-free status of the primary residence.

On the basis of our findings, we conclude that interventions to improve housing affordability are likely to be most effective for low income groups. Interventions to improve housing affordability may involve increasing household income and/or reducing housing costs. Importantly, these interventions targeted to low income groups have the potential to reduce inequities in mental health. In particular, interventions might be expected, based on our findings, to have greatest impact on the social functioning of individuals at risk of poor housing affordability.

Future work is required to investigate the degree to which these results are further differentiated by age. Such research would build upon earlier work by Watkins and Hosier (45) who found that the further an individual is from his/her expected housing "trajectory" (46), the larger the negative effect upon that individual's mental health. On this basis, we speculate that, for younger households, periods of unaffordability are anticipated and would have a lesser mental health effect. Although beyond the scope of the current article, evidence on the potential age differentiation of health effects from housing affordability would be valuable and

enable the better targeting of interventions on the basis of lifecycle stage, as well as income.

The effect sizes estimated in these analyses are modest, partly attributable to the conservative modeling approach used (fixed effects and adjustment for income). Generally in population groups, a change of 2–3 points on this scale is considered to be of clinical importance (47); however, as argued by Testa (48), determining the magnitude at which a within-person change becomes meaningful is not straightforward and may vary across different people and in different contexts. For example, Hopman et al. (49) found an age-related, within-person natural progression in MCS over time that equated to an average increase of 1.3 over 5 years for women aged 45–54 years and of 2.0 for men of the same age. Nonsystematic measurement error of income and housing costs that combine to form our exposure variable may have also attenuated our estimates toward the null. Nonetheless, we argue that small effects are still of public health importance when experienced by a large proportion of the population. For example, in Australia in 2004, there were 1.1 million low income households in unaffordable housing (50) and, therefore, poor housing affordability has a role in both the creation and maintenance of health inequalities.

This study has several important strengths. We have used a large and high quality national longitudinal data set, and this has allowed us to model change in mental health predicted by change in housing affordability and to mount stronger causal arguments. The use of fixed-effects regression analysis, allowing us to look at individual change in response to unaffordable housing, negates the bias generated from unmeasured differences between people. Finally, we were able to address the limitations of previous research that have not

taken into account the association between household income and housing affordability. As shown in Figure 1, housing affordability is closely related to income. Therefore, it is necessary to adopt an analytical approach that reduces the possibility that observed associations between housing affordability and health are the result of residual confounding by low income. The analytical approach used in this article does so by focusing on changes within people over time, while adjusting for household income. Our income-adjusted observations using within-person regression analysis allow us to identify a relation between housing affordability and mental health that appears to operate above and beyond the mental health effect of financial difficulties.

The study also has a number of limitations. First, information was not available on the number of times between annual survey waves that participants had changed housing affordability. Additionally, our understanding of the relation between unaffordable housing and health might be sharpened with more comprehensive measures of poor housing affordability (e.g., indicators which take into account mortgage or rent arrears, generational wealth, tenure, transport costs associated with location of housing, and the costs of heating and cooling housing). We also note that our analysis is based upon a dichotomous exposure measure. Although we are mindful of the importance of assessing exposure by using a policy-relevant measure, we also note its limitation in revealing variation on either side of the 30% cutoff. On the basis of our analysis, we do not know the form of the association between housing affordability and health, and this could be a focus of future research.

We have necessarily made some key assumptions in this paper. The first relates to potential reverse causation occurring *between* survey waves. In some cases, a decline in a person's mental health may cause his/her housing to become unaffordable, perhaps through job loss or a relationship breakdown. If this were to occur *between* data collection waves of HILDA, we have no way of knowing if change in mental health preceded a change in housing affordability. We have assumed that the strongest pathway is likely to be from housing unaffordability to poorer mental health. Second, although the first survey wave was, on the whole, highly representative of the Australian population and subsequent retention has been high (>90% for all but 1 wave), there is a documented attrition bias toward people who are of non-English-speaking backgrounds, unemployed, less educated, indigenous, and in lower status occupations (51). Over time, the sample has therefore become less representative of the population and biased toward higher socioeconomic status population groups. In addition to this potential attrition bias, missing data on key variables led to the exclusion of a large number of survey participants from our analytical sample. The large majority of excluded records were missing the MSC score at 1 or both years. Individuals missing these data were slightly more likely to be in unaffordable housing and slightly more likely to be in low/moderate income households (data not shown). It is possible that attrition and selection biases may have affected the estimates of the strength and significance of the relation between unaffordable housing and health that we have obtained in these analyses. If the housing affordability-mental health relation is stronger in very low income groups who also did not

report their income, it is likely that we have underestimated the association.

Using data from a national household longitudinal survey, we contribute to the emerging evidence on housing and mental health. The analysis provides strong evidence to support a relation between housing affordability and mental health in low income groups. Further, our findings suggest that interventions to improve housing affordability in low income groups are likely to reduce inequalities in mental health.

REFERENCES

1. Bonnefoy X. The policy relevance of housing and health—an international perspective. Presented at the Second World Health Organization Symposium on Housing and Health, Vilnius, Lithuania, September 29–October 1, 2004.
2. Jacobs DE. Housing and health: challenges and opportunities. Presented at the Second World Health Organization Symposium on Housing and Health, Vilnius, Lithuania, September 29–October 1, 2004.
3. Acevedo-Garcia D, Osypuk T, Werbel R, et al. Does housing mobility policy improve health? *Hous Policy Debate*. 2004; 15(1):49–98.
4. Howden-Chapman P, Matheson A, Crane J, et al. Effect of insulating existing houses on health inequality: cluster randomised study in the community [electronic article]. *BMJ*. 2007;334(7591):460. (doi: 10.1136/bmj.39070.573032.80).

5. Smith S, Alexander A, Easterlow D. Rehousing as a health intervention: miracle or mirage? *Health Place*. 1997;3(4): 203–216.

6. Hopton J, Hunt S. The health effects of improvements to housing: a longitudinal study. *Hous Stud*. 1996;11(2):271–286.

7. Somerville M, Mackenzie I, Owen P, et al. Housing and health: does installing heating in their homes improve the health of children with asthma? *Public Health*. 2000;114(6):434–439.

8. Bailie R, Stevens M, McDonald E, et al. Exploring cross-sectional associations between common childhood illness, housing and social conditions in remote Australian Aboriginal communities [electronic article]. *BMC Public Health*. 2010; 10:147. (doi: 10.1186/1471-2458-10-147).

9. Clinch JP, Healy JD. Housing standards and excess winter mortality. *J Epidemiol Community Health*. 2000;54(9):719–720.

10. Evans G, Wells N, Moch A. Housing and mental health: a review of the evidence and a methodological and conceptual critique. *J Soc Issues*. 2003;59(3):475–500.

11. Thomson H, Petticrew M, Douglas M. Health impact assessment of housing improvements: incorporating research evidence. *J Epidemiol Community Health*. 2003;57(1):11–16.

12. Evans GW, Wells NM, Chan HY, et al. Housing quality and mental health. *J Consult Clin Psychol*. 2000;68(3):526–530.

13. Wells NM, Harris JD. Housing quality, psychological distress, and the mediating role of social withdrawal: a longitudinal study of low-income women. *J Environ Psychol*. 2007;27(1): 69–78.

14. Windle GS, Burholt V, Edwards RT. Housing related difficulties, housing tenure and variations in health status: evidence from older people in Wales. *Health Place*. 2006;12(3):267–278.

15. Wright PA, Kloos B. Housing environment and mental health outcomes: a levels of analysis perspective. *J Environ Psychol*. 2007;27(1):79–89.

16. Cairney J, Boyle MH. Home ownership, mortgages and psychological distress. *Hous Stud*. 2004;19(2):161–174.

17. Kearns A, Hiscock R, Ellaway A, et al. 'Beyond four walls'. The psycho-social benefits of home: evidence from West Central Scotland. *Hous Stud*. 2000;15(3):387–410.

18. Schanzer B, Dominguez B, Shrout PE, et al. Homelessness, health status, and health care use. *Am J Public Health*. 2007; 97(3):464–469.

19. Taylor MP, Pevalin DJ, Todd J. The psychological costs of unsustainable housing commitments. *Psychol Med*. 2007;37(7): 1027–1036.

20. Badcock B, Beer A. *Home Truths: Home Ownership and Housing Wealth in Australia*. Melbourne, Australia: Melbourne University Press; 2000.

21. Organisation for Economic Co-Operation and Development (OECD). *Economic Outlook*. Paris, France: OCED; 2008.

22. United Nations Statistics Division. *National Accounts Official Country Data Tables for 2003*. New York, NY: United Nations; 2008.

23. Anderson LM, Charles JS, Fullilove MT, et al. Providing affordable family housing and reducing residential segregation by income. A systematic review. *Am J Prev Med*. 2003; 24(suppl 3):S47–S67.

24. Marsh A, Gordon D, Heslop P, et al. Housing deprivation and health: a longitudinal analysis. *Hous Stud*. 2000;15(3): 411–428.

25. Mair C, Diez Roux AV, Galea S. Are neighbourhood characteristics associated with depressive symptoms? A review of evidence. *J Epidemiol Community Health*. 2008;62(11): 940–946.

26. Shaw M. Housing and public health. *Annu Rev Public Health*. 2004;25:397–418.

27. Commonwealth of Australia. *A Good House is Hard to Find: Housing Affordability in Australia (Report of the Senate Select Committee on Housing Affordability in Australia)*. Canberra, Australia: Parliament of Australia; 2008.

28. Harding A, Phillips B, Kelly S. *Trends in housing stress*. Presented at the National Summit on Housing Affordability, Canberra, Australia, June 28, 2004.

29. National Housing Strategy. *National Housing Strategy: Summary of Papers*. Canberra, Australia: Australian Government Publishing Service; 1992.

30. Seelig T, Phibbs P. Beyond the normative: low income private renters' perspectives of housing affordability and need for housing assistance. *Urban Pol Res*. 2002;24(1):53–66.

31. Nepal B, Tanton R, Harding A. Measuring housing stress: how much do definitions matter? *Urban Pol Res*. 2010;28(2): 211–224.

32. Waters AM. *Do Housing Conditions Impact on Health Inequalities Between Australia's Rich and Poor?* Melbourne, Victoria, Australia: Australian Housing and Urban Research Institute (AHURI); 2001. (AHURI positioning paper no. 2).

33. Yates J. Australia's housing affordability crisis. *Aust Econ Rev*. 2008;41(2):200–214.

34. Wilkins R, Warren D, Hahn M, et al. *Families, Incomes and Jobs, Volume 5: A Statistical Report on Waves 1 to 7 of the HILDA Survey*. Melbourne, Victoria, Australia: Melbourne Institute of Applied Economic and Social Research; 2010.

35. Coons SJ, Rao S, Keininger DL, et al. A comparative review of generic quality-of-life instruments. *Pharmacoeconomics*. 2000;17(1):13–35.

36. McCallum J. The SF-36 in an Australian sample: validating a new, generic health status measure. *Aust J Public Health*. 1995;19(2):160–166.

37. Hemingway H, Stafford M, Stansfeld S, et al. Is the SF-36 a valid measure of change in population health? Results from the Whitehall II Study. *BMJ*. 1997;315(7118):1273–1279.

38. Australian Institute of Health and Welfare. *Housing Assistance in Australia*. Canberra, Australia: AIHW; 2008.

39. Yates J, Milligan V. *Housing Affordability: A 21st Century Problem*. Melbourne, Victoria, Australia: Australian Housing and Urban Research Institute (AHURI); 2007.

40. Organisation for Economic Co-operation and Development (OECD). What are equivalence scales? Paris, France: OECD; 2009. (www.oecd.org/dataoecd/61/52/35411111.pdf). (Accessed March 2010).

41. Australian Bureau of Statistics (ABS). *Household Income and Income Distribution, Australia, 2007–08*. Belconnen, Australian Capital Territory, Australia: ABS; 2009. (Catalog no. 6523.0).

42. Yates J. Is Australia's home-ownership rate really stable? An examination of change between 1975 and 1994. *Urban Stud*. 2000;37(2):63–91.

43. Marks GN, Sedgwick ST. Is there a housing crisis? The incidence and persistence of housing stress 2001–2006. *Aust Econ Rev*. 2008;41(2):215–221.

44. Bourassa SC. A model of housing tenure choice in Australia. *J Urban Econ*. 1995;37(2):161–175.

45. Watkins J, Hosier A. Conceptualising home and homelessness: a life course perspective. In: Rowles G, Chaudhury H, eds. *Home and Identity in Later Life*. New York, NY: Springer; 2005.

46. Beer A, Faulkner D, Gabriel M. *21st Century Housing Careers and Australia's Housing Future: Literature Review. Australian Housing and Urban Research Institute Positioning Paper*. Melbourne, Victoria, Australia: Australian Housing and Urban Research Institute; 2006.

47. Lee C, Russell A. Effects of physical activity on emotional well-being among older Australian women: cross-sectional and longitudinal analyses. *J Psychosom Res.* 2003;54(2): 155–160.

48. Testa MA. Interpretation of quality-of-life outcomes: issues that affect magnitude and meaning. *Med Care*. 2000;38(9 suppl II): S166–S174.

49. Hopman WM, Berger C, Joseph L, et al. The natural progression of health-related quality of life: results of a five-year prospective study of SF-36 scores in a normative population. *Qual Life Res.* 2006;15(3):527–536.

50. Yates J, Gabrielle M. Housing affordability in Australia. Australian Housing and Urban Research Institute (AHURI) background report. Melbourne, Victoria, Australia: AHURI; 2006. (http://www.ahuri.edu.au/downloads/NRV3/NRV3_C_Housing_affordability_in_Australia_Background_Report.pdf).

51. Watson N, ed. *HILDA User Manual—Release 8*. Melbourne, Victoria, Australia: University of Melbourne; 2008.