

Acknowledging the health effects of poor quality housing: Australia's Hidden Fraction

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Abstract

Housing is a central component of productive, healthy and meaningful lives, and a principle social determinant of broader health and wellbeing. Surprisingly though, evidence on the ways that housing influences health in Australia is poorly developed. The underdevelopment of housing and health knowledge in Australia stems largely from the fact that the majority of the population is accommodated in relatively good quality housing stock. The dominance of a 'good housing paradigm' means that households who live in poor quality and unhealthy housing are doubly disadvantaged – by the quality of their housing, and the fact that in Australia we do not adequately acknowledge health effects of housing.

In this paper we examine the scale, health outcomes and populations most vulnerable to poor quality housing. We base our analysis on data from Household Income and Labour Dynamics in Australia (HILDA) survey, a panel dataset that is representative across Australia. We find a sizeable, policy-important, and to date under-acknowledged, cohort of Australians who live in poor condition dwellings. Further, this cohort is shown to have a high prevalence of existing health and socio-economic vulnerability.

1. Introduction

Housing is more than mere bricks and mortar; it is a location; a place with access to social networks, employment and services; a home from which we draw our identity and store much of our wealth; and a shelter that permits comfort and security. Housing and health are closely interrelated within individual lives, and can be visualised as being related through many connecting, and sometimes 'cumulative' (Saegert & Evans, 2003), 'pathways' (Acevedo-Garcia et al., 2004). These pathways link housing and health with other determinants within our lives, such as employment, education, income, and location.

While the relationship between housing and health is relatively well developed across economically and socially similar nations (such as the United Kingdom, New Zealand, and the United States) the development of knowledge in the Australian context is limited and, as a result, relatively few studies have examined the health effects of housing in Australia. An overall good quality housing stock is the principle reason for this lack of research and knowledge development on the influence of housing upon the health of Australians. The majority of Australians live in relatively good quality housing (Paris, 1993), the stock is modern by international standards, and the population tends to be largely concentrated in climatically milder regions around the coastal parts of the nation. This means that, in addition to our housing system and stock being markedly different from these other countries, many of the traditional markers of health risk (including damp, cold, indoor air quality, safety) established in the international literature (e.g. Bonnefoy et al., 2003) are seen to have limited influence in Australia. At the population scale, there is little evidence of negative health effects of poor quality dwellings in Australia. While some studies have shown health effects to be related to dwelling attributes such as location (Bridge et al., 2003), and suitability (Robinson & Adams, 2008), the overarching means by which housing affects health in Australia at the population level, appears to be affordability (Bentley, et al. 2011). Waters neatly describes Australian housing as a "health promoting resource accessed through income" (Waters, 2001, p. 25). This statement captures the importance of relative cost in securing housing that is well located, appropriate to specific needs within the households, and secure. Importantly, Waters' statement reflects the fact that, while the Australian stock is of good overall quality, there are variations, and in a relatively open market, more desirable housing is obtained by those with the best ability to pay. This paper emerges from an acknowledgement of those variations within the Australian housing stock.

Our previous work has examined various perspectives of the mechanisms and effects of housing affordability on health (Bentley et al. 2011; Bentley et al. 2012; Baker et al. 2013), but this work has also begun to highlight the need to examine the health and housing relationship at the sub-population level. While large scale rigorous analyses at the population level show no evidence of direct health effects of housing condition in Australia, recent work (e.g. Mallett et al 2012), and smaller scale qualitative studies, suggests that there are in fact substantial cohorts of Australians, statistically hidden in population-level analysis, whose housing conditions are very poor. We suspect that these cohorts, termed the 'Hidden Fraction' in this paper, occupy dwellings that are disadvantageous to their health. If a hidden fraction does exist in Australia, they possess the double disadvantage of living in a nation where there is limited acknowledgement of their housing problems, while occupying housing that does indeed affect their health.

This paper represents an initial examination of the extent and character of the Hidden Fraction population. We base the analysis on data from Household Income and Labour Dynamics in Australia (HILDA) survey, an ongoing panel dataset that is representative across Australia. Since 2001, the HILDA dataset has collected income, housing, health and wellbeing information from household members aged 15 years and over, using face-to-face interviews and self-completion questionnaires. We focus on dwelling condition classification and relate this to individual characteristics to develop an initial profile of who in Australia lives in poor quality dwellings and how prevalent those dwellings are. We aim overall to work towards the identification and description of a Hidden Fraction in Australian housing, and consequently, to make an argument for further work to understand the means by which housing condition affects health in Australia for these sub-cohorts, and the interventions required to improve their specific health outcomes in the Australian context.

2. Dwelling condition and health in Australia – a brief summary of the literature

Internationally, there is a well-developed literature linking poor quality housing to a number of health consequences, across and beyond, respiratory illness (for example, Bonnefoy et al., 2003), mental and physical health (for example, Howden-Chapman & Wilson, 2000), cardiovascular disease (for example, Clinch & Healy, 2000) and obesity (for example, Schoeppe & Braubach, 2007). This research area is also one of current advance, with a number of high quality and recent intervention studies being undertaken (as noted by Thomson et al., 2009).

A 2011 overview of systematic reviews highlights the fact that among health related interventions targeted to improving internal dwelling quality, “warmth and energy efficiency seemed to have the clearest positive impacts on health” (Gibson et al., 2011, p. 181). Across the work they reviewed, dwelling characteristics were shown to affect outcomes across general health, respiratory health, and mental health. An earlier systematic review (Thomson et al., 2009) of the health impacts of housing improvement showed that there was convincing evidence across a number of studies that housing quality-focused interventions could result in health improvements. Further, Thomson et al. suggest that interventions to target warmth were likely to be the most effective types of housing intervention to bring about improvement in individual health. These findings are also reflected in other primary studies. One UK based study (Evans, Hyndman, Stewart-Brown, Smith and Petersen, 2000), suggested that damp and cold were key housing factors associated with a ‘majority of health outcomes’, and further, that damp and cold were likely to interact. Similarly, a 2010 (Free, Howden-Chapman, Pierse, Viggers et al.) New Zealand study found that warming (importantly using non-polluting home heating) the homes of children with asthma improved child health, when measured by reduced days absent from school. Another, similar UK study is reported by Lloyd, McCormack, McKeever and Syme (2008). This intervention study looked at the effect of improving the thermal quality of cold housing, and found marked improvements across blood pressure; self assessed health and respiratory health. A further UK intervention study (Barton, Basham, et al., 2007) found statistically significant respiratory improvements (both asthma and non-asthma related) in an intervention group.

Alongside respiratory health, mental health appears to be the second major grouping of health outcomes. Such findings are shown in a number of studies. A major review of evidence of the relationship between housing and mental health undertaken by Evans, Wells and Moch (2003) finds substantial evidence across a large number of studies (38) that the “overall quality of the housing environment” may influence mental health. Among the studies presented in this review, health effects included ‘emotional distress’, mental health, anxiety and depression. These findings are well supported in other studies. Similarly, a Canadian study (Gifford and Lacombe, 2006) found significant association between the physical quality of the dwelling, and children’s ‘socioemotional’ health. This supported the findings of another earlier study (Evans, Saltzman and Cooperman, 2001) that found “children living in lower-quality housing, independent of household income, have greater symptoms of psychological distress” (p. 394).

It should be additionally noted that there is also a large literature relating the health outcomes of individuals and populations to processes that are indirectly related to the physical quality of the dwelling, for example, housing tenure (Smith, Easterlow & Munro, 2004; Pollack, Grinnin and Lynch 2010), housing instability (Suglia, 2011), neighborhood quality (Stafford, Chandola & Marmot, 2007; Acevedo-Garcia et al., 2004), ontological security (Macintyre et al., 2001), or access to employment opportunities (Phibbs, 2002). Such, so called, ‘non-physical’ housing influences are closely tied to physical dwelling conditions and have been shown to affect health and wellbeing in a number of important ways, such as through poorer mental health, food insecurity, lower educational achievement, participation in risky health behaviors such as smoking. Finally, across all of the means by which housing may affect the health and wellbeing of individuals, housing affordability is central – affecting health directly (for example, Baker et al., 2013; Bentley et al., 2011; Shaw et al., 1999; Taylor et al., 2007; Ford and Burrows, 1999; Kirkpatrick and Tarasuk, 2011), as well as dictating the adequacy (for example tenure, condition, location, security, suitability) of housing that individuals can obtain.

This summary of international findings, though preparatory, shows the important influence of housing conditions on individual health, especially across general, respiratory, and mental health. Of importance to this paper is the fact that very few studies examining this pathway have been undertaken in the Australian context. In fact, as discussed in the Introduction, there is a significant absence of Australian literature and related evidence on the relationship between housing conditions and health for the non-Indigenous population (we note that the great majority of Australian work focuses on the very real and well acknowledged housing problems for the Indigenous population, for example Pholeros, 1993; Shepherd et al., 2012; Torzillo et al., 2012).

In reflecting the very limited (as also acknowledged by Phibbs and Thompson, 2011) Australian evidence base (focused on the non-Indigenous population), among the few peer-reviewed studies we find - evidence of a relationship between external dwelling condition and child physical health (Dockery et al., 2013, p. 20-1), a spatial relationship between crowding and morbidity (largely due to respiratory diseases) in a major capital city (Beggs and Siciliano, 2001), and the lower health status of individuals in overcrowded dwellings (Waters, 2001). This paper acknowledges this literature gap, and seeks to highlight groups within the Australian context who, in addition to the Indigenous population, live in housing of condition and quality that limits their health.

3. Methods

The approach to the data in this paper is straightforward: we use charts, and two-way cross-tabulations with statistical tests for random distribution (using the standard likelihood ratio chi-squared statistic for which we report the probability level of the joint distribution being random) across categories of dwelling conditions and other socio-demographic measures (in work that will follow we will extend the sophistication of the empirical analysis). (All charts and tables are constructed from the HILDA by the authors.)

4. Describing the data

We use the 6 of the 11 waves of the HILDA Survey collected annually from 2001 to the current 2011 wave. Specifically, dwelling condition is collected in waves 1 to 5 and in wave 11 (but excluded in waves 6 to 10).

We note that dwelling condition in this survey was assessed by each survey collector, who was required to rank dwelling quality on a five-point scale. We acknowledge that this categorization may result in some measurement error—the data are, by definition, subjective views of the individual surveyors.

Because the assessment of dwelling condition is subjective (see above) these data are not ideal. Nonetheless, the HILDA data has a number of features, which make it attractive; first, it is collected over several waves or years and so it is possible to track individuals across time. Second it is designed to be representative of the Australian population living outside remote areas. Third, it has an internationally competitive high retention rate, and fourth non-response and attrition are dealt with using sample weights. In summary it is a high-quality, representative sample of the Australian population (Richardson, 2013).

4.1 Dwellings

Table 1 summarises the pooled sample of housing condition data, the great majority of dwellings were classified as being in 'Good-to-Excellent' condition, a quarter were classified as being in 'Average' condition, and just over 5 per cent were classified as being in 'Poor-to-Derelict' condition. The pattern varied little over time (not shown). Of key importance, the proportion of dwellings classified in this sample

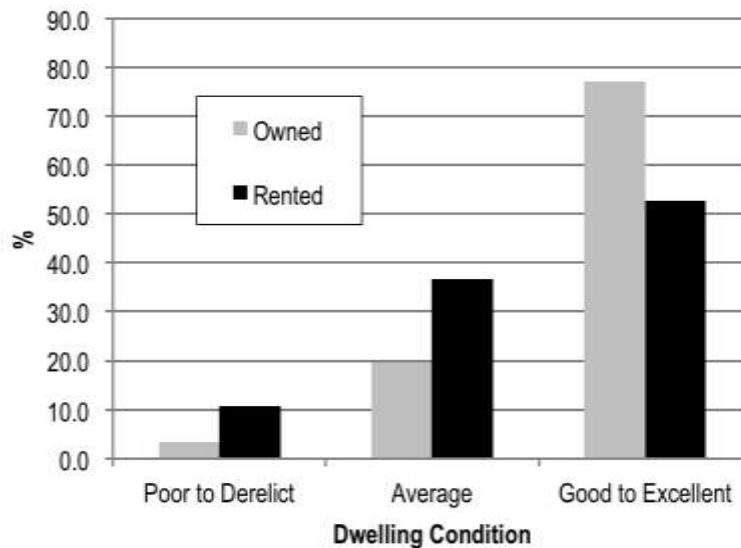
as Poor-to-Derelict numbers 5006, but once weighted we estimate that this 5.3 per cent of all dwellings translates to just under one million Australians.

Table 1: Dwelling Condition Frequencies

Condition rating	n=	Per cent
Good to excellent	66,248	70.3
Average	22,926	24.3
Poor to Derelict	5006	5.3
		100

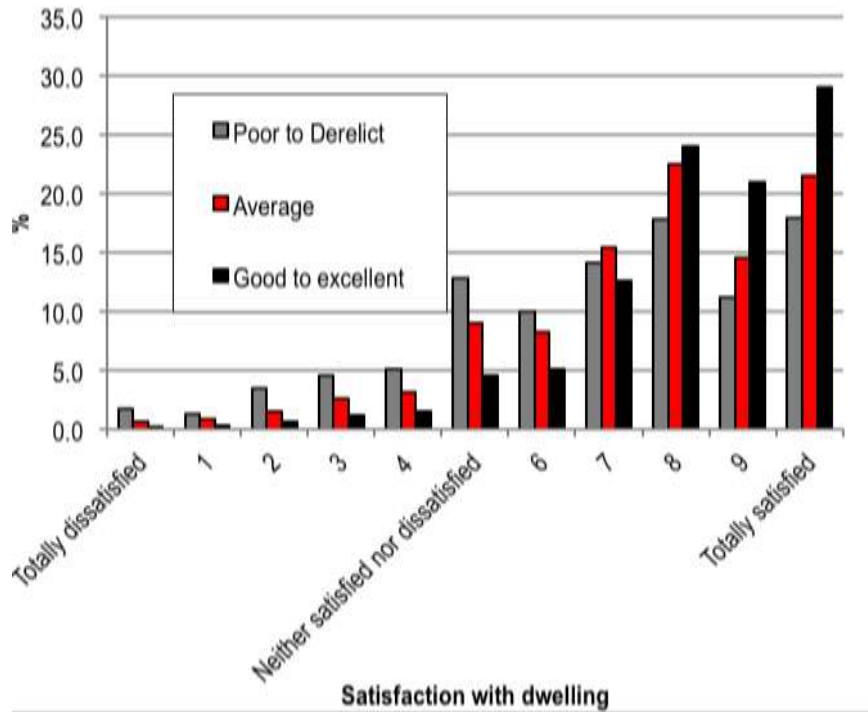
Dwelling condition is clearly associated with tenure (Figure 1). Though 77 per cent of privately owned dwellings were classified as being in Good-to-Excellent condition, a much smaller proportion (52 per cent) of rental dwellings are rated as Good-to-Excellent. Similarly, rented dwellings were much more likely to be rated as Average than owned dwellings. Finally, more than one in ten rented dwellings were classified as Poor-to-Derelict, substantially higher than the 3 per cent of owned dwellings. The probability that the distribution of dwelling condition across tenure type, as demonstrated in Figure 1, is random can be rejected at the $p=0.000$ level.

Figure 1: Tenure by Dwelling Condition



Examining dwelling satisfaction (shown in Figure 2), unsurprisingly, individuals in Poor-to-Derelict condition dwellings are much more likely than individuals in Good-to-Excellent condition dwellings to be dissatisfied with their dwelling (p -value 0.000). What is interesting, however, is the fact that the majority of individuals in Poor-to-Derelict dwellings are satisfied with their housing.

Figure 2: Dwelling satisfaction by Dwelling condition



4.2 Population

There are clear differences across the resident age profile of dwellings of the three condition types. First, individuals are less likely to live in Poor-to-Derelict and Average dwelling types with increasing age (Table 2a, p-value 0.000).

Table 2a: Age cohort by Dwelling Condition, per cent (column)

Age	Poor to Derelict	Average	Good to excellent
15-24	22	20	16
25-34	20	20	16
35-44	20	21	20
45-54	16	16	18
55-64	11	11	14
65+	11	12	16
Total	100	100	100

Second, there is a gradual migration from poorer to better housing as people age (Table 2b, p-value 0.000).

Table 2b: Age cohort by Dwelling Condition, per cent (row)

Age	Poor to Derelict	Average	Good to excellent	Total
15-24	6.4	27.6	66.0	100
25-34	6.0	28.1	65.9	100
35-44	5.0	24.4	70.6	100
45-54	4.5	22.4	73.1	100
55-64	4.2	19.8	76.0	100
65+	3.5	19.5	77.0	100
Total	5.0	23.9	71.1	100

While just over five per cent of the dwellings in this analysis were classified being in Poor-to-Derelict condition, the data described below (Table 3, p-value 0.000) show a concentration of individuals with specific population characteristics within them. Individuals with a disability or long-term health condition, for example, are much less likely than the broader population to live in housing classified as good to excellent. Similarly, individuals with a disability or long-term health condition are almost twice as likely to reside in Poor-to-Derelict housing.

Table 3: Condition rating by Long term Disability or Health Condition, Proportion

Condition rating	No Disability/Health Condition	Disability/Health Condition
Poor to Derelict	4.9	6.9
Average	23.9	26.0
Good to Excellent	71.2	67.1
Total	100	100

There is a strong relationship between income decile and dwelling condition (Figure 3, p-value 0.000). Individuals with higher incomes are more likely to live in better condition dwellings. Most interesting in this figure is that fact that it appears not entirely income dependent – that is, high-income people live in very poor quality dwellings, and many low-income people (in fact the majority) live in very good quality dwellings.

Figure 3: Income Decile by Dwelling condition

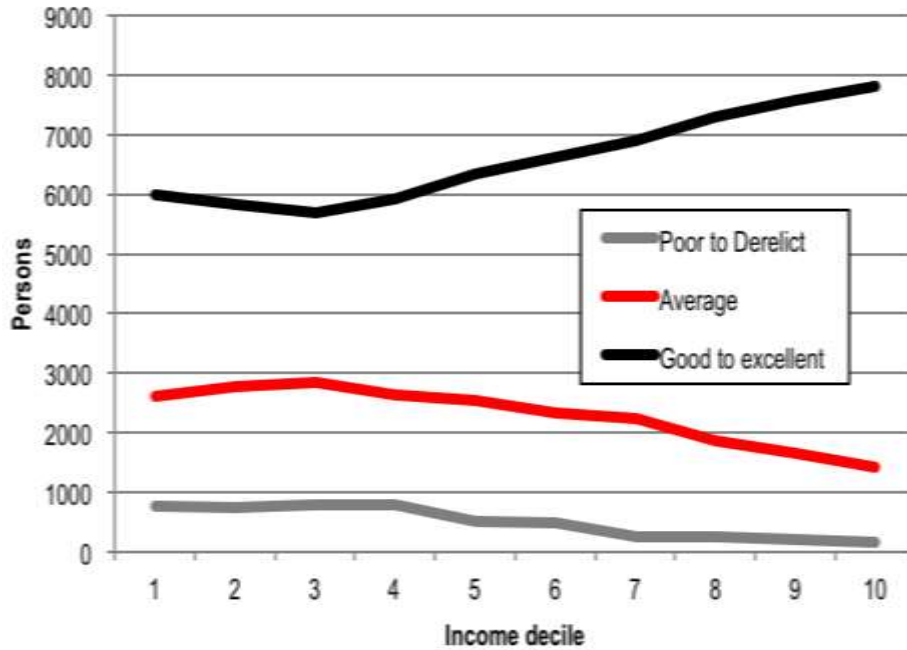
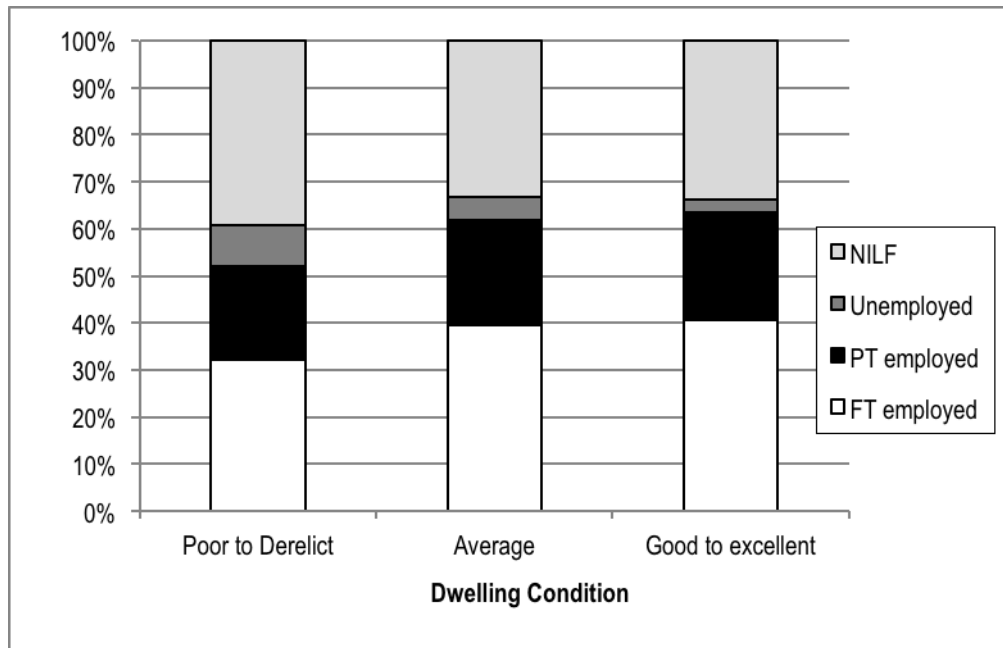


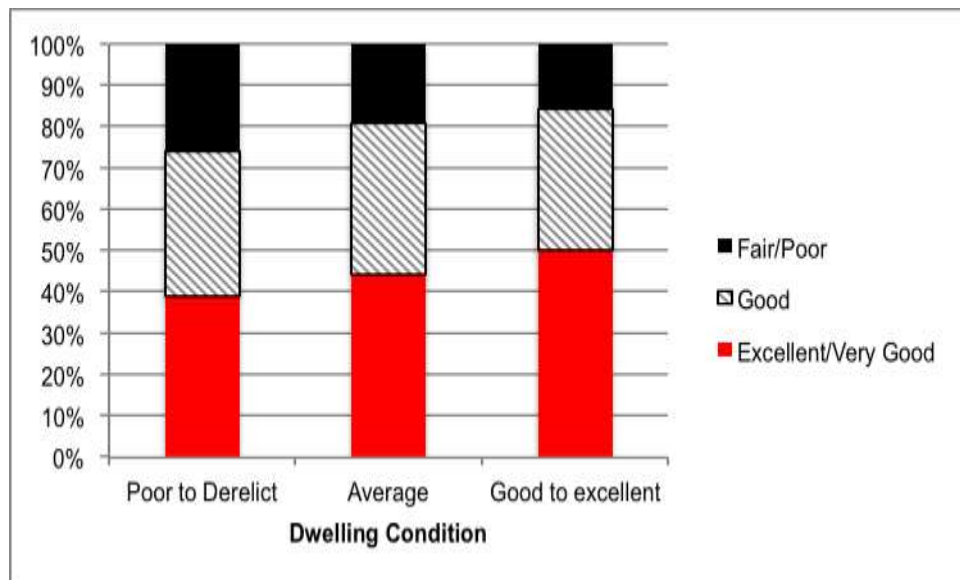
Figure 4 details the labour force status of individuals by their housing condition. We consider labour force status in four categories: Unemployed, employed part-time (working less than 37 hours per week), employed full-time (working at least 37 hours per week) and not in the labour force—not employed and not unemployed (NILF). It shows that those resident in Poor-to-Derelict dwellings are substantially more likely to be unemployed or NILF, and correspondingly, much less likely to hold full time employment, than those residing in dwellings rated as Good-to-Excellent. This finding suggests that there is a relationship between the incidence of poor quality housing and non-participation in the labour force (p-value 0.000).

Figure 4: Labour force status by Dwelling Condition



The health of individuals within each dwelling condition type also appears to vary (Figure 5, p-value 0.000). More than one quarter of the population resident in poor to derelict dwellings regard themselves as having fair or poor health. This proportion is much larger than among those residing in Good-to-Excellent dwellings (16 per cent). While there is a gradient, it is also important to note that a large proportion of people who live in derelict housing also rate their health as Good/Very good/Excellent.

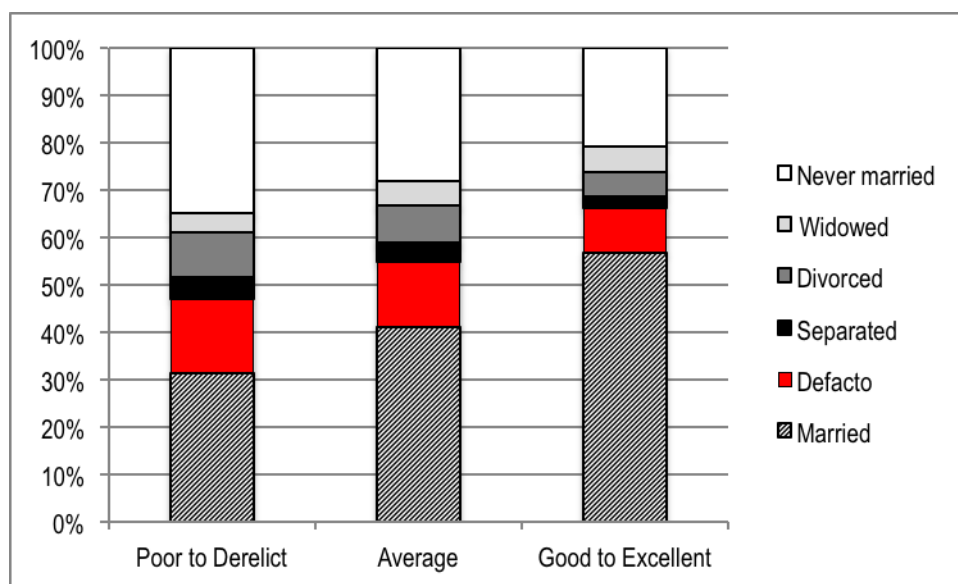
Figure 5: Self-rated General Health by Dwelling Condition



Considering marital status (Figure 6, p-value 0.000) there is a clear difference in the population profiles across the three housing condition types. Married individuals dominate (57 per cent) the population in

housing described as Good-to-Excellent, followed by the never married population (21 per cent). This pattern is reversed in the dwelling stock described as Poor-to-Derelict, where 35 per cent were never married, and just 31 per cent were married. We suggest a possible gender relationship here, with age also having an impact. Both young households and old households may well occupy the worst housing, but not having married is clearly a risk factor. In part this ties in with what we know from previous work on housing careers (Beer and Faulkner 2011) where marriage and the arrival of children has a long-term stabilising impact on housing circumstances.

Figure 6: Marital Status by Dwelling condition



One of the most extreme population variations is shown in Table 4. Strikingly, less than half of Indigenous persons reside in dwelling classified as Good-to-Excellent (p-value 0.000). This compares to 71 per cent in the non-Indigenous population. Considering the proportion of each of these populations living in Poor-to-Derelict dwellings, Indigenous individuals are three times more likely than non-Indigenous individuals to reside in Poor-to-Derelict dwellings. We note the relatively small numbers of Indigenous individuals in the sample (pooled sample, n=1,304), and the fact that Indigenous individuals contribute 1.4 per cent of the analytical sample (which is less than the 2.5 per cent which would be required to be mirror this group in the Australian population). Missing data and undercounting for Indigenous persons is documented for this dataset, and is related to the difficulties, such as including individuals who live in very remote areas, and the higher likelihood of Indigenous persons being in insecure accommodation (which is more difficult to survey). We report these findings because they are indicative of even greater dwelling condition inequity that would be likely to be found in a sample that more fully captured Indigenous persons.

Table 4: Indigenous Status by dwelling condition, per cent.

	Poor to Derelict	Average	Good to excellent
Non Indigenous (n= 92,876)	5.15	24.18	70.68
Indigenous (n=1,304)	17.25	36.27	46.47

4. Concluding discussion

These preliminary findings clearly show a sizeable and policy-important cohort of Australians who live in poor condition dwellings. Almost one million live in housing categorised as being of poor to derelict quality. Importantly, while Indigenous Australians are over-represented in this group, they are not the majority of affected households. There has been a long-standing debate in Australia about the quality of the housing stock and the apparent benign impact it exerts of the health of Australians (Waters 2001). This paper, and the findings it presents, suggests that this interpretation may not represent a full picture. There is clear evidence that there is a substantial population of poor quality housing in Australia. The fact that previous research has not been able to identify an influence on health suggests a number of

possibilities: previous research may have been limited in its analytical techniques, or it may not have had access to appropriate data. It is also possible that the mild climatic conditions in Australia result in no significant health penalty as a consequence of adverse housing. In that sense, it could be argued that it is the climate that is the health promoting resource, not the housing. Poor quality housing might also be considered in terms of cultural and social capital. Living in a derelict house is likely to have social implications and be a barrier to accessing some social resources in the community. Further, this simple descriptive analysis of population characteristics supports our supposition shows those living in our worst housing have many characteristics that predispose them to other types of social disadvantage. In addition, and of importance for a potential consideration of the health impacts of poor quality housing in Australia, it is notable that those with the poorest existing health have an above average likelihood of also inhabiting housing that may further contribute to their poor health.

Finally, we can only speculate that for non Indigenous Australians living in poor quality or derelict housing is associated with particular stages in the life course – potentially younger age and old age. The data presented in this paper are suggestive rather than predictive, but the high percentage (25 per cent) of never married persons in Poor-to-Derelict housing indicates individuals pre marriage and child rearing, as well as older persons, are predominantly women. There is a well-established literature on the feminisation of poverty, and the available evidence suggests that living in poor quality housing has been feminised also.

Overall this paper, though presenting unsurprising findings, establishes a gap in a highly context-dependent literature. We have established that there is a relatively sizeable population (hidden fraction) who live in poor condition dwellings in Australia, but currently we know little of the context specific mechanisms by which their housing may cause health effects. The international literature and evidence base will be important in directing this research, but cannot be unthinkingly applied.

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