

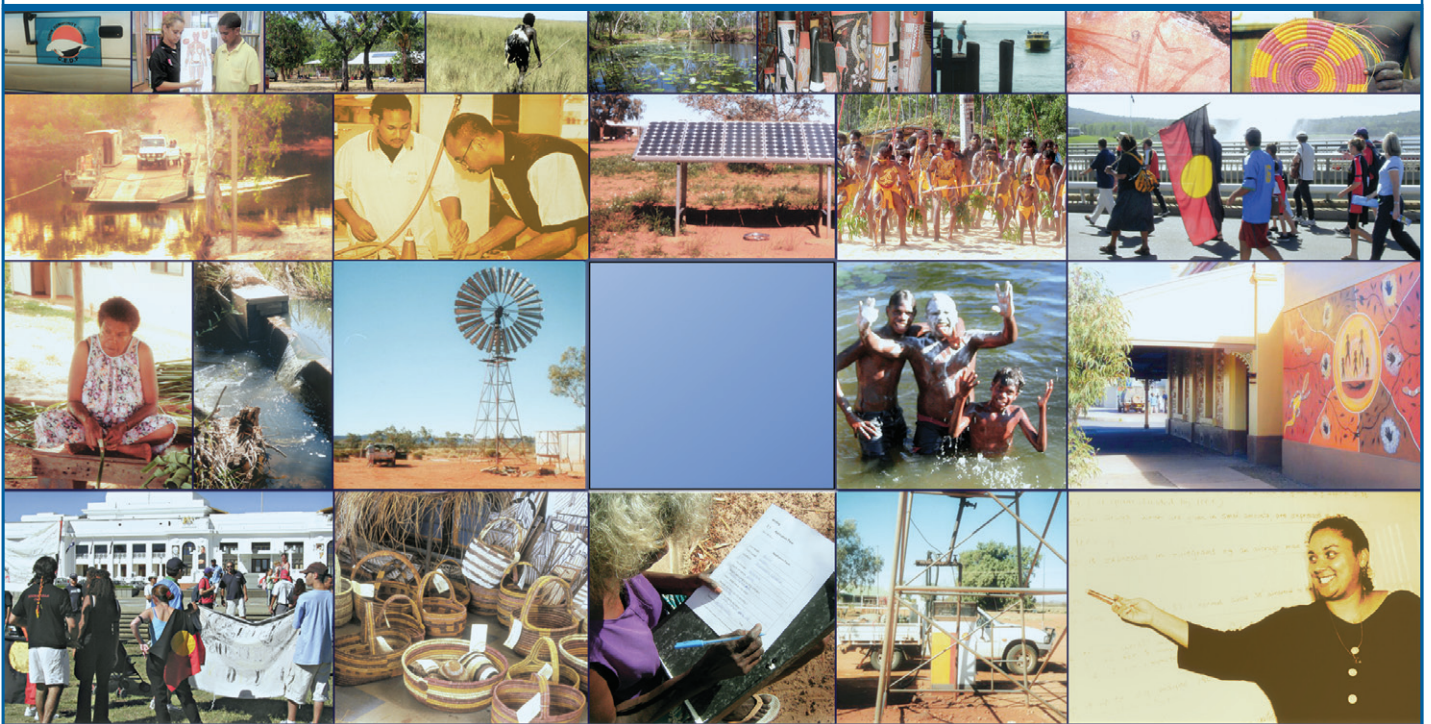
CENTRE FOR ABORIGINAL ECONOMIC  
POLICY RESEARCH



# An Exploratory Analysis of the Longitudinal Survey of Indigenous Children

N. Biddle

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# An Exploratory Analysis of the Longitudinal Survey of Indigenous Children

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## ABSTRACT

The Longitudinal Study of Indigenous Children (LSIC) or *Footprints in Time* is the first large-scale longitudinal survey in Australia to focus on the development of Aboriginal and Torres Strait Islander (Indigenous) children. The analysis presented in this paper is structured around six research questions using the LSIC: the size and composition of Indigenous children's families and households; how key measures of parental wellbeing are associated with family and household structure and how they change through time; the factors associated with different types of early childhood education attendance; how household characteristics vary across the sample and how they change through time; how self-reported measures of the quality of the community in which a person lives compare with other neighbourhood-level indicators; and how migration is related to self-reported measures of the community and other area-level characteristics. The conclusions from the analysis in this paper are but a small subset of the insights that will emerge from analysis of the LSIC as more researchers make use of it and a greater number of waves and variables become available. Ultimately, in addition to ethically conducted randomised controlled trials, longitudinal databases are arguably the most effective source of data for designing evidence-based policy. One of the greatest contributions of the LSIC (and this paper) may be to demonstrate the feasibility and desirability of having such evidence for all Indigenous Australians, not just children.

**Keywords:** Longitudinal Study of Indigenous Children (LSIC), Indigenous children, Indigenous families and households, Indigenous education, Indigenous mobility



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## EXECUTIVE SUMMARY

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### INTRODUCTION

The Longitudinal Study of Indigenous Children (LSIC) or *Footprints in Time* is the first large-scale longitudinal survey in Australia to focus on the development of Aboriginal and Torres Strait Islander (Indigenous) children. The first wave of the survey was carried out between April 2008 and February 2009, and collected information on 1,687 study children and their families. The second wave of data collection commenced in March 2009 and concluded in December 2009. The main objective of the study is to provide quantitative and qualitative data of a high quality that can be used to provide a better insight into how a child's early years affect their development. The analysis presented in this paper is structured around six research questions using the LSIC.

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**LSIC:**  
Longitudinal  
Study of  
Indigenous Children

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### RESEARCH QUESTION 1

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**How does the size and composition of Indigenous children's families and households vary across the LSIC sample and how does it change through time?**

On average, across the sample the number of people in an Indigenous child's household is relatively small. There are, on average, around 2.8 children (including the study child themselves) and around 2.0 adults. However, with a standard deviation of 1.6 and 1.1 respectively, these averages hide significant variation across the sample, with household size larger in more isolated parts of the country.

A significant proportion of Indigenous children live in households with at least one non-Indigenous resident. For the total sample, around three in 10 children live in such a household. However, in the least isolated areas and those with the most advantaged usual residents, such households represent the majority (with 57% and 59% of households respectively).

There was a large amount of change between the two waves in household demographics. Specifically, 17.3 per cent of Indigenous children were in a household where the number of children increased between the waves, alongside 10.8 per cent where the number decreased. In addition, 13.0 per cent witnessed an increase in the number of adults, and 11.9 per cent a decrease. In a relatively short time period, this is a substantial change. Those living in areas with moderate or high/extreme isolation have higher rates of both increase and decrease in household size, implying a greater rate of population turnover in these areas.

### RESEARCH QUESTION 2

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**How are key measures of carer wellbeing associated with family and household structure, and how do they change through time?**

In order to analyse carer wellbeing, an index was created from the *Strong Souls* questionnaire which measures the strength of people's relationships and general resilience. Those who speak English well have a significantly and substantially higher value on this index than those who only speak on some topics, only speak a few words, or have forgotten what they knew. According to data from the LSIC, greater self-assessed English language ability is positively associated with subjective wellbeing. Financial stress rather than income is the more important determinant of wellbeing for Indigenous Australians.

Those carers of Indigenous children who live in relatively disadvantaged areas have significantly and substantially lower index values than those who live in relatively advantaged areas. However, once the socioeconomic characteristics of the area have been controlled for, those who live in relatively isolated areas have stronger relationships and greater self-reported resilience.



A separate index was also created measuring the absence of negative emotional wellbeing. Those carers of Indigenous children who are themselves relatively young (aged 15–19 years) or relatively old (aged 30 years or over) have lower levels of emotional wellbeing than those aged 20–29 years. Those who report that they spend more money than they receive in income also have lower levels of subjective wellbeing, as do those who live in a dwelling that has major things that need fixing. It is financial stress or not being able to meet basic needs that affect wellbeing, rather than income itself. Unlike the variables in the *Strong Souls* questionnaire, the measures of social and emotional wellbeing did not vary by the socioeconomic status of the area or by relative isolation.

One of the benefits of using the LSIC to study subjective wellbeing is the ability to examine how the measures change through time and, potentially, some of the determinants in changes in subjective wellbeing. Indeed, the LSIC is the only dataset in Australia that has longitudinal information on a large sample of Indigenous adults. There was substantial change between waves in the index value derived from the factor analysis of the social and emotional wellbeing questions. Although high/low emotional wellbeing in one year is associated with high/low wellbeing in the subsequent year, there is scope for changes in individual circumstances or other external factors to influence wellbeing.

An analysis of the factors associated with the change in an individual's social and emotional wellbeing did not find any association with the standard measures of individual wellbeing. Changes in household count, student status, employment status, income, usual residents, socioeconomic characteristics of the area, isolation and self-assessed health were not found to be statistically significant. However, a number of life events were found to have a significant association with changes in the index of social and emotional wellbeing.

Of the 15 life events covered in the LSIC, 12 had a statistically significant association, with changes in social and emotional wellbeing showing that a range of life events had the potential to affect subjective wellbeing. The life event with the greatest negative association was the family having serious worries about money. Other variables that had a large association were family break-up, family arguments, alcohol or drug problems, children being scared by other people's behaviour, crime victimisation, and being asked for money. Not all major life events were associated with changes in wellbeing. Neither pregnancy, nor commencing work or study, nor children being cared for by others, were associated with changes in social and emotional wellbeing.

### RESEARCH QUESTION 3

#### What are the factors associated with different types of early childhood education attendance?

Going to cultural events and identifying with a tribal group, a language group or clan were both associated with higher rates of participation in early childhood education. It would seem that attendance at preschool and maintenance of Indigenous culture are not mutually exclusive. Those children who have lived in two or more homes since birth are significantly less likely to be participating in preschool than those who had lived in the same household since birth. This implies that disruption from changing households can have a negative effect on early childhood education. The areas that are identified as having the highest level of participation are those in the second and third quartile in terms of socioeconomic disadvantage.

Perhaps the most policy-relevant finding with regards to preschool is that those children who have a carer who felt they were discriminated against because of their Indigenous status are significantly less likely to be attending preschool. Formal, mainstream education has the potential to be alienating for Indigenous students and their families and the analysis presented in this paper gives circumstantial evidence that ongoing discrimination is a further cause of disengagement from formal education.



#### RESEARCH QUESTION 4

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##### **How do household characteristics vary across the sample and how do they change through time?**

Those who lived in the least isolated areas and areas with the most advantaged usual residents had a greater number of bedrooms per usual resident, and were less likely to identify that the house needed major repairs. Those dwellings with the least amount of overcrowding and the least likelihood of needing major repair were owned or being purchased by the usual residents. This reflects not only the greater material resources of the types of people who live in these houses, but also the greater incentive to maintain a dwelling that one is likely to make ongoing use of. Compared to owner-occupiers, those dwellings rented from State or Territory agencies had the highest level of overcrowding, whereas those rented from a community organisation had the highest rates of repair needed.

One interesting use of the LSIC is to test whether there are particular factors that are associated with whether or not a person who identified repairs as needing to be done in Wave 1 still identified repairs as needing to be done in Wave 2. Of those who in Wave 1 identified the dwelling as needing major repairs, 44.1 per cent were identified as no longer needing repairs. There was no statistically significant difference in the rate at which repairs had been done by income of the carer. Most importantly, there were no differences by tenure. That is, although those who live in houses rented from the private rental market or from State/Territory or community organisations are more likely to identify repairs needing to be done, they are just as likely to have had those repairs carried out between waves.

#### RESEARCH QUESTION 5

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##### **How do self-reported measures of the quality of the community in which a person lives compare with other neighbourhood-level indicators?**

The LSIC includes three subjective measures of the wellbeing of the community: if the main carer thinks it is a good community or neighbourhood for little kids; if the main carer thinks there are good places for kids to play in the community or neighbourhood; and how safe the main carer would say the community or neighbourhood is. There is significant variation in the subjective measures of community wellbeing by isolation and the socioeconomic status of the area's usual residents. However, this is not always in the expected direction.

The areas with the worst outcomes are not the most isolated, but rather those somewhere in between. That is, large and small regional centres. However, those carers in the areas with the most disadvantaged usual residents tend to report lower levels of community wellbeing than those in the most advantaged areas, and lower levels for 'no places to play' or 'community not safe' than those in the second most disadvantaged quartile of areas.

#### RESEARCH QUESTION 6

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##### **How is migration related to self-reported measure of the community and other area-level characteristics?**

Those carers of Indigenous children who changed usual residence in the year leading up to Wave 1 of the LSIC were more likely to change usual residence again the year (or so) that followed. This may be because having only lived in an area for a short period of time, these carers have fewer ties to the area. That is, it is an indication of chronic movement or previous geographic instability, leading to (or at least being associated with) ongoing instability. The older the carer, the lower the probability of moving, reflecting the lifecourse patterns of migration. Those who lived in mixed Indigenous and non-Indigenous households had higher levels of mobility than those who lived in Indigenous-only households, confirming the invalidity of assuming Indigenous Australians are always more mobile than their non-Indigenous counterparts.

It would appear that the characteristics of an individual's dwelling is a more important factor in explaining population movement than the characteristics of the area in which an individual lives. Those Indigenous children/carers who live in a house rented from a private landlord are significantly and substantially more likely to move in the subsequent year than those who live in a house owned or being purchased by its residents. Those who live in a house rented from a State/Territory or a community housing organisation are slightly more likely to move than those in owner-occupied dwellings, but they are less likely to move than those in the private rental market. This shows that community and government housing puts a brake on Indigenous mobility relative to the private rental market. Those who live in a household that has less than one bedroom per person are more likely to change usual residence than those who do not, showing the potential effect of overcrowding on the motivation to move.

### GENERAL CONCLUSION

A recurring theme from the paper is the ability of longitudinal data like the LSIC to provide answers to a range of policy-relevant questions that could not be answered using cross-sectional databases. With such a large focus on Indigenous policy in Australia and considerable resources devoted to improving the wellbeing of the Indigenous population, all levels of government should be steadfastly committed to doing so in the most effective, efficient and equitable way possible. In addition to ethically conducted randomised controlled trials, longitudinal databases are arguably the most effective way to design policy that meets these three aims. One of the greatest contributions of the LSIC may be to demonstrate the feasibility and desirability of having such evidence for all Indigenous Australians, not just children or their carers.

## INTRODUCTION AND OVERVIEW

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It is almost a truism to say that what happens in childhood effects the rest of a person's life. The environment in which a child grows up influences their potential experience of poverty and social exclusion (Héroult & Kalb 2009). However, families may also provide a protective factor, enhancing emotional strength and wellbeing. Resnick, Harris and Blum (1993), for example, showed that family connectedness had the greatest association with positive behaviour amongst children and adolescents, dominating both socioeconomic status and family demographics.

A child's early years are also crucial in determining future educational options and constraints. This means that investment by governments in the early years of schooling can have very large returns, partly because early investment raises the productivity or effectiveness of later investment (Cunha et al. 2006). Biddle and Cameron (2011: 23) showed that Indigenous Australians 'are no more likely to drop out of school once other ability (self-assessed and measured through test scores), happiness at school, hours worked and expectations [at the age of 15] are controlled for'. In terms of meeting the Council of Australian Governments' (COAG's) Closing the Gap target of halving the gap in Year 12 attainment between Indigenous and non-Indigenous Australians, it is early school and early childhood experiences that will be of greatest importance.

There are five specific reasons to study the particular characteristics of Indigenous childhood. First, Indigenous Australians have unique cultural traits that lead to different responsibilities being placed on Indigenous children, with life stage rather than chronological age often being of greater importance in defining these roles (Taylor 2009).

A second reason to study the outcomes of Indigenous children is that the Indigenous population has a relatively young age profile, meaning that there is a much greater proportion of the population currently in their childhood, adolescence and young adulthood (Australian Bureau of Statistics (ABS) 2008). The outcomes of Indigenous children will therefore have a much greater influence on overall wellbeing than they would for other population groups. This age distribution is summarised in the age pyramid shown in Fig. 1, which gives the proportion of Indigenous and non-Indigenous males and females in each five-year age cohort. According to estimates based on the 2006 Census, around 12.5 per cent (or one in eight) Indigenous Australians were aged under 5 years. A similar percentage were in each of the next two 5-year age cohorts, compared to 6.2 per cent of non-Indigenous Australians aged 0–4 years, 6.3 per cent aged 5–9 years and 6.6 per cent aged 10–14 years. Putting this another way, although Indigenous Australians make up only 2.5 per cent of the total Australian population, this rises to 4.9 per cent of the Australian population aged under 5.

Across most standard socioeconomic indicators, the Indigenous population does relatively poorly compared to the non-Indigenous population. Using data from the 2006 Census once again, by the age of 20–24 years, 36.0 per cent of Indigenous Australians (who were not still at school) had completed Year 12, compared to 74.5 per cent of non-Indigenous Australians. For all education types, 34.5 per cent of Indigenous 15–24 year olds were undertaking education, compared to 55.3 per cent of non-Indigenous young adults.

Extending even further across the lifecourse, 46.1 per cent of the Indigenous population 15 years and over were employed, compared to 61.7 per cent of the non-Indigenous population. The unemployment rate for Indigenous Australians was 15.5 per cent compared to 5.0 per cent for the non-Indigenous population. Finally, median income for those who were employed was \$521 for the Indigenous population and \$723 for the non-Indigenous population. Understanding the extent to which this socioeconomic disadvantage

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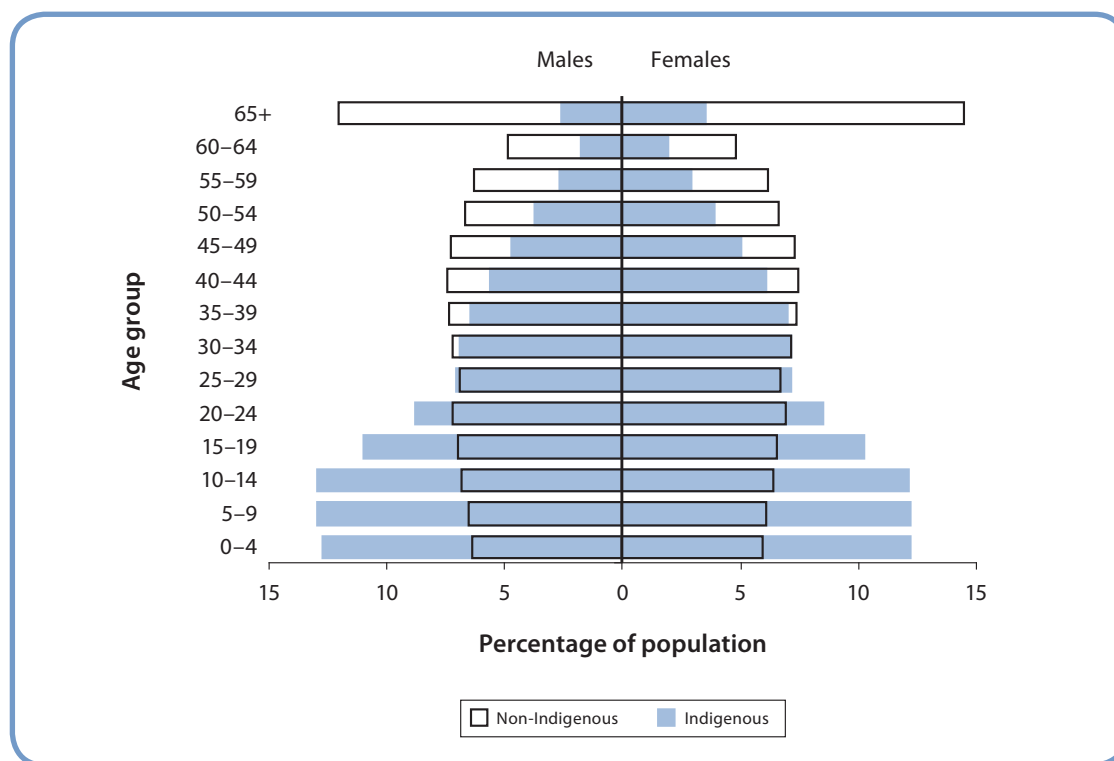
**COAG:**  
Council of  
Australian  
Governments

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**ABS:**  
Australian Bureau  
of Statistics

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**Fig. 1. Age distribution of Indigenous and non-Indigenous Australians, 2006**

Source: ABS (2008).

is passed on to Indigenous children (and designing policies to minimise it) is the third reason to study the outcomes of Indigenous children.

Although not completely understood (and often hotly debated), it is generally accepted that some of the reasons for this socioeconomic disadvantage are historical. That is, past government policies like removal of children from their natural families, exclusion from full citizenship rights and dispossession of lands have led to current socioeconomic disadvantage. Whether well intentioned or not, previous policies are still having ongoing effects, and therefore the state has additional responsibilities to ensure that Indigenous children have as good a start to their life as possible—the fourth reason for analysing Indigenous child outcomes separately.

The fifth and final reason is that there is a relative lack of quantitative research on the way in which Indigenous children grow and progress throughout their childhood and into adolescence. It is reasonable to suspect that the socioeconomic disadvantage faced by their parents will hamper the life chances of Indigenous children. However, we don't know the extent of this, nor do we know in which domains socioeconomic status is of greatest importance. Furthermore, we may suspect that living in remote or regional Australia (as more Indigenous children do, relative to the non-Indigenous population) can have some disadvantages, but we do not know whether these disadvantages are temporary or long-term. We also cannot reject the possibility that there are also advantages for Indigenous children growing up in particular remote areas—not only in terms of cultural maintenance, but also in terms of health or exposure to crime and violence.

Ultimately, we know very little about the protective factors that shield Indigenous children from the negative aspects of their circumstances and allow them to live the types of lives that they and their family

would value. One of the main reasons for this is the lack of data. A large and important literature has developed around the study of the outcomes of Indigenous children using cross-sectional data. However, this research does not give any indication of how outcomes change over time. Furthermore, it is not possible with this data to identify causal relationships.

## DATA AND RESEARCH QUESTIONS

The Longitudinal Study of Indigenous Children (LSIC) or *Footprints in Time* is the first large-scale longitudinal survey in Australia to focus on the development of Aboriginal and Torres Islander (Indigenous) children. The first wave of the survey was carried out between April 2008 and February 2009, and collected information on 1,687 study children and their families. The second wave of data collection commenced in March 2009 and concluded in December 2009. A further two waves of data collection are planned with Wave 3 carried out between March and November 2010 and Wave 4 carried out between March and November 2011.

The main objective of the study is to provide high quality quantitative and qualitative data that can be used to provide a better insight into how a child's early years affect their development. Specifically, *Footprints in Time* has four key research questions (Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) 2009b):

- What do Aboriginal and Torres Strait Islander children need to have the best start in life to grow up strong?
- What helps Aboriginal and Torres Strait Islander children to stay on track or get them to become healthier, more positive and strong?
- How are Aboriginal and Torres Strait Islander children raised?
- What is the importance of family, extended family and community in the early years of life and when growing up?

Data from the first two waves of the LSIC are now being made available to researchers. Although there has been very little published thus far, it is expected that the LSIC will provide unique insights into a range of policy questions. With this in mind, the analysis summarised in this paper will focus on two sets of research questions. The first set will focus on child outcomes and household structure. The second set will focus on a number of housing and community indicators. Specific research questions are as follows:

### Child outcomes and household structure

1. How does the size and composition of Indigenous children's families and households vary across the LSIC sample and how does it change through time?
2. How are key measures of carer wellbeing associated with family and household structure and how do they change through time?
3. What are the factors associated with different types of early childhood education attendance?

### Housing and community indicators

4. How do household characteristics vary across the sample and how do they change through time?
5. How do self-reported measures of the quality of the community in which a person lives compare with other neighbourhood level indicators?

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**LSIC:**  
Longitudinal Study  
of Indigenous  
Children

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**FaHCSIA:**  
Department of  
Families, Housing,  
Community  
Services and  
Indigenous Affairs

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6. How is migration related to self-reported measure of the community and other area-level characteristics?

To analyse these research questions, a range of methodologies will be used. The analysis will begin with the presentation of a wide range of summary statistics. Having established the distribution of key variables of interest, more sophisticated statistical techniques will then be employed, including multiple regression analysis. These techniques allow a researcher to look at the relationship between a particular variable of interest (e.g. early childhood education) and a range of other explanatory variables (e.g. family/household structure) whilst holding constant other potentially confounding variables (e.g. age, sex, household income).

One focus of analysis will be the relationship between the characteristics of the area in which a child lives and their outcomes, or those of their family/household. Much of the focus on area-level outcomes for the Indigenous population has tended to look at the impact of remoteness or geographic isolation. While this is important (and will be a feature of the analysis in this paper), remoteness is only one aspect of where a child lives. Potentially as important are the socioeconomic characteristics of those Indigenous and non-Indigenous Australians who live in the area—it is socioeconomic characteristics rather than remoteness that are likely to influence the developments of social norms and values, as well as the characteristics of a child's peers. In addition to remoteness, analysis in this paper will therefore use the Index of Relative Indigenous Socioeconomic Outcomes (IRSEO) presented in Biddle (2009b).

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### IRSEO:

Index of Relative  
Indigenous  
Socioeconomic  
Outcomes

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The IRSEO was calculated based on a principal components analysis of nine variables from the 2006 Census—three related to employment, three related to education, two related to housing and one related to income. It is calculated at the Indigenous Area level, the middle geographic level in the Australian Indigenous Geographic Classification. Unlike the similar and better known Socioeconomic Indexes for Areas, the IRSEO is calculated specifically for Indigenous Australians. It is linked to the individual data on the LSIC based on the Indigenous Area of usual residence.<sup>1</sup>

## INDIGENOUS CHILD AND FAMILY OUTCOMES—EVIDENCE FROM CROSS-SECTIONAL DATA

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There is much insight that can be gained from cross-sectional data collections that include Indigenous children in the sample. While this insight tends to be descriptive, it does paint a picture of the circumstances under which Indigenous children grow up. There are five main sources of quantitative, cross-sectional data on Indigenous children, each with their own strengths and weaknesses. These are outlined below, with a number of key findings from the surveys presented at the end of this section.

### THE CENSUS OF POPULATION AND HOUSING

The aim of the ABS Census of Population and Housing is to collect a range of demographic and socioeconomic information on the entire population of Australia at a particular point in time. The most recent census was carried out on 9 August 2011.

The two major advantages of the census for analysis of Indigenous children are the large sample size and the availability of a non-Indigenous comparison population. Specifically, there were 171,108 Indigenous children aged 0–14 years counted in the 2006 Census, alongside 3,541,603 non-Indigenous children of the same age. Such large samples allow for detailed analysis across a range of demographic and geographic characteristics. A further advantage of the census is the consistency of the questions through time. This allows for the tracking across collections of average outcomes for the population, even if one is not able to track individuals.

The major limitation of the census is the limited availability of wellbeing measures on offer. This is not only true for the population as a whole, but is particularly the case for child outcome measures. Most child outcome measures on the census tend to be based on the characteristics of their household or the area in which they live. Perhaps even more importantly, there are very few Indigenous-specific measures of wellbeing on the census. While things like employment, income and education are important for Indigenous Australians, Indigenous notions of wellbeing tend to be broader and take into account the strength of kinship networks, language and cultural maintenance, attachment to land, and community wellbeing (ABS 2010; Jordan, Bulloch & Buchanan 2010). The census is simply not designed for analysing wellbeing, let alone the wellbeing of Indigenous children.

### THE NATIONAL ABORIGINAL AND TORRES STRAIT ISLANDER SOCIAL SURVEY

Recognising the limitations of the census and other mainstream data collections, the ABS has also carried out a number of social surveys focused specifically on Indigenous Australians. The most recent of these was carried out in 2008, with two previous surveys, one in 2002 and another in 1994.<sup>2</sup> Although it has not been confirmed, it is likely that the next survey will take place in 2014. The 2008 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) was conducted from August 2008 to April 2009, with broad information collected across key areas of social concern for Indigenous Australians. Importantly, there were a number of wellbeing measures collected that were developed specifically for the Indigenous population.

Unlike in 2002, the most recent (2008) NATSISS collected information on children under 15 years. Although the sample was not as large as the census or some other collections, there is information available on 5,484 Indigenous children aged under 15 in the NATSISS—a large enough sample size to undertake reasonably detailed analysis.

The major limitation of the NATSISS is that there is no non-Indigenous sample against which comparisons can be made. Although there was a General Social Survey carried out in 2006 on the total Australian population, this was restricted to respondents aged 18 years and over. It is not always necessary to compare results for Indigenous children with those for non-Indigenous children. In many instances, questions asked of Indigenous children have minimal relevance for non-Indigenous children (for example, Indigenous language use and participation in Indigenous cultural activities). However, there are a number of questions asked of the carers of Indigenous children in the NATSISS that could potentially be benchmarked against non-Indigenous children.

### THE NATIONAL ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH SURVEY

Every three years, the ABS conducts a National Health Survey (NHS), with the most recent survey for which data is available conducted between August 2007 and June 2008.<sup>3</sup> The survey is designed to obtain national benchmarks on a wide range of health issues, and to enable changes in health to be monitored over time. Information in the most recent NHS was collected about the health status of the population; health-related aspects of lifestyle and other health risk factors; and the use of health services and other actions people had recently taken for their health.

While there is information on the NHS for the Indigenous population, sample sizes tend to be reasonably small. However, every second NHS is undertaken concurrently with a with a National Aboriginal and Torres Strait Islander Health Survey (NATSIHS), which collects comparable information on a reasonably large Indigenous sample. When combined with respondents in the NHS, the most recent (2004–05) NATSIHS has information on 10,439 Indigenous Australians, of which 4,114 were aged under 15.

The focus of the NATSIHS is clearly on health outcomes and health determinants. This is reflected in the types of questions asked which, for children, include the presence or absence of long-term conditions,

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**NATSISS:**  
National Aboriginal  
and Torres  
Strait Islander  
Social Survey

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**NHS:**  
National  
Health Survey

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**NATSIHS:**  
National  
Aboriginal and  
Torres Strait  
Islander  
Health Survey

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immunisation status, breastfeeding experience, hospital and other health service usage. However, while there is a range of contextual information for adults including a number of wellbeing measures, there is very little non-health information for children. There is no information on education participation or outcomes, nor is there any information on cultural identification or participation.

#### THE WESTERN AUSTRALIAN ABORIGINAL CHILD HEALTH SURVEY

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#### **WAACHS:** Western Australian Aboriginal Child Health Survey

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Perhaps the most comprehensive survey in Australia on the health and wellbeing of Indigenous children is the Western Australian Aboriginal Child Health Survey (WAACHS). The survey investigated the health of 5,289 Western Australian Aboriginal and Torres Strait Islander children and young people aged 0–17 years. The survey was conducted in 2000–01 by the Telethon Institute for Child Health Research, in conjunction with the Kulunga Research Network.

The breadth and depth of data collected in the WAACHS makes it a highly important set of data with unique insights for Indigenous policy in Australia. Information was collected on: demographic characteristics; physical health; social and emotional wellbeing and its determinants; health risk behaviours; self-esteem; forced separation; school attendance and academic performance; life stress events; use of service; and housing.

The major limitation of the WAACHS is its limited geographic and population coverage. As the survey was only conducted in Western Australia, it is not possible to undertake comparisons with other States or Territories. While many of the insights will be applicable to all Indigenous children, this is not necessarily the case, and is in many ways an untestable hypothesis. Furthermore, there is no non-Indigenous comparison population against which the results can be benchmarked. Finally, results from the WAACHS are becoming a little dated and it is unclear whether there are any plans for future data collections.

#### THE AUSTRALIAN EARLY DEVELOPMENT INDEX

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#### **AEDI:** Australian Early Development Index

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A final set of cross-sectional data on Indigenous children is the Australian Early Development Index (AEDI). Collected for the first time in 2009, the AEDI is based on a checklist completed by the teachers of children in their first year of full-time school. The checklist measures five key areas, or domains, of early childhood development: physical health and wellbeing; social competence; emotional maturity; language and cognitive skills (school-based); and communication skills and general knowledge.

Like the census, the AEDI is designed to be a population collection, with information sought on all children in their first year of full-time school. While coverage is not completely universal, information was collected for 261,203 children (97.5% of the estimated national 5-year-old population). This response rate is substantially higher than that of the population census, reflecting the large amount of resources devoted to the AEDI and, in particular, the support given to the collection by teachers across Australia.

While it was not designed exclusively for Indigenous children, there was considerable effort devoted to ensure the data collected was also useful in an Indigenous context.<sup>4</sup> In total, there was information collected on 12,452 Indigenous children nationwide. Once again, the usefulness of the AEDI is limited somewhat by its narrow population focus. However, for the population in scope, it provides a very rich source of cross-sectional data.

#### CROSS-SECTIONAL EVIDENCE—GEOGRAPHY

Taken together, the five datasets summarised above provide a rich set of information on the circumstances of Indigenous children today. This data is not complete and as mentioned earlier and outlined in more detail below, there are many important research and policy questions that can only be answered using longitudinal data. Nonetheless, it is important to put this longitudinal data into context, especially when

the design of the sample means that it is not completely representative of the entire Indigenous population. The remainder of this section provides this context, beginning with geography.

Indigenous Australians are much more likely to live in remote parts of the country than the non-Indigenous population. For example, according to estimates based on the 2006 Census (ABS 2008), only 3.8 per cent of the total Australian population aged 0–14 years living in non-remote Australia were identified as being Indigenous, compared to 38.3 per cent of the remote population.

This relative concentration of the Indigenous population in remote Australia is well understood and factored into government policy. However, what is often overlooked is that although Indigenous Australians (including Indigenous children) are more likely to live in remote Australia than non-Indigenous Australians, the Indigenous population is still quite urbanised. More than three out of four Indigenous children (76.9%) live in non-remote parts of the country. Indeed, 9.3 per cent of the total Indigenous population aged 14 years and under live in the Brisbane Indigenous Region, with an additional 8.6 per cent living in Sydney.

Another factor that is often overlooked when considering the geographic context of Indigenous children is that even in non-remote areas, Indigenous children are much more likely to live in areas or neighbourhoods where the rest of the population is relatively disadvantaged. Biddle documented this for the total Indigenous population, showing that:

... 38.3 per cent of the Indigenous population are in the most disadvantaged 10 per cent of Collection Districts (CDs) and nearly 60 per cent are in the bottom 25 per cent. Alternatively, only 18.5 per cent of Indigenous Australians were in the most advantaged 50 per cent of CDs (2009b: 16).

The relative distribution is equally true for Indigenous children, showing that geographic context has the potential to contribute to Indigenous child outcomes across Australia, not just in remote parts of the country.

### CROSS-SECTIONAL EVIDENCE—HOUSEHOLD CONTEXT

One of the biggest differences between the situations of Indigenous and non-Indigenous children is the type of household in which they live. Demographically, Indigenous children are much more likely to live in houses with a relatively large number of usual residents (Biddle & Yap 2009). This should not necessarily be seen as a negative outcome, as in many ways it reflects a cultural preference and has the potential to have beneficial outcomes for Indigenous children due to the greater number of kin and family members able to provide care.

Where this large number of usual residents is potentially problematic is when the housing stock that Indigenous children live in is not adequate to service the usual residents. Here, outcomes are worse for Indigenous children, with between 71 and 76 per cent of Indigenous children aged 0–14 years living in a household with more than one person per bedroom, compared to between 59 and 64 per cent of non-Indigenous children (Biddle & Yap 2010). While this is a crude measure of overcrowding and does not take into account household demographics or differences in cultural norms, it is indicative of more sophisticated measures.

Other characteristics of the households of Indigenous children were also shown to vary in Biddle and Yap (2010). Figures 2 and 3 look at the intersection between three characteristics of Indigenous and non-Indigenous children's households—living in a single parent household, living in a household where no one has completed Year 12 and living in a household where no one is employed.

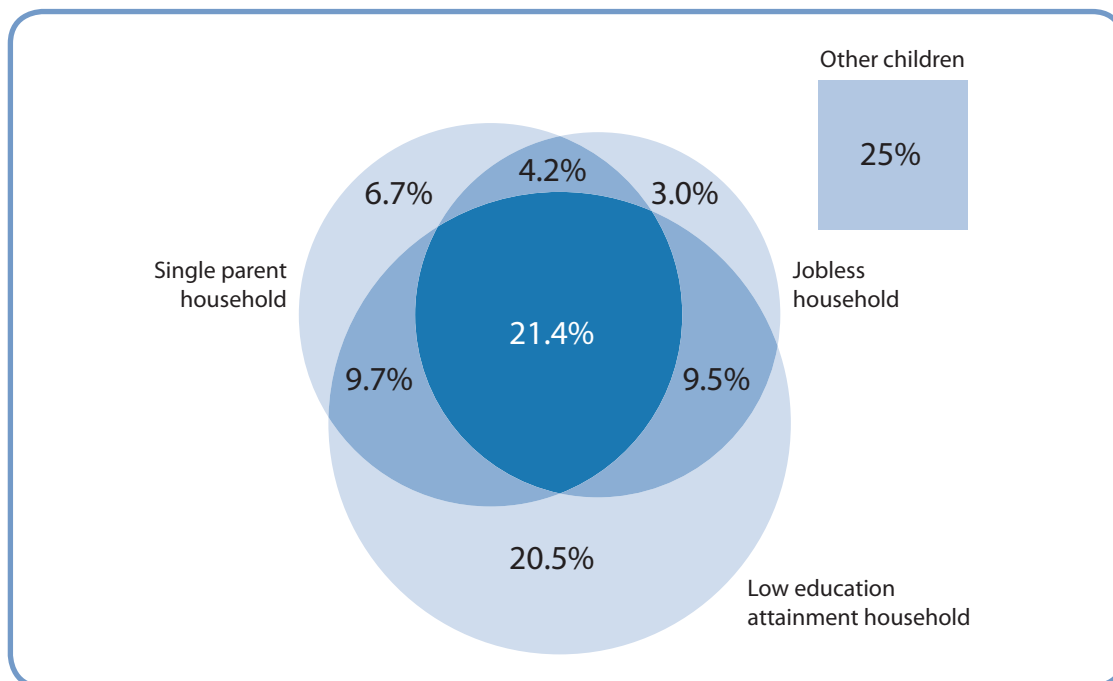
The results in Fig. 2 show that 75.0 per cent of Indigenous children live in a household that is either a single parent household, has no one employed or has no one who has completed Year 12. In total, 21.4 per cent

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**CD:**  
(Census)  
Collection District

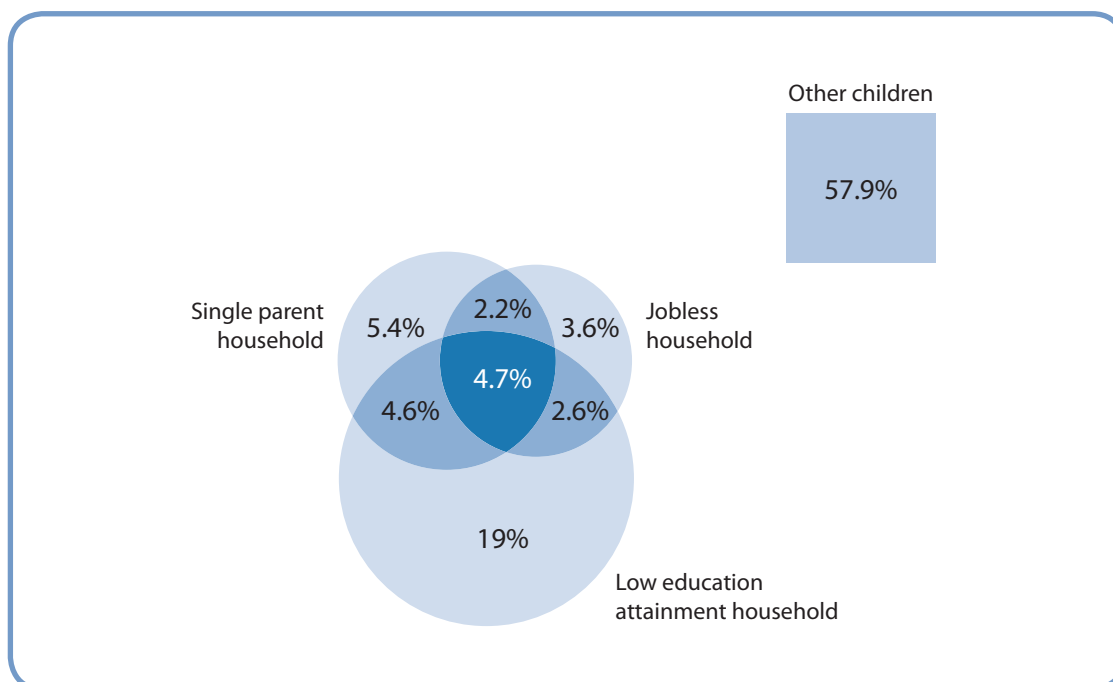
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**Fig. 2. Percentage of Indigenous child population aged 0–14 years by three characteristics of their family or household, 2006**



Source: Biddle and Yap (2010), based on customised calculations using the 2006 5% Census Sample File (CSF), ABS Census of Population and Housing.

**Fig. 3. Percentage of non-Indigenous child population aged 0–14 years by three characteristics of their family or household, 2006**



Source: Biddle and Yap (2010), based on customised calculations using the 2006 5% CSF, ABS Census of Population and Housing.

of Indigenous children live in a household with all three of these characteristics. By way of comparison, only 42.1 per cent of non-Indigenous children live in a household with one of the characteristics, and only 4.7% per cent live in households with all three (Fig. 3).

### CROSS-SECTIONAL EVIDENCE—HEALTH AND WELLBEING

The picture that emerges from NATSIHS data is that Indigenous Australians start off with worse health outcomes than the non-Indigenous population. They are more likely to be born prematurely and to have low birth weight (ABS/AIHW 2008), due in part to the fact that Indigenous mothers are much more likely to be relatively young and to smoke and/or drink alcohol during pregnancy. Indigenous Australians also experience worse physical health outcomes through childhood and into adolescence. They are less likely to have been breastfed up until 12 months, more likely to have a worse diet, less likely to be vaccinated at a young age, more likely to be exposed to passive smoking, more likely to have a long-term health condition, and more likely to have been hospitalised due to illness and/or injury (ABS/AIHW 2008).

While the data on physical health is important and points to potential long-term health consequences, Indigenous Australians define health in much broader terms than simply the absence of disease or particular conditions. In 1990, the National Aboriginal Health Strategy defined health as follows—'Health does not just mean the physical well-being of the individual but refers to the social, emotional, spiritual and cultural well-being of the whole community' (Jackson & Ward 1999). That is, the individual's wellbeing is important as is the wellbeing of the community in which the individual lives and has an ongoing attachment to. When one expands the definition of health, the picture becomes more complex, with comparisons between non-Indigenous children more problematic.

Despite these difficulties in making comparisons, data from the 2008 NATSISS gives some indication of broader notions of childhood wellbeing for the Indigenous population in isolation. Three variables are of particular importance under this broader notion of wellbeing. First, speaking or understanding an Indigenous language is an important aspect of cultural continuity. Indigenous languages are a link to the past and also contain important information about views and history. According to the 2008 NATSISS, 34.7 per cent of Indigenous children speak, understand or are learning an Indigenous language. This percentage varies widely across Australia (and is much higher in remote than non-remote Australia). Nonetheless, it does show a reasonable degree of language maintenance.

One way in which Indigenous children can be exposed to Indigenous language, cultural traditions and history is by spending time with an Indigenous elder or leader. According to data from the 2008 NATSISS, 33.2 per cent of Indigenous children spend at least a day a week with an Indigenous elder or leader. While low, this national figure once again masks significant variation across Australia, with rates of 49.2 per cent in remote Australia compared to 24.6 per cent in non-remote areas. A separate aspect of cultural maintenance is participation in cultural events, with 70.1 per cent of Indigenous children in the sample being involved in Indigenous cultural events, ceremonies or organisations in the previous 12 months.

### CROSS-SECTIONAL EVIDENCE—EDUCATION

Empirical evidence in other contexts (Cunha et al. 2006) and for the Indigenous population (Biddle 2011c) shows that early experiences are the main determinant of education marginalisation later in life. Nationally, less than half of the eligible Indigenous population aged 3–5 years (that is, those not currently at school) were attending preschool at the time of the 2006 Census (47.8%) compared to 57.5 per cent of non-Indigenous children. Part of this difference was due to geographic variation (Biddle 2010). However, in all but three of the 37 Indigenous Regions that form part of the Australian Indigenous Geographic Classification, Indigenous Australians were less likely to participate in preschool.

This lower level of preschool participation is reflected in data from the AEDI which shows that although 'the majority of Australian Indigenous children are doing well on the AEDI domains, ... Indigenous children show disproportionately higher developmental vulnerability rates when compared with non-Indigenous children' (Brinkman 2010: 5). One of the benefits of the AEDI, though, is that it allows for comparisons across a range of domains. Here, the unique abilities that Indigenous Australians bring to school are highlighted. For example, 'Indigenous children show extremely good skills in terms of physical independence but significantly poorer results in terms of language and cognitive development' (Brinkman 2010: 5).

The school performance of Indigenous children worsens relative to non-Indigenous children across their school career (DEEWR 2008; Leigh & Gong 2009). However, it is important to keep in mind that there are many Indigenous children who have succeeded and continue to succeed at school, both relative to the non-Indigenous population and on their own terms.

Analysis of the WAACHS (Zubrick et al. 2006) identified a number of important determinants of Aboriginal students being at risk of low academic performance. Perhaps most important in explaining academic performance was school attendance. According to their analysis 'students absent from school for 105 days or more were two times more likely to have low academic performance compared with students that were absent for 10 days or less' (Zubrick et al. 2006: 285). Because the WAACHS is a cross-sectional survey, it is not possible to tell whether it was low attendance that was affecting academic performance or whether it was academic performance that was causing low attendance (there is very little incentive to attend school if one feels they are not doing well). It would be reasonable to say, however, that low attendance is likely to be both a cause and a consequence of poor Indigenous outcomes. Analysis of the WAACHS also showed that 'the academic performance of Aboriginal students is substantially lower in the presence of an emotional or behavioural difficulty' (Zubrick et al. 2006: 285).

## THE HOUSEHOLDS AND MAIN CARERS OF INDIGENOUS CHILDREN

While just a limited selection, the discussion in the previous section showed that the household and family context of a child can have an important effect on a number of domains. With that in mind, the discussion in this section looks at the size and composition of the families of Indigenous children. I begin with a discussion of the size of the household of Indigenous children, as measured by the number of children present as well as the number of adults. As mentioned earlier, this should not be considered an outcome in and of itself, but rather a contextual factor that can have positive influences—in terms of access to a range of carers and support—as well as potentially negative effects, especially with regards to overcrowding. Table 1 also gives the proportion of children who live in a household with both Indigenous and non-Indigenous residents.

Results in Table 1 are given separately by sex, cohort (babies and kids), Level of Relative Isolation (LORI),<sup>5</sup> and the socioeconomic outcomes of the usual residents in the area in which the child lives (as measured by the IRSEO). The statistical significance of the differences by these categories is identified through the number of asterisks, as discussed in the notes underneath the table. As an example, there was no statistical difference between the number of adults in the households of boys and girls (no asterisks), a difference that is statistically significant at the 1 per cent level of significance between babies and kids (three asterisks) and a difference that is statistically significant at the 10 per cent level only between those in the second and first quartile of the IRSEO (one asterisk).

On average, across the sample the number of people in an Indigenous child's household is relatively small. There are, on average, around 2.8 children (including the study child themselves) and around 2.0 adults. However, with a standard deviation of 1.6 and 1.1 respectively, these averages hide significant variation

**LORI:**  
Level of  
Relative Isolation

**Table 1. Household characteristics of Indigenous children in the LSIC, Wave 1 (2008–09)**

Variable	Number of observations	Number of children in household	Number of adults in household	Mixed Indigenous & non-Indigenous household
<b>Sex</b>				
<i>Male</i>	854	2.79	2.05	0.31
Female	823	2.84	1.98	0.30
<b>Cohort</b>				
<i>Babies</i>	958	2.73	2.07	0.33
Kids	719	2.93***	1.94***	0.28**
<b>LORI</b>				
<i>None</i>	435	2.57	1.92	0.57
Low	839	2.84***	1.87	0.28***
Moderate	214	2.96***	2.47***	0.11***
High/Extreme	173	3.02***	2.28***	0.03***
<b>IRSEO</b>				
<i>First quartile</i>	288	2.56	2.03	0.59
Second quartile	710	2.70	1.91*	0.36***
Third quartile	486	3.15***	2.10	0.17***
Fourth quartile	193	2.78	2.16	0.04***
<p><b>Note:</b> The reference category is marked in <i>italics</i>. Proportions or means which are significantly different from the reference category at the 1% level of significance are labelled ***; those significantly different at the 5% level of significance only are labelled **; whereas those significantly different at the 10% level of significance only are labelled *.</p> <p><b>Source:</b> Customised calculations using Wave 1 of the LSIC.</p>				

across the sample. So, while there are undoubtedly a significant minority of Indigenous children who live in large households, across all parts of the LSIC sample, this is far from the norm. Household size is also larger in more isolated parts of the country. However, it is important to note that even in the most isolated parts of the sample, the average number of children is still only 3.0 and the average number of adults on 2.3. So, while there are undoubtedly a significant minority of Indigenous children who live in large households, across all parts of Australia this is far from the norm.

A significant proportion of Indigenous children live in households with at least one non-Indigenous resident. For the total sample, around three in 10 children live in such a household. However, in the least isolated areas and those with the most advantaged usual residents, such households represent the majority (with 57% and 59% of households respectively).

This large share of mixed households in such areas is largely a consequence of the high rates of exogamy (marriage/partnerships involving an Indigenous and non-Indigenous person) in many urban areas as documented in Heard, Birrell and Khoo (2009). In many instances, it is probably the characteristics of the residents rather than their Indigenous status which is important. However, in an analysis of the 2008 NATSISS it is clear that living in households with both Indigenous and non-Indigenous members has a significant association with some wellbeing measures, even after controlling for socioeconomic and demographic characteristics (Bath & Biddle 2011). In an analysis of the 2008 NATSISS it is clear that living in households with both Indigenous and non-Indigenous members has a significant association with some

**Table 2. Change in household characteristics of Indigenous children in the LSIC, Wave 1 (2008–09) to Wave 2 (2009)**

Variable	Number of children in household		Number of adults in household	
	Increase	Decrease	Increase	Decrease
<b>Sex</b>				
<i>Male</i>	0.16	0.10	0.13	0.11
Female	0.18	0.12	0.13	0.13
<b>Cohort</b>				
<i>Babies</i>	0.18	0.11	0.12	0.13
Kids	0.16	0.11	0.14	0.11
<b>LORI</b>				
<i>None</i>	0.16	0.08	0.12	0.10
Low	0.15	0.10	0.11	0.10
Moderate	0.20	0.17***	0.15	0.22***
High/Extreme	0.31***	0.13*	0.24***	0.13
<b>IRSEO</b>				
<i>First quartile</i>	0.16	0.09	0.09	0.13
Second quartile	0.15	0.08	0.12	0.10
Third quartile	0.15	0.16***	0.12	0.16
Fourth quartile	0.33***	0.10	0.25***	0.08*
<p>Note: The reference category is marked in <i>italics</i>. Proportions or means which are significantly different from the reference category at the 1% level of significance are labelled ***; those significantly different at the 5% level of significance only are labelled **; whereas those significantly different at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Waves 1 and 2 of the LSIC.</p>				

wellbeing measures, even after controlling for socioeconomic and demographic characteristics (Bath & Biddle 2011). To add to the complexity, for some measures the association was positive, whereas for others it was negative.

Perhaps the greatest impact of such high rates of mixed households in certain areas is in the assessment of the potential for government policy targets to be achieved, and the role of intergenerational transfer of poverty and low socioeconomic outcomes (O'Reilly 1994: 154). The dependency of Indigenous children cannot simply be related to aggregates such as the number of working-age Indigenous adults or the level of education completion. This is because a significant number of non-Indigenous adults contribute to the support of Indigenous children either as parents or other household members.

While important, the results presented in Table 1 in many ways replicate those from analysis of other data sources (most notably the census). It is true that the designers of the LSIC showed great care in ensuring that the household characteristics in the data are reflective of Indigenous notions, and that this enhanced the accuracy of the measures derived. However, the major benefit of using LSIC data to analyse household context is that one can get a glimpse into how this context changes through time.

There were 1,437 Indigenous children in the sample for whom information is available in both Waves 1 and 2. Within this subsample, there was a large amount of change between the two waves in household demographics. Specifically, 17.3 per cent of Indigenous children were in a household where the number of children increased between the waves, alongside 10.8 per cent where the number decreased. In addition,



**Table 3. Characteristics of the main carer of Indigenous children, Wave 1 (2008–09)**

	Not natural parent	Male	Non-Indigenous	Aged 15–19	Aged 30+	Has spouse living in household
<b>Sex</b>						
<i>Male</i>	0.04	0.03	0.14	0.05	0.44	0.55
Female	0.06	0.02	0.14	0.05	0.43	0.53
<b>Cohort</b>						
<i>Babies</i>	0.04	0.02	0.14	0.08	0.37	0.55
Kids	0.06***	0.03	0.13	0.01***	0.52***	0.52
<b>LORI</b>						
<i>None</i>	0.03	0.02	0.26	0.03	0.48	0.62
Low	0.06*	0.03	0.13***	0.05	0.44	0.48***
Moderate	0.05	0.02	0.02***	0.08***	0.35***	0.58
High/Extreme	0.03	0.02	0.01***	0.05	0.39**	0.55
<b>IRSEO</b>						
<i>First quartile</i>	0.03	0.03	0.26	0.02	0.48	0.66
Second quartile	0.05	0.03	0.16***	0.05***	0.45	0.52***
Third quartile	0.06	0.03	0.08***	0.06***	0.42	0.51***
Fourth quartile	0.05	0.02	0.02***	0.06*	0.33***	0.47***
<p>Note: The reference category is marked in <i>italics</i>. Proportions or means which are significantly different from the reference category at the 1% level of significance are labelled ***; those significantly different at the 5% level of significance only are labelled **; whereas those significantly different at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Wave 1 of the LSIC.</p>						

13.0 per cent witnessed an increase in the number of adults, and 11.9 per cent a decrease. In a relatively short time period, this is quite a large amount of change. Furthermore, changes in the aggregate numbers of adults or children in the household are an underestimate of the change in household composition through time, as situations where one person leaves the household and a separate person enters is not going to be picked up.

Table 2 looks at whether changes in household size are more prevalent for certain types of children (males/females or babies/kids) or for those who live in certain types of areas (by LORI and IRSEO).

There is very little systematic difference in the change in household size through time, at least in terms of statistical significance. One exception is the change in household size by isolation. Specifically, those living in areas with moderate or high/extreme isolation have higher rates of both increase and decrease in household size than those in the least isolated areas. Around 31 per cent of children in the high/extreme isolation category experienced an increase in the number of children compared to around 16 per cent of those in the least isolated areas. Furthermore, around 17 per cent of children in the moderate isolation category experienced a decrease compared to the reference category (around 8%). This implies a much greater rate of population turnover in relatively isolated areas. This has potential implications for children in these households, with their households likely to be much less stable than those in other parts of the country.

Although the number of people in an Indigenous child's household can potentially impact on their development opportunities and life chances, the characteristics of household members are arguably more

important (as shown later in this paper). Although the LSIC does not have information on all household members, one of the most useful components of the survey is the wide range of information on the child's main carer or the 'adult family member who spends the most time with the study child'. The next section of this paper considers the social and emotional wellbeing of these carers in detail. Before then, it is worth considering a number of demographic characteristics.

Table 3 examines five characteristics of the child's main carer: whether they are the child's natural parent; whether they are male; whether they are non-Indigenous; their age (15–19 years or 30 years and over); and whether they have a spouse living in the household. Comparisons are once again made by the sex of the child, their cohort and characteristics of the area in which they live.

The incidence in the LSIC sample of a child's main carer not being their natural parent or being male was quite low. Furthermore, there was very little variation across the sample, with very few comparisons being statistically significant. There was, however, greater variation in the probability of the child's main carer being non-Indigenous, with those in non-isolated areas or areas with the least disadvantaged usual residents having the greatest percentage. This mostly reflects the trends in spatial variation in exogamy discussed earlier.

There was also significant variation by geography in the age of the main carer. Importantly, this variation appears to be more consistent in terms of socioeconomic status of the area as opposed to relative isolation. Children of teenage mothers have been shown to have worse outcomes in later life in terms of education, earnings and health (Francesconi 2008). Results in Table 3 show that those Indigenous children who live in the most disadvantaged areas are more likely to have a main carer who is aged 15–19 years and less likely to have a carer aged 30 years and over. There were also large and significant differences by IRSEO in the percentage of carers who have a spouse living in the household, falling from 0.66 in the most advantaged areas to 0.47 in the most disadvantaged.

## WELLBEING MEASURES FOR THE CARERS OF INDIGENOUS CHILDREN

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The association between the characteristics of the carers of Indigenous children and the outcomes of the children themselves is analysed in the next section of this paper. In this section I consider the implications for the social and emotional wellbeing of the carers themselves. One of the stated aims of government policy in Australia is to improve the wellbeing of the Indigenous population (FaHCSIA 2009a). Traditionally, one of the main approaches to achieve this has focused on mainstream measures of socioeconomic status and health. There is nothing inherently wrong with this approach. Reducing the life expectancy gap and improving access to employment and education opportunities has the potential to improve the circumstances of many Indigenous Australians. However, Indigenous and other notions of wellbeing are more widely encompassing than employment, income or even health. Focusing on mainstream socioeconomic factors alone is therefore unlikely to 'close the gap' in wellbeing between Indigenous and non-Indigenous Australians.

According to estimates based on the 2008 NATSISS, 40.2 per cent of the Indigenous sample aged 15 years or over were a parent or guardian of an Indigenous child aged 0–14 years. While not all of these respondents will have the main caring role for their children, this is still a sizable minority of the Indigenous population. Hence, the wellbeing of carers is an important determinant of the wellbeing of the Indigenous population as a whole. The wellbeing of Indigenous carers is of additional importance because of the potential effect it can have on the development of their children. For example, according to results presented in Luoma et al. (2001), prenatal, postnatal and current maternal depressive symptoms were significantly associated with poorer outcomes for their children.

A number of surveys show that females with children report lower levels of subjective wellbeing, even after controlling for other characteristics (Shields & Wooden 2003). However, children can also bring substantial benefits to their parents and families that need to be traded off against the costs. For example, Nomaguchi and Milkie (2003: 362) show a higher level of 'social integration with relatives, friends and neighbours' for new parents compared to those who are childless. Ultimately though, the analysis in Nomaguchi and Milkie shows that the effect of having children on subjective wellbeing is highly contingent. That is:

... unmarried parents report lower self-efficacy and higher depression than their childless counterparts. Married mothers' lives are marked by more housework and more marital conflict but less depression than their childless counterparts. Parental status has little influence on the lives of married men (2003: 356).

There is no strong evidence that Indigenous carers of children have higher or lower levels of subjective wellbeing than the rest of the Indigenous population. In an unpublished analysis of the 2008 NATSISS carried out for this paper, parents or guardians did not have significantly different levels of happiness or sadness after controlling for age and sex. When combined with the results from Nomaguchi and Milkie (2003), it would appear that the majority of the variation in subjective wellbeing is within the carer/non-carer populations, rather than between them.

The LSIC is a potentially useful dataset to study variation in the wellbeing of the carers of Indigenous children for two main reasons. Firstly, it is possible to look at changes in wellbeing through time (as discussed later in this section), but also because even in isolation each wave of the survey has a rich set of measures of wellbeing and a range of variables at the individual, household and family level that one would expect to be associated with it. Specifically, there are two sets of questions on Waves 1 and 2 of the LSIC related to wellbeing. The first is a reduced set of questions from the *Strong Souls* questionnaire (Thomas et al. 2010). This set of questions, designed specifically for the Indigenous population, measures the strength of people's relationships and general resilience. Furthermore, the responses to the *Strong Souls* questionnaire can also be used as measures of wellbeing in their own right. However, they are also a potential predictor of a second set of questions on subjective wellbeing that covers things like anger, shame, sadness and loss of appetite.

For the analysis presented in this paper, separate indices from each of these two sets of questions are constructed. The indices are constructed based on separate factor analyses of the data items and have a mean of zero and a standard deviation of 0.9.<sup>6</sup> Higher index values indicate higher levels of wellbeing.

The first set of analysis presented in this section uses the index from the *Strong Souls* questionnaire as the dependent variable and analyses the factors associated with it through two separate models. Model 1 includes basic demographic characteristics of the carer only—gender, Indigenous status, age and whether or not they have a spouse in the household. Model 2 includes these variables but also has a range of other characteristics including household size, language spoken, employment, financial position, income, housing characteristics and characteristics of the area in which the person lives. Given the dependent variable is linear, results are presented as regression coefficients (from an Ordinary Least Squares estimate), which indicate the difference in the predicted index value after changing that characteristic while holding all other characteristics constant. The statistical significance of the coefficients is given by the number of asterisks as detailed in Table 4 notes.

**Table 4. Factors associated with *Strong Souls* index, carers of Indigenous children in Wave 1 of the LSIC (2008–09)**

Explanatory variables	Model 1	Model 2
Male	0.060	-0.019
Non-Indigenous	-0.142**	-0.105
Aged 15–19	0.015	0.021
Aged 25–29	0.009	-0.009
Aged 30+	0.017	-0.086
Has spouse living in household	-0.021	-0.081
Number of children in household		0.027
Number of adults in household		-0.027
Mixed Indigenous and non-Indigenous household		-0.075
Speaks an Indigenous language		-0.019
Speaks English well on most topics		0.813***
Current student		0.170**
Employed		0.148
Employed part-time (as opposed to full-time)		0.025
Usually runs out of money before payday, or is spending more money than receives in income		-0.328***
Can save at least a bit of income every now and then		0.046
Income of carer and partner is less than \$250 per week (after deductions)		0.004
Income of carer and partner is more than \$800 per week (after deductions)		0.082
Receives extra assistance with household expenses		-0.039
Changed usual residence in the previous 12 months		0.029
Lives in a house rented from a private landlord		0.028
Lives in a house rented from a State/Territory government		-0.015
Lives in a house rented from a community organisation		0.105
Has an 'other' tenure type		-0.375
Household is identified as having major things that need fixing		-0.056
Lives in an area with an IRSEO in the 2nd quartile		0.025
Lives in an area with an IRSEO in the 3rd quartile		-0.158*
Lives in an area with an IRSEO in the 4th quartile		-0.360***
Lives in an area of low relative isolation		0.154**
Lives in an area of moderate relative isolation		0.283***
Lives in an area of high/extreme relative isolation		0.490***
Constant	0.020	-0.812***
Adjusted R-Squared	-0.0003	0.0756
Number of observations	1,561	1,135
<p>Note: Variables for which the coefficient is statistically significant at the 1% level of significance are labelled ***; those statistically significant at the 5% level of significance only are labelled **, whereas those statistically significant at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Wave 1 of the LSIC.</p>		

Model 1 explained very little of the variation in the *Strong Souls* index. The only variable that was statistically significant at even the 10 per cent level of significance was whether or not the carer was non-Indigenous. Although still negative, the coefficient for this variable is no longer significant after controlling for a range of other characteristics. Demographic characteristics do not appear to be the cause of variation in the resilience of the carers of Indigenous children.

Some of the additional variables in Model 2 did have a large association with the *Strong Souls* index. Those who speak English well have a significantly and substantially higher value than those who only speak on some topics, only speak a few words, or have forgotten what they knew. According to data from the LSIC, greater self-assessed English language ability is positively associated with subjective wellbeing. Interestingly, there was no association with income, but there was a large and negative association with one's family spending more money on average than they receive. Similar to the results shown in Biddle (2011a), financial stress rather than income is the more important determinant of wellbeing for Indigenous Australians.

Amongst all the variables in Model 2, geographic characteristics explain the greatest amount of the variation. However, the results aren't necessarily what one would expect *a priori*. On the one hand, those carers of Indigenous children who live in relatively disadvantaged areas have significantly and substantially lower index values than those who live in relatively advantaged areas. This is to be expected, as area-level disadvantage tends to correlate with poor individual outcomes. However, once the socioeconomic characteristics of the area have been controlled for, those who live in relatively isolated areas have stronger relationships and greater self-reported resilience.

The finding in Table 4 for the LORI variables is quite important from a policy perspective. In contrast to research that focuses on socioeconomic status either at the area or individual level, both of which tend to be lower in remote or isolated Australia (Biddle 2009a), Indigenous Australians in isolated parts of the country have higher levels of subjective wellbeing than those in less isolated parts of the country.

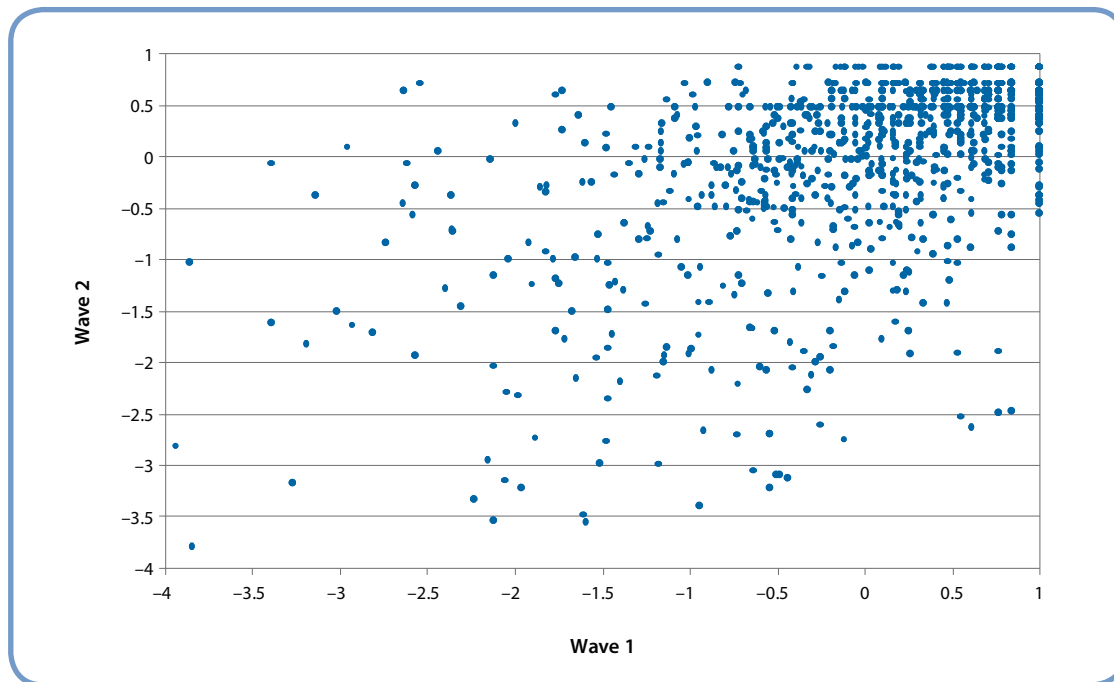
As mentioned earlier, although the data items in the *Strong Souls* questionnaire can be treated as measures of wellbeing, they are in many ways better thought of as determinants of wellbeing. Fortunately, there are an additional seven questions on the LSIC that better capture subjective wellbeing. Unfortunately, they do not capture positive aspects of emotional wellbeing, nor do they capture how satisfied a person is with their life—both important aspects of a rounded picture of subjective wellbeing (Kahneman & Krueger 2006). Nonetheless, the index value based on a factor analysis of the seven variables does, once rescaled, give a good indication of the absence of negative emotional wellbeing.

This index is analysed in a similar way to the *Strong Souls* index. However, while two models are once again estimated, the first model in Table 5 is more similar to the second model in Table 4. Model 2 includes three additional explanatory variables: the index value from the *Strong Souls* questionnaire; whether or not the person reports their health as very good or excellent (as opposed to good, fair or poor); and whether or not they felt they have been discriminated against because of their Indigenous status.

**Table 5. Factors associated with social and emotional wellbeing index, carers of Indigenous children in Wave 1 of the LSIC (2008–09)**

Explanatory variables	Model 1	Model 2
Male	0.113	0.127
Non-Indigenous	0.026	0.041
Aged 15–19	–0.257*	–0.197*
Aged 25–29	–0.089	–0.091
Aged 30+	–0.205***	–0.166***
Has spouse living in household	0.079	0.034
Number of children in household	0.009	–0.003
Number of adults in household	–0.003	–0.011
Mixed Indigenous and non-Indigenous household	0.093	0.105
Speaks an Indigenous language	–0.142*	–0.138**
Speaks English well on most topics	0.142	–0.090
Current student	0.070	0.064
Employed	0.021	–0.003
Employed part-time (as opposed to full-time)	0.138	0.104
Usually runs out of money before payday, or is spending more money than receives in income	–0.474***	–0.299***
Can save at least a bit of income every now and then	0.105*	0.035
Income of carer and partner is less than \$250 per week (after deductions)	0.081	0.063
Income of carer and partner is more than \$800 per week (after deductions)	0.073	0.047
Receives extra assistance with household expenses	–0.080	–0.046
Changed usual residence in the previous 12 months	0.046	0.014
Lives in a house rented from a private landlord	0.074	0.075
Lives in a house rented from a State/Territory government	0.048	0.048
Lives in a house rented from a community organisation	–0.066	–0.079
Has an 'other' tenure type	–0.181	–0.060
Household is identified as having major things that need fixing	–0.165***	–0.120**
Lives in an area with an IRSEO in the 2nd quartile	–0.059	–0.048
Lives in an area with an IRSEO in the 3rd quartile	–0.098	–0.021
Lives in an area with an IRSEO in the 4th quartile	–0.011	0.086
Lives in an area of low relative isolation	–0.002	–0.026
Lives in an area of moderate relative isolation	0.105	0.040
Lives in an area of high/extreme relative isolation	0.057	–0.023
Strong souls index		0.222***
Self-assessed health very good or excellent		0.153***
Discriminated against because carer is Indigenous		–0.549***
Constant	–0.003	0.415*
Adjusted R-Squared	0.1061	0.2787
Number of observations	1,072	1,030
<p>Note: Variables for which the coefficient is statistically significant at the 1% level of significance are labelled ***; those statistically significant at the 5% level of significance only are labelled **, whereas those statistically significant at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Wave 1 of the LSIC.</p>		

**Fig. 4. Plot of social and emotional wellbeing index in Wave 1 (2008–09) and Wave 2 (2009) of the LSIC, carers of Indigenous children**



Source: Customised calculations using Waves 1 and 2 of the LSIC.

Unlike the results presented in Table 4, the results in Table 5 for social and emotional wellbeing indicate some significant variation by age. In particular, those carers of Indigenous children who are themselves relatively young (aged 15–19 years) or relatively old (aged 30 years or over) have lower levels of emotional wellbeing than those aged 20–29 years. Those who report that they spend more money than they receive in income also have lower levels of subjective wellbeing, as do those who live in a dwelling that has major things that need fixing. Taken together, the results for these last two variables demonstrate that it is financial stress or not being able to meet basic needs that affect wellbeing, rather than income itself.

Unlike the variables in the *Strong Souls* questionnaire, the measures of social and emotional wellbeing did not vary by the socioeconomic status of the area or by relative isolation. This is in line with the results presented in Biddle (2011b), which found no variation in self-reported sadness by remoteness for the total adult Indigenous population. However, the analysis in Biddle (2011b) did show higher levels of positive wellbeing in remote Australia, indicating that conclusions are affected by the type of wellbeing measure used. In order to test for this, future waves of the LSIC may consider including more positive measures of subjective emotional wellbeing and, in particular, measures of life satisfaction.

As mentioned earlier, one of the benefits of using the LSIC to study subjective wellbeing is the ability to examine how the measures change through time and, potentially, some of the determinants in changes in subjective wellbeing. Indeed, the LSIC is the only dataset in Australia that has longitudinal information on a large sample of Indigenous adults.<sup>7</sup>

To analyse the change through time in subjective wellbeing, the factor analysis of the social and emotional wellbeing module was repeated with Wave 2 of the data.<sup>8</sup> Doing so identified substantial change in the index values over the intervening period. There was still a large and positive cross-wave correlation (0.55), showing that high/low emotional wellbeing in one year is associated with high/low wellbeing in the



subsequent year. Nonetheless, the scatter plot shown in Fig. 4 shows that there is scope for changes in individual circumstances or other external factors to influence wellbeing.

Unlike the factor analysis of the *Strong Souls* module, there was substantial change in the index value from the factor analysis of the social and emotional wellbeing questions. There was still a large and positive cross-wave correlation (0.55), showing that high/low emotional wellbeing in one year is associated with high/low wellbeing in the subsequent year. Nonetheless, the scatter plot shown in Fig. 4 shows that there is scope for changes in individual circumstances or other external factors to influence wellbeing.

An analysis of the factors associated with the change in social and emotional wellbeing did not find any association with the standard measures of individual wellbeing. Changes in household count, student status, employment status, income, usual residents, socioeconomic characteristics of the area, isolation and self-assessed health were not found to be statistically significant. However, a separate set of questions on the LSIC asked the carer whether they or their close family member had experienced one of a range of life events in the previous 12 months. As demonstrated in Fig. 5, a number of these life events were found to have a significant association with changes in the index of social and emotional wellbeing.

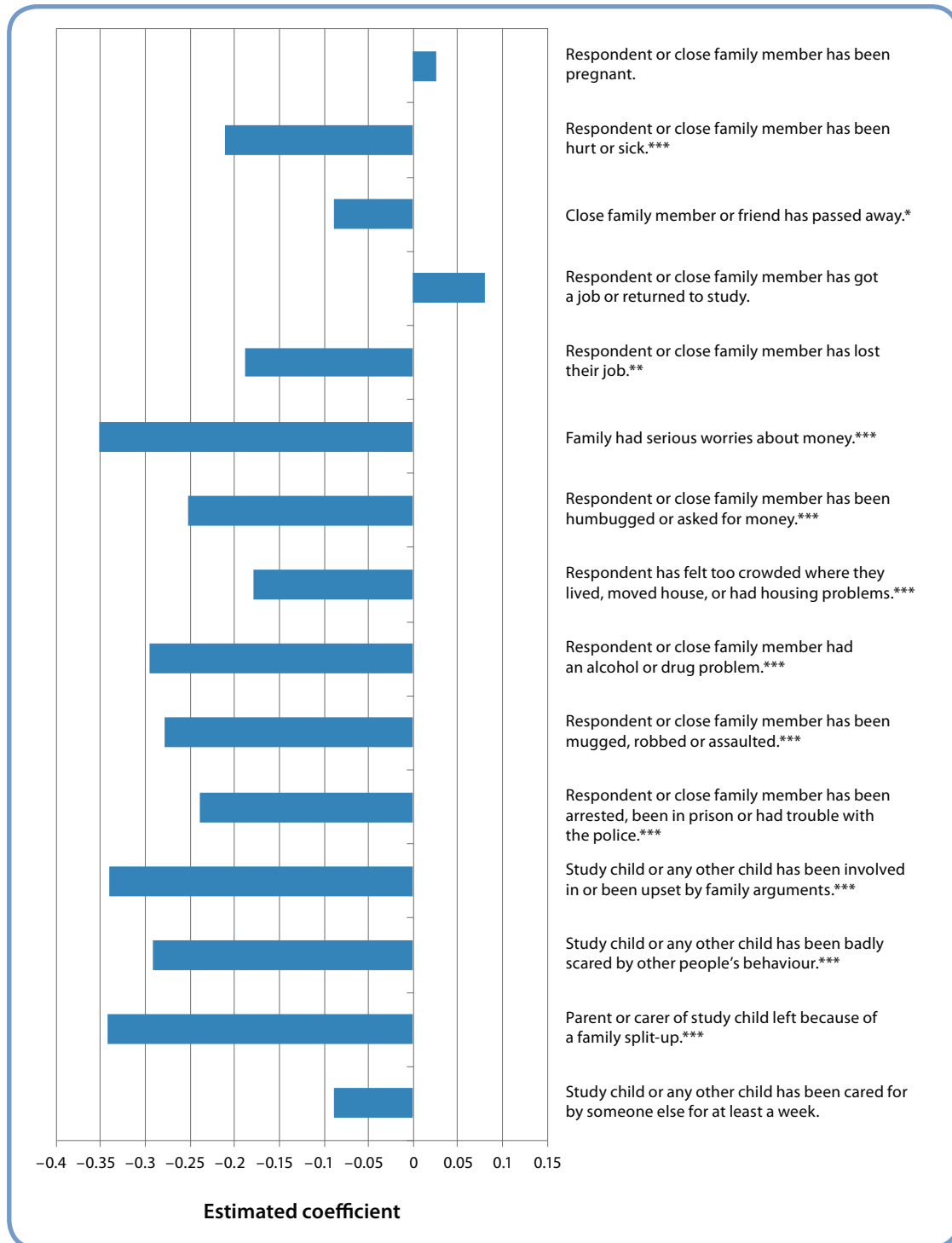
The results presented in Fig. 5 are based on 15 separate regressions, each with the same dependent variable—the change in the index of social and emotional wellbeing estimated for that carer between Waves 1 and 2 of the LSIC. The first explanatory variable in each of the regressions is the index value estimated in Wave 1. This is included as an explanatory variable to control for the fact that the index value is bounded, and those with very high/low social and emotional wellbeing in Wave 1 cannot increase/decrease their measured wellbeing beyond these bounds. A separate model is then estimated, with whether or not the carer reported that particular life event as the only other explanatory variable. The statistical significance of the coefficient from these separate regressions is given alongside the event name as outlined in Fig. 5 notes. Finally, to help interpret the size of the coefficients, they have been rescaled as a proportion of the standard deviation of the index in Wave 1.

Of the 15 life events covered in the LSIC, 12 had a statistically significant association with changes in social and emotional wellbeing. Of these, 10 were significant at the 1 per cent level of significance, showing that a range of life events had the potential to effect subjective wellbeing. The life event with the greatest negative association was the family having serious worries about money. After controlling for social and emotional wellbeing in Wave 1, experiencing this major life event was associated with a decrease in wellbeing of  $-0.3067$ , or 35 per cent of a standard deviation. Other variables that had an association that was equal to or greater than one-quarter of a standard deviation were family break-up, family arguments, alcohol or drug problems, children being scared by other people's behaviour, crime victimisation, and being asked for money.

Not all major life events were associated with changes in wellbeing. Neither pregnancy, nor commencing work or study, nor children being cared for by others, were associated with changes in social and emotional wellbeing. Furthermore, it is worth pointing out that, apart from the first two of these, respondents in the LSIC were not asked about positive life events. Analysis of Waves 1 and 2 data has shown a clear association between a number of negative life events and worsening social and emotional wellbeing. Future questionnaires may be constructed to help identify what leads to improvements in wellbeing.

A final point to note from the social and emotional wellbeing data is that when analysing some of the individual components of the social and emotional wellbeing index separately, one set of results was of particular interest. Specifically, it was found that those carers who moved to areas that were identified as being more disadvantaged (based on the IRSEO) between Waves 1 and 2 of the LSIC, were more likely to report that they felt so sad that nothing could cheer them up in Wave 2, but not Wave 1. The socioeconomic characteristics of the area in which a carer lives may not be associated with wellbeing in

**Fig. 5. Relationship between self-reported life events and change in social and emotional wellbeing index for carers of Indigenous children, between Wave 1 (2008–09) and Wave 2 (2009)**



**Note:** Variables for which the coefficient is statistically significant at the 1% level of significance are labelled \*\*\*; those statistically significant at the 5% level of significance only are labelled \*\*, whereas those statistically significant at the 10% level of significance only are labelled \*.

**Source:** Customised calculations using Waves 1 and 2 of the LSIC.

a cross-sectional sense, but there is some evidence that it has an association with changes in wellbeing through time.

## EARLY CHILDHOOD ATTENDANCE

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Partly because of the effect on later academic achievement, but also because of direct effects on social skills, maturity and self-confidence (Kronemann 1998), children who attend preschool have been found to be better off in terms of self-esteem and later social and emotional maturity, as well as being less likely to engage in criminal and antisocial behaviour, teen pregnancy or drug abuse (Hull & Edsall 2001).

With regards to health, attendance at preschool may expose a child to a greater number of potential infections and infectious diseases (Ferson 1997). However, there are also likely to be a number of positive effects. Long-term health is likely to be improved through the effect preschool has on cognitive development and academic achievement (see Masse & Barnett 2002 for a calculation of the effect on smoking). There are also likely to be direct, immediate effects on nutritional or general health knowledge (Hendricks, Echols & Nelson 1989).

The potential positive effects that preschool education might have on future academic achievement and broader cognitive development are also important. Preschool can improve a child's school readiness and close some of the gap between 'at-risk' and other students in terms of cognitive development and school achievement. Most studies find that, in the short term, preschool attendance has large effects on both achievement and IQ scores (Barnett 1998; Boocock 1995). Heckman, Stixrud & Urzua (2006) identify early childhood education as having its greatest effect on non-cognitive ability (motivation, persistence and self-esteem) as opposed to cognitive ability. Furthermore, Heckman, Stixrud & Urzua (2006: 27) identify non-cognitive ability as being 'as important, if not more important' than cognitive ability in explaining future outcomes like school completion and wages.

Not all preschool education has the same effect on a child's development. A quality preschool education is likely to be beneficial for a child, but poor quality preschool may in fact have a negative effect on outcomes (Magnuson, Ruhm & Waldfogel 2005).

To the author's knowledge at least, there have not been any studies of the benefits of preschool education for Indigenous children. On the one hand, it may be potentially large, given that many previous studies have shown the greatest effect of preschool and other early childhood education accruing to those who grow up in relatively disadvantaged families. On the other hand though, preschools that are not responsive to the unique culture and needs of Indigenous children may have negative long-term consequences.

As a greater range of child outcome measures become available both from Wave 2 and in later waves, it will be possible to test whether early childhood attendance and in particular preschool participation is associated with improved outcomes for the Indigenous population. Before then though, it is worth considering the factors associated with preschool attendance. This is important for two reasons. First, understanding the factors that influence participation will help to understand the benefits of preschool. This point is taken up at the end of this section. Second, and more importantly from a policy perspective, the current government is already investing heavily in improving preschool attendance and hence from an efficiency point of view it is important to know what the current barriers—financial, geographic and other—might be.

Table 6 summarises results for those aged 3, 4 or 5 years who are not currently attending school. That is, those currently attending a Year One or a pre-Year One program in a school are excluded from the analysis.<sup>9</sup> The dependent variable is the probability of these non-school students attending a preschool,<sup>10</sup>

**Table 6. Factors associated with attending preschool—Indigenous children aged 3, 4 and 5 years who were not attending a Year One or pre-Year One program at school, Wave 1 (2008–09)**

Explanatory variables	Model 1	Model 2
Study child female	0.003	0.047
Study child aged 3 years	-0.193***	-0.202***
Study child aged 5 years	0.299***	0.416***
Study child's dominant language is an Indigenous language	-0.051	0.026
Study child goes to cultural events often or very often	0.121**	0.091
Study child is taught traditional practices often or very often	-0.100	-0.028
Study child is taught traditional arts often or very often	0.099	0.043
Study child identified with a tribal group, a language group or clan	0.100*	0.123
Study child has a connection to a country or place	-0.077	-0.086
Study child has lived in two or more homes since birth	-0.085*	-0.103
There are no children's books in the household		0.195
Main carer is male		0.138
Main carer is Non-Indigenous		0.078
Main carer is aged 15–19		-0.072
Main carer is aged 30+		-0.144*
Main carer has a spouse living in the same household		-0.008
Main carer is a current student		0.021
Main carer is employed		0.136
Main carer is employed part-time (as opposed to full-time)		-0.142
Income of carer and partner is less than \$250 per week (after deductions)		-0.087
Income of carer and partner is more than \$800 per week (after deductions)		0.106
Receives extra assistance with household expenses		-0.112
Changed usual residence in the previous 12 months		-0.183**
Lives in an area with an IRSEO in the 2nd quartile		0.270***
Lives in an area with an IRSEO in the 3rd quartile		0.304***
Lives in an area with an IRSEO in the 4th quartile		0.129
Lives in an area of low relative isolation		-0.090
Lives in an area of moderate relative isolation		-0.116
Lives in an area of high/extreme relative isolation		0.053
Main carer was discriminated against because they are Indigenous		-0.109*
Predicted probability of base case	0.465	0.435
Pseudo R-Squared	0.0600	0.1405
Number of observations	513	343
<p><b>Note:</b> Variables for which the coefficient is statistically significant at the 1% level of significance are labelled ***; those statistically significant at the 5% level of significance only are labelled **, whereas those statistically significant at the 10% level of significance only are labelled *.</p> <p><b>Source:</b> Customised calculations using Wave 1 of the LSIC.</p>		

with Model 1 including characteristics of the child and Model 2 characteristics of the child's carer, household and the area in which they live (in addition to the variables from Model 1).

Results are presented as marginal effects or the difference in the predicted probability of attending preschool after changing one characteristic but keeping all else constant. The way in which statistical significance is reported is given underneath the table.

Looking at the results from Model 1, it is clear that there is a large difference in preschool participation by age, with 3 year olds much less likely to be attending than 4 year olds, and 5 year olds much more likely. While this is not surprising, it is important to keep in mind that the other results hold after controlling for age. Because of the relatively small sample size, it is quite likely that some of the other variables that were not found to be significant nonetheless do have an association. Nonetheless, a few interesting results emerge from the analysis. First, going to cultural events and identifying with a tribal group, a language group or clan were both associated with higher rates of participation. While some of the other variables that were related to Indigenous cultural maintenance were negative, it would seem that attendance at preschool and maintenance of Indigenous culture is not mutually exclusive.

The second important result from Model 1 is that those children who have lived in two or more homes since birth are significantly less likely to be participating in preschool than those who had lived in the same household since birth. This implies that disruption from changing households can have a negative effect on early childhood education, not just infants, primary and secondary education.

Although some of the marginal effects for the carer and family variables were reasonably large, few of them were statistically significant. This shows once again that, because of the relatively low sample size of the child cohort in the LSIC, it is difficult to be too definitive about all the variables that are associated with preschool attendance. One variable that emerges as being important is a change in usual residence, highlighting once again the disruptive effects of instability on preschool participation. Interestingly, the areas that are identified as having the highest level of participation are those in the second and third quartile in terms of socioeconomic disadvantage. Access issues may explain why those children in the most disadvantaged areas have relatively low rates of participation and it may be that the parents of children in the most advantaged areas use other forms of childcare or early childhood education than preschool.

The finding from Table 6 with probably the most policy relevance is that those children who have a carer who felt they were discriminated against because of their Indigenous status are significantly less likely to be attending preschool. Formal, mainstream education has the potential to be alienating for Indigenous students and their families, with Biddle (2007) showing that children who grow up in areas with a greater number of Indigenous preschool workers being more likely to participate. While it is not possible to be too definitive about the causal relationships, the results in Table 6 give circumstantial evidence that ongoing discrimination is a further cause of disengagement from formal education.

The results presented in this section have demonstrated substantial variation across the population in preschool participation. There are clear policy implications from these results, including, for example, the potential for carer discrimination to inhibit child education participation. However, the final implication to note is methodological. Specifically, if one finds differences in later school outcomes by preschool attendance, then this may be being driven by the different types of children who go to preschool compared to those who do not. Longitudinal data like the LSIC allows researchers to control for such observable characteristics and the results from future waves will be keenly analysed with this in mind. However, even a rich dataset like the LSIC can only explain a small amount of the variation in attendance and there are likely to be unobservable characteristics that are also associated with later outcomes. Ultimately, a true understanding of the effect of preschool will only be possible through the analysis of randomised controlled trials which include Indigenous children, like the Perry Preschool Program discussed in Barnett (1998).

## HOUSEHOLD MEASURES

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Access to good quality early childhood education is likely to be one of the most effective ways to reduce social inequity. However, adequate housing is also a fundamental human need for survival and protection from the environment (Human rights and Equal Opportunity Commission (HREOC) 1996). Homelessness and overcrowding—in essence, the inability of the housing stock in a particular area to meet the needs of a community's usual residents—have significant negative impacts on a number of outcomes. The impact of inadequate housing on health outcomes has been identified historically (Gauldie 1974; Thomson, Petticrew & Morrison 2001), as well as more specifically for the Indigenous population of Australia (Baillie & Wayte 2006; Pholeros, Rainow & Torzillo 1993). However, the efficacy of any policy responses to high levels of overcrowding will depend heavily on the local housing market and dominant tenure type in the region. For example, AIHW (2005: 42) showed that in 2001 there was greater disparity in levels of overcrowding between Indigenous and other households in public or community rental compared to other tenure types. Furthermore, Memmott et al. (2009) identified a number of intrinsic benefits of home ownership, including stability and the ability to pass a house down in the family.

The LSIC is not a housing survey per se. The focus of the majority of the questions is on the characteristics of the child or their main carer. However, there are a few questions on housing that are of particular relevance. The first is on the number of bedrooms in the dwelling in which a person lives. From this, we can derive an occupancy rate (the number of bedrooms per person) either as a continuous variable or as a binary variable for whether the house meets a certain threshold. The threshold used in this paper is whether or not the household has less than one bedroom per person. This is not quite a measure of overcrowding as it is generally accepted that some individuals in a household (couples, young siblings, siblings of the same gender) can and often want to share a bedroom. However, analysis in Biddle (2009c) shows that it does correlate very highly with more sophisticated measures of overcrowding at the area level.<sup>11</sup>

A second important measure of housing on the LSIC is whether, according to the main carer, the dwelling has any major things that need fixing. Table 7 looks at variation in the above three household measures—average number of bedrooms per person, proportion of households with less than one bedroom person, and the proportion of dwellings that need major repairs. These averages/proportions are calculated separately by sex, cohort, LORI and IRSEO. A fifth categorisation in the table is the tenure type of the dwelling. Those who live in a dwelling rented through the private rental market are compared to those who live a dwelling owned or being purchased by one of the usual residents, as are those living in a dwelling rented from a State or Territory agency or from a community organisation.<sup>12</sup>

**Table 7. Household characteristics, Wave 1 (2008–09)**

Variable	Number of bedrooms per person	Proportion in dwelling with less than one bedroom per person	Dwelling needs major repairs
<b>Sex</b>			
<i>Male</i>	0.74	0.73	0.40
Female	0.75	0.73	0.40
<b>Cohort</b>			
<i>Babies</i>	0.74	0.72	0.40
Kids	0.75	0.74	0.41
<b>LORI</b>			
<i>None</i>	0.80	0.69	0.33
Low	0.76**	0.72	0.38*
Moderate	0.64***	0.82***	0.46***
High/Extreme	0.69***	0.77**	0.61***
<b>IRSEO</b>			
<i>First quartile</i>	0.80	0.68	0.33
Second quartile	0.77	0.71	0.33
Third quartile	0.67***	0.80***	0.48***
Fourth quartile	0.74	0.72	0.57***
<b>Tenure</b>			
<i>Owner/purchaser</i>	0.86	0.62	0.20
Private rental	0.77***	0.70*	0.29***
State/Territory rental	0.68***	0.80***	0.49***
Community rental	0.72***	0.74***	0.52***
<p>Note: The reference category is marked in <i>italics</i>. Proportions or means which are significantly different from the reference category at the 1% level of significance are labelled ***; those significantly different at the 5% level of significance only are labelled **; whereas those significantly different at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Wave 1 of the LSIC.</p>			

The first two sets of results show that there were very few differences in occupancy/overcrowding and dwellings needing major repair by the gender of the study child or the cohort. The former finding is not surprising, although one may have suspected that as children get older their housing circumstances (at least in terms of occupancy) change. This was not borne out in the data.

Unlike the characteristics of the child, there was significant and substantial variation by LORI and IRSEO in terms of occupancy/overcrowding and whether or not the dwelling was deemed to need major repairs. Those who lived in the least isolated areas and areas with the most advantaged usual residents had a greater number of bedrooms per usual resident. They were therefore less likely to live in a dwelling with less than one bedroom per person and less likely to identify that the house needed major repairs. There was not, however, consistent variation across the other three categories within each of the area-level measures.



Those houses in the moderate LORI, or second most isolated areas, had the fewest number of bedrooms per person and the greatest proportion of the population living in a dwelling with less than one bedroom per person. Overcrowding (at least based on this proxy measure) was not highest in the most isolated areas, but rather those areas that were moderately isolated. However, the dwellings which were most likely to be in need of repair were found in the high or extreme isolation areas—reflecting in part the substantially higher costs involved in repairing these types of dwellings. A similar non-linear pattern was found by IRSEO.

Building on the results in Biddle and Yap (2010) and AIHW (2005), there was also significant variation in dwelling characteristics by tenure. Those dwellings with the least amount of overcrowding and the least likelihood of needing major repair were owned or being purchased by the usual residents. This reflects not only the greater material resources of the types of people who live in these houses, but also the greater incentive for people to maintain a dwelling that they are likely to continue to use. Compared to owner-occupiers, those dwellings rented from State or Territory agencies had the highest level of overcrowding, whereas those rented from a community organisation had the highest rates of repair needed.

These variables on housing in the LSIC are useful for explaining other individual outcomes or trajectories. For example, it was shown earlier that those who live in dwellings needing major repair have lower levels of social and emotional wellbeing. Also, the results in the penultimate section of this paper show that children and/or carers are more likely to move if they live in overcrowded dwellings—even after controlling for a range of other characteristics. In and of themselves though, they do not tell us too much beyond what can be found in the census or the NATSISS. However, the strength of the LSIC lies in being able to track individuals through time and see how their housing circumstances change.

One interesting use of the LSIC is to test whether there are particular factors that are associated with whether or not the repairs that were identified by the carer in Wave 1 were repaired by Wave 2. This is not possible to test definitively as the survey does not ask about specific repairs. However, we can see whether a person who identified repairs as needing to be done in Wave 1 still identified repairs as needing to be done in Wave 2. When one does so, the lack of variation across the population is both interesting and, to a certain extent, heartening from a public policy point of view.

Across the sample, there were 395 dwellings that were identified in Wave 1 as needing major repairs, had an observation for Wave 2 and had the same main carer responding to the survey. Of these, 174 or 44.1 per cent were identified as no longer needing repairs. It may be the case that the repairs that needed to be done on some of the other 221 dwellings had been done, but other repairs were now needed. However, this result does show a fair degree of improvement through time (although of course, some of the dwellings that didn't need repair in Wave 1 may need repair in Wave 2).

There was no statistically significant difference in the rate at which repairs had been done by income of the carer. This may reflect the relatively low sample size, as the proportions were slightly different—0.39 for those in the low income group compared to 0.45 for the rest of the population. However, even if these differences held for the population as a whole, this is not a terribly large gap. It may also reflect the difficulty in collecting income data in a survey such as the LSIC. Most importantly, there were no differences by tenure. That is, although those who live in houses rented from the private rental market or from State/Territory or Community organisations are more likely to identify repairs needing to be done, they are just as likely to have had those repairs made between waves.

## COMMUNITY INDICATORS—SELF-REPORTED AND STATISTICAL

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The two types of area variables used in most analysis of Indigenous (and non-Indigenous) outcomes are the socioeconomic status of the area's usual residents and the relative position of the area in some form of remoteness hierarchy. While not always made explicit, the assumption often seems to be that a person's experience of the area in which they live is more or less captured by these two types of variables.

This assumption is often made due to a lack of alternative data items. However, in reality, a person's experiences of the area in which they live extends way beyond the level of remoteness (or isolation) and the level of socioeconomic disadvantage. Just as income, employment or physical health does not adequately capture an individual's wellbeing, standard statistical measures of an area do not capture the wellbeing of the community. Fortunately, in addition to including individual measures of wellbeing, the LSIC also includes three subjective measures of the wellbeing of the community. These are:

- if the main carer thinks it is a good community or neighbourhood for little kids
- if the main carer thinks there are good places for kids to play in the community or neighbourhood
- how safe the main carer would say the community or neighbourhood is.

These measures of subjective community wellbeing will be used later in this paper to explain a person's migration decision. In Table 8, however, I look at the proportion of the population who report the community/neighbourhood as okay, not so good, or really bad (for the first variable); report no places to play (for the second variable); and say the community/neighbourhood is okay, not very safe, or dangerous (for the last variable). In order to compare these subjective measures of community wellbeing with the aforementioned statistical measures, proportions are calculated separately by relative isolation and socioeconomic status of the area.

The results presented in Table 8 show that there is significant variation in the subjective measures of community wellbeing by isolation and the socioeconomic status of the area's usual residents. However, this is not always in the direction that one might expect. On the one hand, those carers of Indigenous children who live in the least isolated areas, or the areas with the most advantaged usual residents, tend to report higher levels of subjective community wellbeing (based on these outcomes). Outside of these areas though, the effect of isolation or socioeconomic status is not linear.

Looking first at relative isolation, those carers of Indigenous children who live in the areas identified as being of moderate isolation have the highest probability of reporting that the community in which they live is not good for little kids, has few places for children to play, or is not safe. While those carers who live in areas with high or extreme isolation are more likely to report that there were few places to play compared to those who lived in areas with no isolation, there was no significant difference for the other two variables. What Table 8 shows, therefore, is that with regards to the three subjective measures of community wellbeing in the LSIC, the areas with the worst outcomes are not the most isolated, but rather those somewhere in between. That is, large and small regional centres.

The second part of Table 8 shows that the spread of the self-assessed measures of community wellbeing is much greater by the socioeconomic characteristics of the area's usual residents than it is by the index of relative isolation. Furthermore, there is a much clearer gradient, with those carers in the areas with the most disadvantaged usual residents tending to report lower levels of community wellbeing than those in the most advantaged areas and, for there being no places to play or the community not being safe, than those in the second most advantaged quartile of areas.

**Table 8. Comparison of self-reported measures of community and statistical measures from 2006 Census, Wave 1 (2008–09)**

	Community not good for kids	No places to play	Community not safe
<b>LORI</b>			
<i>None</i>	0.33	0.16	0.43
Low	0.39**	0.29***	0.46
Moderate	0.44***	0.43***	0.51*
High/extreme	0.32	0.29***	0.48
<b>IRSEO</b>			
<i>1st quartile</i>	0.24	0.10	0.33
2nd quartile	0.38***	0.22***	0.45***
3rd quartile	0.43***	0.41***	0.53***
4th quartile	0.38***	0.34***	0.54***
<p>Note: The reference category is marked in <i>italics</i>. Proportions or means which are significantly different from the reference category at the 1% level of significance are labelled ***; those significantly different at the 5% level of significance only are labelled **; whereas those significantly different at the 10% level of significance only are labelled *.</p> <p>Source: Customised calculations using Wave 1 of the LSIC.</p>			

Ultimately, the results in Table 8 show that subjective measures of community wellbeing tend to be associated with geographic isolation and the socioeconomic characteristics of the area. However, this association isn't always linear and one should not assume that the most isolated areas or those with the most socioeconomically disadvantaged usual residents are those with the lowest wellbeing.

## LONGITUDINAL DETERMINANTS OF MIGRATION

At first glance, census-based analysis on Indigenous population movement suggests higher rates of migration and mobility relative to the non-Indigenous population. Between 2001 and 2006, 46.5 per cent of the Indigenous population changed their place of usual residence, compared to 43.1 per cent for the non-Indigenous population, as reported in Biddle (2009c).

While these percentage comparisons paint an initial picture of a relatively mobile Indigenous population, more detailed analysis by geography and across the lifecourse shows a more complex set of patterns that is obscured by a single summary figure (Biddle & Yap 2010). Both populations exhibit a similar pattern of migration and mobility across the lifecourse, with rates starting off high, declining throughout the school years, reaching a peak in a person's mid- to late-twenties, and then declining slowly across a person's thirties, forties and fifties. However, the size and the duration of the different peaks and troughs are often quite different for Indigenous and non-Indigenous Australians.

Taking these two sets of results together, Biddle and Yap (2010) and Taylor (2006) showed that rates of migration for the Indigenous population converged quite dramatically when the age distributions of the two populations were controlled for. It is not so much that the Indigenous population is more likely to change usual residence than the non-Indigenous population, but rather that there are more Indigenous Australians who are of the age where migration is at its highest.

People change usual residence for a number of reasons, with the literature (summarised in Greenwood 1997) identifying a number of push-and-pull factors that make the decision more or less likely.

Push factors, or factors related to the person's source area, include local housing or labour market characteristics, political conditions, climate and the presence or absence of social networks. If on balance the characteristics of potential destination areas (pull factors) are more favourable, then a person is more likely to make the decision to move. However there are significant financial and psychological costs associated with migration that need to be weighed up against the benefits before a potential move is considered worthwhile. Furthermore, the decision to migrate is often made at the family or household level, with the gains or losses for one member of the family or household needing to be traded against the gains or losses for other members.

One of the major limitations of analysing the causes (and consequences) of Indigenous migration has been the absence of longitudinal databases. At the individual level, it has only been possible to compare those who move and those who don't move in terms of their characteristics after the migration has occurred. Apart from time-invariant characteristics (like age and sex), this does not tell us much about the motivations for moving, because the act of migration itself may have changed those characteristics. For example, analysis in Biddle and Yap (2010) showed that the employed Indigenous population is less likely to have changed usual residence over the previous five years compared to those not employed. However, analysis presented in Biddle (2010) showed that it may be migration that worsened employment outcomes, rather than employment leading to lower levels of migration.

In the analysis presented in this section of the paper, I exploit the longitudinal nature of the LSIC and compare the probability of having changed one's place of usual residence between Waves 1 and 2 with the characteristics in Wave 1 of the child, their carer, the house in which they live and their community. Having main caring responsibility for a young child may impact on both the motivation and the ability to move. The results presented in Table 9 are therefore not indicative of the determinants of migration for the total Indigenous population. Nonetheless, they are relevant for a large minority of Indigenous Australians.

Results in Table 9 are once again presented as marginal effects, or the difference in the probability of having moved for someone with that characteristic compared to someone with the 'base case' characteristics. Statistical significance is also once again indicated by the number of asterisks after the marginal effect (with no asterisks indicating the variable is not statistically significant at the 10% level of significance). It should also be noted that, in order to be able to use characteristics of both the carer and child, records where the main carer of the child changed between waves were not included in the analysis.

The marginal effect in the first line of the table shows that those carers of Indigenous children who changed usual residence in the year leading up to Wave 1 of the LSIC were more likely to change usual residence again in the year (or so) that followed. This may be because having only lived in an area for a short period of time, these carers have fewer ties to the area. That is, it is an indication of chronic movement or previous geographic instability, leading to (or at least being associated with) ongoing instability (Skelton 2002).

The age of both the child and carer were associated with the probability of changing usual residence. It is not clear why, but the results presented in Table 9 show that Indigenous children aged 2 years are significantly less likely to have changed usual residence than those aged 1 year. A little easier to explain is the finding that the older the carer, the lower the probability of moving. This finding reflects the lifecourse patterns outlined in Biddle (2009c) and Biddle and Yap (2010). Another finding in line with previous research is that those who live in mixed Indigenous and non-Indigenous households have higher levels of mobility than those who lived in Indigenous-only households, confirming the invalidity of assuming Indigenous Australians are always more mobile than their non-Indigenous counterparts.

Perhaps the most surprising finding from Table 9 was that those children whose main carer was employed in Wave 1 were significantly and substantially more likely to move than those who were not employed.

**Table 9. Wave 1 factors associated with change in usual residence between Wave 1 (2008–09) and Wave 2 (2009)**

Explanatory variables	Marginal effects
Changed usual residence in the year preceding Wave 1	0.155***
Study child aged 0	-0.014
Study child aged 2	-0.114*
Study child aged 3	-0.047
Study child aged 4	-0.028
Study child aged 5	-0.047
Study child attending preschool	-0.039
Study child attending a Year 1 or pre-Year 1 program in a school	0.011
Main carer male	0.065
Main carer non-Indigenous	-0.046
Main carer aged 15–19 years	0.027
Main carer aged 25–29 years	-0.059*
Main carer aged 30+	-0.074**
Main carer has spouse living at home	-0.044
Additional child in household	0.003
Additional adult in household	0.011
Household has both Indigenous and non-Indigenous usual residents	0.082*
Main carer speaks an Indigenous language	0.002
Main carer speaks English well or very well	-0.078
Main carer currently studying	0.058
Main carer employed	0.113**
Main carer employed part-time (as opposed to full-time)	-0.092**
Usually runs out of money before payday or is spending more money than receives in income	-0.003
Can save at least a bit of income every now and then	-0.061**
Income of carer and partner is less than \$250 per week (after deductions)	-0.022
Income of carer and partner is more than \$800 per week (after deductions)	0.000
Receives extra assistance with household expenses	-0.014
Lives in a house rented from a private landlord	0.305***
Lives in a house rented from a State/Territory government	0.062
Lives in a house rented from a community organisation	0.121*
Has an 'other' tenure type	0.205
Household is identified as having major things that need fixing	0.006
Household has less than one bedroom per person	0.067*
Lives in an area with an IRSEO in the 2nd quartile	-0.028
Lives in an area with an IRSEO in the 3rd quartile	0.010
Lives in an area with an IRSEO in the 4th quartile	-0.055
Lives in an area of low relative isolation	-0.006
Lives in an area of moderate relative isolation	0.018
Lives in an area of high/extreme relative isolation	-0.074
Community or neighbourhood not good for little kids	0.018
No good places for kids to play in the community or neighbourhood	0.054
In terms of safety, community or neighbourhood is either OK, not very safe or dangerous	-0.006
Predicted probability of the base case	0.177
Pseudo R-Squared	0.1300
Number of observations	1,098

**Note:** Variables for which the coefficient is statistically significant at the 1% level of significance are labelled \*\*\*; those statistically significant at the 5% level of significance only are labelled \*\*, whereas those statistically significant at the 10% level of significance only are labelled \*

**Source:** Customised calculations using Waves 1 and 2 of the LSIC.

Furthermore, the marginal effect for part-time employment status shows that this effect is only really for those employed full-time. This finding is in contrast to previous analysis which showed employment putting a brake on mobility. For carers of babies and young children at least, it would seem that employment encourages rather than discourages movement, perhaps because it provides the means for movement or because those carers who need to be employed when their children are young need to move to where the jobs are. Whatever the explanation, the result highlights the benefit of using longitudinal data to analyse migration.

Taking the results in the second half of the table together, it would appear that the characteristics of one's dwelling is a more important factor in explaining population movement than the characteristics of the area in which one lives. Those Indigenous children/carers who live in a house rented from a private landlord are significantly and substantially more likely to move in the subsequent year than those who live in a house owned or being purchased by its residents. Those who live in a house rented from a State/Territory or a community housing organisation are slightly more likely to move than those in owner-occupied dwellings, but they are less likely to move than those in the private rental market. This reinforces the point made in Sanders (2005) that community and government housing puts a brake on Indigenous mobility relative to the private rental market.

Those who live in a household that has less than one bedroom per person are more likely to change usual residence than those who do not. While this is a crude proxy at best, this result does show the potential effect of overcrowding on the motivation to move.

It is interesting to note that there were no community or area-level variables that were found to have a significant association with population movement. Admittedly, some of the marginal effects were reasonably large, implying that the relatively low sample size does introduce a substantial degree of uncertainty to the analysis. This aside, the results are suggestive of the strong ties that many Indigenous people have to the community or area in which they live. Indigenous Australians appear to be reasonably open to moving from a dwelling that has a large number of usual residents relative to the number of bedrooms. However, because of either ties to the area or a lack of means, they do not seem willing or able to move from areas which are socioeconomically disadvantaged (as measured by the census), or which are subjectively identified as not being ideal places for children to grow up or play in.

## CONCLUDING COMMENTS

Due to the exploratory nature of this paper a range of research questions were considered. Because of this, it is difficult to draw out any overarching concluding comments. However, one recurring theme from the paper is the ability of longitudinal data like the LSIC to provide answers to a range of policy-relevant questions that could not be answered using cross-sectional databases. For example, it was shown that not only do houses in more isolated or socioeconomically disadvantaged areas have a greater number of usual residents, but that there is also a greater degree of turnover within these houses. An additional insight was the finding that area-level socioeconomic disadvantage was not associated in a cross-sectional sense with social and emotional wellbeing, but was associated with changes in negative emotional wellbeing through time. Finally, the results presented in this paper showed that a large proportion of houses that were deemed to need repairs in one year were no longer identified as doing so in subsequent years. Importantly, this was true across all tenure types.

Perhaps the most relevant analysis from a research point of view is the comparison of migration rates over a given year with the characteristics of individuals, their household and their community at the start of that period. All previous analysis of Indigenous migration has either been qualitative—very useful but not always easy to generalise from—or cross-sectional. By using longitudinal data it was possible

to show that previous changes in usual residence were associated with future migration. Much of the migration that occurs amongst Indigenous Australians comes from chronic movers. It was also possible to show with longitudinal data that the characteristics of Indigenous households—namely tenure type and overcrowding—were some of the more important determinants of migration in the subsequent period. By way of comparison, there was very little association with community-level characteristics.

The above is but a taste of the insights that will emerge from analysis of the LSIC, as more researchers make use of it and a greater number of waves and variables become available. However, what these results also bring into focus is the lack of longitudinal information across the Indigenous lifecourse. The characteristics of Indigenous children and their carers are important from a policy perspective. However, so too are other demographic groups. The Longitudinal Survey of Australian Youth (LSAY) has a large Indigenous sample, so we know a little bit about the determinants of later school outcomes and the post-school transition. However, we know very little in a longitudinal sense about what happens between early childhood and late adolescence. As the results in Biddle (2011c) show, by the time an Indigenous youth reaches 15 years of age (when the LSAY picks them up), much of their education trajectory has been determined.

As mentioned, the LSIC can tell us a lot about how the characteristics of the carers of Indigenous children change through time. As later waves of the LSIC become available it will be interesting to compare how wellbeing and other measures change as their children grow and enter schooling age. However, because the LSIC sample is explicitly focused on children, we know nothing about the characteristics of the adult respondents before they became parents or carers.

Finally, neither the LSIC nor the LSAY can tell us anything about the lifecourse outcomes of relatively older Indigenous Australians. It was mentioned at the start of this paper that the current Indigenous population is relatively young. Between 2006 and 2031, Biddle and Taylor (2009) project that the Indigenous population aged 0–4 years will grow by 25.4 per cent, and the population aged 5–14 years by 20.9 per cent. Annualised, these are very rapid growth rates, outstripping those of the non-Indigenous population. However, Biddle and Taylor (2009) project that the population aged 25–54 years will grow by 76.1 per cent, and the population 55 years and over by 218.2 per cent. In essence, the Indigenous population is projected to age quite rapidly over the next 25 years. However, we know very little in an empirical sense about the processes that lead to a successful transition into prime working age and then into retirement for the Indigenous population.

Biddle and Yap (2010) outlined a proposal for a new National Closing the Gap Survey that could be integrated with existing ABS data collections to provide a more up-to-date assessment of COAG's Closing the Gap targets, and also allow the determinants of a range of wellbeing outcomes to be properly established. This proposal is just one of a number of ways in which a longitudinal database could be constructed to inform policy across the whole of the Indigenous lifecourse. With such a large focus on Indigenous policy in Australia and considerable resources devoted to improving the wellbeing of the Indigenous population, all levels of government should be steadfastly committed to doing so in the most effective, efficient and equitable way possible. In addition to ethically conducted randomised controlled trials (Leigh 2010), longitudinal databases are arguably the most effective way to design policy that meets these three aims. One of the greatest contributions of the LSIC may be to demonstrate the feasibility and desirability of having such evidence for all Indigenous Australians, not just children and their carers.



## NOTES

1. Rankings for individual areas are available for download at:  
<<http://caepr.anu.edu.au/Publications/WP/2009WP50.php>>.
2. The first of these surveys was simply called the National Aboriginal and Torres Strait Islander Survey.
3. The survey has been renamed the Australian Health Survey, and will be in the field from mid-2011. More detail can be found at <<http://www.abs.gov.au/websitedbs/D3310114.nsf/home/Australian+Health+Survey+-+News+and+Overview>>.
4. For more information see the discussion on *Adapting the AEDI for Indigenous Children* at <[http://www.rch.org.au/aedi/about.cfm?doc\\_id=13283](http://www.rch.org.au/aedi/about.cfm?doc_id=13283)>.
5. According to FaHCSIA:  
*Footprints in Time* uses a classification system of remoteness known as the level of relative isolation (LORI). Previously used in the Western Australian Aboriginal Child Health Survey (WAACHS), LORI is based on an extension of the 18-point ARIA (Accessibility/Remoteness Index of Australia) called ARIA++. Five categories of isolation have been defined, ranging from None (the Brisbane metropolitan area) to Low (for example, Shepparton), Moderate (for example, Derby), High (for example, Doomadgee) and Extreme (for example, Moa Island) (2009b: 33).
6. There are a number of alternative ways to summarise such data items, with the most commonly used being principal components analysis (PCA) and factor analysis. While PCA and factor analysis use similar input information, their aims are somewhat different. The focus of PCA is to summarise variation, whereas with factor analysis the aim is to identify underlying latent or unobserved variables (Darlington 1997). For both sets of factor analysis, a single-factor solution was deemed to be appropriate, as eigenvalues for the first factor were 2.9 and 2.2 respectively, with eigenvalues for the second factor of 0.4 and 0.1.
7. The Household Income and Labour Dynamics in Australia (HILDA) survey has a range of questions on subjective emotional wellbeing and life satisfaction that are repeated in each wave. While this survey is useful for making broad comparisons between the Indigenous and non-Indigenous population, the sample in the survey is not large enough to make comparisons within the Indigenous population.
8. Only new entrants to the LSIC were given the *Strong Souls* questionnaire in Wave 2. As such, the factor analysis was not repeated.
9. Year One or pre-Year One programs in school are known by different names in different states. That is: Pre-primary (Western Australia); Kindergarten (New South Wales and the ACT); Preparatory (Victoria and Tasmania); Prep (Queensland); Reception (South Australia); and Transition (the Northern Territory).
10. The study child's parents were asked whether the child goes to preschool, kindergarten or school. Options for types of preschool are: preschool program in a school; preschool program in a non-school centre; and mobile preschool.
11. Given the range of information on the survey, it might be possible to derive some of these more sophisticated measures, like the Canadian National Occupancy Standard, using the LSIC. Data administrators may consider doing so for standard data outputs.
12. There is an 'other' category that is used in later analysis in this paper which includes those who are occupying the dwelling rent-free. However, there are too few dwellings occupied under this tenure type to make sensible comparisons.

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