# ☆ The geography of wellbeing across four longitudinal surveys

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## Introduction

A core aim of the Department of Social Services (DSS) is to improve the lifetime wellbeing of people and families in Australia. In 2014, The National Centre for Longitudinal Data (NCLD) was established within DSS to help leverage greater analytical value from the longitudinal data assets held by the Department and more broadly across government. The key objectives of the NCLD are to:

- enhance the predictive power of DSS longitudinal data by increasing linkages between administrative and survey data

- influence the architecture of longitudinal surveys in Australia through collaboration and discussion with agencies and organisations who manage other surveys.

At present the Department has four active longitudinal studies[1]. They are:

- The Household, Income and Labour Dynamics in Australia survey (HILDA)

- Growing Up in Australia: The Longitudinal Study of Australian Children (LSAC)

- Footprints in Time: The Longitudinal Study of Indigenous Children (LSIC)

- Building a New Life in Australia: The Longitudinal Study of Humanitarian Migrants (BNLA).

These studies provide a wealth of data about a wide range of issues across the diversity of Australia's population. Collectively the four studies have in excess of 38,000 participants with data collection occurring in urban, regional and remote areas of Australia (See Figure 1). All of them contain a variety of health and wellbeing data which can be interrogated at various geographical scales. As such, the potential for conducting national level analysis of health and wellbeing issues is considerable. This paper will highlight some of the relationships between mental health and geography (using the ABS Remoteness Structure) uncovered in cursory analyses of data from the four studies.
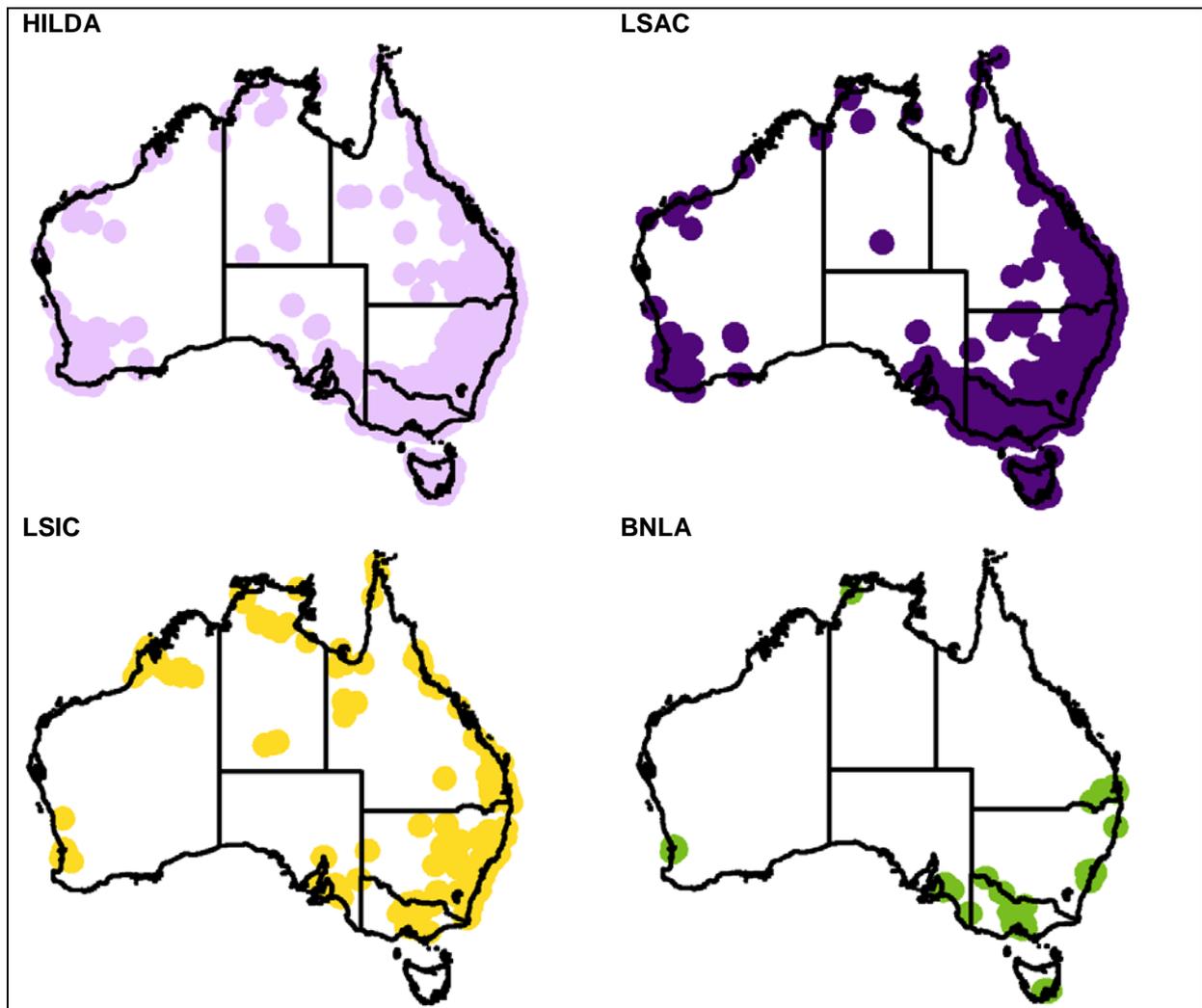
## HILDA

The 'Household, Income and Labour Dynamics in Australia' (HILDA) Survey is a household-based panel study which began in 2001. It has collected a wide range of information about economic and subjective well-being, labour market and family dynamics at annual intervals since then. It is currently into its 15th Wave. The Wave 1 panel consisted of 7,682 households and 19,914 individuals. In Wave 11 there was a top-up conducted with an additional 2,153 households and 5,477 individuals joining the study. Interviews are conducted with all adult members of each household[2].

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[1] In addition, DSS also holds data from a fifth longitudinal study, 'Journeys Home: the Longitudinal Study of Homlessness' which ran from 2011-2014. Although data collection for this study is now complete, the resultant datasets are available through the Department for further analysis.
[2] Detailed information about HILDA and its methodology is available from the Melbourne Institute website: https://www.melbourneinstitute.com/hilda/

Figure 1    Approximate distribution of participants in HILDA, LSAC, LSIC and BNLA



Being the largest and longest running, HILDA is the best known of our four studies. For some types of analyses it is possible to pool the HILDA datasets, a technique which results in approximately 200,000 data points. Using this approach with data from the first 13 waves, Figure 2 demarcates the mental health of the HILDA cohort by their remoteness of residence. For this analysis mental health was measured using the relevant items from the SF-36[3]. As is clear, although the results in all four remoteness areas are between 73 and 78, some statistically significant differences are evident. In particular, persons living in remote/very remote areas enjoy significantly better mental health than people in all other areas. Conversely, those living in major cities have statistically significant poorer mental health than all other areas. Using an alternative measure of mental health (Kessler Psychological Distress Scale K10 or K6) leads to the same conclusions.

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[3] The SF-36 is a multi-purpose, short-form health survey with only 36 questions. It yields an 8-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health summary measures and a preference-based health utility index. See http://www.sf-36.org/tools/sf36.shtml.
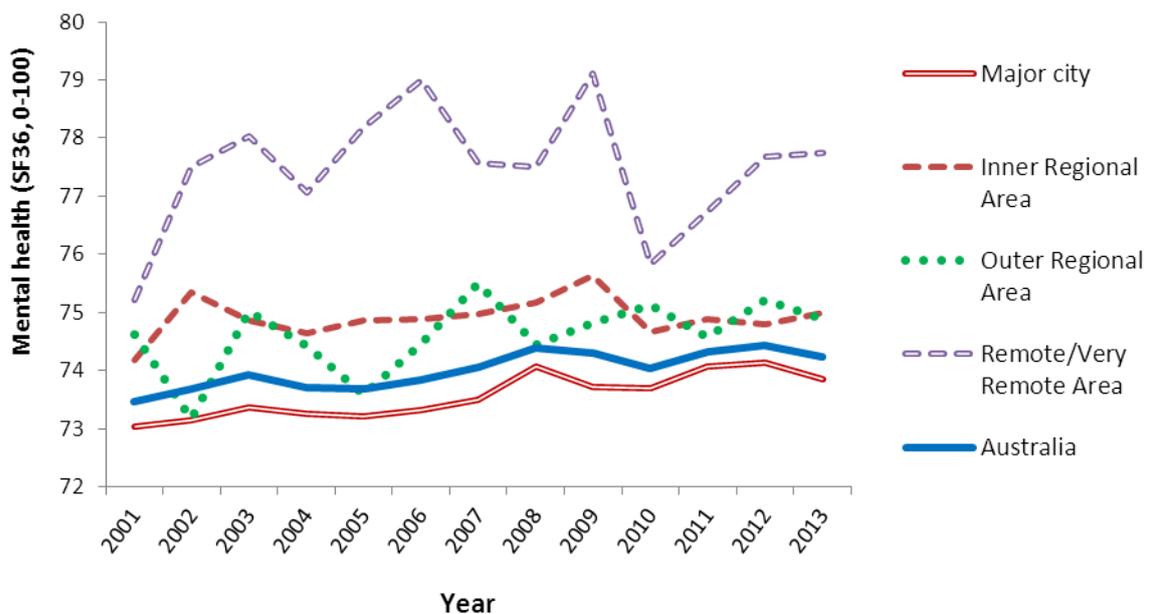
Figure 2    Mental Health (SF-36) of Australian adults (15+) by remoteness location of residence
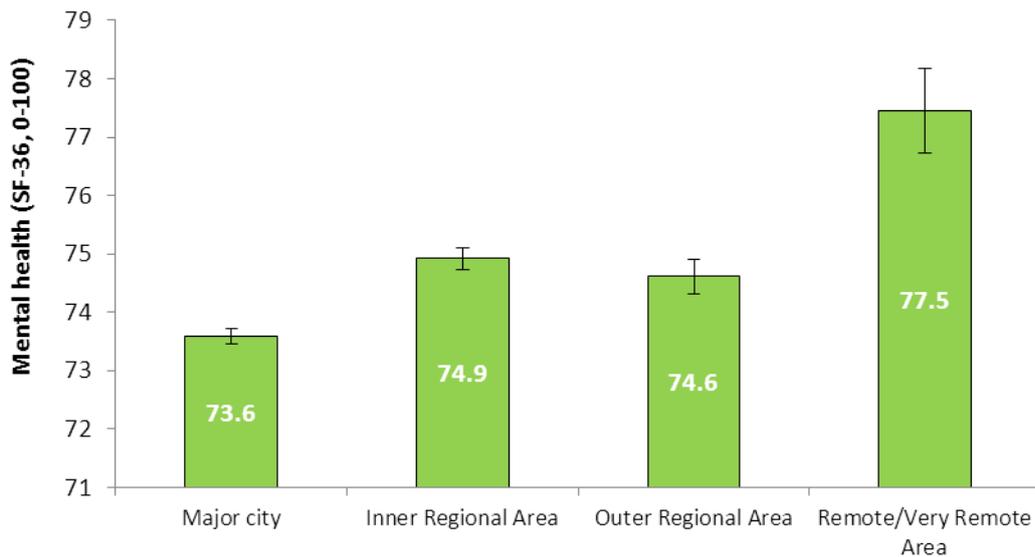


Note: Error bars represent the 95% confidence interval

With 13 waves of HILDA data it is also possible to conduct robust time-series analyses. As indicated in Figure 3, mental health of the adult Australian population improved slightly over the 13 years to 2013. Although fluctuations over the period are evident, mental health of people living in major cities was consistently lower than those in other areas, while in remote and very remote areas it was above other areas.

Figure 3    Mental Health (SF-36) of Australian adults (15+) by remoteness location of residence, 2001-2013



When the mental health of Australian adults is considered by age and remoteness (Figure 4) there is evidence of a general trend of improvement with age regardless of remoteness region, although beyond the age of 70 a decline is evident.

Figure 4    Mental Health (SF-36) of Australian adults (15+) by remoteness location of residence and age
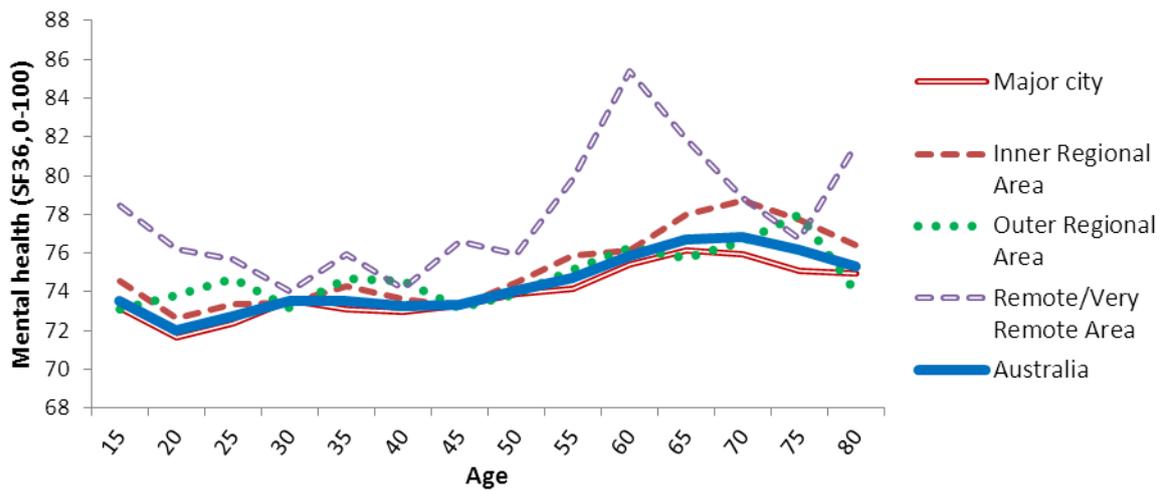


Using HILDA it is also possible to look at how the mental health of individuals fares over time by location. For our analysis we considered those who moved houses from one remoteness area to another. In Figure 5 the average mental health of persons for five years before and after moving from one remoteness area to another is plotted and divided by those who moved to a more or less remote area. As indicated, on average the mental health of persons who moved tended to decline for a number of years prior to their move and then, tended to improve during the years after the move, regardless of whether they moved to a more or less remote region.

Figure 5    Mental Health (SF-36) of Australian adults (15+) five years before and after changing remoteness area
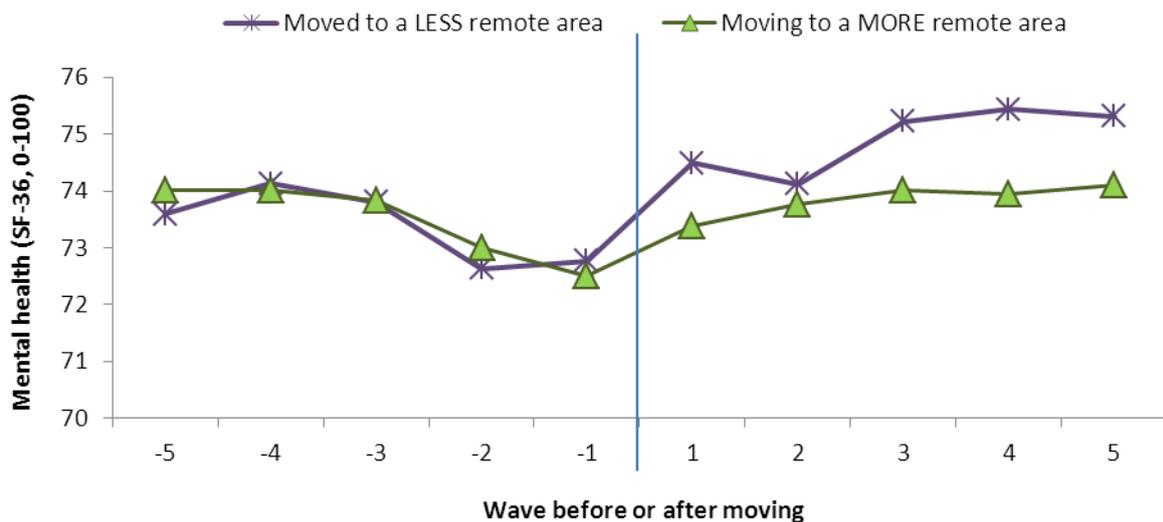


As these analyses using the pooled HILDA data indicate, there is a vast array of potential for exploiting this dataset to better understand wellbeing in Australia over time and by location. While the focus here was on mental health and remoteness indicators, other wellbeing data collected in HILDA include long-term conditions and disabilities, doctor and hospital visits and diet. Due to HILDA's large national and representative sample there is scope to conduct relatively detailed analysis at range of geographical scales and for specific sub-populations.

## LSAC

Data for 'Growing Up in Australia: The Longitudinal Study of Australian Children' (LSAC) has been collected at least biennially since 2003-04. The study's aim is to examine the development and lifetime wellbeing of those born in the late 1990s and early 2000s in the context of Australia's social

and cultural environment. The study has a broad, multi-disciplinary base and examines policy-relevant questions as it follows the cohorts through life. LSAC commenced with a representative sample of 10,000 children recruited from urban and rural areas of all states and territories of Australia. Two cohorts were recruited, the B cohort aged 0-1 years in 2004 and the K cohort aged 4-5 years. Study informants include the child (when of an appropriate age), and the child's parents (both resident and non-resident), carers and teachers[4].

Insight to the mental wellbeing of children can be obtained from the Strengths and Difficulties Questionnaire (SDQ). The SDQ is a brief behavioural screen which is widely used by researchers, clinicians and educationalists as a tool to measure the social and emotional wellbeing of children aged 3-16 years[5]. Figure 6 compares average 'Total Problem Score' as measured by the SDQ for each of the cohorts of LSAC children by their remoteness location at Wave 5. The key point of interest here is that generally the data indicates that the older children have fewer social and emotional problems than the younger cohort, except in the remote/very remote context. Indeed for the younger cohort, there is a statistically significant better average SDQ score in the remote regions than in either of the inner or outer regional areas.

Figure 6    SDQ Total Problem Score for LSAC children from Wave 5, by cohort and remoteness location
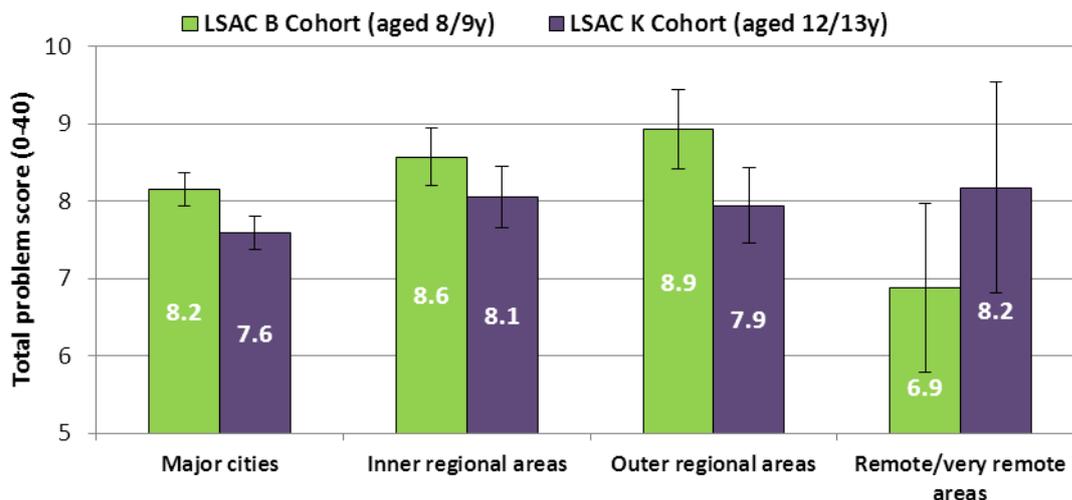


Note: Error bars represent the 95% confidence interval

Figure 7 shows how the SDQ scores of the K cohort track over time. The graph indicates that the older the children get, the less variation there tends to be between those living in different remoteness regions. While these results may be indicative of underlying trends that may be significant in larger samples, no differences are statistically significant here.

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[4] Detailed information about LSAC and its methodology is available from the Growing Up in Australia website. http://www.growingupinaustralia.gov.au/
[5] For more detailed information see: http://www.sdqinfo.org/

Figure 7    SDQ Total Problem Score for LSAC children (K Cohort), by remoteness location over time (Wave 1 to Wave 5)

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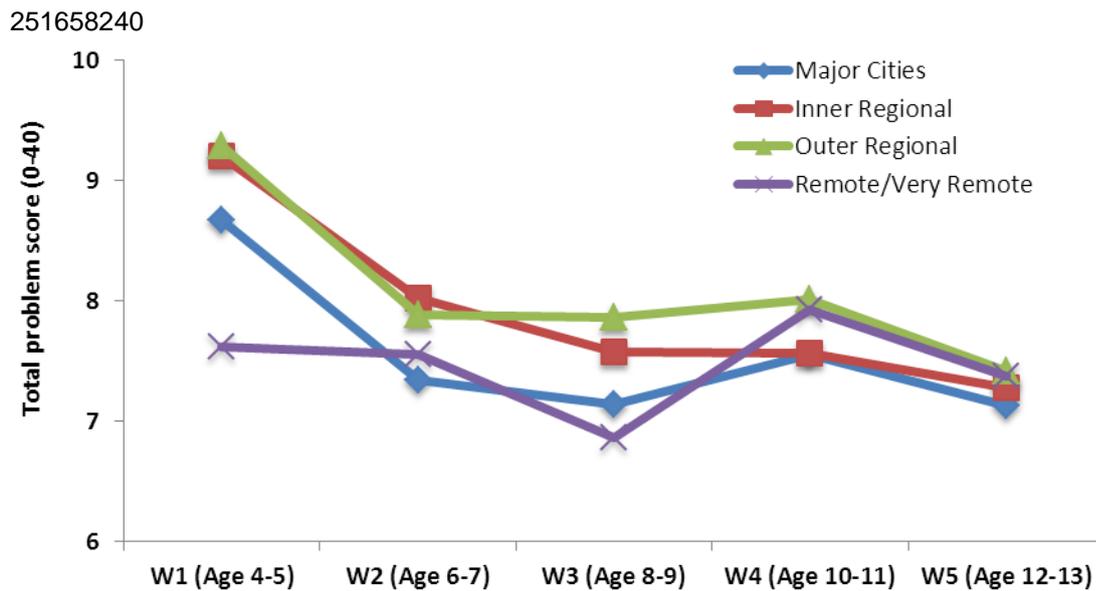


Of all the studies discussed in this paper, LSAC has within it the greatest potential for health researchers. Besides the SDQ data discussed here, LSAC also includes a wide range of other measures related to the children (e.g. diet, physical activity, personality, illness, medical treatment, PBS[6] and MBS[7] data) as well as their parents (e.g. mental and physical health, pregnancy issues, relationships, alcohol consumption and a range of other lifestyle issues). Data is available for analysis from the children in the study and also their parents.

## LSIC

Like LSAC discussed above, 'Footprints in Time: The Longitudinal Study of Indigenous Children' (LSIC) also has two cohorts of children (B cohort aged 0-1 and K cohort aged 3-5) which were recruited to the study in 2008. Data collection is annual and like LSAC involves interviews with the parents as well as the children (once old enough). LSIC has some 1,600 families participating from 11 key sites across Australia. LSIC is not a representative study of the Indigenous population but uses a cluster methodology to ensure participants were recruited from a diverse range of community types, including very remote[8].
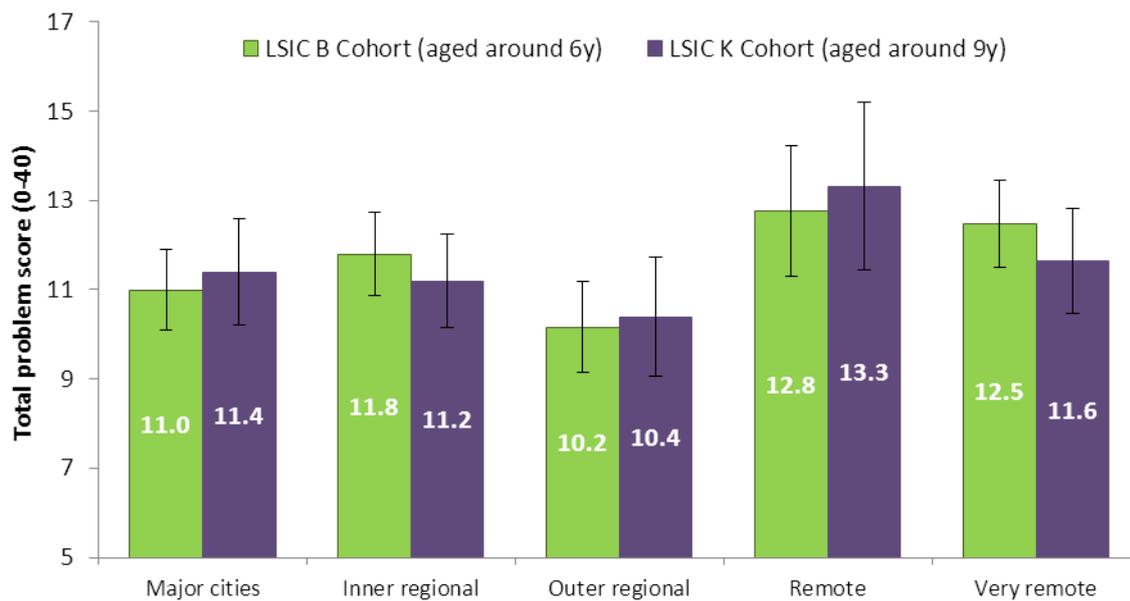
As in LSAC, the SDQ is utilised in LSIC to monitor the social and emotional wellbeing of the Indigenous children in the study. Figure 8 indicates that those in the B cohort living in outer regional areas have significantly lower 'Total Problem Scores' than those in remote areas. However this difference is not evident for the older K cohort. No other statistically significant differences are noted.

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[6] Pharmaceutical benefits scheme
[7] Medicare benefits schedule
[8] More information about LSIC and its methodology is available at: https://www.dss.gov.au/about-the-department/publications-articles/research-publications/longitudinal-data-initiatives/footprints-in-time-the-longitudinal-study-of-indigenous-children-lsicn

Figure 8     SDQ Total Problem Score for LSIC children by age cohort and remoteness location



Note: Error bars represent the 95% confidence interval

Figure 9 charts the SDQ Total Problem Scores for the LSIC children from the K cohort over time. There is no evidence of consistent patterns of change as the children get older. While those living in both major cities and inner regional areas appear to remain stable over time, the results for the other three regions vary with outer regional and very remote tending to improve with age while for remote the opposite is evident.

Figure 9     SDQ Total Problem Score for LSIC K cohort, by remoteness location and age
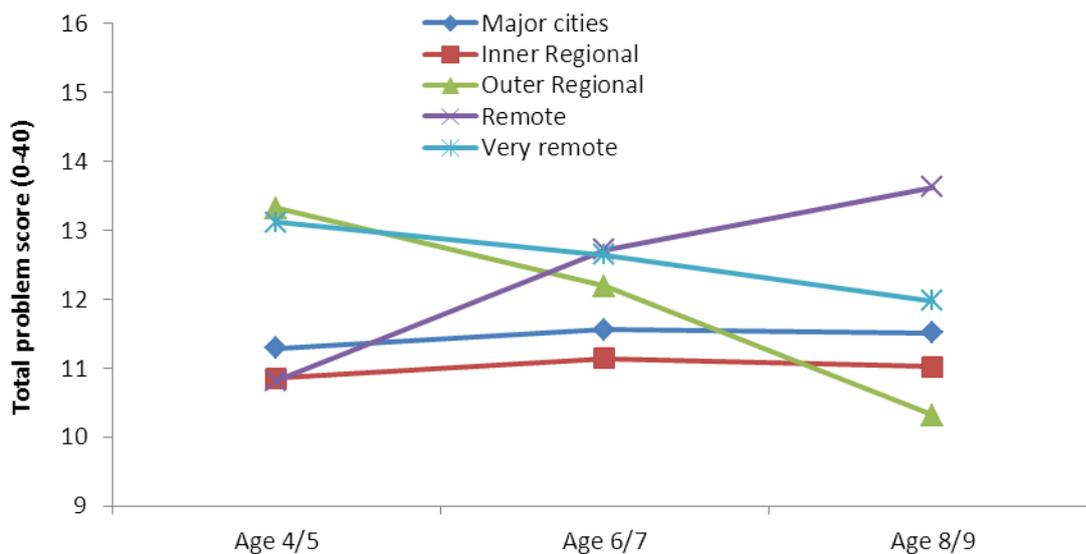


In addition to the data presented here, LSIC also captures an array of other health and wellbeing information, some of which is comparable to LSAC and other studies (e.g. dental, sleeping problems, hospitalisation and a range of specific illness and conditions) whilst some is specific to Indigenous contexts. For example, the Strong Souls Assessment Tool (specifically designed to assess the social and emotional wellbeing of Indigenous adolescents in the Aboriginal Birth Cohort Study[9]) is also

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[9] Thomas A, Cairney S, Gunthorpe W, Paradies Y, Sayers S, Strong Souls; the development and validation of a culturally appropriate tool for assessment of social and emotional wellbeing in Indigenous youth. Australia & New Zealand Journal of Psychiatry 2010; 44(1); 40–48.

included as a measure of parent wellbeing in LSIC, as are some questions around consumption of bush tucker.

## BNLA

The 'Building a New Life in Australia Longitudinal Study of Humanitarian Migrants' (BNLA) was established in 2011 and is currently planned to run until 2018. The study's aim is to help the Government and its stakeholders better understand the factors that aid, or hinder, successful settlement of humanitarian migrants. Data collection occurs at annual intervals and commenced with a cohort of 2,399 individuals from over 1,500 migrating families in Wave 1. Participants were selected from 11 sites around Australia including metropolitan and regional areas. Only those who held a permanent protection visa were eligible for inclusion. Participants had either arrived or been granted their permanent visas between 3 and 6 months prior to joining the study.

In BNLA the mental health of participants is measured using the Kessler-6 scale[10]. The Kessler-6 measures psychological distress and provides an indication of whether respondents are likely to be suffering from a serious mental illness. As Figure 10 indicates 16.4 per cent of the BNLA cohort was identified as probably suffering from a serious mental illness. There was no substantial difference in this rate when demarcated by their location of residence[11].

Figure 10    Percentage of BNLA participants identified as probably having a serious mental health condition, by remoteness location
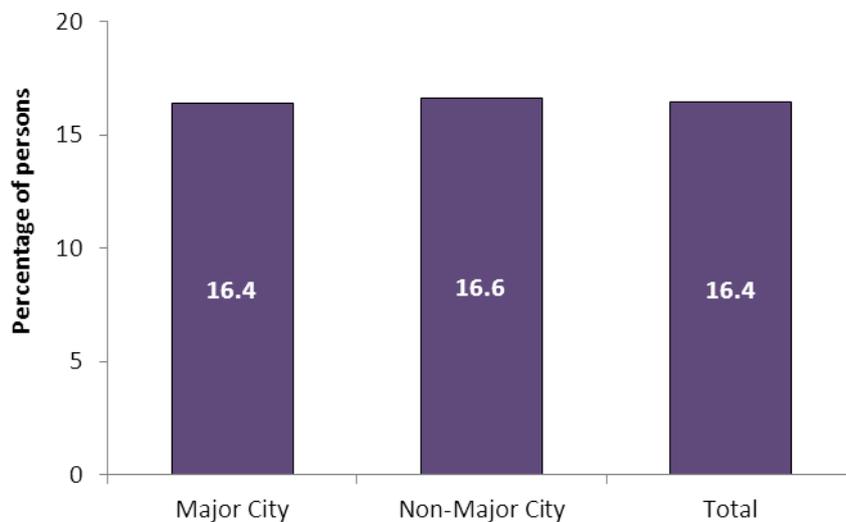


Of those who were identified as having a possible serious mental condition, 32.2 per cent also reported being prescribed medication for emotional conditions (See Figure 11). However, the rate of prescription amongst those living outside of the major cities was only 21.1 per cent as compared to 34.1 per cent for those living in major cities. Such figures are suggestive of higher rates of untreated mental illness for recently arrived humanitarian migrants living outside the major cities.

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[10] http://www.mindhealthconnect.org.au/guide-to-kessler-6
[11] Non-major city includes the inner regional, outer regional, remote and very remote areas and have been amalgamated here due to small sample sizes beyond the major cities.

Figure 11    Percentage of BNLA participants identified as probably having a severe mental health condition who have been prescribed medication for emotional conditions, by location



Given there is only a single wave of BNLA data currently available, longitudinal analysis is not yet possible. Once subsequent waves are available it will be possible to monitor the health of this cohort of humanitarian migrants over time as they settle into their new lives in Australia. In addition to the Kessler-6 and emotional health medication data presented here, other health and wellbeing data collected in BNLA include general and physical health, life satisfaction, experiences of trauma, disabilities, stress and discrimination. In addition the study collects data on pre-migration circumstances, immigration experiences, language proficiency, education, employment, self-sufficiency and community engagement.

## Comparisons across four studies

With the NCLD now running four independent longitudinal surveys which focus on different populations of interest, we are in the position to compare results for the same or similar measures across multiple studies. However, given that each of the studies have different policy interests and are designed to address different research questions, the potential for direct comparisons across all four studies will depend on the specific issues of interest.

In terms of mental health, a comparison is possible across three studies (HILDA, LSAC and BNLA) with the Kessler-6 measure of psychological distress. As indicated in Figure 12, only in HILDA is there evidence of geographical remoteness variation with those living in more remote areas tending to have significantly lower levels of distress. The LSAC data is reported by the primary carers (usually the mother) of the children in the study and although those in cities have higher levels of distress, the difference with other areas is not statistically significant. The BNLA data indicates that the rates of distress are significantly higher for this cohort than for the broader population regardless of their location. Given this cohort of survey participants has only recently arrived in Australia, and in most cases experienced traumatic events such as war, persecution and violence prior to arriving, such findings are not surprising.

**Figure 12    Mean Kessler 6 scores in HILDA, LSAC and BNLA by remoteness location**
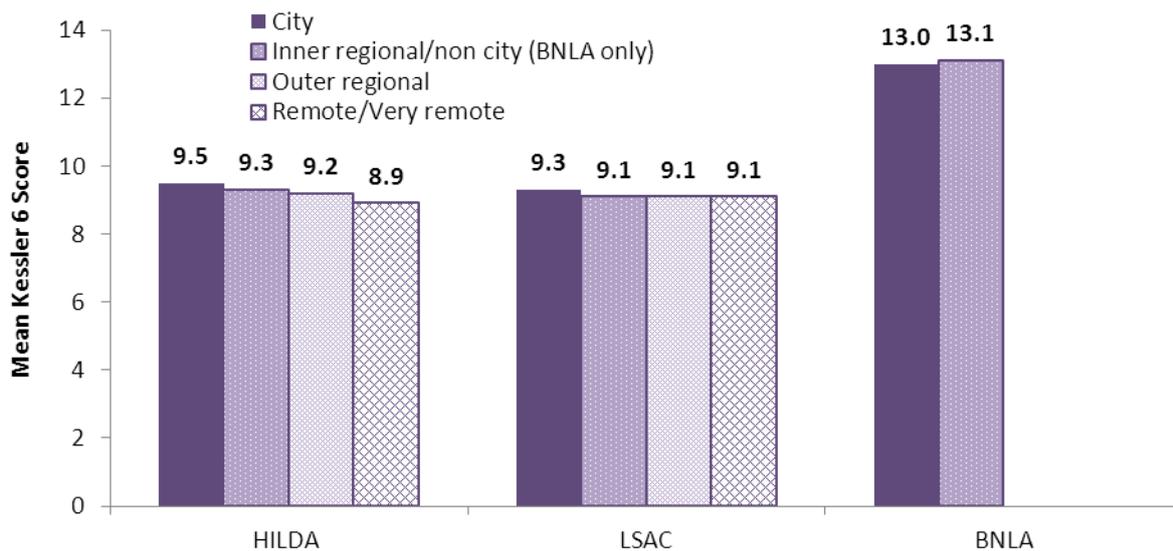


While it was not possible to include LSIC in the Kessler-6 comparison, it is possible to compare LSIC children with LSAC children using the SDQ total problems score previously discussed. As indicated in Figure 13, which considers children aged approximately 8 or 9, in the LSIC cohort there is no significant difference in results across the remoteness areas. Amongst the LSAC cohort however, those living in remote areas have better scores than either of the inner or outer regional areas. While the remote LSAC children also have a lower score than those living in major cities, the difference is not statistically significant. When comparing results for the two studies, the LSAC children perform significantly better in all remoteness regions except outer regional where the difference is not statistically significant.

**Figure 13    Total problem score from the SDQ for LSAC and LSIC children by remoteness location**
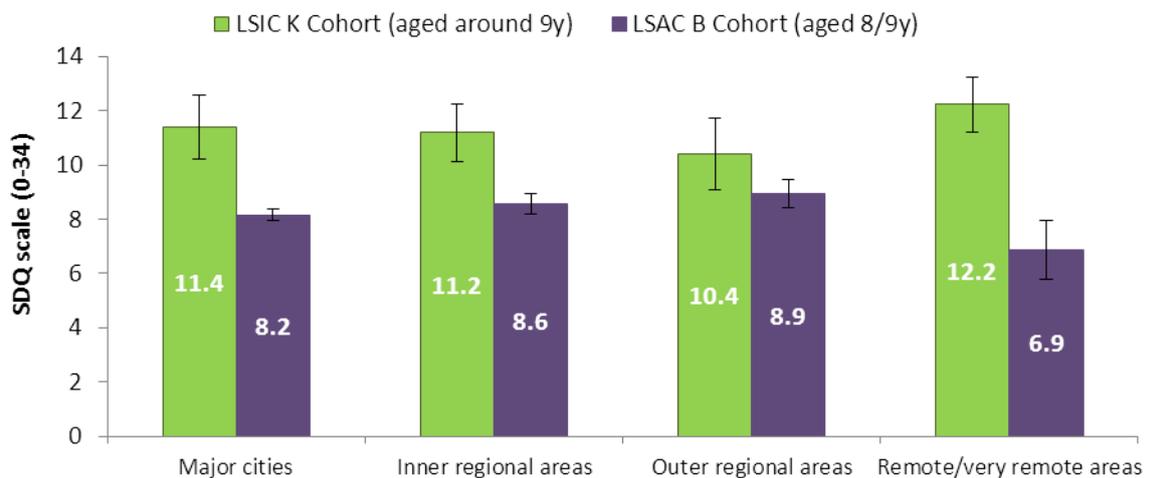


Note: Error bars represent the 95% confidence interval

One wellbeing measure which is comparable across all four studies is financial hardship. Although not a mental health indicator, it is a variable which is likely to be related to mental health. In all four studies participants were provided with a list of hardship indicators (such as skipping meals or missing rent payments) and asked to nominate which of these they had experienced during the period of interest. In Figure 14 the number of financial hardship indicators selected by survey participants is reported. It is evident that both Indigenous families (LSIC) and humanitarian migrant families (BNLA) were considerably more likely to report financial hardship than the broader populations represented by the HILDA and LSAC studies.

Figure 14    Number of financial hardship indicators selected by participants of HILDA, LSAC, LSIC and BNLA
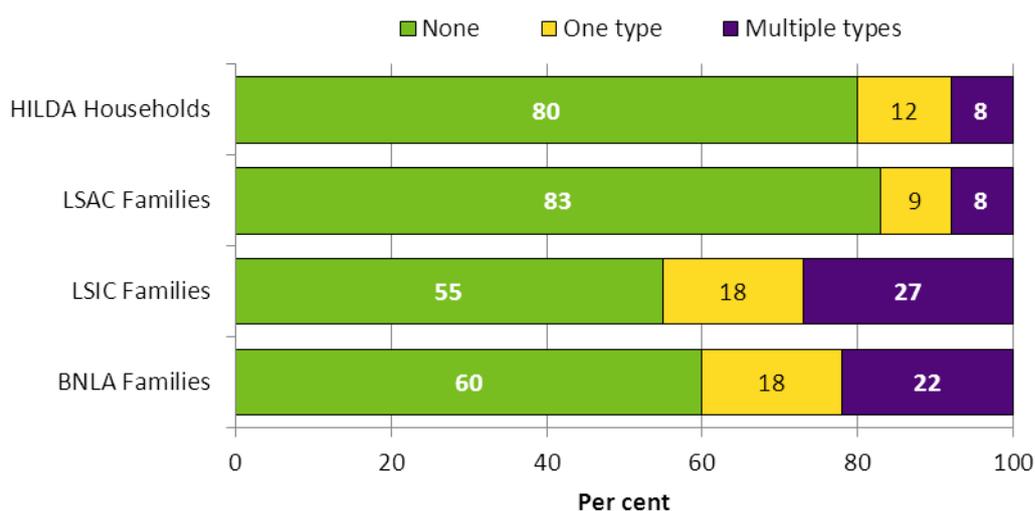


Another interesting comparison of a variable which is likely to be related to wellbeing can be made using discrimination and racism data from LSIC and BNLA. In LSIC, participants were asked if they had experienced racism while BNLA participants were asked whether they had been discriminated against. Although technically different, it was deemed that the two constructs were similar enough for the purposes of this cursory analysis. As evident in Figure 15 there are some notable differences in the reported data by geography and between the two studies. The first point is that the LSIC parents are much more likely to have reported experiencing racism than the BNLA participants are to have reported discrimination. When we consider geography, of most interest is the different trends evident in the two studies. For the BNLA cohort it is clear that less discrimination is reported in the major cities than outside of them. For LSIC however, it is the most remote regions where racism is least likely to be reported. Although the peak rate of racism is in the outer regional areas, there is little difference with the inner regional or major cities.

Figure 15    Reporting of Racism and Discrimination by remoteness location, LSIC and BNLA
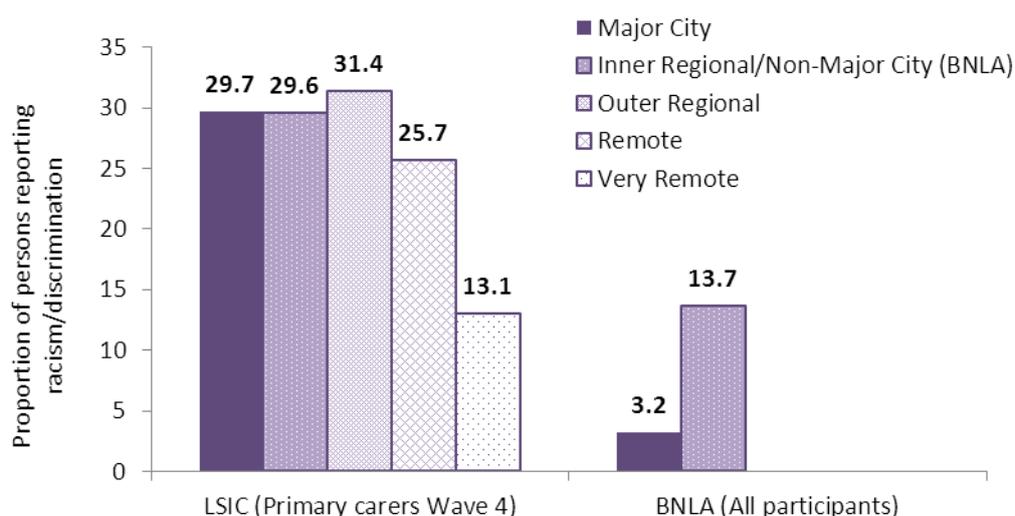


## Future potential and conclusion

As this short paper has demonstrated, there is within the longitudinal datasets held by the Department of Social Services a wealth of information which can be utilised to advance understanding of health and wellbeing issues in rural and regional settings across Australia. As the relatively straighforward analyses here have demonstrated, there are variations evident across remoteness regions in mental health status when measured by a variety of different instruments. It is also apparent that relationships identified for one group may not necessarily apply to other groups within the same

remoteness areas. As such, taken as a whole, the data presented here highlights the need to take into account both people and places when developing policies and programmes designed to assist with health and wellbeing outcomes.

With the establishment of the National Centre for Longitudinal Data it is anticipated that there will be an enhanced capacity to utilise the four studies for compariative analysis not only as has occurred here, but also with studies managed from elsewhere in Australia and overseas. For example, within Australia the Longitudinal Study of Australian Youth (LSAY) has been running since the late 1990s and could provide valuable comparison data, while internationally there are studies comparable to both HILDA and LSAC running in New Zealand, the UK and Germany among other places. In addition, a key focus of the Centre will be to develop an enhanced capacity to link the longitudinal data we hold to other administrative datasets held within government. The capacity to link to other data and to compare with comparable studies within Australia and internationally will further enhance the value of these studies. In due course, as these studies continue to build their longitudinal datasets, link to other similar data sources and follow new cohorts over time, the potential for explanatory analyses will increase. Ultimately such datasets and associated analyses and explanations will be able to provide invaluable information for the development and implementation of evidence-based health and wellbeing policies and programmes in Australia and its diverse communities regardless of where in Australia they happen to be.

## Presenter

**David Dennis** has enjoyed a wide range of roles over the course of his career, prior to his appointment as Branch Manager, Policy Evidence Branch of the Policy Office of DSS. Most recently he was responsible for the Economic and Statistical and Analysis Branch within the Department Health and Ageing. Also within the Health portfolio, he was responsible for managing Health Workforce, Mental Health and Primary Care areas. Prior to his entering government, he was Chief Executive Officer of a large hospital and health service in South Australia. He also held senior executive management positions in ACT Mental Health and was formally the Senior Forensic Psychologist for the ACT. David has clinical qualifications in physical and mental health fields. He has postgraduate qualifications in psychology and business management and has studied at the doctorial level in Epidemiology.