



Cohort Profile

Cohort Profile: Footprints in Time, the Australian Longitudinal Study of Indigenous Children

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Abstract

Indigenous Australians experience profound levels of disadvantage in health, living standards, life expectancy, education and employment, particularly in comparison with non-Indigenous Australians. Very little information is available about the healthy development of Australian Indigenous children; the Longitudinal Study of Indigenous Children (LSIC) is designed to fill this knowledge gap.

This dataset provides an opportunity to follow the development of up to 1759 Indigenous children. LSIC conducts annual face-to-face interviews with children (aged 0.5–2 and 3.5–5 years at baseline in 2008) and their caregivers. This represents between 5% and 10% of the total population of Indigenous children in these age groups, including families of varied socioeconomic and cultural backgrounds. Study topics include: the physical, social and emotional well-being of children and their caregivers; language; culture; parenting; and early childhood education.

LSIC is a shared resource, formed in partnership with communities; its data are readily accessible through the Australian Government Department of Social Services (see <http://dss.gov.au/lisic> for data and access arrangements). As one of very few longitudinal studies of Indigenous children, and the only national one, LSIC will enable an understanding of Indigenous children from a wide range of environments and cultures. Findings from LSIC form part of a growing infrastructure from which to understand Indigenous child health.

Key Messages

- LSIC has demonstrated the ability to maintain a high retention rate and community support in a challenging context.
- Annual interviews by Indigenous interviewers provide rich, detailed information including verbatim responses that researchers across the globe can use to explore what helps Indigenous children thrive.
- Many administrative datasets collect information about children and families who are in contact with service providers; this study also provides information about the children who are not in contact with these services.
- These data show the impact of factors ranging from parental well-being, parental education, housing stability, negative life events, experiences of racism, remoteness and neighbourhood disadvantage on children's outcomes including behavioural difficulties, preschool attendance, English reading scores, body mass index and soft drink consumption.

Why was the cohort set up?

Indigenous Australians maintain one of the oldest living cultures, dating back more than 50 000 years.^{1,2} The diversity of cultures is exemplified by the existence of more than 200 distinct Australian languages at the time of European settlement;³ 13% of Indigenous children aged 3 to 14 years still spoke one of these languages in 2008.⁴

Indigenous Australians suffer a disproportionate burden of morbidity and mortality compared with non-Indigenous Australians. The difference in average life expectancy is around 10 years.⁵ Two-thirds of this gap is attributed to chronic disease, such as cardiovascular disease.⁵ In 2008, Australian Commonwealth, State and Territory governments agreed to work jointly on reducing disparities between Indigenous and non-Indigenous Australians, setting targets to 'close the gap' and decrease inequity in infant mortality, reading, writing and numeracy achievement, educational attainment, employment and life expectancy.

Despite this policy agenda, there have previously been no national longitudinal resources dedicated to providing information about the healthy development of Indigenous children.⁶⁻⁹ This evidence gap can exacerbate the health gap: without data to better understand the healthy development of Indigenous children, it is unclear how well policy is positioned to meet these targets.¹⁰

The Longitudinal Study of Indigenous Children (LSIC), also known as Footprints in Time, is designed to inform evidence-based policy to improve the well-being of Indigenous children and approach these targets.¹¹ The development of this study was sparked by recognition of the limitations of the Indigenous subsample in the larger, nationally representative Longitudinal Study of Australian Children.¹² Funding for the present study was provided by the Australian Federal Government who support and manage LSIC through the Department of Social Services (DSS).¹¹ It will remain ongoing as long as the sample retention and funding allow the study to be viable.

The key research questions guiding the study, determined through community consultation and endorsed by the LSIC Steering Committee, are:

- i. What do Aboriginal and Torres Strait Islander children need to have the best start in life to grow up strong?
- ii. What helps Aboriginal and Torres Strait Islander children to stay on track or get them to become healthier, more positive and strong?
- iii. How are Aboriginal and Torres Strait Islander children raised?
- iv. What is the importance of family, extended family and community in the early years of life and when growing up?¹³

Also of interest is: how can services and other types of support make a difference to the lives of Aboriginal and Torres Strait Islander children?

Who is in the cohort?

Community engagement and governance

Within Indigenous health, it is critical to conduct research based on strong community partnerships, given the deep-rooted links between research, colonialism and exploitation.¹⁴ Consultation and negotiation have been integral to the design of this study, ensuring the genuine participation of Indigenous people and a sense of local ownership. These processes are cited as being responsible for the success of LSIC (see [Supplementary Material A](#) for more detail, available as [Supplementary data](#) at *IJE* online).¹⁰ Based on these community priorities, LSIC was designed as a community-based survey with both quantitative and qualitative structured components, focusing on resilience and positive factors.

Ethical approval

The study has received ethical approval from the Departmental Ethics Committee of the Australian

Government Department of Health; this is the study's primary Human Research Ethics Committee. Additional approval at the State, Territory or regional level was obtained from the relevant bodies, in line with the guidelines of the National Health and Medical Research Council¹⁵ and the Australian Institute of Aboriginal and Torres Strait Islander Studies (see [Supplementary Material A](#) for more detail, available as [Supplementary data](#) at *IJE* online).¹⁶

Sampling of participants

The size of Australia and the limited accessibility of some areas pose recruitment challenges. LSIC's sampling method was developed to maximize diversity while respecting communities' interests. The result was a two-stage sampling design, beginning with the selection of 11 sites across the country in remote, regional and urban locations (see [Figure 1](#)), strongly influenced by communities' interest in participating.¹⁷ Next, within each site, Indigenous children were recruited to participate using purposive sampling.¹⁸ Centrelink and Medicare Australia provided lists of addresses of families with children in the correct age range and an Indigenous indicator on their record, and LSIC Research Administration Officers approached families to see if they would be interested in the study. Additional children were recruited using informal approaches including word of mouth, local knowledge and study promotion (using a 'snowballing' method).^{10,13} The aim was to interview 150 families at each site for a total of 1650 children, representing 5–10% of the total Australian population of Indigenous children within the designated age range. Because of the multiple approaches to sampling, it is not possible to calculate an overall response rate.

The sample size and selection methods reflect pragmatic, rather than statistical, considerations. Initially, the targeted sample size had been 4000 children; however, it was quickly realized that this would not be feasible with the available financial and time resources, given the complexities unique to Indigenous research.^{10,19} The clustered sampling method was required for cost-effectiveness, to allow community support and involvement and to enable the employment of exclusively Indigenous Research Administration Officers.¹⁰

The number of children interviewed at each site deviated slightly from the goal of 150. Within some sites, the target number exceeded the number of children in the appropriate age range, so fewer children were sampled; to balance this, sites with a higher population density of Indigenous children were oversampled.

Neither the selection of sites nor the selection of children within each site was random. As is typical of cohort studies,²⁰ this study is not intended to be representative of

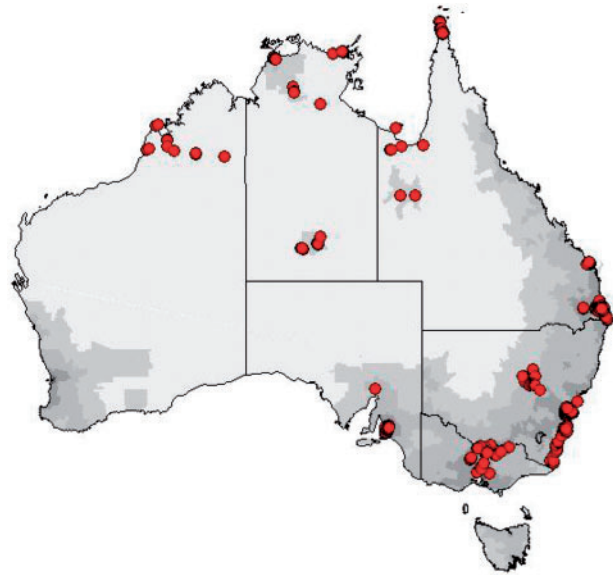


Figure 1. Locations of interviews in the first wave of LSIC (represented by the gray circles)¹³.

all Aboriginal and Torres Strait Islander children;¹⁷ rather, it intends to provide a picture of life within a range of environments and communities in which Aboriginal and Torres Strait Islander children are concentrated.¹⁸ Hence, LSIC is particularly suited to the conduct of internal comparisons and longitudinal analyses. [Table 1](#) presents the distribution of the LSIC sample compared with the estimated population of Australian Indigenous children less than 5 years of age across basic demographic variables.

Survey methods

Children are the sample units in LSIC, with their information collected from multiple informants (see [Supplementary Material B](#) for more information, available as [Supplementary data](#) at *IJE* online). Each survey involves a face-to-face interview with a study child and their primary caregiver. If consent is provided, Indigenous Research Administration Officers also conduct a face-to-face or phone interview with a secondary carer, when available. Additionally, some teachers and childcare workers fill out questionnaires about the study child.

This design was chosen to best reflect the meaning of 'family' for Indigenous Australians. The mainstream Australian idea of the nuclear family does not resonate with all Indigenous families, many of which are extended, complex, dynamic and mobile.²¹ Due to this mobility, the identity of the primary and secondary carer can change between waves, but the study child reported upon remains fixed.

Two age cohorts of children are followed in LSIC; at the first wave of the study in 2008, children in the younger

Table 1. Characteristics of LSIC study children at baseline (2008)¹¹ compared with the general population of Indigenous Australian children less than 5 years of age^a

Characteristic	LSIC sample		Estimated population of Australian Indigenous children	
	<i>n</i>	%	<i>n</i>	%
Total	1687	100	77715	100
State/territory				
New South Wales	494	29.3	22 967	29.6
Victoria	143	8.5	4904	6.3
Queensland	515	30.5	22 842	29.4
Western Australia	126	7.5	10 282	13.2
South Australia	106	6.3	4003	5.2
Tasmania	0	0	2610	3.4
Northern Territory	303	18.0	9472	12.2
Australian Central Territory	0	0	608	0.8
Other territories	0	0	27	0.0
Age (years) ^b				
< 1	241	14.3	13 279	17.1
1	660	39.1	12 894	16.6
2	77	4.6	12 553	16.2
3	193	11.4	12 720	16.4
4	460	27.3	12 980	16.7
5	55	3.3	13 289	17.1
Sex				
Male	860	51.0	39 599	51.0
Female	827	49.0	38 116	49.0
Level of remoteness				
Major cities	439	26.0	24 708	31.8
Inner regional	428	25.4	17 153	22.1
Outer regional	227	13.5	17 063	22.0
Remote	256	15.2	7003	9.0
Very remote	337	20.0	11 788	15.2

^aIn the initial participating cohort, 1687 primary carers were interviewed. However, 16 families were removed from Release 2 and Release 3 datasets for administrative reasons; thus, the total number of participants in Wave 1 is reduced to 1671.

^bOne missing value.

cohort (born between 2006 and 2008) were between the ages of 6 months and 2 years; and children in the older cohort (born between 2003 and 2005) were between 3.5 and 5 years of age. By the fourth wave of the study in 2011, participants had reached 3.5–5 and 6.5–8 years of age.

This accelerated cross-sequential design enables data to be gathered about the first 8 years of life for Indigenous children through only four waves of data collection. This design also enables data users to compare two cohorts of children of the same age (such as the younger cohort at Wave 4 with the older cohort at Wave 1), allowing the separation of ageing and period effects. It also allows researchers to combine the two cohorts into the same age group for increased sample size.²²

How often have they been followed up?

Children participating in LSIC are followed up annually. At the time of writing, six waves of data collection had been completed, and data from the first four waves were available for analysis. In the first wave of the study in 2008, interviews were conducted with the primary carers of 1671 children; this best represents the baseline sample of participating children. Of these children, nearly 90% (1435) had data contributed in a second interview. For a variety of reasons, data were not obtained on 236 of these children in Wave 2; however, some participated again in later waves (Figure 2; see [Supplementary Material B](#) for more detail, available as [Supplementary data](#) at *IJE* online).

The rates of re-interview are higher among primary carers who, at the first wave of the study, were non-Indigenous, living with a partner and owning or privately renting a house (see [Table 2](#)). Additionally, participation rates were higher among the carers/children in the younger cohort and those who lived in areas with lower levels of relative isolation at the first wave of the study. Overall, however, the level of participation and engagement is relatively high across groups.²²

As with any project relying on participant data, there are appreciable levels of missing data in LSIC. The amount of missing data varies according to the nature of the question or survey item. Demographic information, such as Level of Relative Isolation or the Decile of Socioeconomic Indexes for Areas, is available for over 95% of participants at each wave. Other items, such as questions about alcohol use or direct measurements of children, however, are more prone to non-response. For example, height and weight are items with relatively high proportions of missing values; they were measured for 1304 of the 1671 children (78%) participating in the first wave of the study.²³ However, with the formation of a relationship between participants and the Research Administration Officers and the building of trust, children and carers were more comfortable participating in the measurement process.²³ By the fourth wave of the study, height and weight were recorded for 97% of children participating in the study.

What has been measured?

The core LSIC survey topics are consistent across waves, but to ensure that questions are age-appropriate, some items vary between waves of the study and between the two age cohorts. Survey topics include: demographic, household and neighbourhood characteristics (see [Table 3](#) as an example); study child health; study child dietary intake; maternal health during pregnancy; current caregiver health; parenting; study child social and emotional

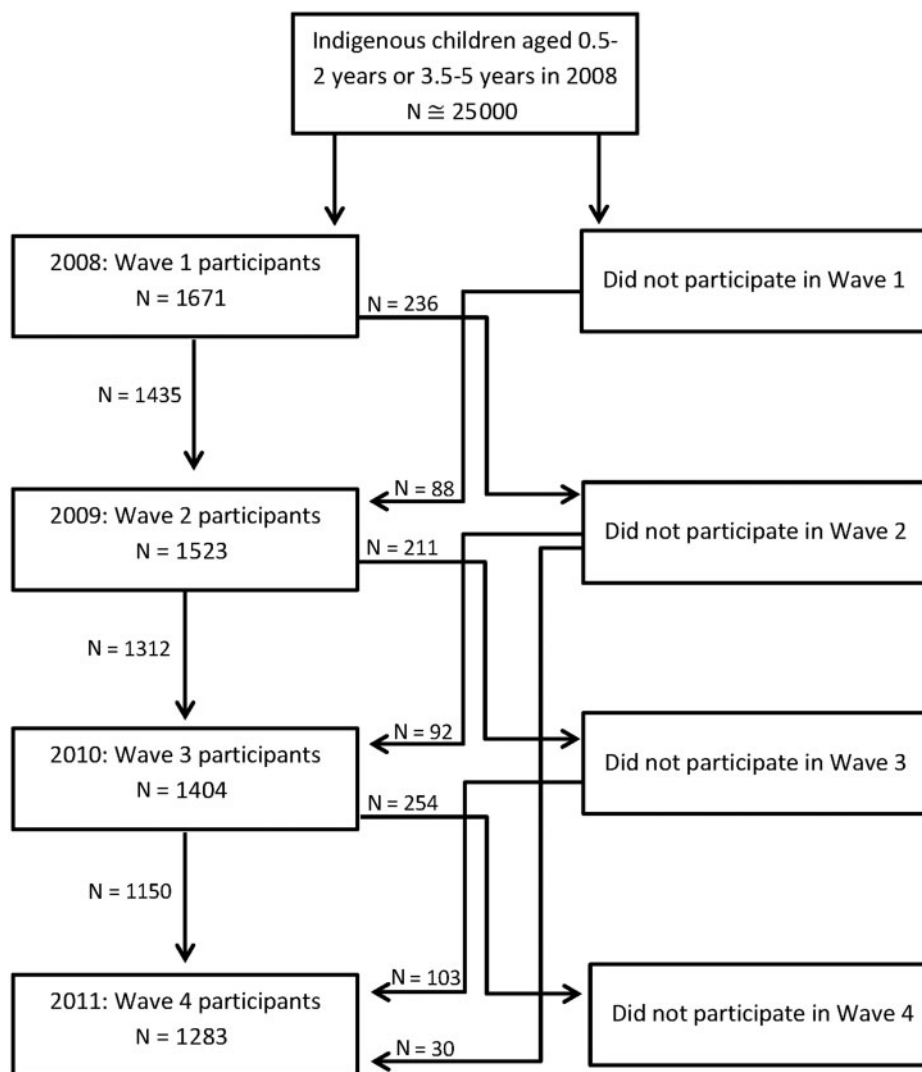


Figure 2. LSIC participant flow, Waves 1 to 4 (2008–11). These figures refer to interviews with the primary carer.

well-being; and caregiver social and emotional well-being. These are addressed using a mix of questions, scales and tasks (Table 4; see [Supplementary Material C](#) for study items added in recent waves, available as [Supplementary data](#) at *IJE* online).

Because of the young age of the study children, most of the data are obtained from the primary caregiver. During their interview, study children answer questions about school and their favourite things, and Research Administration Officers measure their height and weight. Study children also participate in a range of activities designed to assess verbal and non-verbal processes that underlie early literacy and numeracy skills.¹³ Interviews are conducted, when appropriate, in the idiom of Aboriginal English, in a Creole specific to the location, or in an Aboriginal language (see [Supplementary Material B](#) for more information, available as [Supplementary data](#) at *IJE* online).^{10,24}

Additional resources and linkage opportunities

LSIC provides the opportunity for linkage to data sources including the Australian Early Development Index²⁵ and the National Assessment Program – Literacy and Numeracy. The Longitudinal Study of Australian Children offers the potential for direct comparisons with a predominantly non-Indigenous Australian sample (see [Supplementary Material D](#) for more information, available as [Supplementary data](#) at *IJE* online).

What has it found?

LSIC has been designed as a dataset that is readily accessible to the policy and research community. LSIC works collaboratively with policy developers across Commonwealth Government departments and agencies. Policy concerns inform the content design and analysis of findings, including

Table 2. Percentage of Wave 1 primary carers re-interviewed at Wave 4 (2011) and interviewed in all waves (1–4), by selected characteristics²²

Characteristic	Percent	
	re-interviewed at Wave 4	interviewed at all four waves
Level of Relative Isolation ^a		
No	81.3	73.4
Low	71.4	62.0
Moderate	66.4	50.6
High/extreme	67.3	45.5
Index of Relative Indigenous Socioeconomic Outcomes quintile		
1st quintile (most disadvantaged)	71.6	54.7
2nd quintile	66.8	53.4
3rd quintile	74.0	63.8
4th quintile	73.6	66.9
5th quintile (most advantaged)	76.6	65.3
Child characteristics		
Male	73.8	62.8
Female	71.9	60.5
Aboriginal	74.0	63.0
Torres Strait Islander	67.3	53.6
Both Aboriginal and Torres Strait Islander	60.8	50.5
Younger cohort	74.3	63.7
Older cohort	70.9	59.0
Primary carer characteristics		
Male	80.5	73.2
Female	72.6	61.4
Indigenous	70.6	59.1
Non-Indigenous	86.9	78.8
Employed	75.8	64.4
Not employed	71.5	60.4
Has a partner in the household	75.1	65.1
Has no partner in the household	70.1	57.6
Home owner	82.6	77.0
Private rental	78.6	68.1
Public or community housing rental	68.6	55.8
Total (<i>n</i>)	72.8(1217)	61.7(1031)

This presents the percentage of children on whom data were included in Wave 1 (regardless of changes to the identity of the primary carer) who also had data about them included in the fourth wave of the study, and the percentage with data in all four waves, across selected characteristics.

Category for Level of Relative Isolation, Index of Relative Indigenous Socioeconomic Outcomes quintile, and primary carer characteristics are based on the values at Wave 1; however, these values may have changed across waves.

The 88 children who entered the study in Wave 2 are not included in this table.

^aLevel of Relative Isolation (LORI) indicates the level of remoteness of the areas in which children live. This scale determines remoteness using a purely geographical approach, and is based on the Accessibility/Remoteness Index of Australia⁺⁺ Scale.

the review and co-authoring of information papers and briefs on various topics. These outputs are central to their policy-driven approach.

Table 3. Household characteristics in LSIC Wave 1,^a by Level of Relative Isolation²⁷

Household characteristics	Level of Relative Isolation				
	None (urban)	Low	Moderate	High/extreme	Total
Average number of people in the household	4.5	4.8	5.8	5.7	5.0
Average number of children in the carer's nuclear family	2.1	2.6	2.6	2.7	2.5
Average number of children in the household	2.6	2.8	3.0	3.1	2.8
Total (<i>n</i>)	435	839	214	189	1677

^aThe total sample size is 1677 rather than 1671, as the paper was written before six families were removed from the data for administrative reasons. The *P*-values for differences by cohort across LORI exceeded 0.05, so it was considered appropriate to combine the younger and older cohorts in this table.

DSS releases an annual report about each wave (these can be found at <http://dss.gov.au/lisic>). As part of their community dissemination strategy, DSS provides participating families and communities with Community Feedback sheets (summarizing findings within a site), Community booklets (summarizing findings across all sites) and DVDs with most waves of data collection. The annual Key Summary Reports provide overviews of the data along with in-depth analyses of certain topics, showcased in feature articles. Technical papers and publications relating to the development of LSIC can be found on the DSS website (<http://dss.gov.au/lisic>).

At the time of writing, licences for LSIC data use had been granted to more than 150 researchers from a range of research organizations. Research based on the LSIC dataset has been showcased at the Growing Up in Australia and Footprints in Time Research Conferences (held in 2011 and 2013), and six journal articles have been published to date,^{10,26–30} despite recruitment to the study only starting in 2008. These articles cover topics including culture and identity, body mass index, mobility, socioeconomic status, temperament and post-separation parenting. For example, research using LSIC has identified:

- An association between carers' experience of major life events and negative changes in social and emotional well-being: the strongest association was with reported financial strain, and weaker associations held for reported family break-up, family arguments, alcohol or drug problems, children being scared by other people's behaviour, crime victimization and experiences of being asked for money.³¹

Table 4. Brief description of topics covered in the LSIC survey

Subject	Description
Household information	
Dwelling type and street type	RAO assesses housing type and traffic.
Household demographics	P1 and P2 report on who lives in the house with SC by age, Aboriginal and/or Torres Strait Islander identity, and relationship to P1.
Child health	
Maternal health and care	P1 self-reports on health care when pregnant.
Alcohol, tobacco and substance use during pregnancy	P1 self-reports on use of alcohol, cigarettes and other substances while pregnant with SC.
Birth	P1 self-reports on factors surrounding birth of SC, including birthweight and gestational age, from memory or from Baby Book.
Early diet and feeding	P1 reports on SC's breastfeeding and transition to solid foods.
Current nutrition	P1 recalls foods consumed by SC in the past 24 h (selected from a list of food groups) and number and types of drinks consumed. P1 also reports on SC's consumption of bush tucker, breakfast, takeaway meals.
Dental health	P1 reports on SC's teeth cleaning, visits to dentist and problems with teeth or gums (selected from a list).
Health conditions	P1 rates SC's general health (poor to excellent) and reports on health problems SC has experienced (selected from a list).
Injury	P1 reports on injuries SC has experienced since the previous survey (selected from a list), number of times injuries happened and the place injuries occurred.
Hospitalization	P1 reports the number of times SC has been hospitalized since the previous survey, the reason for hospitalization (selected from a list), length of stay in hospital and the use of other health services (including the Aboriginal Medical Service).
Sleeping patterns	P1 reports on SC's sleeping routine and any trouble sleeping.
Parental health	
Ongoing health conditions	P1 and P2 rate their own general health (poor to excellent) and report on health problems experienced (RAOs select from a list including diabetes, disability and kidney disease).
Social and emotional well-being and resilience	Strong Souls questionnaire: P1 and P2 respond to questions about 'what helps get you through hard times' and 'big worries, stress and sadness' (including experiencing discrimination).
Smoking habits and exposure; alcohol use	P1 and P2 self-report on tobacco use, smoking inside the house, methods of quitting smoking, and alcohol use.
Gambling	P1 reports on frequency of gambling, types of gambling activities, reasons for gambling, gambling problems.
Parent relationships	P1 reports on relationship with partner, including questions about domestic violence.
Childhood and parenting	P1 and P2 respond to questions about the relationship with their partner, parents living separately, contact with SC, and the stolen generations.
Child and family functioning	
Strengths and difficulties	P1 reports on SC's behaviour and relationships with others, using the Strengths and Difficulties Questionnaire. ³⁹
Child's physical ability	P1 reports on SC's physical abilities including holding a pencil, dressing and undressing, using buttons, walking up stairs, hopping and catching.
Child's temperament	P1 responds to a questionnaire about the SC's personality, adapted from the <i>Short Temperament Scale for Children</i> .
Brief Infant-Toddler Social and Emotional Assessment (BITSEA)	P1 responds to a questionnaire about SC's personality, using the BITSEA, a screening tool designed to assess social-emotional and behavioural development.
Parent concerns about child's language and development	P1 reports on worries about SC's development (talking, speaking, understanding, use of hands, behaviour, learning and development). ^a
Parental warmth, monitoring and consistency	P1 and P2 respond to questions about interaction with SC.
Major life events	P1 and P2 report whether any close family member has experienced a series of major life events.
Socio-demographics	
Participant language, culture and religion	P1 and P2 respond to questions about languages spoken by family members, including Creoles, culture, identity and religion.

(Continued)

Table 4. Continued

Subject	Description
Parental education	P1 and P2 self-report on highest level of education completed.
Work	P1 and P2 self-report on employment.
Financial stress and income	P1 and P2 report family's money situation and experience with income management.
Child support and maintenance	P1 and P2 respond to questions about the SC's living arrangements and child support.
Housing and mobility	P1 and P2 describe the current home and neighbourhood, the length of time residing at the current home and the number of other homes SC has lived in. Includes number of bedrooms and repairs needed.
Community	P1 describes community places for children, safety, homelessness experiences, whether facilities such as toilets and washing machines are working and levels of trust in doctors, hospitals, police and schools.
Child care and early education	P1 and P2 report on SC's school and care arrangements.
Child's school	P1 and P2 respond to questions about SC's school experience, including bullying and racism.
Activities with the study child	P1 and P2 respond to questions about activities that SC does with particular family members, and the language used when participating in these activities.
Child direct measures	
Vocabulary	Older SCs complete the Renfrew Word Finding Vocabulary Test, identifying names of pictured objects (measuring expressive vocabulary). Younger SCs complete the MacArthur Bates Communicative Development Inventory: P1 reports if SC knows words read aloud from a list (measuring early language skills). ¹⁷
Who Am I?	SCs are asked to write their name, copy a circle, cross, square, triangle and diamond, and draw a picture of themselves; the Australian Council for Educational Research score the booklets and RAOs evaluate their focus. ⁴⁰
Favourite things	SCs respond to questions about their favourite things.
School	Older SCs respond to questions about their experience of preschool or school.
Height and weight	RAOs measure the SC's height and weight. If parents are not comfortable with measurements being taken by the RAOs, they can take the child's measurements themselves or report the most recent height and weight recorded in the child's health book. RAOs also measure the height and weight of P1. ¹⁷
MATRIX reasoning	SCs complete the MATRIX Reasoning segment of the Weschler Intelligence scale for children; this provides a general measure of abstract reasoning ability (not based on reading or writing skills). ¹⁷
Progressive Achievement Tests in Reading	Older SCs complete the LSIC version of Progressive Achievement Tests in Reading, providing diagnostic information about reading comprehension abilities. Scores are scaled by the Australian Council for Educational Research for release.

SC, Study Child; P1, primary carer; P2, secondary carer; RAO, Research Administration Officer.

^aAdapted from *Parent's Evaluation of Developmental Status*. Australian version Melbourne, VIC: Centre for Community Child Health, Royal Children's Hospital, 2005. Adapted with permission from Frances Page Glascoe, Ellsworth and Vandermeer Press.

- Improved subjective well-being (stronger relationships and greater resilience) among carers living in more isolated areas, after adjusting for the demographic characteristics of the carer, household and neighbourhood.³¹
- Decreased preschool attendance of children whose carers experienced feelings of racial discrimination.³¹
- Increased mean body mass index z-score (adjusted for age and gender) in 2011 among children living in more urban, compared with remote, areas (see Figure 3).²³
- Increased soft drink consumption (adjusted for age and gender) in 2011 among children whose parents had lower levels of education, who experienced housing instability, who lived in urban areas and who lived in disadvantaged neighbourhoods.³²

Increasing numbers of publications are likely as more researchers become aware of the study and additional waves of data are released.

What are the main strengths and weaknesses?

Indigenous Australians are among the most researched people in the world;^{12,21} an important potential benefit of LSIC is that researchers may use this shared resource, rather than conducting additional individual studies and further increasing the burden placed upon Indigenous communities and families.

Specific strengths of LSIC include the level of community engagement, protection of privacy, large sample size,

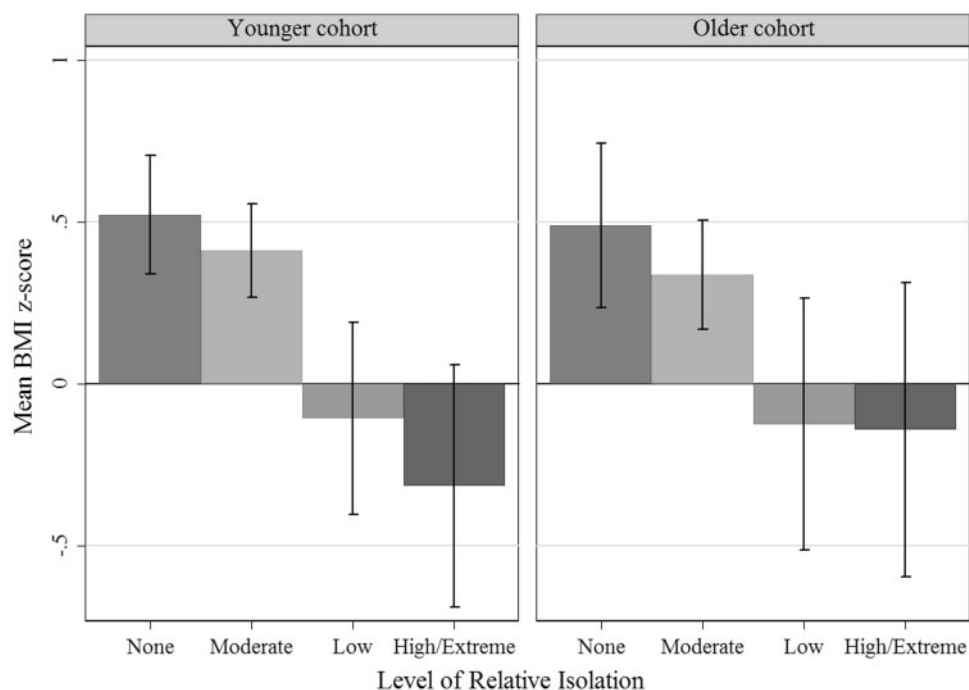


Figure 3. Mean body mass index (BMI) z-scores in 2011 for children in LSIC by Level of Relative Isolation and cohort, modified from²³.

geographical and socioeconomic diversity of participants, collection of qualitative and quantitative data, collection of data from multiple informants, breadth of measures collected, conduct of face-to-face interviews and the opportunity for data linkage.

The high retention rate and ongoing and frequent follow-up are also notable strengths, particularly within an Indigenous population, given the acknowledged challenges of conducting longitudinal research in Indigenous populations.^{19,20} Lawrance and colleagues have described the challenges for cohort retention and data collection within the Australian Aboriginal Birth Cohort study, a prospective study of 686 children in Darwin, Northern Territory.³³ These challenges include limited means of contacting participants, high mobility, and cultural diversity (including language); LSIC has demonstrated the ability to meet these challenges on a national scale. The emphasis on community engagement is likely to be an important contributor to the success of LSIC.¹⁰ In particular, the employment of Indigenous interviewers, dedicated community consultation process and continuous feedback loop are likely to underlie the ability of the LSIC study to maintain data integrity and minimize attrition while ensuring communities' good will towards the study.

Another strength of the study is that LSIC is designed to facilitate a life course approach to research. This approach incorporates the roles played by physical, social, psychological, environmental and other pathways across

an individual's, and a population's, development.³⁴ It is particularly appropriate for Indigenous health research, given the predominance of holistic understandings of health in Indigenous communities.^{9,35}

The life course approach offers a longitudinal view of health situated within family, community and society-level contexts. These exposures can act at any point in time in a child's development, and their impact can vary depending upon broader macrosocial factors, such as the rapidly changing policies in Indigenous affairs.⁹ By drawing on both Western science and Indigenous knowledge systems, LSIC creates the opportunity to conduct research that expands understanding and is both scientifically and culturally credible.^{34,35}

A limitation of LSIC is the lack of representativeness; findings on prevalence cannot automatically be extrapolated to all Indigenous children across Australia. However, this is a common feature of cohort studies, and as with other such studies, the LSIC data are designed for internal comparisons and longitudinal analyses rather than estimates of point prevalence.³⁶ Although the geographical location of participants is not disclosed for the protection of their privacy, Level of Relative Isolation can be used as an indicator of the location's remoteness, and Indigenous Area can be used to adjust for the study's clustered design (see [Supplementary Material E](#) for more information, available as Supplementary data at *IJE* online).

Another limitation is that height and weight are the only physical measures taken in LSIC. This was a response

to community consultations and consideration of participants' comfort and willingness to participate.

Additionally, the validity of screening instruments, particularly those measuring social and emotional well-being, requires verification within Indigenous populations.³⁷ Where possible, LSIC employs instruments that have been validated in similar cultural contexts, and encourages researchers to evaluate the face validity of instruments within LSIC specifically (for example^{27,31,37,38}).

Despite these limitations, LSIC remains the largest current source of information about the longitudinal development of Indigenous children, and indeed adults,³¹ across Australia. These issues do not preclude its use, but rather reinforce the general point that data sources need to be appropriate to the specific research and policy question under investigation.

Can I get hold of the data? Where can I find out more?

LSIC is a shared resource, formed in partnership with communities, to be used to inform policy and programme development for the improvement of Indigenous well-being. These data are readily accessible, and their use is encouraged.

At the time of writing, data for the first four waves of the study were available as Data Release 4.1. Prospective users need to sign a deed of licence and complete an application for the dataset, including a disclosure of the context of their research; data users also need to adhere to strict security and confidentiality protocols. The LSIC webpage (<http://dss.gov.au/lsic>) and [Supplementary Material F](#) (available as [Supplementary data](#) at *IJE* online) provide additional information on the LSIC data and access arrangements.

Queries about the study or the data should be sent to [LSICdata@dss.gov.au]; queries about applying for the data or licensing arrangements should be sent to [longitudinalsurveys@dss.gov.au].

Supplementary Data

[Supplementary data](#) are available at *IJE* online.

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The LSIC Team

The LSIC Team comprises a Canberra-based team of DSS employees responsible for study management, community engagement, research design and data management, and the Research Administration Officers, past and present, who are based in their own communities and work across Australia to interview families. The team is guided by the decisions of the LSIC Steering Committee and informed by the Longitudinal Study Advisory Group, a Commonwealth Government interdepartmental committee that provides strategic and policy advice for a range of longitudinal surveys including LSIC. The current LSIC Steering Committee includes Mick Dodson, Karen Martin, Lester-Irabinna Rigney, Ann Sanson, Paul Stewart, Maggie Walter and Steve Zubrick. For further information contact [LSIC@dss.gov.au]; for enquiries about the data [LSICdata@dss.gov.au]; and for details about published research [FLoSse.dss.gov.au].

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