



Longitudinal Studies and the National Centre for Longitudinal Data (NCLD)



This overview of longitudinal studies aims to demonstrate the value of longitudinal data, particularly how it can support decision makers to address critical questions.

Longitudinal data is data collected from the same individuals (or households, businesses or other entities) repeatedly over time. The data is able to show how actions and events can affect outcomes later in life.

Longitudinal data differs from cross-sectional data that most people are familiar with, such as Australia's Census of Population and Housing. A cross-sectional survey provides a snapshot of data at a single point in time. A series of repeated cross-sections, or time-series, can show broad population trends over time, but unlike longitudinal data, cannot show persistence or changes within individuals.

Longitudinal data can be collected from surveys which follow and collect data from the same subjects over time (for example, by participants being interviewed in person or over the phone), or can be constructed using administrative data¹ available from a number of sources, such as health, education or taxation.

Both types of longitudinal data provide an evidence base for research and inform the development of public policy. And by linking survey and administrative data together, even richer and more detailed longitudinal data sets can be created.

¹ Administrative data refers to information collected primarily for administrative (not research) purposes. This type of data is typically collected by government departments and other organisations for the purposes of registration, transaction and record keeping, usually during the delivery of a service.

How does longitudinal data support good decision making?

Analysing cross-sectional data is an important first step in identifying and describing policy problems. For example, the Census provides the best estimates of the numbers of people in the population with particular characteristics such as level of education or housing status.

Longitudinal data allows decision makers to go beyond describing the extent of a policy problem to understanding how and why problems occur. It also enables identification of the consequences of problems. Because longitudinal data tracks individual pathways, it can show how different people respond to opportunities and setbacks, and how their responses and outcomes change in the short and long term.

This provides researchers and policy makers a breadth and depth of perspective – showing how circumstances and policy levers affect outcomes over time.

Understand persistence and change in people's circumstances

Experiencing disadvantage such as poor health or poverty can be a temporary set-back for some, but for others these problems can be entrenched. In each case a very different policy response is required. To measure persistence, cross-sectional surveys could in theory ask people to recall their earlier circumstances.

However, research shows that these recall measures tend to be biased and unreliable, particularly over longer time periods.

Only longitudinal data can reliably show whether circumstances are:

- temporary,
- persistent (and if so, for how long), or
- recurrent / relapsing (and if so, how often relapse occurs).

Longitudinal data allows researchers to determine what factors influence transition and persistence. For example, what supports the long term unemployed to get and keep a job, what factors influence the course of recurrent mental health problems, or how people change their asset portfolios before, during and after retirement and in response to government policies.

Know what makes a difference to people's outcomes

Effective policy necessarily targets the causes of problems. However, for many complex policy problems it is not easy to quantify the size and direction of the different causal influences that really matter.

While randomised control trials, such as the 'pill-placebo' studies used in medical research, are the 'gold standard' for demonstrating causal relationships (determining the factors that influence or cause an outcome), it is often impractical or unethical to run such studies to assess policy questions. For example, you can't randomise experiences of racism on a sample group.

Longitudinal data often provides the next best available evidence for quantifying the relative strength of different causal influences on an outcome. Longitudinal data can show the temporal sequence of possible causes and effects and so provide evidence that is consistent with a causal relationship.

Statistical methods such as 'fixed effects' regression models can be employed to examine the effects of various factors on life outcomes such as earnings, unemployment and life satisfaction. These models can control for the effects of stable characteristics of individuals that are typically not observed, such as innate ability and motivation, that may otherwise bias estimates of effects when using cross-sectional data.

Without knowing and quantifying these causal processes, it is not possible to know whether, and to what extent, a policy designed to achieve an outcome (e.g. better mental health of children) by improving some situation (parenting) is likely to work.

Explain how experiences interact over time and across different life domains

Many longitudinal studies collect information across a breadth of domains such as early childhood, parenting, education, employment, physical and mental health, finances, housing, social relationships, and family. In addition, longitudinal data can show how these domains interact across the life span – from as early as before an individual is born right through to subsequent generations.

By exploiting this breadth and depth of data, longitudinal studies are particularly powerful tools for identifying sensitive windows of development when the return on investment from policy intervention can be very high. The benefits of early intervention and prevention can also spread across portfolio outcomes. For example, longitudinal data has underpinned the understanding of how social and economic investment in early childhood benefits subsequent educational, mental health and employment outcomes.

By informing early intervention strategies, longitudinal data is uniquely placed to help address problems that are much harder and more expensive to change later in life.

Test ideas and evaluate policy

Longitudinal data can help decision makers test and cost policy ideas and evaluate smaller scale interventions.

Comprehensive longitudinal data can help quantify the cumulative costs of policy action (or inaction). A number of longitudinal studies include linkages with administrative data (such as Medicare) that allow policy-makers to establish the costs and potential cost-effectiveness of different policy options. Many longitudinal datasets also include indicators that are frequently used to monitor or compare policies – for example, the National Assessment Program – Literacy and Numeracy (NAPLAN) data in education has been linked to the Longitudinal Study of Australian Children (LSAC).

Duration of poverty

Poverty experienced even for a short period of time is undesirable, but more so is long-term or entrenched poverty.

The Household, Income and Labour Dynamics in Australia (HILDA) Survey can track the duration of poverty spells. Generally, 40% of adults who enter poverty one year are still in poverty the next year. By the third year, levels are at 23%. Furthermore, whilst in the minority, approximately 2% of spells will last 13 years.

Poverty spells commenced by single non-elderly males and couples with dependent children are relatively more likely to last only one year, and less likely to last six or more years. However, elderly people are more likely to experience a spell of poverty for at least six years.

Significantly, despite having high poverty rates in each year, lone parents are more likely to have shorter poverty spells. This could reflect the temporary nature of this family situation, since lone parents can partner or children cease being dependent.

Without longitudinal data it would not be possible to identify these trends or key demographics. Moreover, it emphasises the need for policy to prioritise those in entrenched poverty.

Further information: Wilkins, R. (2016). "The Household, Income and Labour Dynamics in Australia Survey: Selected Findings from Wave 1 to 14, the 11th Annual Statistical Report on the HILDA Survey". The Melbourne Institute of Applied Economics and Social Research, Melbourne University.

Longitudinal studies can also serve as a benchmark for evaluating smaller scale, trial interventions.

By matching individuals within a small scale intervention trial with individuals sharing similar observed characteristics from a longitudinal study (who have not experienced the intervention) it is possible to estimate how effective the intervention is compared to the status quo.

Types of longitudinal studies

Although all longitudinal studies share the distinguishing feature of linking individual data records taken at different points in time, there are a wide range of longitudinal study designs, with different areas of focus.

- Household panel surveys such as the Household, Income, and Labour Dynamics in Australia (HILDA) Survey typically focus on the dynamics of economic and subjective wellbeing, employment and families.
- Birth cohort studies (e.g. LSAC – B cohort) collect data from the families of children in their first year of life (or before) and follow them over time to investigate how early life experiences (childcare, early health, schooling etc.) influence educational, health and employment outcomes in later life.
- Age cohorts are similar to birth cohort studies, but respondents are older when data is first collected. For example, the LSAC – K cohort were aged 4-5 years in the first wave of data collection, and Longitudinal Surveys of Australian Youth (LSAY) cohorts are aged 15 years at Wave 1.
- Special population studies such as Building a New Life in Australia (BNLA) or the Longitudinal Study of Indigenous Children (LSIC) focus on the experience of individuals with a particular background, such as recently arrived migrants to Australia or Indigenous people.
- Area studies involve the experiences of individuals from a particular location and are commonly used to investigate physical health or to investigate the experience of local institutions or services.
- Other specialised longitudinal studies can track other groups for analysis – for example the Business Longitudinal Survey follows a cohort of small to medium enterprises over time.

Factors leading to incomplete immunisation in children

To examine the factors leading to incomplete child vaccination, the Longitudinal Study of Australian Children (LSAC) data from 2004 to 2008 was linked to the Australian Childhood Immunisation Register (ACIR). Of all fully immunised children, 99% of parents correctly said that their child was up to date. However, 44% of parents (representing 6,160 study children aged 7 to 10 months) of partially immunised children also said their child was up to date. Of children not immunised, 18% of parents (about 730 of the study children) said their child was up to date.

The attributable factors for non-immunisation at the child's age at 12, 24, and 60 months were analysed. Across the whole sample, at 12 and 24 months, around 50% of non-immunisation was attributable to parent disagreement with childhood immunisation, and at 60 months around 62% of non-immunisation was attributable to parent disagreement.

This was the first nationally representative study to show that parental attitude to immunisation is a stronger correlate for incomplete immunisation, as compared to other factors such as lack of time or lower financial resources.

From 1 January 2016, the vaccine conscientious objection was no longer considered an exemption category for immunisation, and incomplete immunisation would result in penalties.

Further information: Edwards, B, Homel, J. (2015). "Demographic, attitudinal and psychosocial factors associated with childhood immunisation". *LSAC Annual Statistical Report 2015*. pp. 71-98

Comparing different types of data

	Longitudinal data	Cross-sectional data	Randomized control trials	Qualitative research – e.g. focus groups
Demonstrate Causal Processes	✓✓	✓	✓✓✓	–
Evaluate diverse outcomes over time	✓✓✓	✓	✓	✓
Quantify persistence and transition	✓✓✓	✓	–	–
Quantify prevalence	✓✓	✓✓✓	–	–
Qualitatively describe individual stories	–	–	–	✓✓✓

- ✓✓✓ Best available standard of evidence, where practically and ethically feasible.
- ✓✓ Good scope for conducting this analysis – but some limitations.
- ✓ Limited scope to conduct this analysis.
- Rarely or never used or designed for this purpose.

The role of the National Centre for Longitudinal Data (NCLD)

The National Centre for Longitudinal Data (NCLD) was established to advance a longitudinal evidence base able to inform policies to improve the wellbeing of Australians throughout their lives.

The NCLD is:

- Guiding future government investment in longitudinal surveys and data, having just completed a national Review of Australia's Longitudinal Data Architecture
- Actively promoting the use of longitudinal data by researchers and policy makers
- Managing four nationally significant longitudinal data sets
- Supporting increased collaboration between the developers of longitudinal surveys, researchers and policy makers
- Exploring new ways of linking longitudinal data sets to gain a deeper understanding of Australian society.

Our studies

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

Collected annually since 2001, HILDA provides insights into Australians' economic and subjective wellbeing, the labour market, and family dynamics.

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

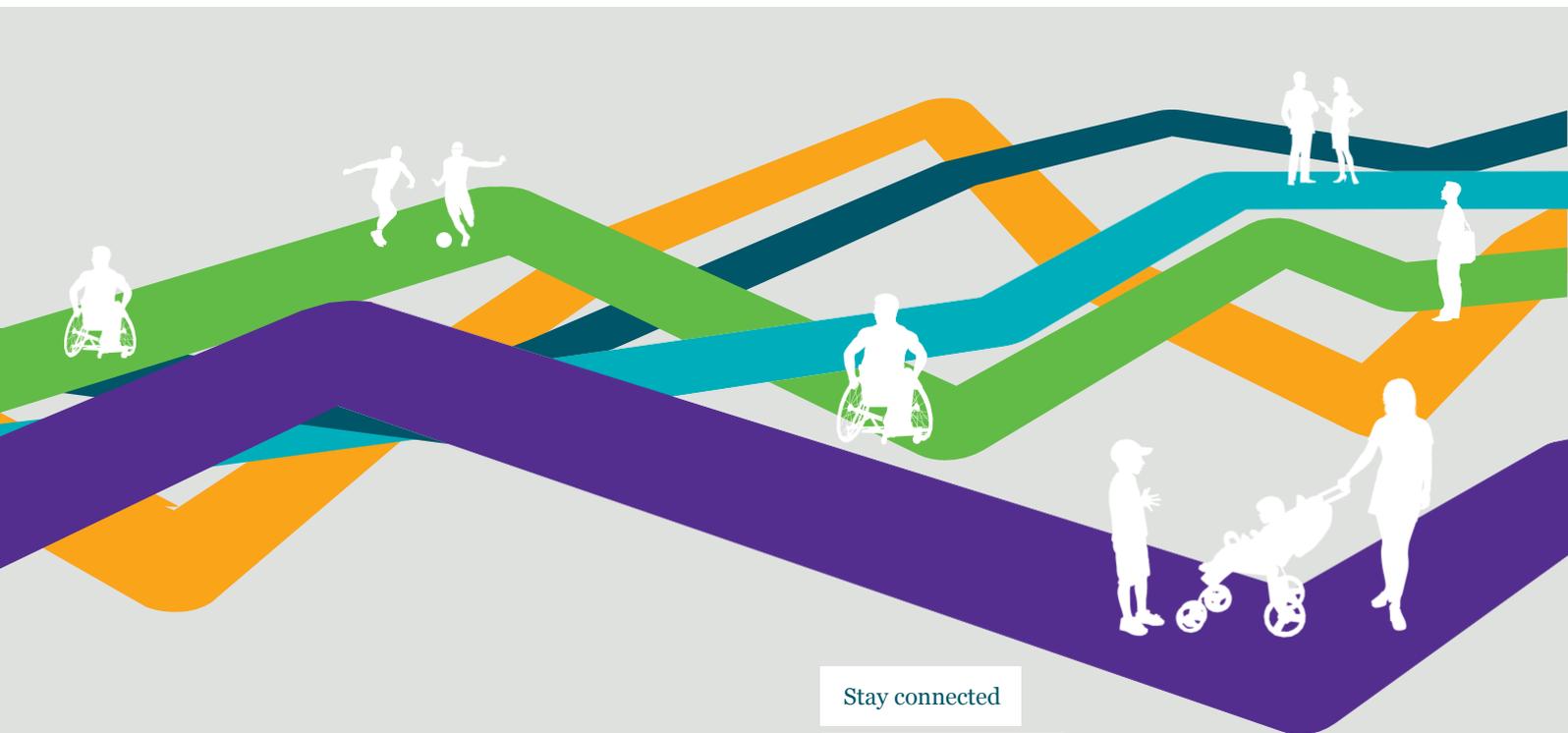
LSAC commenced in 2004 with over 10,000 families participating in the first wave. LSAC explores the contribution of children's families, social, economic and cultural environments to their development, adjustment and wellbeing.

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

LSIC is one of the largest studies worldwide following Indigenous children and their carers over time. Almost 1,700 families from remote, regional and urban Australia participated in the first LSIC survey in 2008.

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

BNLA aims to identify the factors which help or hinder the successful settlement of humanitarian migrants in Australia. BNLA began in 2013 with a cohort of 2,400 people who had been granted a permanent humanitarian visa in the three to six months prior.



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