



Measuring vulnerability and disadvantage in early childhood data collections

A report for the Australian Government Department of Education

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The Centre for Community Child Health is a department of The Royal Children's Hospital and a research group of the Murdoch Children's Research Institute.

Centre for Community Child Health

The Royal Children's Hospital Melbourne
50 Flemington Road, Parkville
Victoria 3052 Australia

Telephone: +61 9345 6150

Email: enquiries.ccch@rch.org.au

www.rch.org.au/ccch

The Centre for Community Child Health acknowledges the Traditional Owners of the land on which we work and pay our respect to Elders past, present and emerging.



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Abbreviations and acronyms

Abbreviation/acronym	Definition
ABS	Australian Bureau of Statistics
AEDC	Australian Early Development Census
BMI	Body mass index
CALD	Culturally and linguistically diverse
CCC	Changing Children's Chances
CCMS	Child Care Management System
CEaCS	Childhood Education and Care Survey
Census	Census of Population and Housing
CI	Confidence Interval
DEX	Data exchange
DOMINO	Data Over Multiple Individual Occurrences
DV1	Developmentally vulnerable on one or more domain(s)
ECEC	Early childhood education and care
FFY	First Five Years: What makes a difference?
GP	General practitioner
HILDA	Household, Income and Labour Dynamics in Australia
LBOTE	Language background other than English
LGBTIQ+	Lesbian, Gay, Bisexual, Transgender, Intersex, Queer, Sexual and Other Sexual or Gender Diverse
LSAC	Longitudinal Study of Australian Children
MADIP	Multi-Agency Data Integration Project
MBS	Medicare Benefits Schedule
NAPLAN	National Assessment Program – Literacy and Numeracy
NHS	National Health Survey
NQS	National Quality Standards
OT5	Developmentally on track on five domains
PAYG	Pay As You Go
PBS	Pharmaceutical Benefits Scheme
PIT	Personal Income Tax
SEIFA	Socio-economic Index for Areas
The Department	Department of Education



Executive summary

Background

Addressing inequity and optimising the health and development of children is reliant on being able to effectively assess and measure the disadvantage experienced by children and families. Ensuring robust measurement of disadvantage during the early years is crucial to understanding the extent of the problem, monitoring change over time, and identifying modifiable leverage points for optimal child development trajectories.

While area-based measures can tell us a lot about communities in need of support, they cannot capture the wide variation in children's experiences of disadvantage at the individual or family level. As such, there is a need to consider how early childhood/family data collections can be better utilised or enhanced (e.g., through the addition of survey questions or through linkage with other data sets) to better capture the many drivers of inequities in children's development.

Aim of the project

The aim of this project was to identify options for feasible child-centred indicators of disadvantage in collaboration with the Department of Education (The Department). The child disadvantage indicators must meet the following priorities:

The indicators must be **child-centred** (relevant to children aged from birth to eight years and their families).

Indicators should feasibly be able to be **collected** through early childhood data collections (e.g., built into surveys) or available from existing Australian Government data collections and able to be **linked** to early childhood data collections.

There is a need to prioritise indicators for which **quality** data are available and which are less subject to bias (e.g., missing data, subjective).

Indicators need to be able to measure **progress** over time (e.g., across Australian Early Development Census data collections).

Indicators must be associated with **children's developmental vulnerability**, as reported in the Australian Early Development Census.

In identifying child disadvantage indicators for The Department's consideration, this project was guided by a multidimensional framework of child disadvantage that was developed, tested, and published by the Changing Children's Chances project, based at The Centre for Community Child Health. It acknowledges that children's experiences of disadvantage are complex and shaped by the many environments in which they live, learn and grow (i.e., the social determinants). This framework has been extensively tested and provides a useful tool for conceptualising child disadvantage and guiding the selection of measures for the current project.



Summary of methods

To identify feasible child-centred measures of disadvantage the following steps were undertaken:

1. A rapid desktop review was completed to compile an inventory of indicators of child disadvantage already being used across Australian and State and Territory government agencies, which focus on younger children (0-8 years).
2. Drawing on the child disadvantage framework previously developed by the Changing Children's Chances project, results of the rapid desktop review and in consultation with The Department, a summary list of potential child disadvantage indicators was created.
3. To narrow down a shortlist of workable options, the indicators were evaluated against a set of criteria based on availability, simplicity, quality, and relevance. This evaluation was informed by a review and analysis of indicators available in Australian Government data collections.

Indicator evaluation criteria

Availability: the degree to which the indicator is already available and accessible for use in early childhood data collections.

Simplicity: the resources needed for data collection and how easily the data can be analysed and interpreted (e.g., time to administer, informant involvement, complexity of indicators).

Quality: how complete the data are, with consideration given to the degree of missing data, repeatability of assessment over time, and robustness of measurement.

Relevance: how relevant the indicator is to the objectives being pursued by The Department, that is, predicting differences in children's developmental outcomes.

Data source

This project draws on data from the Multi-Agency Data Integration Project (MADIP), which links large-scale Australian Government administrative data. Specifically, a child-centred data asset from the MADIP was utilised, which has been developed for the First Five Year (FFY) project. This enduring data asset captures information about children and their family's social, economic, and health circumstances over the child's first five years of life, along with information about children's early childhood education and care experiences. This information is all linked to a nationwide teacher-reported measure of children's development at school entry, the Australian Early Development Census.

Key findings

Rapid desktop review

Relevant documents were identified through a search of the grey literature using different combinations of key terms (e.g., 'disadvantage', 'vulnerability', 'child', 'data', 'measure'), a targeted search of relevant websites, and based on recommendations from expert advisors. Of 144 documents screened, 13 were eligible for inclusion.

Findings from the rapid desktop review show that Australian and State and Territory government agencies are already drawing on a wide range of data sources and indicators to report on the factors that shape children's early development and that drive inequitable developmental outcomes. While socioeconomic-based indicators are commonly used to measure children's experiences of disadvantage (e.g., family income and financial hardship), there is broad recognition across agencies that children's experiences of disadvantage are much more than this; they are complex and multifaceted.



Many agencies also identify a range of priority population groups (e.g., Aboriginal and Torres Strait Islander children, children from culturally and linguistically diverse backgrounds, and children with a disability) and report on these groups separately. While not indicators of disadvantage in themselves, indicators of priority population groups are important to capture because these children are more likely to experience inequitable developmental outcomes due to a range of structural and systemic barriers.

Summary of child disadvantage indicators

A summary of 87 potential child disadvantage indicators was created based on indicators identified in the rapid desktop review, in the Changing Children's Chances social determinants framework, and in consultation with The Department. These were arranged according to the four social determinant lenses consisting of:

- Sociodemographic (characteristics that define subpopulation groups)
- Geographic environments (characteristics of the places where children live)
- Health conditions (medical/chronic health problems for parents/carers and children)
- Risk factors (attributes, characteristics and exposures that increase the likelihood of poor developmental outcomes).

A range of priority population groups were also identified including children from Aboriginal and Torres Strait Islander backgrounds and children from culturally and linguistically diverse populations.

Evaluation of child disadvantage indicators

Evaluation of the child disadvantage indicators against the four criteria first identified 25 indicators which are **Available** within the First Five Years dataset, measuring children's experiences of disadvantage across the four social determinants lenses. For many of the indicators, there were multiple variables available across the available linked datasets that could be used to measure the indicator.

Evaluation of the indicators for **Simplicity** and then **Quality** resulted in a shortlist of 36 individual variables (capturing data on 19 indicators) for further consideration and analysis. Multiple options for measuring some indicators were considered (e.g., different ways of categorising household income).

The shortlisted set of measures were evaluated against the criterion of **Relevance**. This was informed by the data analysis undertaken using the FFY data. The analysis identified a set of top 15 indicators that were the most predictive of differences in children's development on the two outcomes: **developmentally vulnerable on one or more domain(s) (DV1)** and **developmentally on track on five domains (OT5)** based on univariate associations.

AEDC measures of child development

The Australian Early Development Census (AEDC) measures five 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.

This report focuses on two indicators that summarise children's development across the five domains:

- **Developmentally vulnerable on one or more domain(s) (DV1)**: the percentage of children who are developmentally vulnerable on one or more AEDC domain(s).
- **Developmentally on track on five domains (OT5)**: the percentage of children who are developmentally on track on all five AEDC domains.



The child disadvantage indicators rated to be of high relevance in this project capture experiences of disadvantage across the four social determinants lenses, including sociodemographic characteristics, health conditions, geographic environments and risk factors (Table 1).

Table 1. Child disadvantage indicators

Sociodemographic	Health conditions	Geographic environments	Risk factors
<ul style="list-style-type: none"> Lower household income (defined based on the childcare benefit income threshold of \$70,015 or less) Lower maternal education (completed Year 12 or below) Family received any type of special childcare benefit payment At least one parent was employed for four years or less Parent highest occupation was a labourer, machinery operator or administrative worker Child lived in a single-parent family Family received any type of social support payment 	<ul style="list-style-type: none"> Lower child experienced mental health issue/s Child experienced chronic health issue/s 	<ul style="list-style-type: none"> Housing overcrowding (3 or more additional bedrooms needed) Tenure type is rented/occupied 	<ul style="list-style-type: none"> Child is not regularly read to at home Child was born to a teenage mother Child did not attend preschool Child experienced the death of a parent

Recommendations and next steps

The following steps are recommended for enhancing the measurement of child disadvantage and vulnerability in early childhood data collections.

Data linkage

Data linkage of existing administrative data sets provides a feasible opportunity to enhance the measurement of child-level disadvantage in early childhood data collections. Linkage to multiple data sources (e.g., drawing on established child-centred linked data assets such as First Five Years) provides opportunities to robustly capture children's varied experiences of disadvantage and improve measurement quality. No single data set effectively captures all aspects of child disadvantage.

Supplement existing data collections

The addition of new questions or flags to existing early childhood data collections could be considered where objective, high-quality data are able to be captured and are not already being collected elsewhere. The addition of new data items would also be preferred where time taken to access linked data is likely to impact the timeliness of reporting. The types of data that could be considered - if not already captured - includes the child's ethnicity, refugee or asylum seeker status, whether the child has a disability or special health care need, the child's family composition and care arrangements (e.g., non-parental care), and parent education and occupation. Where possible it would be practical to draw on information already collected in school, preschool and early childhood education and care enrolment records.



Extending this work

This project provides a preliminary evaluation of a range of feasible options for measuring child disadvantage in early childhood data collections to inform discussions by The Department. Additional work using more robust analytic methods (e.g., multivariate analyses enhanced by methods such as machine learning), is recommended to further examine which combinations of child disadvantage indicators best predict children's developmental outcomes. Examining the causal associations between child disadvantage indicators and children's developmental outcomes would also help to better understand the key drivers of developmental inequities and identify more precise policy intervention pathways.



Background

The early years of a child's life provide the foundation for lifelong health, development, and wellbeing. However, not every child has an equal start in life. Evidence has shown that when children experience disadvantage during the critical early childhood period, it diminishes their wellbeing and contributes to poorer health and developmental outcomes.^{1,2} This early disadvantage carries both individual and societal costs, and immediate and lasting impacts:³ the higher the level of disadvantage, the greater the impact. These inequities are unjust and preventable.^{4,6} Reducing the impact of early life disadvantage is an increasing area of policy focus in Australia and around the world.

Addressing inequity and optimising the health and development of children is reliant on being able to effectively assess and measure the disadvantage experienced by children and families to enable the identification of effective mechanisms and strategies for tackling it.⁵ Policymakers need to be able to identify groups of children experiencing relatively worse levels of disadvantage, who may be at greater risk of poorer developmental outcomes, to ensure that resources are directed towards those who are most vulnerable, and to evaluate policy and program efforts. Because the capacity to influence children's developmental trajectories declines with age,^{7,8} ensuring robust measurement of children's experiences of disadvantage during the early years is crucial to understanding the extent of the problem, monitoring change over time, and identifying modifiable leverage points for optimal child development trajectories.

The Department of Education (referred to as The Department hereafter) conducts several data collections that support them in developing policies that ensure all children have access to quality support during the early childhood period that helps to prepare them for school and achieve their potential. These include the Australian Early Development Census (AEDC) and the National Early Childhood Education and Care Collection. These early childhood data collections provide a valuable platform for measuring and monitoring inequities and identifying population groups of children who may require additional support. Currently, the methodology to measure children's relative experiences of disadvantage within these collections largely relies on geographic measures. Most notable is the Australian Bureau of Statistics (ABS) Socio-economic Index for Areas (SEIFA) – a geographic-based measure using data from the Census of Population and Housing. SEIFA is used in The Department's early childhood data collections to understand how access to programs and outcomes are experienced differently for children from disadvantaged backgrounds.

While SEIFA can tell us a lot about communities in need of support, it is unable to capture the wide variation in children's experiences of disadvantage at the individual level.⁹ There are children and families in all communities who could benefit from additional support, but these children may be missed by reliance on SEIFA, particularly if they live in areas characterised by lower levels of community disadvantage: most disadvantaged children do not live in the most disadvantaged areas of Australia.^{9,10} Consequently, there is a need to consider how The Department's early childhood data collections can be enhanced (e.g., through the addition of survey questions or through linkage with other data sets) to better capture the many drivers of inequities in children's development so that these factors can be readily identified to inform additional program support and assess outcomes.

Defining and measuring children's experiences of disadvantage

Choosing appropriate measures of children's experiences of disadvantage to enhance The Department's early childhood data collections is not straightforward. Disadvantage can be conceptualised and measured in many different ways. Philosophical perspectives emphasise disadvantage as limiting opportunity and the capacity for individuals to freely lead lives they have reason to value.¹¹ In the context of health equity, disadvantage refers to the relative position in a social hierarchy determined by wealth, power, and prestige.¹² According to the Productivity Commission, disadvantage in Australia can be assessed against three metrics of relative income poverty, material deprivation (inability to afford life's essentials), and social exclusion.¹³ In contrast to concepts of poverty that focus on those who are the most deprived (e.g., of money or material possession), socially excluded, and/or vulnerable,¹⁴ disadvantage exists on a continuum.



Children’s experiences of disadvantage are complex and multifaceted. Disadvantage manifests in the circumstances in which children live, learn, and develop (referred to as social determinants) and drives differential health and developmental outcomes.⁴ Social determinants include upstream (e.g., economic resources) and downstream determinants (e.g., parent mental health).¹⁵ Children’s experiences of disadvantage are often measured using relative socioeconomic position, which is a key upstream social determinant frequently measured by parental education, occupation, and income. There is a strong argument that policymakers need to retain a focus on socioeconomic position if we are going to reduce child inequities.^{16,17} However, if we underestimate the extent to which children are exposed to disadvantage, this may mask the full extent of social gradients in children’s health and developmental outcomes.^{5,18} Further, potential opportunities to modify specific aspects of adversity and social risks may be overlooked. As such, a multidimensional framework may better capture the complex and multifaceted ways in which disadvantages can manifest and offer opportunities for more precise and effective ways of intervening and making a difference.^{5,6,18,19}

A framework for understanding the multidimensional drivers of child inequities⁵ was developed, tested and published by the Changing Children’s Chances (CCC) project, based at The Centre for Community Child Health (see Figure 1). The CCC social determinants framework is a child-centred framework that recognises that child development is shaped by the circumstances in which children live, learn and grow (i.e., the social determinants).²⁰ It also recognises that child development occurs within multiple nested levels of children’s surrounding social and physical environments. Inequities may therefore arise at the individual (e.g., preschool participation), family (e.g., parental mental health), and/or community level (e.g., built environment).⁵ The framework is structured around four interrelated social determinants ‘lenses’: sociodemographic (characteristics that define subpopulation groups and priority populations); geographic environments (characteristics of the places where children live); health conditions (diagnosable medical problems for parents/carers and children); and risk factors (attributes, characteristics and exposures that increase the likelihood of poor child outcomes).⁵ The framework captures broader upstream and downstream social determinants and is useful for considering pathways and mechanisms, and identifying modifiable policy levers. The framework has been extensively tested and provides a useful tool for conceptualising child disadvantage and guiding the selection of measures for the current project.

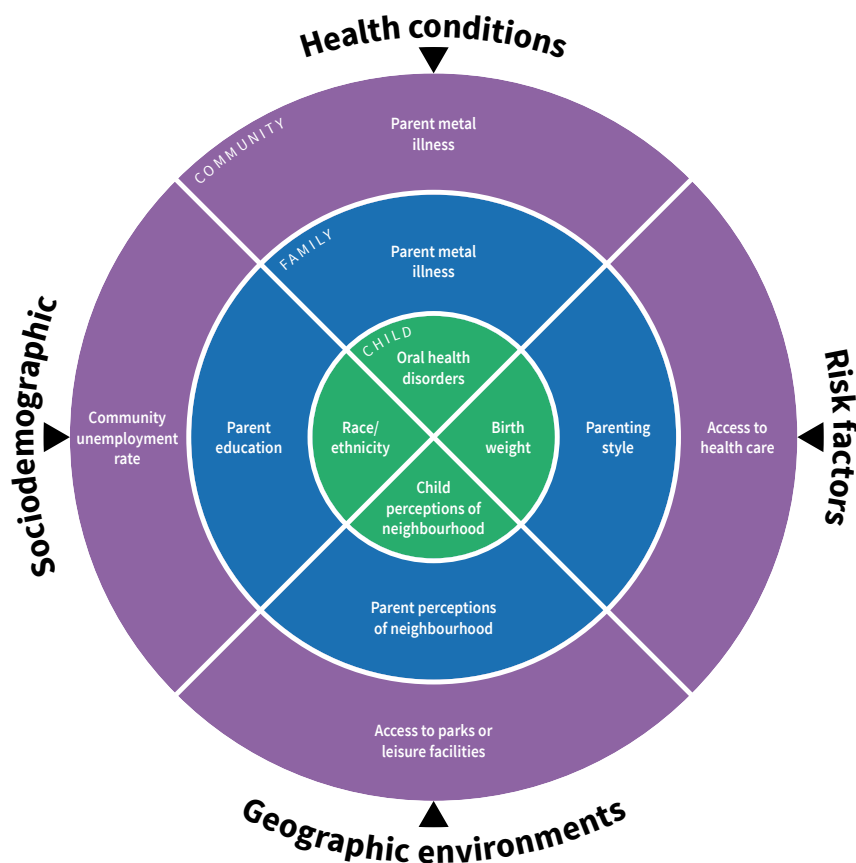


Figure 1. Framework for understanding the social determinants of inequities in children’s health and development, with examples of relevant indicators.

(Source: reproduced from Goldfeld, O’Connor, Cloney, Gray, Redmond, Badland, Williams, Mensah, Woolfenden, Kvalsvig, Kochanoff)⁵



This framework also captures children from a range of priority population groups, including children from culturally and linguistically diverse populations and children with a disability. These are groups of children that are at higher risk of experiencing disadvantage and vulnerability due to a range of structural and systemic barriers, including racism,²¹⁻²³ and often in greater need of support.²⁴ While belonging to these groups is not itself an indicator of disadvantage, capturing data on these priority population groups is critical to identifying and addressing inequity (providing services and resources based on need). This report considers indicators of children's priority population status separately from other indicators of disadvantage to avoid defining these children as inherently disadvantaged.

Enhancing The Department's early childhood data collections with data on children's multifaceted experiences of disadvantage would allow policymakers to better understand the extent of inequities in children's developmental outcomes and the key drivers of these inequities. This data could be leveraged to inform more **precise policy decisions** to redress child inequities, that is, identifying the most effective interventions for specific populations of children and their ideal time point(s), duration, and intensity to maximise impact.⁶

Nevertheless, while conceptually nuanced measures of children's experiences of disadvantage, such as the social determinants lenses approach, better align with the theory, survey developers and policymakers are often limited in how many measures they can include or by what is available in existing data sources. The breadth of data needed to operationalise a social determinants lenses approach is not routinely available in administrative data collections. Therefore, further work is needed to understand the scope of existing data and its alignment to the CCC social determinants framework and identify relevant indicators within this framework that best capture inequities in children's developmental outcomes.



Project overview

The Department seeks to enhance its early childhood data collections (e.g., the AEDC and the National Early Childhood Education and Care Collection) through the inclusion of child-centred measures of disadvantage that could allow them to more precisely identify and monitor children who are at risk of poor developmental outcomes and who may benefit from additional support. The aim of this project is to identify options for feasible child-centred indicators of disadvantage for The Department's consideration. The term 'child disadvantage indicators' is used in this report to refer to a measurable piece of information regarding some aspect of children's experiences of disadvantage or vulnerability.

Specifically, The Department seeks information on child disadvantage indicators that meet the following priorities:

- The indicators must be **child-centred** (relevant to children aged from birth to eight years and their families).
- Indicators must be realistically able to be **directly collected** through early childhood data collections (e.g., built into surveys) or available from existing Australian Government data collections and able to be **linked** to early childhood data collections.
- There is a need to prioritise indicators for which **quality** data are available and which are less subject to bias (e.g., missing data, subjective).
- Indicators need to be able to measure **progress** over time (e.g., across AEDC data collections).
- Indicators must be associated with **children's developmental vulnerability** as reported in the AEDC.

In identifying child disadvantage indicators for The Department's consideration, this project was guided by the CCC social determinants framework (see Figure 1), which recognises that children's development does not occur in a vacuum but is strongly influenced by the circumstances in which they live, learn, and grow. Therefore 'child-centred' aspects of disadvantage are viewed as those that manifest across the social determinants at the individual, family, and community levels.

An overview of the methodology for identifying relevant child disadvantage indicators is summarised in Figure 2. It included the following:

1. A rapid desktop review was undertaken to compile an inventory of indicators of child disadvantage already being used across Australian State and Territory government agencies, which focus on younger children (0-8 years).
2. Drawing on the social determinants framework previously developed by the Changing Children's Chances project in Figure 1,⁵ results of the rapid desktop review and consultation with The Department, a summary list of potential child disadvantage indicators was created.
3. The indicators were evaluated against a set of criteria based on availability, simplicity, quality and relevance. This evaluation was informed by a review and analysis of indicators available in Australian Government data collections (specifically the First Five Years: What makes a difference? (FFY) dataset from the Multi-Agency Data Integration Project (MADIP)). Refer to the 'Data sources' section.
4. Final recommendations were then provided.

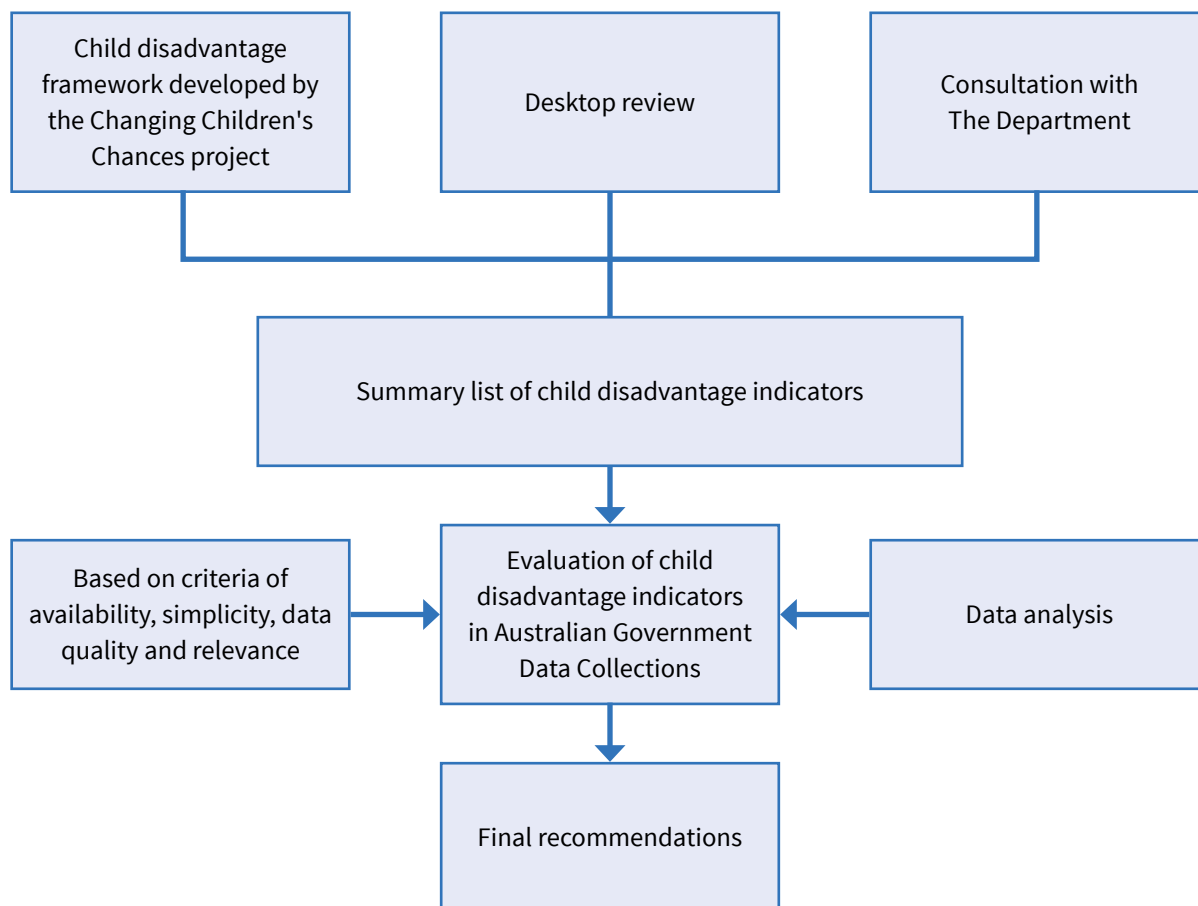


Figure 2. The workflow of the selection process of child disadvantage indicators.



Rapid desktop review

A rapid desktop review was undertaken to compile an inventory of existing measures of children’s experiences of disadvantage used across Australian and State and Territory government agencies, with a focus on younger children (aged 0-8 years). The desktop review utilised a rapid evidence assessment (REA) methodology, which adapts components of the ‘gold-standard’ systematic review process but allows for rigorous locating, appraising and synthesis of evidence to produce information in a timely manner.^{25,26}

Full details of the rapid desktop review methodology are provided in Appendix A. In brief, relevant documents were identified through:

- a search of the grey literature using different combinations of key terms, including “disadvantage”, “vulnerability”, “child”, “measure”, and “data”
- a targeted search of relevant websites
- recommendations from internal expert advisors.

The identified documents were screened to determine eligibility for inclusion based on the inclusion and exclusion criteria described in Table 2. Of the 144 documents screened in this rapid desktop review, 13 were eligible for inclusion.

Table 2. Inclusion and exclusion criteria for the selection of papers in the rapid desktop review

Inclusion criteria	Exclusion criteria
Utilised by an Australian or State and Territory government agency	Measures utilised by non-government agencies
Infants and children between 0-8 years	Children (> 8 years) and adults or general population focus
Websites / PDFs / Reports	Books / News articles / Journal publications / Web reports
Published from 1 January 2011	Published prior to 2011
English language	Non-English language
Australian	Not Australian
	Focus is not on child-level disadvantage (e.g., school-level disadvantage)
	No supporting document provided
	Insufficient information on indicators / measures / tools or document lacks comprehensiveness



Results

Table 3 summarises the documents included in this rapid review, 12 of these were government documents, and one report was from a non-government institute. However, the latter was included based on input from expert advisors. For a comprehensive summary of the characteristics of the included documents in this desktop review, see Appendix B.

The following sections summarise the purpose of the documents, the definitions of disadvantage, the indicators used and the data sources in the 13 documents we identified through our rapid review.

Purpose of the documents

The purpose of the documents can be organised according to two general categories: to report (or to aid reporting) upon child outcomes and to examine the relationship between disadvantage (or factors associated with disadvantage) and child outcomes.

Most of the documents report on or examine child outcomes at a national level, with 5 reporting on child outcomes at a state level (Victoria, Western Australia and South Australia), other states and territory documents did not satisfy inclusion criteria or had inadequate information. Only one document focuses exclusively on a specific subgroup within the population (Aboriginal children in Victoria).

Definitions of disadvantage

All the documents report on or examine indicators relating to children's experiences of disadvantage but not all provide a definition of disadvantage. For example, the *Western Australian Child Development Atlas*²⁷ is a list of indicators such as low-income households, unemployment, and household overcrowding, and South Australia's Outcomes Framework for Children and Young People²⁸ includes specific indicators across five dimensions but don't provide a description of disadvantage as a concept.

All the documents also either explicitly or implicitly indicate an association between disadvantage and financial hardship. However, most also explicitly state that disadvantage is about more than just financial hardship. For example, the authors of *Contexts of Disadvantage*²⁹ note that family disadvantage is multidimensional and incorporates material resources, employment, education, health and disability, and social support.

The authors of *Child Social Exclusion and Health Outcomes*³⁰ note that disadvantage is one aspect of social exclusion, along with lack of opportunity, resources, participation, and skills. The title of the report *Parental joblessness, financial disadvantage and the wellbeing of parents and children*,³¹ clearly highlights the authors' recognition that disadvantage is just one factor that can affect child outcomes.

The documents that report on child outcomes^{24, 27, 28, 32-36} all report on outcomes traditionally associated with disadvantage, such as family income, unemployment and housing. For example, in *Australia's Children*,²⁴ the authors report on factors such as housing stress and material deprivation, along with a host of other factors relating to, for example, health, education and social support.

Table 3. Summary of documents included in the rapid desktop review

Document title (authors)	Year	Age in (years)	Purpose of document
Western Australian Child Development Atlas: List of Indicators (Telethon Kids Institute) ²⁷	2020	0-24	To outline indicators of child development that can be used to provide insights into the associations between neighbourhood-level factors and child outcomes
Australia's Children (Australian Institute of Health and Welfare) ²⁴	2020	0-12/14	To bring together and contextualise national statistics on child wellbeing in one place and to provide updated data on measures and a greater understanding of data gaps



Document title (authors)	Year	Age in (years)	Purpose of document
Contexts of Disadvantage (Warren and Edwards) ²⁹	2017	0-9	To examine whether the pattern of exposure to disadvantaged contexts changes over time and to test when and to what extent disadvantaged contexts influence children's life chances
The tyrannies of distance and disadvantage: Factors related to children's development in regional and disadvantage areas of Australia (Edwards and Baxter) ³⁷	2013	0-9	To examine whether gaps in child development between regional areas and major cities are the result of geographical distance or neighbourhood disadvantage
Parental joblessness, financial disadvantage and the wellbeing of parents and children (Baxter et al.) ³¹	2012	0-9	To analyse the links between joblessness/part-time hours of employment and the wellbeing of parents and their children
Child social exclusion and health outcomes: A study of small areas across Australia (Australian Institute of Health and Welfare) ³⁰	2014	0-14	To explore links between risk of social exclusion and health outcomes in Australian kids at the small area level
The State of Victoria's Children: Aboriginal Children and Young People (Victorian Department of Education and Training) ³²	2021	0-25	To investigate outcomes for Aboriginal children and young people in Victoria and the contexts in which these outcomes occur, and to describe relevant programs and initiatives
The State of Victoria's Children Report: A focus on health and wellbeing (Victorian Department of Education and Training) ³³	2017	0-19	To provide a picture of the health and wellbeing of Victorian children
The State of Victoria's Children Report 2013-14: A report on resilience and vulnerability within Victoria's children and young people (Victorian Department of Education and Training) ³⁴	2016	0-17	To outline outcomes for Victorian children and young people regarding their and their families' resilience, vulnerability and disadvantage
Headline indicators for children's health, development and wellbeing (Australian Institute of Health and Welfare) ³⁵	2011	0-12	To provide information on how Australian children are faring according to 19 priority areas
Safe and Supported: the National Framework for Protecting Australia's Children 2021-2031. (Commonwealth of Australia, Department of Social Services) ³⁶	2021	0-18	To support the development and wellbeing of South Australians from birth to 18 years
South Australia's Outcomes Framework for Children and Young People. (Child Development Council, South Australia) ²⁸	2019	0-18	To improve the lives of children, young people and families experiencing disadvantage or who are vulnerable to abuse and neglect
Scoping enhanced measurement of child wellbeing in Australia: discussion paper (Australian Institute of Health and Welfare) ³⁸	2019	0-18	To provide a preliminary summary of the current national child wellbeing data

For a comprehensive summary of the documents, see Appendix B.

The authors of *The State of Victoria's Children: Aboriginal Children and Young People*³² note that Aboriginal children are more likely to experience disadvantage and vulnerability when compared to non-Aboriginal children, but they also note that this does not reflect outcomes for all Aboriginal children. The disadvantage experienced by Aboriginal children is strongly related to intergenerational trauma and economic exclusion. Similarly, the authors of *Safe and Supported: the National Framework for Protecting Australia's Children 2021-2031* also highlight the need for focus areas to address the over-representation of Aboriginal and Torres Strait Islander children.³⁶



In *Australia's Children*,²⁴ the authors also report vulnerable population groups that are at risk of disadvantage, including children born into poverty, children from Aboriginal and Torres Strait Islander backgrounds and children with disabilities. This aligns with an argument highlighted in *The State of Victoria's Children: Aboriginal Children and Young People*³² whereby the authors note that disadvantage and vulnerability don't always go hand in hand. By acknowledging that vulnerable populations are at risk of disadvantage (rather than implying that vulnerable groups are disadvantaged), the authors of *Australia's Children*,²⁴ reinforce the argument that disadvantage and vulnerability don't necessarily coincide.

Indicators of disadvantage

The documents that examine the relationship between disadvantage and child outcomes generally^{28-31,37} have a much smaller number of indicators than those that report on child outcomes.^{24,27,32-34} However, the range of indicators used in the documents that examine the relationship between disadvantage and child outcomes^{28-31,37} reflect an understanding of disadvantage as a multidimensional concept.

For example, along with indicators relating to economic circumstances and financial wellbeing, the *Parental joblessness, financial disadvantage and the wellbeing of parents and children* report³¹ include indicators relating to parental employment, social capital and parental mental health along with indicators relating to the socioeconomic circumstances of families. Similarly, the *Child Social Exclusion and Health Outcomes* report³⁰ includes indicators relating to parent and child education, connectedness (no parent doing voluntary work, no motor vehicle), housing and health service access. Furthermore, the South Australia's Outcomes Framework for Children and Young People includes specific indicators across five dimensions i.e., health, safety, wellbeing, education and citizenship that may impact children that are disadvantaged and/or vulnerable.²⁸

Ten of the documents include indicators relating to parent, family and/or household income and/or finances^{24,27,29-31,33,35-38} such as low-income households,^{27,33,36} poverty^{34,36,38} and family economics / economic situation.^{24,28,33,35,36,38}

There were many indicators relating to early childhood education and care, and school. The most common early childhood education and care (ECEC) indicator was attendance at preschool / kindergarten.^{24,27,33,34,37,38} School indicators varied and included:

- school readiness^{28,32,34}
- attendance at school.^{24,28,32,38}

Some indicators relating to child mental health included:

- child mental health diagnosis/conditions^{27,38}
- mental illness^{24,28}
- emotional, developmental or behavioural difficulties.^{28,33}
- self-perceived satisfaction with life²⁸
- suicidal rates²⁸

At the family level, common indicators included:

- parent / family / household joblessness / unemployment^{27,29,30,33,36-38}
- parent education^{27,29,30,33,37}
- parent health / disability.^{24,29,37}

There were many indicators relating to housing. These included:

- overcrowding^{24,27,30,38}
- housing stress^{24,33,38}
- homelessness.^{24,32,33,38}

There were few indicators at the community level. Of the few community-level indicators, the most common was community-level disadvantage^{29,31,32} followed by neighbourhood crime and safety.^{24,28,33,38}



Data sources

A wide range of data sources were used for the indicators. These included nationally representative administrative and survey data from the ABS (including the Childhood Education and Care Survey, the Census of Population and Housing, and the National Health Survey), the Household, Income and Labour Dynamics in Australia (HILDA) survey, and health data from the Australian Immunisation Register. A range of state-based data sources were also drawn upon including the School Entrant Health Questionnaire (Victoria), Victorian Perinatal Data, Emergency Department Data (Western Australia), and Registry of Births, Deaths and Marriages (Western Australia).

Seven of the eleven documents used the Longitudinal Study of Australian Children (LSAC) as a data source. These included: *Australia's Children*,²⁴ *Contexts of Disadvantage*,²⁹ *The tyrannies of distance and disadvantage: Factors related to children's development in regional and disadvantage areas of Australia*,³⁷ *Parental joblessness, financial disadvantage and the wellbeing of parents and children report*,³¹ *The State of Victoria's Children Report 2013-14: A report on resilience and vulnerability within Victoria's children and young people*,³⁴ *Headline Indicators*,³⁵ and *Scoping enhanced measurement of child wellbeing in Australia*.³⁸



Summary of child disadvantage indicators

A summary of 87 potential child disadvantage indicators was compiled based on indicators identified in the rapid desktop review, in the Changing Children's Chances social determinants framework, and in consultation with The Department (see Table 3). These indicators were arranged according to the four social determinants lenses: sociodemographic (characteristics that define subpopulation groups); geographic environments (characteristics of the places where children live); health conditions (diagnosable medical problems for parents/carers and children); and risk factors (attributes, characteristics and exposures that increase the likelihood of poor child outcomes).⁵ It is clear that a wide variety of indicators have been used to measure children's experiences of disadvantage across the four social determinants lenses. In addition to indicators of disadvantage, a range of indicators have been used to identify children from priority population groups in previous work, which are also summarised in Table 4. These are groups of children that are at higher risk of experiencing disadvantage and vulnerability and are often in greater need of support.²⁴ These children are more likely to experience inequitable developmental outcomes.

Table 4. Summary of child disadvantage indicators identified through rapid desktop review, the Changing Children's Chances social determinants framework, and consultation with The Department

Constructs	Indicators
Sociodemographic (n=13)	
Material resources	Low-income household; sources of income; material deprivation; earning power; poverty; financial hardship; food insecurity
Parent education	Parent education level
Parent occupation and employment	Parent occupation; parent employment status; labour force status
Household composition	Single-parent household; the number of people in the household
Health conditions (n=20)	
Health issues	Chronic health issues or disability of parents; chronic health issues of the child; burden of disease; oral health; injuries; hospitalisations
Mental health issues	Parent mental health issues; child mental health issues; emergency department presentations for mental illness or self-harm; social and emotional wellbeing
Health risk	Main caregiver smoking; main caregiver binge drinking; main caregiver body mass index; child overweight and obesity; child physical activity; child nutrition; child sleep; overall child health; child smoking; child drinking
Geographic - where children live (n=17)	
Housing	Housing overcrowding; housing stress; homelessness; shelter; internet access; the number of homes a child has lived in
Built environment	Neighbourhood safety and crime; neighbourhood belonging; access to services; availability of general practitioners (GPs) and dentists; healthy, accessible and enabling communities; physical environment; transportation; neighbourhood liveability
Geographic	Community socioeconomic status; school-level socioeconomic status; remoteness (urban vs rural location)



Constructs	Indicators
Risk factors (n=37)	
Education	Preschool attendance; attendance at primary school; early childhood education and care attendance; books in the home; reading with children; television watching; home learning environment; school engagement; expulsions; student safety
Pregnancy, birth and infancy	Teenage mothers; low birth weight; preterm birth; smoking during pregnancy; drinking during pregnancy; substance use during pregnancy; breastfeeding; immunisation; maternal and child health service use; temperament; secure attachment
Adverse experiences	Parental death; child abuse and neglect; family violence; bullying; out-of-home care; racism; stressful life events in a family; caregiver argumentative relationships
Social	Social networks; parent social support; help from family and friends; unmet needs for social support contact with family; friends and neighbours; involvement in volunteer or community groups; parenting; family functioning
Priority populations (n=16)	
Aboriginal and Torres Strait Islander status	Child's Aboriginal and Torres Strait Islander status
Cultural and linguistic diversity	Ethnicity; country of child's birth; country of parent's birth; child's language background; parent's language background; year child arrived in Australia; year parent arrived in Australia; child's English proficiency; parent's English proficiency; child's ancestry; ancestry of parents; child's religion; parent's religion
Disability	Child has a disability; special healthcare needs

Cultural and linguistic diversity (CALD) is a common categorisation used in Australia. Its components include: country of birth, language spoken at home and English proficiency.^{39,40} Recent recommendations suggest that conflating or confusing these components may be problematic as, while related, they are conceptually distinct and may capture different impacts on children's health and development.^{41,42} As such, they are considered separately in this report. It is also recommended that these measures be considered only proxy indicators of ethnicity, which itself is not currently captured in Australian administrative and health care data. The identification of high-quality, rigorous and contextually appropriate measures of ethnicity is a topic of ongoing discussion.⁴³



Evaluation of child disadvantage indicators

Drawing on the objectives and priorities set out by The Department, a set of criteria was developed to evaluate individual child disadvantage indicators. The four criteria are summarised in Table 5 and relate to Availability, Simplicity, Quality, and Relevance. Each individual indicator of child disadvantage was evaluated against these four criteria, with the results of this analysis being used to derive a set of preferred indicators for consideration by The Department.

Evaluation of child disadvantage indicators against the criteria proceeded as follows:

- Child disadvantage indicators were mapped against Australian Government data (The FFY dataset, described below) to determine their Availability.
- The available indicators were then evaluated against the criteria of Simplicity and Quality to shortlist a set of indicators that were suitable for further consideration.
- The shortlisted set of indicators were evaluated against the criteria of Relevance, which was informed by data analysis undertaken using the available datasets.

A summary of the results of the full evaluation are available in Appendix C.

Table 5. Definition and criteria for evaluating child disadvantage indicators

	Availability	Simplicity	Quality	Relevance
Definition	Refers to the degree to which the indicator is already available and accessible for use in early childhood data collections.	Refers to the resources needed for data collection and how easily the data can be analysed and interpreted (e.g., time to administer, informant involvement, complexity of indicators).	Refers to how complete the data are with consideration given to degree of missing data, repeatability of assessment over time and robustness of measurement.	Refers to how relevant the indicator is to the objectives being pursued by The Department, that is predicting differences in children's developmental outcomes.
Classification				
High	The indicator is readily available in early childhood data collections (e.g., AEDC) or available to be linked from MADIP.	The indicator is simple to use/collect, using single indicators with limited administrative burden (e.g., no formula required or simple formula to derive the indicator).	The indicator is available at the population level with a low proportion of missing data, is consistently collected over time, and robustly measures what it intends to capture.	The indicator is statistically associated with children's developmental outcomes and is in the top 15* indicators based on the strength of statistical association with children's developmental outcomes.
Medium	The indicator could pragmatically be measured in future data collections, or there is potential to link the indicator from other data sources in the future.	The indicator needs to be derived from two or more single indicators/datasets, using a potentially complex formula. The relevant formula for deriving the indicator and its interpretation is available and informed by expert knowledge.	The indicator is available at the population level but has a high proportion of missing data and/or is not collected frequently. The indicator may also be a blunt measure but is the best available for measuring the construct of interest.	The indicator is statistically associated with children's developmental outcomes but not ranked in the top 15 indicators based on the strengths of statistical association with children's developmental outcomes.



	Availability	Simplicity	Quality	Relevance
Low	The indicator is only available in research-based survey data collections or is not collected in existing data sources.	The indicator needs to be derived from two or more single indicators/datasets, using potentially complex formula which has not been thoroughly explored to date or requires further input from expert knowledge to derive and interpret.	The indicator is only measured in a subgroup of the population and is not available at the population level. The construct being measured may also be better captured by another, more robust indicator.	There was little or no statistical association between the indicator and children's developmental outcomes, or the association was not in the expected direction.

Abbreviations: AEDC, Australian Early Development Census; MADIP, Multi-Agency Data Integration Project.

*where multiple indicators measuring the same construct (e.g., different ways of categorising household income) were in the top 15 indicators, only the strongest performing indicator for that construct was selected.

Data source

This report draws on integrated person-level data from MADIP, which provides large-scale Australian Government administrative data. Specifically, this report utilises a child-centred data asset from the MADIP created for the project FFY. The FFY project is a collaborative endeavour involving project partners from across the government and the university sector. By creating an enduring child-centred data asset that links the AEDC with family, social, economic and health data and data about childcare centre attendance and quality, the FFY dataset enables policymakers and researchers to better understand the influence that social, economic and health events and circumstances have on early child development.

For the FFY project, to date, data has been linked to both the 2015 and 2018 AEDC, with the aim to link future AEDC collections. The AEDC is a nationwide data collection of early childhood development at the time children commence their first year of school, undertaken every three years since 2009. The AEDC involves teachers completing a research tool, the Australian version of the Early Development Instrument. The instrument collects data relating to five key domains: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills (school-based), and communication skills and general knowledge. In measuring how children have developed by the time they start school, the AEDC highlights what is working well and where more work is needed to ensure all children have the best start in life. This project draws on data that has been linked to the 2018 AEDC data collection, summarised in Table 6. The 2018 AEDC collected data on the development of almost 309,000 children in Australia, representing over 96% of children in their first year of full-time school.⁴⁴

Datasets available within FFY include:

- [Australian Early Development Census \(AEDC\)](#)
- [Census of Population and Housing \(Census\)](#)
- [Child Care Management System \(CCMS\)](#)
- [Data exchange \(DEX\)](#)
- [Data Over Multiple Individual Occurrences \(DOMINO\)](#)
- [Medicare Benefits Schedule \(MBS\)](#)
- [National Health Survey \(NHS\)](#)
- [National Quality Standards \(NQS\)](#)
- [Pay As You Go \(PAYG\)](#)
- [Personal Income Tax \(PIT\)](#)
- [Pharmaceutical Benefits Scheme \(PBS\)](#)
- [Registries of Deaths](#)



Table 6. Overview of available datasets linked to the 2018 Australian Early Development Census

Dataset	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australian Early Development Census									
Census of Population and Housing									
Child Care Management System									
DEX – Family and Community Program Data									
DOMINO Centrelink administrative data									
Medicare Benefits Schedule									
National Health Survey									
National Quality Standards									
Pay As You Go									
Personal Income Tax									
Pharmaceutical Benefits Scheme									
Registries of Deaths									

Abbreviations: DEX, Data exchange; DOMINO, Data Over Multiple Individual Occurrences. Note: Some datasets are available according to the financial year and others according to calendar year.

Assessment of child disadvantage indicators: availability

The disadvantage indicators (see Table 3) were mapped onto data available in the FFY dataset. Each indicator was evaluated against the criterion of Availability, which refers to the degree to which the indicator is already available and accessible for use in early childhood data collections.

The process used to identify relevant indicators in the FFY dataset included:

- drawing on the existing work and expertise of the FFY team
- drawing on the knowledge of indicators within the project team
- scanning data dictionaries.

Table 7 provides a summary of 25 broad indicators that are available in the FFY dataset. Further details regarding data sources for available indicators can be found in Appendix C and D. Many of the indicators were measurable within more than one of the FFY datasets. For example, an indicator of annual gross income is available within the Census, DOMINO, NHS, PAYG and PIT datasets. A full summary of the datasets across which the indicators are available is provided in Appendix C. In some cases, where multiple measures were available for the same indicator (i.e., across different FFY datasets), we nominated a single measure based on considerations of the indicator's simplicity and data quality (described below). Note that not all available indicators were examined in this project. For example, area-based measures such as community socioeconomic status and remoteness were not included in line with The Department's priorities to explore opportunities for measuring child disadvantage outside of area-based indicators. We also focused on two priority population groups in this report – Aboriginal and Torres Strait Islander children and children from culturally and linguistically diverse backgrounds – but it may be of interest to explore additional groups in future (e.g., children with a disability).



Table 7. Summary of child disadvantage indicators by current availability in the FFY datasets

Constructs	Indicators available in FFY datasets	Indicators not currently available in FFY datasets
Sociodemographic		
Material resources	Household income; sources of income; poverty	Material deprivation; earning power; financial hardship; food insecurity
Parent education	Parent education level	
Parent occupation and employment	Parent occupation; parent employment status	Labour force status
Household composition	Single-parent household; number of people in household	
Health conditions		
Chronic health issues	Chronic health issues of parent; chronic health issues of child	Burden of disease; oral health; injuries; hospitalisations
Mental health issues	Parent mental health issues; child mental health issues	Emergency department presentations for mental illness or self-harm; social and emotional wellbeing
Health risk	Main caregiver smoking; main caregiver binge drinking; main caregiver body mass index	Child overweight or obesity; child physical health; child nutrition, child sleep; overall child health; child smoking; child drinking
Geographic – where children live		
Housing	Housing overcrowding; housing stress; housing mobility	Homelessness; shelter; internet access
Built environment		Neighbourhood safety and crime; neighbourhood belonging; access to services; availability of general practitioners (GPs) and dentists; healthy, accessible and enabling communities; physical environment; transportation; neighbourhood liveability
Geographic	Community socioeconomic status; remoteness (urban vs rural location)	School-level socioeconomic status
Risk factors		
Education	Preschool attendance; childcare attendance; reading with children	Attendance at primary school; books in the home; television watching; home learning environment; school engagement; expulsions; student safety
Pregnancy, birth and infancy	Teenage mothers	Low birthweight; preterm birth; smoking during pregnancy; drinking during pregnancy; substance use during pregnancy; breastfeeding; immunisation; maternal and child health service use; temperament; secure attachment
Adverse experiences	Parental death	Child abuse and neglect; family violence; bullying; out-of-home care; racism; stressful life events in family; caregiver argumentative relationships
Social		Social networks; parent social support; help from family and friends; unmet needs for social support contact with family; friends and neighbours; involvement in volunteer or community groups; parenting; family functioning



Constructs	Indicators available in FFY datasets	Indicators not currently available in FFY datasets
Priority populations		
Aboriginal and Torres Strait Islander status	Child's Aboriginal or Torres Strait Islander status	
Cultural and linguistic diversity	Country of child's birth; country of parent's birth; child's language background; parent's language background; year child arrived in Australia; year parent arrived in Australia; child's English proficiency; parent's English proficiency; child's ancestry; ancestry of parents; child's religion; parent's religion	Ethnicity
Disability	Child has a disability; special healthcare needs	

Further details regarding data sources for available indicators can be found in Appendix C and D.

Table 7 also summarises indicators that are not currently available in the FFY dataset, but which were identified in this project as being relevant to measuring child disadvantage (Table 4). These indicators are all available in data collections not captured in the FFY dataset (being used in the documents identified through the rapid desktop review or through the Changing Children's Chances program of work), however it was beyond the scope of this project to identify specific datasets where these indicators are available. Some constructs that are generally not well captured in the FFY dataset include characteristics of the neighbourhood built environments in which children live, health risk factors particularly those relevant to pregnancy, birth and infancy (e.g., immunisation and birthweight), and a range of family-level factors (e.g., home learning environments and social connections and supports).

Below is a list of indicators that are not currently captured in the FFY dataset but which were evaluated within this project to be of 'medium' availability (i.e., they could pragmatically be measured in future data collections or there may be potential to link the indicator in the future):

- Health data related to hospitalisations and emergency department visits
- Health risk factors including children's weight and obesity, birthweight, immunisations
- Service use data such as maternal and child health service use
- Education data on school attendance and engagement
- Risk factors including homelessness, out-of-home care, family violence
- Data relevant to identifying priority population status including ethnicity and disability.

There were also a range of indicators which are relevant to measuring children's experiences of disadvantage (see Table 4) but that are not well captured in administrative datasets generally (i.e. they are mostly available within research-based surveys). While these were rated as 'low' in the evaluation of availability for this project, the indicators listed below warrant further exploration as to whether and how they might feasibly be captured within national data collections:

- Children's overall mental health and wellbeing
- Neighbourhood built environments and service availability
- Family-related factors including parenting, social support and networks, family functioning and home learning environments.



Assessment of child disadvantage indicators: simplicity and quality

The indicators available in the FFY dataset and listed in Table 7 were evaluated against the criteria of Simplicity and Quality. Simplicity refers to the resources needed for data collection and how easily the data can be analysed and interpreted (e.g., time to administer, informant involvement, complexity of indicators). Quality refers to how complete the data are, with consideration given to degree of missing data, repeatability of assessment over time and robustness of measurement. A complete summary of this evaluation is provided in Appendix C. Analysis of missing data for each indicator also informed evaluations against the quality criterion. Details of missing data can be found in Appendix D.

The purpose of this step in the evaluation was to shortlist a set of options for child disadvantage indicators that were suitable for further consideration. It also informed the prioritisation of measures where multiple were available for the same indicator (i.e., across different FFY datasets).

The results of the evaluation of child disadvantage indicators against the criteria of Simplicity and Quality suggest that no indicator is perfect, and in determining indicators for inclusion, researchers, and policymakers may face a trade-off between a measure of high quality versus a simpler, lower quality measure that is easier to operationalise. In many instances, indicators that rated high on simplicity received a lower rating for quality. For example, while the Census and National Health Survey contain single item measures of household income that could be simple to collect, derive and/or interpret, we did not consider these to be of high quality due to issues such as missing data (e.g., NHS data was only available for a fraction of the cohort); frequency of assessments (e.g., Census and NHS are not collected frequently and collection timelines may not align with early childhood data collections such as the AEDC); and robustness of the measure (the measures are not considered best practice and there are more robust or objective measures of household income available in the dataset). **As such, in many instances, we selected the less simple but higher quality indicators for further consideration, consistent with The Department's priorities.**

Listed below are some indicators which were not shortlisted for further consideration due to issues with data quality, but which warrant further exploration including consideration as to how the measurement of these indicators could be enhanced through further data linkage:

- Main caregiver smoking status
- Main caregiver binge drinking
- Main caregiver body mass index
- Housing stress
- Main caregiver English proficiency.

With regards to the measurement of cultural and linguistic diversity, the indicators available within the dataset are considered only proxy measures of ethnicity (which itself is not routinely captured in Australian administrative data) and therefore were not given a rating of high quality. Nevertheless, we selected several commonly reported proxy measures for further consideration since these may capture population groups who are at greater risk of poorer developmental outcomes due to disproportionate exposure to structural and systemic barriers that contribute to higher disadvantage.

Assessment of child disadvantage indicators: relevance

The available indicators nominated for further consideration based on the assessment of simplicity and quality were evaluated against the criterion of Relevance. This criterion refers to the connectedness of the indicators to the objectives being pursued by The Department, which is predicting differences in children's developmental outcomes at a population level. Based on this evaluation, the child disadvantage indicators were ranked according to the strength of their statistical association with children's developmental outcomes, with the top 15 indicators being highlighted for The Department's consideration. To do this, the FFY data were analysed to estimate the univariate associations between the nominated indicators and children's developmental outcomes as reported on the AEDC.



Data analysis plan

Child disadvantage indicators

All selected candidate variables were cleaned and categorised. A total of 36 individual variables were considered in the analyses (capturing data on 19 child disadvantage indicators). Different ways of measuring and/or categorising disadvantage were considered for some constructs (e.g., different ways of categorising household income). Details of each included variable are available in Appendix D. Where possible, this project used measures that had already been derived for the FFY project through an extensive program of work. For other measures, the researchers drew on established best practices, previous research and/or expert advice. It should be noted that there are alternative ways of coding many of the variables included in this report, and future work may be needed to explore the implications of alternative coding for the results and to further refine and establish best practice measurement of specific indicators.

Child developmental outcomes

Developmental outcomes were measured using existing domains of the AEDC, drawing on the 2018 data collection. The AEDC is a cross-sectional population census of early childhood development across Australia, adapted from the Canadian Early Development Instrument.⁴⁵ The Australian Government has committed to undertake this developmental census every three years (2009, 2012, 2015, 2018, 2021), with the data used by researchers, policymakers, communities and schools to inform service development, policy and planning.^{45,46}

The AEDC measures five 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 domains) across 96 items,⁴⁵ summarised in **Table 8**. These outcomes have been well researched, validated and align with understandings of child development.^{47,48} Each item's response scale is either dichotomous (yes/no) or a Likert scale (e.g., very good/good, average, and poor/very poor). Children received a score between 0-10 on each domain, which is the means score of all valid answers for that domain. Higher scores indicate stronger competency in a domain. Domain scores are then categorised into the following:

- 'Developmentally vulnerable' if they fall below the 10th percentile, which should be interpreted as the child demonstrating much lower than average ability in the competencies measured in that domain⁴⁹
- 'Developmentally at risk' if they fall between the 10th and 25th percentile
- 'Developmentally on track' if they fall above the 25th percentile.

Categorisations of 'developmentally vulnerable', 'developmentally at risk' and 'developmentally on track' are based on cut-offs established using the 2009 AEDC data to allow changes over time to be monitored.

For this report, analyses focus on two AEDC summary indicators that summarise development across the domains:

- **Developmentally vulnerable on one or more domain(s) (DV1)** – which captures children who are developmentally vulnerable on one or more of the five AEDC domains
- **Developmentally on track on five domains (OT5)** – which captures children who are developmentally on track on all five domains, providing an indicator of how well children's holistic development is being supported generally.



Table 8. Summary and description of AEDC domain and subdomains

Domain	Subdomain	Description
Physical health and wellbeing (12 items)	Physical readiness for the school day	Whether the child is dressed appropriately for school activities, comes to school on time, and is not hungry or tired
	Physical independence	Whether the child is independent regarding their own needs, has an established hand preference and is well coordinated
	Gross and fine motor skills	Child's ability to physically tackle the school day, including gross and fine motor skills
Social competence (24 items)	Overall social competence	Overall social development, including the ability to get along and play with other children, cooperativeness, and self-confidence
	Responsibility and respect	Whether the child shows respect for others and for property, follows the rules, takes care of materials, accepts responsibility for actions, and shows self-control
	Approaches to learning	Whether the child works neatly and independently, can solve problems, follow instructions, and class routines, and easily adjust to changes
	Readiness to explore new things	Whether the child is curious about the surrounding world, and eager to explore new books, toys or unfamiliar objects and games
Emotional maturity (26 items)	Pro-social and helping behaviour	Whether the child shows helping behaviours, including helping someone hurt, sick, or upset, offering to help spontaneously, and inviting others to join in
	Anxious and fretful behaviour	Whether the child shows anxious behaviours, is happy and able to enjoy school, and is comfortable being left at school
	Aggressive behaviour	Whether the child shows aggressive behaviours as a means of solving a conflict and has temper tantrums
	Hyperactivity and inattention	Hyperactive behaviours and ability to concentrate, settle to chosen activities, wait their turn, and think before acting
Language and cognitive development (school-based) (26 items)	Basic literacy	Basic literacy skills include how to handle a book, the ability to identify some letters and attach sounds to some letters, show awareness of rhyming words, knowing the writing directions, and the ability to write their own name
	Interest in literacy/ numeracy and memory	Interest in books and reading, math and numbers, and memory functioning
	Advanced literacy	Advanced literacy skills such as reading simple words or sentences and writing simple words or sentences
	Basic numeracy	Basic numeracy skills such as counting to 20, recognising shapes and numbers, comparing numbers, sorting, and classifying, use of one-to-one correspondence, and understanding simple time concepts
Communication skills and general knowledge (8 items)	Communication skills and general knowledge	Ability to communicate easily and effectively, participate in story-telling or imaginative play, articulate clearly, and show adequate standard knowledge



Statistical analysis plan

Descriptive statistics were first obtained to understand the distribution of child disadvantage indicators, priority populations and children's developmental outcomes on the AEDC (DV1 and not OT5). Where relevant, these analyses explored a range of different thresholds for key child disadvantage indicators that could provide a more precise measure of child disadvantage. For example, for family income, we considered how a range of income bands and measurable thresholds (e.g., those corresponding with Low Income Health Care Card, Family Tax Benefit A, Family Tax Benefit B, Child Care Subsidy) are related to children's AEDC outcomes.

Second, we conducted a series of generalised linear models to examine the association between each child disadvantage indicator and each AEDC developmental outcome, DV1 and OT5. Associations were presented as risk ratios (RR) with corresponding 95% confidence intervals (95% CI). Confidence intervals are a range of values that describe the uncertainty surrounding an estimate.

- For DV1, which signifies a negative outcome, the estimated RR for each child disadvantage indicator represents the increased risk ($RR > 1$) of developmental vulnerability on one or more domain among disadvantaged children relative to their non-disadvantaged peers.
- Alternatively, for OT5 which signifies a positive outcome, the estimated RR for each child disadvantage indicator represents the reduced likelihood ($RR < 1$) of being developmentally on track on all five domains among disadvantaged children relative to their non-disadvantaged peers.

The child disadvantage indicators were ordered according to the size of the RR, with RRs further away from one indicating a stronger statistical association with children's developmental outcomes. The top 15 ranked child disadvantage indicators were shortlisted. Where multiple indicators measuring the same construct (e.g., different ways of categorising household income) were in the top 15 indicators, only the strongest performing indicator for that construct was selected.

Results

Participant characteristics and 2018 AEDC outcomes

In total, there were 293,910 children with 2018 AEDC outcomes linked to FFY relevant datasets, with a majority of children aged five years (78.4%) and six years (19.0%). Boys (50.5%) and girls (49.5%) are almost evenly distributed across the full sample. Overall, in 2018, the percentage of children who were developmentally vulnerable on one or more domain(s) (DV1) was 20.9% and the percentage of children who were developmentally on track on all five domains (OT5) was 55.3%. See Appendix E for full details.

Distribution of child disadvantage indicators

Sociodemographic

There are 16 indicators within this lens. Findings for key indicators are summarised in Figure 3 and full details of results relating to each indicator are available in Appendix E and Appendix F. Overall, the proportion of children who were DV1 was higher among those who came from families with lower income (see Figure 3), had parents who were less employed and less educated (see Figure 4), received higher rates of social support and benefit payments, and who came from single parent families. Conversely, proportions of children who were OT5 were lower among children with these characteristics.

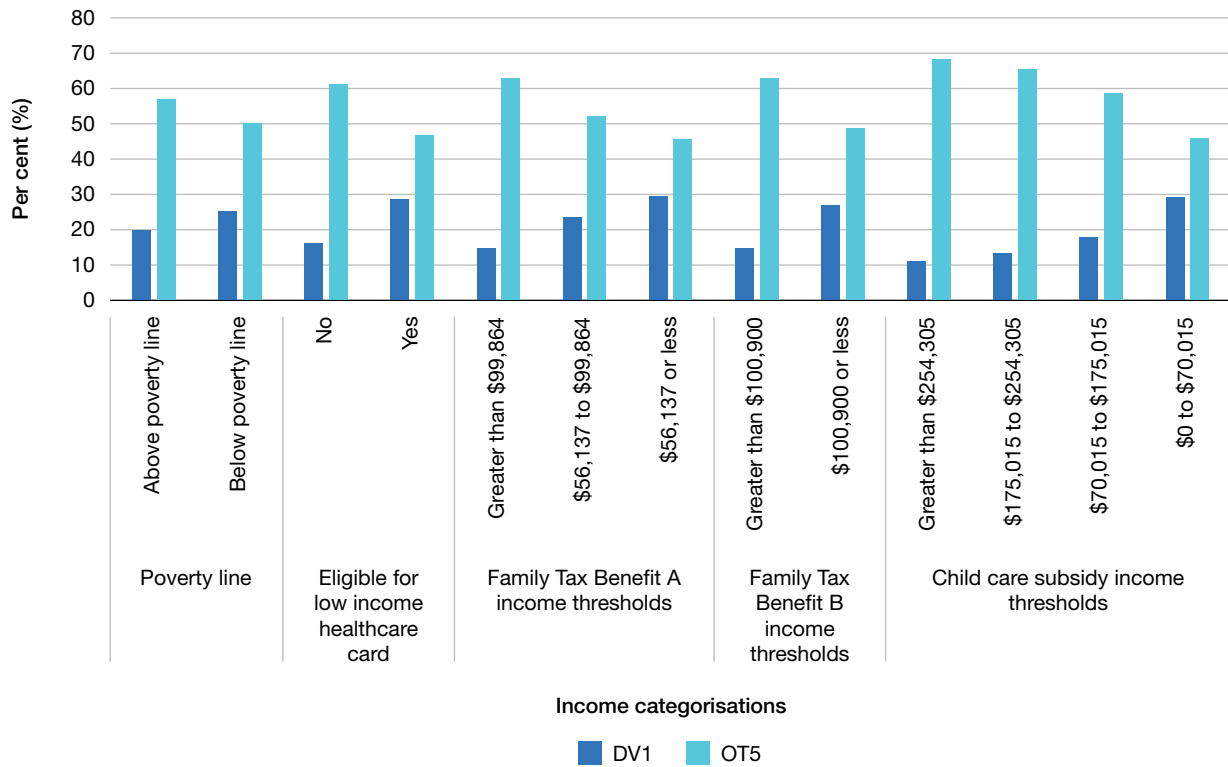


Figure 3. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by family income

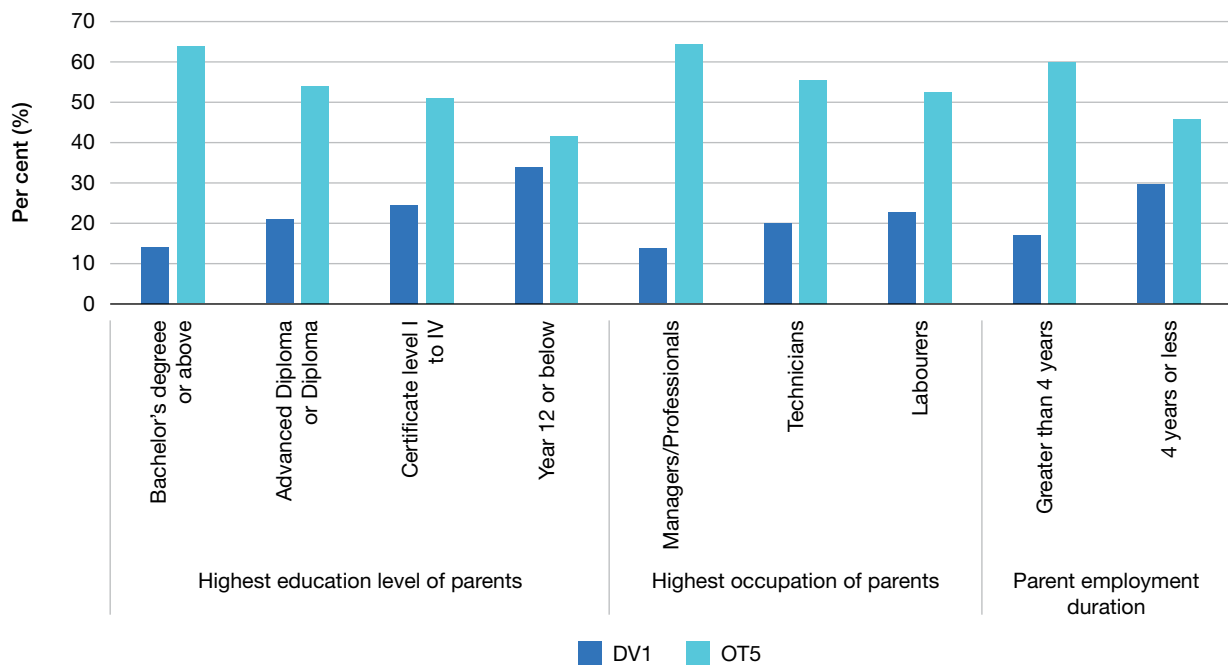


Figure 4. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by parent education, occupation and employment duration



Health conditions

There were six health condition indicators. Findings for key indicators are summarised in Figure 5 and full details of results relating to each indicator are available in Appendix E and Appendix F. Overall, the proportion of children who were DV1 was higher among those who had a chronic health issue or mental health issue at any point in early childhood (see Figure 5). Children who had a parent with a chronic health issue or mental health issue at any point from their birth to the time they started school were also more likely to be DV1 than those whose parents did not have a chronic health issues or mental health issue. Conversely, rates of children who were OT5 were lower among those who had child and parent health issues (chronic health and mental health). It should be noted however that the measurement of child chronic health issues may include conditions that affect children’s physical, social-emotional and cognitive development, which may have conflated the association with DV1 and OT5.

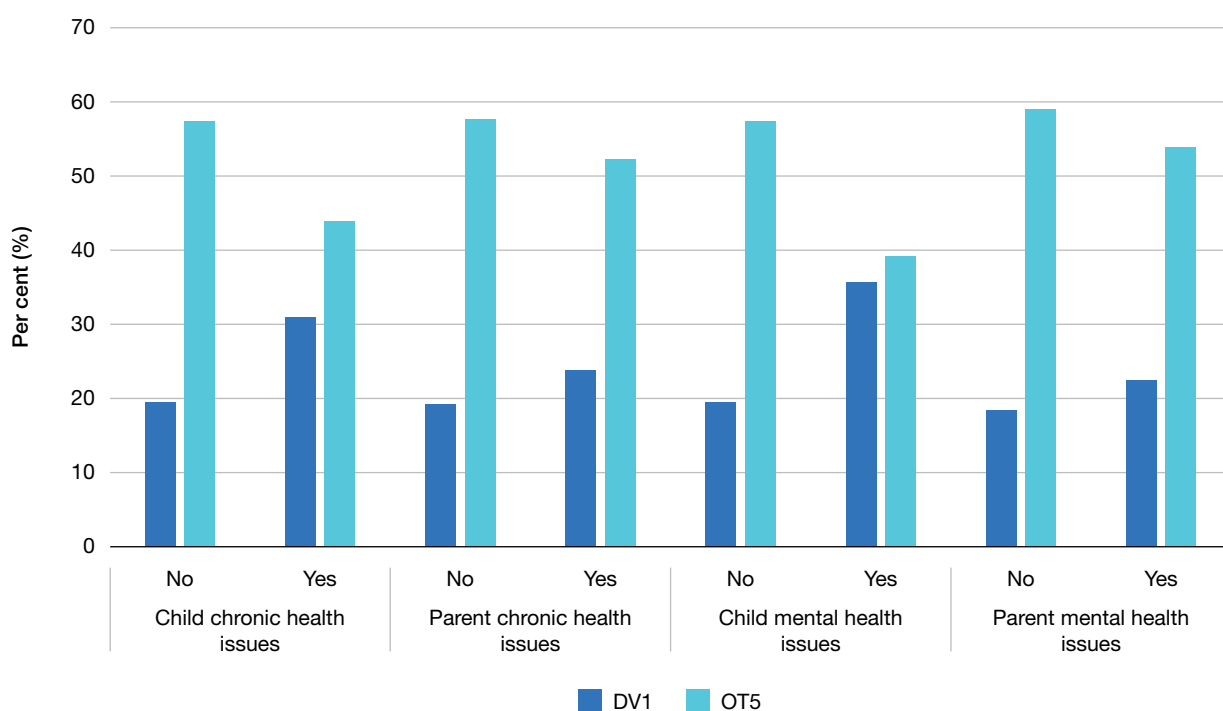


Figure 5. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by whether child and parent had chronic health issues and mental health issues

Geographic – the places where children live

There were five geographic indicators. Findings for key indicators are summarised in Figure 6 and full details of results relating to each indicator are available in Appendix E and Appendix F. Overall, the proportion of children who were DV1 was higher among those experiencing housing overcrowding and lived in residences that were rented/occupied (Figure 6). Conversely, rates of children who were OT5 were lower among those with housing overcrowding and rent/occupied tenure.

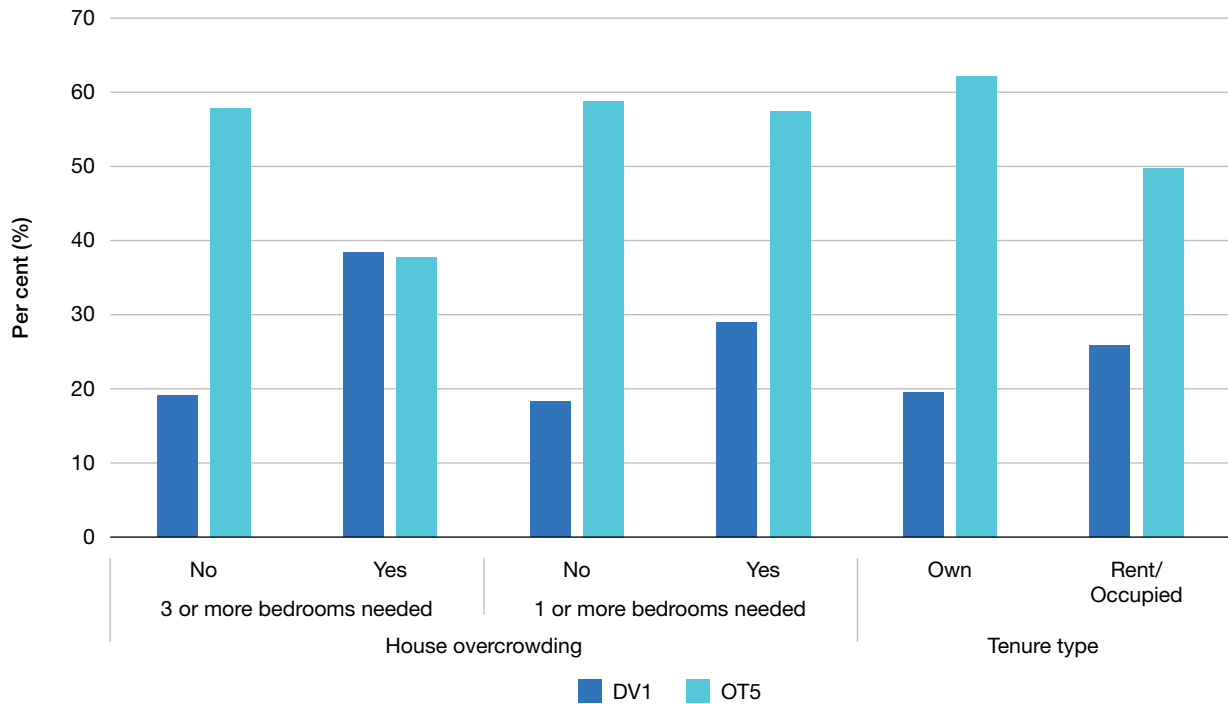


Figure 6. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by housing overcrowding and tenure type

Risk factors

There were nine risk related indicators. Findings for key indicators are summarised in Figure 7 and full details of results relating to each indicator are available in Appendix E and Appendix F. Overall, the proportion of children who were DV1 was higher among those who did not attend preschool, were not regularly read to at home, and were born to a teenage mother (see Figure 7). Conversely, the proportion of children who were OT5 was lower among children with these characteristics.

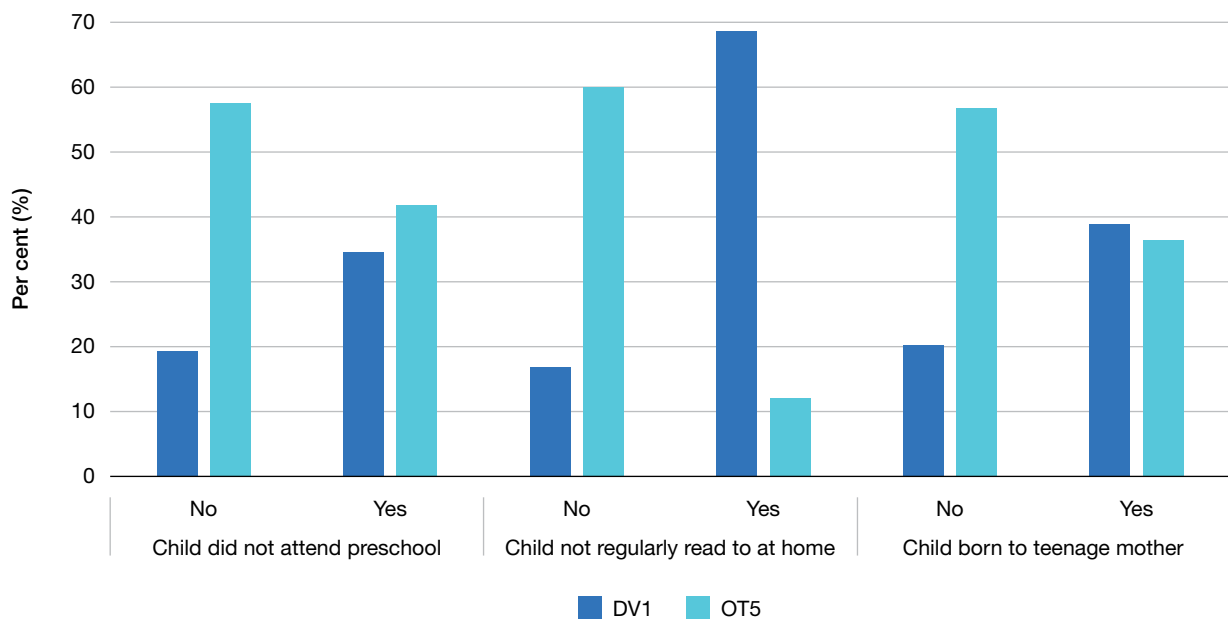


Figure 7. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by preschool non-attendance, not regularly read to at home and teenage mothers



Priority population groups

Overall, the proportion of children who were DV1 was higher among those from priority population groups. For instance, those who were from an Aboriginal or Torres Strait Islander background and those who were not proficient in English had higher proportions of children who were DV1 compared to children without Aboriginal or Torres Strait Islander status and children who were proficient in English (Figure 8). Conversely, rates of children who were OT5 were lower among those from priority population groups. Full results for the priority population indicators are available in Appendix H.

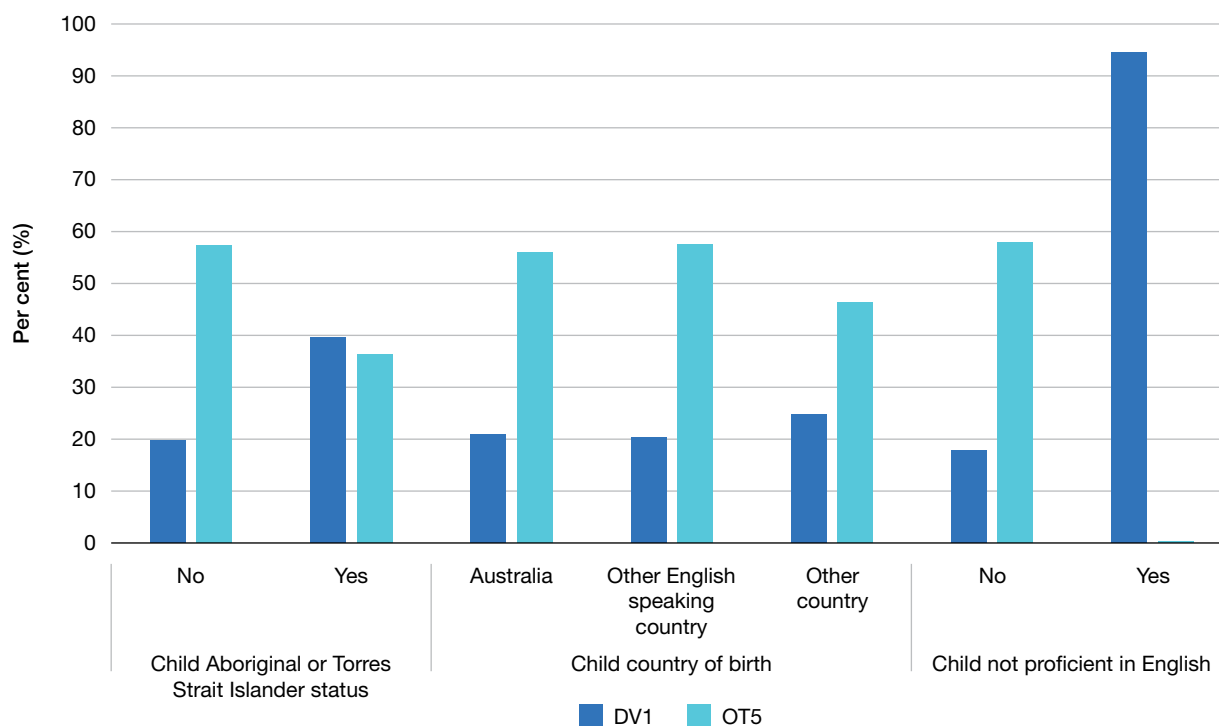


Figure 8. Percentage of children who are developmentally vulnerable on one or more domain (DV1) and those developmentally on track on all five domains (OT5) by priority population indicators. (Note: children’s English proficiency is measured using an item from the AEDC and as such associations with DV1 and OT5 are conflated)

Associations between child disadvantage and developmental outcomes

All child disadvantage indicators were ranked according to the strength of associations with DV1 and OT5 respectively: risk ratios (RR) further away from 1.0 represent a stronger association. Full details of the univariate associations between each child disadvantage indicator and DV1 and OT5 are available in Appendix G. The top 15 ranked child disadvantage indicators were shortlisted and are reported in Figure 9. Where multiple indicators measuring the same construct (e.g., different ways of categorising household income) were in the top 15 indicators, only the strongest performing indicator for that construct was selected.

Figure 9 shows the top 15 child disadvantage indicators that were associated with risk of children being developmentally vulnerable on one or more domain. For example, the indicator “child is not regularly read to at home” has the strongest univariate association with DV1: Children who are not regularly read to at home had four times (RR=4.06, 95% CI: 4.00, 4.11) the risk of being developmentally vulnerable on one or more domain relative to their peers who were regularly read to at home.

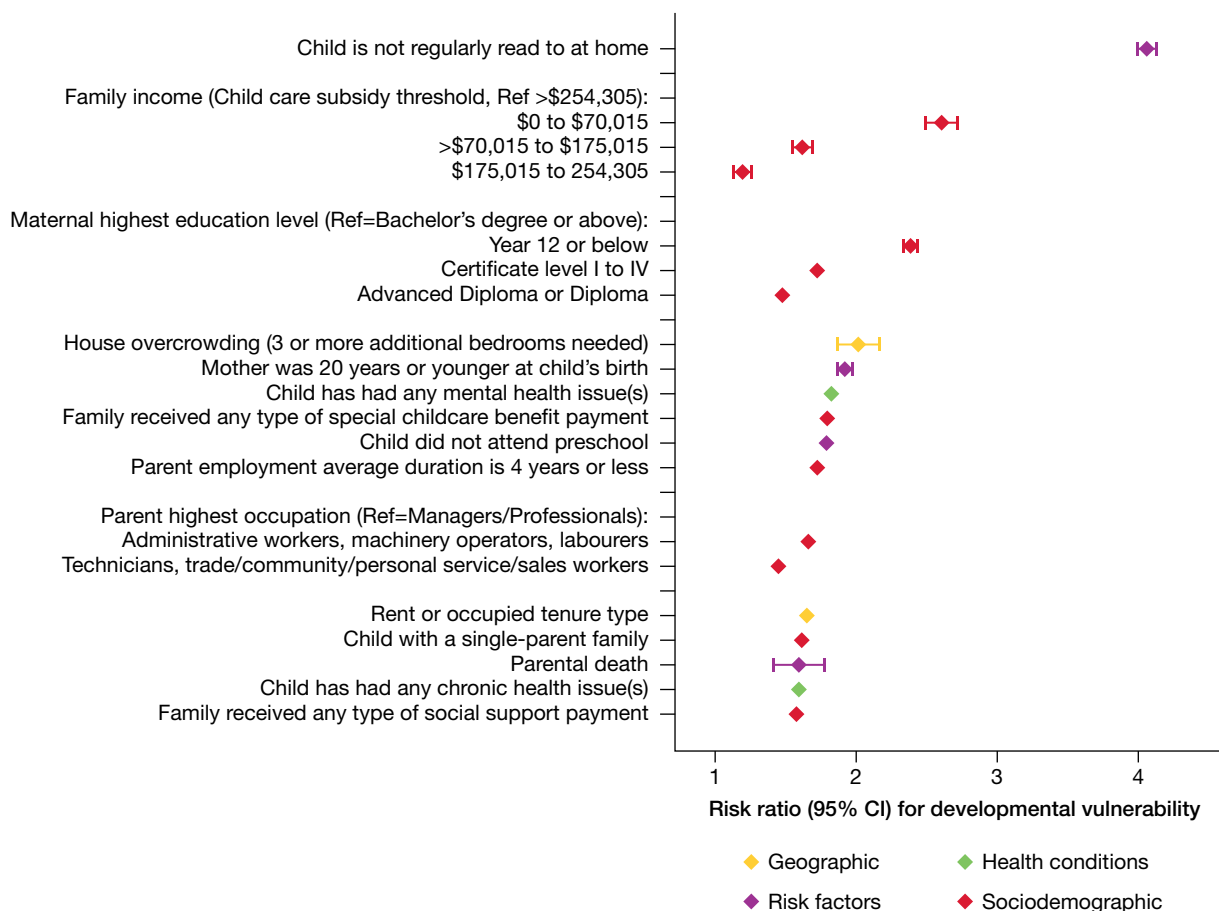


Figure 9. Top 15 ranked child disadvantage indicators based on strength of univariate association with DV1

Figure 10 shows the top 15 child disadvantage indicators associated with being developmentally on track on all five domains. As above for DV1, the indicator “child is not regularly read to at home” has the strongest univariate association with OT5: Among those children who are not regularly read to at home, the likelihood of being developmentally on track is 0.2 times (RR=0.20, 95% CI: 0.19, 0.21) the likelihood among those children who are regularly read to at home. That is, the likelihood of being on developmentally track among children who are not regularly read to at home is 80% less (95% CI: 79%, 81%) than that among children who are regularly read to at home.

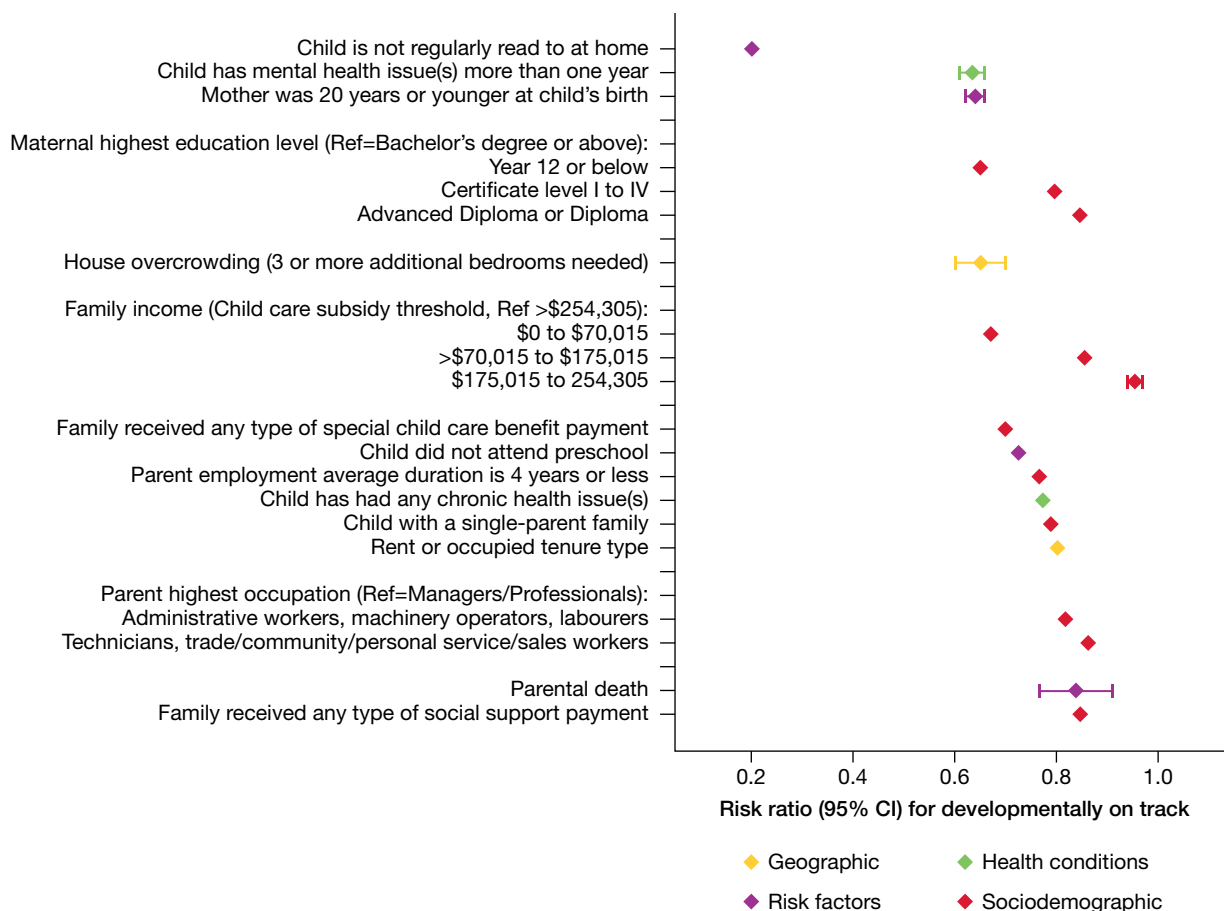


Figure 10. Top 15 ranked child disadvantage indicators based on strength of univariate association with OT5

Notably, the child disadvantage indicators shortlisted in the top 15 were similar when predicting DV1 and OT5. Further, as shown in Figure 9 and Figure 10, these indicators capture children's experiences of disadvantage across the four social determinants lenses, including:

- **Sociodemographic:** lower income households (defined based on the childcare benefit income threshold of \$70,015 or less), lower maternal education (completed Year 12 or below), family received any type of special childcare benefit payment, parent was employed for four years or less, parent highest occupation was a labourer, child lived in single-parent family, and family received any type of social support payment.
- **Health conditions:** child experienced mental health issue(s), child experienced chronic health issue(s)
- **Geographic environments:** housing overcrowding (3 or more additional bedrooms needed), tenure type is rented/occupied
- **Risk factors:** child is not regularly read to at home, child was born to a teenage mother, child did not attend preschool, and child experienced the death of a parent.

Associations between the priority population and developmental vulnerability

With regards to children's priority population memberships, the child's English proficiency was the strongest predictor of developmental vulnerability. Children who were not proficient in English had five times the risk (RR=5.29, 95% CI: 5.24, 5.34) of being developmentally vulnerable on one or more domains compared to children who were English proficient. It should be noted however that the measure of English proficiency is an item on the AEDC that is used to calculate DV1 and OT5, and so the relationship between English proficiency and AEDC outcomes is conflated. Aboriginal or Torres Strait Islander children had two times the risk (RR=2.01, 95% CI: 1.97, 2.05) of being developmentally vulnerable on one or more domain, compared to children without Aboriginal or Torres Strait Islander status. Further details are available in Appendix H.



Discussion

Summary

The results of this project show that children who experience disadvantage in early childhood are at increased risk of being developmentally vulnerable at school entry. Inequities in developmental vulnerability that are apparent at school entry do not tend to resolve over time once children are established in the school environment. Rather, evidence suggests that these inequities continue to manifest and often worsen in terms of gaps in ability and achievement.⁵⁰⁻⁵² Early disadvantage has been associated with increased risk of a range of poor outcomes, including chronic health problems, developmental delay, mental health problems, school failure and increased mortality and morbidity in adulthood.⁵³ Early childhood is an opportune time to intervene to address disadvantages and reduce developmental inequities. This is because children's development in the first few years of life lays the foundations for development across the lifespan.⁵⁴ Addressing developmental inequities early requires understanding the factors that drive these inequities to identify potential leverage points for change.

This project highlights the wide range of complex factors that shape inequities in children's early development. While this project considered a large number of indicators across the four social determinants lenses of sociodemographic (characteristics that define subpopulation groups), geographic environments (characteristics of the places where children live), health conditions (diagnosable medical problems for parents/carers and children) and risk factors (attributes, characteristics and exposures that increase the likelihood of poor child outcomes), the list of indicators examined was not exhaustive. The results of the rapid desktop review highlight a wide range of other measures that have been used to report on and understand differences in children's health and development.

While the Changing Children's Chances social determinants framework (see Figure 1) provided a useful tool for conceptualising child disadvantage and guiding the selection of measures for the current project, it is not always practical nor feasible for policymakers to measure all aspects of children's experiences of disadvantage captured within this framework. The findings of this project provide initial guidance as to which specific indicators of child disadvantage have utility for the purposes being pursued by The Department; that is, more precisely identifying and monitoring children who are at risk of poor developmental outcomes to inform service delivery. While further work is needed to understand the causal pathways between the child disadvantage indicators and children's developmental vulnerability, the findings of this project also point towards many potential intervention targets to reduce developmental inequities. Evidence suggests that no single intervention approach in isolation is sufficient to address inequities in children's development, but rather what is required is an approach that 'stacks' multiple complementary interventions throughout childhood, targeting a range of social determinants that shape inequitable outcomes.⁵⁵⁻⁵⁷ The capacity to collect data on a range of potential intervention targets, including many of the indicators explored in this project, is essential to building an evidence base that can inform more precise policies to redress child inequities.⁶



Data gaps and challenges

To inform further discussions and evaluations by The Department as to the utility of the indicators that were examined for measuring child disadvantage in their early childhood data collections, a range of data limitations and challenges should be noted. Below an overview of some of the key data gaps and challenges identified during this project is provided, but this list is not exhaustive. Other data gaps and limitations relevant to child reporting have been noted elsewhere (e.g.,^{24,35,38,58}). Data limitations specific to variables in the FFY dataset have been noted elsewhere by the FFY project team.

Overarching data limitations and challenges

Three overarching limitations relate to data sources available, accuracy of reporting and data access and timeliness.

The **data sources** used in this project were administrative datasets or surveys completed by adults. There is some information not captured in these data sources which might be considered conceptually relevant to understanding children's experiences of disadvantage, for instance:

- There is limited data available at the national level that provide insight into the 'voice of the child' and children's own experiences of disadvantage. For example, income-based measures assume the equal distribution of resources within households and do not capture the economic disadvantage experienced by children.
- There are some limitations to the national data available on families (e.g., indicators such as family functioning, parenting practices, and family social support and social networks) who are known to be one of the most important influences on children during the early years.
- National data development in this area might draw on measures available in alternative data sources such as the Longitudinal Study of Australia Children (LSAC) and the Longitudinal Study of Indigenous Children (LSIC). These data sets nevertheless have limited utility for linking to The Department's early childhood data collections, given that data are restricted to the participating cohort of children.

Accurate reporting of children from priority population groups is important for understanding and addressing inequity. As noted by the Australian Institute of Health and Welfare,²⁴ data are not well captured in Australia for some priority population groups, including children from ethnically diverse groups, children with a disability, children of refugee and asylum seeker families, children from lesbian, gay, bisexual, transgender, intersex, queer, asexual and other sexually or gender diverse (LGBTIQ+) families and children living in out of home care. Improving the collection of data for children from these priority population groups require further work to identify high quality, rigorous and contextually appropriate measures.

There are a number of limitations around data access and timeliness of data collections which need to be considered.

- It can often take time for data collections to become available for use which can affect the timeliness of reporting. Added to this, some of the data sources used in this project are only collected periodically (e.g., Census), and data collected may not align well with some of the Department's early childhood data collections resulting in linked data being outdated for some cohorts. For example, using parent education as measured by the AEDC (the indicator of parent education used in this project) for reporting on the National Early Childhood Education and Care Collection would lead to a greater than three year lag in reporting for some cohorts.
- Further, while the FFY dataset used in this project has capacity to be enhanced through additional data linkages, including the addition of more recent and timely data (e.g., future AEDC data collection cycles), it can take extended periods for necessary approvals and data linkages to be completed. Even then, access to the FFY data is restricted to a small number of organisations for specific purposes (i.e., approved research questions).

Specific data challenges

More specific data challenges relate to ECEC data, mental health data, identifying parents and primary carers, the timing of data collections, and identifying ethnicity and children with a disability.



Early Childhood Education and Care data:

- This project used a combination of AEDC and CCMS data to define preschool attendance. Each of these data sources has limitations for capturing preschool attendance. The AEDC is a teacher-based report of whether the child attended a preschool program in the year before school, but the 2018 data collection used in this report does not capture the dose of attendance (e.g., hours attended). The CCMS tracks attendance hours on a quarterly basis, however, it only captures attendance at a preschool program within a long day care service (under the assumption that the service provides a preschool program) and does not capture attendance at other types of services (e.g., standalone preschools or school-based settings). The CCMS data used for this project also only captured hours charged rather than hours attended (now captured in data from January 2019 onwards) and so may overestimate the dose of preschool attendance.
- In order to provide a more complete picture of children's ECEC experiences and to enhance reporting on child disadvantage, data development in this area might consider the potential to link other sources of data on preschool participation, such as the National Early Childhood Education and Care Collection, with the above data sources.
- Another important indicator which is relevant to understanding the relationship between ECEC and children's outcomes is the quality of ECEC services and programs attended by children. While not included in this report, the FFY dataset includes NQS ratings which could be explored in future work. NQS data are nevertheless collected at different timings to the AEDC, so relationships between the quality of services children attend and their later AEDC outcomes might be difficult to establish clearly.

Mental health data

- While MBS and PBS data used in this report are a useful source of information on parent and child mental health problems, it is important to note that families may have accessed services for mental health problems not captured in this data. For example, the MBS data captures attendance at services funded by the federal government's MBS, which includes general practitioners and specialists working in private practice (paediatricians, psychiatrists, psychologists, and other allied health professionals). However, MBS data do not capture tertiary community-based mental health services (e.g., Child and Adolescent Mental Health Services – CAMHS), fully privately funded consultations not billed to Medicare (the public insurer), hospital inpatient care, or school-based services. Greater reporting of community services could provide a more complete picture of children's and parents' mental health and service use across Australia.
- Generally, there is a lack of nationally representative data on children's overall mental health and social-emotional wellbeing. There is also a lack of national consistency with regards to how positive constructs related to mental health (e.g., how well children are thriving) are defined and measured; with constructs including wellbeing, mental health competence, resilience and positive mental health being used. A measure of mental health competence that has been developed using the AEDC data,⁵⁹ provides opportunities to monitor positive aspects of mental health over time at the population level, but is limited to children starting school. This is an area for requiring further data development.

Identification of child's primary carer and parent-child relationships

- There are limitations in the way that family relationships are coded in some of the FFY data sets (e.g., the Census and the AEDC) that can make it difficult to correctly classify relationships between children and parents/carers. For example, the Census does not tell us who the adults living in a household are in relation to a child. This is particularly problematic for larger households with complex family relationships or multiple families. While the AEDC includes parent information (e.g., level of education) based on the child's enrolment records, it does not include identifying information about the parent, including whether they are mother/father, primary or secondary caregiver or carer.
- This project used information drawn from other data sources (e.g., maternal and paternal age) to identify parents in the Census and AEDC data, however, if these datasets were used in isolation, these relationships would be challenging to identify. Given that some maternal indicators are known to be strongly related to children's outcomes (e.g., maternal education), it may be worth considering how data can be enhanced to identify specific parent-child relationships.



Children with a disability

- While children with a disability were not included in this report, this is another priority population group worthy of further exploration. While data are available across national datasets relevant to identifying children with a disability, how disability is measured and defined across data sources varies considerably. Differences in the definition and measurement of children with a disability have implications for the consistent measurement and reporting of outcomes for this priority population group. Data development in this area requires the clarification of these definitional and conceptual issues.

Ethnicity

- As noted earlier, data on ethnicity is not routinely collected in Australia. While this study used a range of commonly used proxy measures, these measures may not adequately capture the diversity of the child population. Australia's failure to collect data on ethnicity or race – unlike the United States, Canada and New Zealand – has recently been noted as a “fundamental barrier to understanding the issues that face multicultural Australians” by the Minister for Immigration, Citizenship, Migrant Services and Multicultural Affairs.⁶⁰ The Department should consider how the ongoing development of national standards for diversity data collection can be applied to their early childhood data collections to better capture ethnically priority population groups.

Recommendations and next steps

Two key options for enhancing the measurement of child-level disadvantage in early childhood data collections identified by The Department are (1) data linkage and (2) enhancing existing collections. The feasibility of these options is considered below in light of findings from this project to aid in further discussions undertaken by The Department.

Data linkage

Given the breadth of indicators available in existing data sources capable of being linked to early childhood data collections, data linkage provides a feasible opportunity to enhance the measurement of child-level disadvantage in early childhood data collections. Below are recommendations to maximise the utility of data linkage for measuring child disadvantage in early childhood data collections:

- No single data source captures all aspects of child disadvantage. At the indicator-level, it is also often necessary to draw on multiple data sources to enhance the quality of measurement of an aspect of child disadvantage. Robust and quality measurement should be prioritised over simplicity of measurement to achieve more accurate reporting. Therefore, it may be **preferable to link to multiple data sources** rather than a single source.
- **Leveraging existing multisectoral data linkages**, such as the FFY/MADIP dataset, with strong existing data infrastructure and governance arrangements would provide the most practical option. This would overcome some of the challenges associated with linking data across multiple sources, including multiple lengthy application processes to data custodians and negotiations around data sharing, usage and governance.
- Ongoing discussion might consider how the **FFY platform can best be used to share data resources** such as that created for this project (e.g., a derived data set linking multiple child disadvantage indicators with children's AEDC outcomes) and foster collaborations around shared goals to better measure and address inequities in children's health and development.
- Ongoing discussions might also consider how the **FFY dataset can be further enhanced through additional data linkages**. This dataset is largely restricted to national level data. There is a wealth of data available across other levels of government (e.g., state/territory preschool attendance data) and at the service system level that may help to fill some national data gaps. The National Assessment Program – Literacy and Numeracy (NAPLAN) data is also not available in the FFY dataset that may provide insights into impacts of disadvantage on children's learning outcomes throughout school.



- While linkage of data across multiple levels of governments comes with challenges (e.g., competing interests and governance arrangements), this is likely best overcome through a focus on all stakeholders' shared interests and goals around achieving more equitable outcomes for Australia's children.⁵⁸ Discussions around data development should consider how The Department can promote the more timely addition of relevant datasets to the FFY data and expand access to this important data asset to more organisations under such a shared goal.

Enhance existing early childhood data collections

New questions could be added to existing early childhood data collections where quality data are not captured elsewhere or not available through data linkage. The addition of new data items would also be preferred where time taken to access linked data sources is likely to impact the timeliness of reporting. The following should also be considered:

- Decisions to add new data items would need to consider the **capacity to capture objective and high-quality data**. For example, as the AEDC is a teacher-based report survey, there may be limitations to the information that can reliably be obtained from teachers (e.g., information related to family functioning).
- **Drawing on information already collected by schools, preschools, or early childhood education and care services** in their enrolment records may be a feasible option for adding new data items to The Department's early childhood data collections that are less subject to bias.
 - The types of data items that might be considered include the child's ethnicity, refugee or asylum seeker status, whether the child has a disability or special healthcare needs, the child's family composition and care arrangements (e.g., non-parental care), whether the child is from a LGBTIQ+ family and parent education and occupation. These kinds of data items could be added as additional questions or through the inclusion of flags. Some of these data items are already captured in the AEDC and should be considered for inclusion in other early childhood data collections.
- Further work is needed to understand the **feasibility of adding data items** such as these and to identify the limitations of existing data collection platforms (e.g., data inconsistency).
- The choice of meaningful indicators to identify priority population groups must also rest on appropriate consultation and guidance as to what constitutes an acceptable and rigorous indicator, as noted above. While there are existing indicators available to capture these groups of children, it is important to be mindful that some indicators may conflate children (e.g., children of different ethnic backgrounds) and not adequately capture the inequities faced by some smaller population groups.
- In addition, implicit bias should be minimised/avoided when developing or collecting relevant indicators for appropriate data collections (e.g., assuming that children with disabilities may have impacted education attainment levels). In the case where children have certain disabilities (e.g., vision impairment), questions related to developmental vulnerability measurement (e.g., reading ability) should be asked in a particular way that ensure the relevance and appropriateness of the indicator.

Considerations for future work

This project provides a preliminary evaluation of a range of options for measuring children's early experiences of disadvantage for The Department's further consideration and evaluation. Some next steps for progressing the work presented in this report have been identified

- This report prioritised child disadvantage indicators based on strength of univariate association with children's developmental outcomes. **Further evaluations may need to take into consideration the number of children exposed to a child disadvantage indicator**. For example, while not being regularly read to at home was strongly associated with children's developmental outcomes, there is only a small proportion of children (6.4%, N=16,936) who are not regularly exposed to home reading according to teacher report. As another example, parental death affected only 0.2% (N=595) of children in the cohort. It may be necessary to weigh the benefits of capturing data on these risks affecting a smaller targeted group, versus risks that might have a larger population impact if targeted through intervention.



- This report focuses on univariate associations between disadvantage indicators and developmental vulnerability. Univariate associations only go so far to explain how predictive an indicator is of children's developmental outcomes. A next step might be to consider adjusted multivariate regression analyses, which could be enhanced by methods such as machine learning. This would help to further inform **which combinations of indicators are the strongest predictors of developmental vulnerability**.
- Causal modelling would also be a valuable next step to **more precisely specify causal pathways** between disadvantage indicators and children's developmental vulnerability. Methods such as causal mediation using the interventional effects approach allow for testing the benefits of hypothetical, or 'what if', policy intervention scenarios.⁶¹ Such analyses would make it possible to model the extent to which intervening on different combinations of modifiable factors (e.g., preschool attendance, family income, maternal education, housing, mental health) could potentially reduce inequities in children's developmental vulnerability. This would help to identify the key drivers of inequities in children's developmental vulnerability while also signalling where policy investment is best placed to reduce developmental inequities. Further work in this space should consider the extent to which such methods can be applied within datasets such as FFY/MADIP and their specific value-add to the purposes being pursued by The Department.
- While a wide range of child disadvantage indicators was explored in this project, the list was not exhaustive. For example, child adverse experiences (e.g., abuse, neglect and trauma) and parental lifestyle factors (e.g., substance use, alcohol consumption, smoking status), which pose risks to a child's health and development over the life course, were not captured in our analysis. In addition, while this project did not consider area-based measures such as SEIFA, it may be of interest to compare the predictive utility of these measures against child-level indicators of disadvantage. This may help to better understand the added value of including child-level disadvantage indicators in early childhood data collections and provide a sense of which children are missed by a reliance on area-level measures.
- This project used the AEDC as a measure of children's developmental outcomes. It may be of interest to explore the **relationships between early childhood disadvantage indicators and children's later outcomes** of interest to The Department (e.g., children's NAPLAN results). This would help to understand the enduring impact of children's early experiences of disadvantage on their developmental pathways through school.
- In this project, many child disadvantage indicators were measured at a single time point. Future work should consider **measuring indicators at different time points** and consider the effect of timing of disadvantage exposure during early childhood for explaining differences in children's developmental outcomes to identify optimal measurement time points. Further, disadvantage is dynamic, and children's experiences of disadvantage can change over time.⁶² Additional analyses drawing on longitudinal data, where available, might consider children's pathways of disadvantage over early childhood (e.g., identifying children at risk of persistent disadvantage) and their relevance for explaining differences in children's developmental outcomes.
- This project drew on data linked to the 2018 AEDC. There are opportunities to extend and **validate this work by undertaking analyses in additional cohorts** (e.g., the 2021 AEDC data collection). Further approaches to validation could also be pursued, such as repeating analyses in state-based cohorts of children.
- This project reports data on a small number of priority population groups of children (i.e., Aboriginal and Torres Strait Islander children and children from culturally and linguistically diverse backgrounds) who are likely to be disproportionately exposed to disadvantage and who may be in greater need of additional support. It will be important for future work to disaggregate **reporting of child disadvantage indicators according to children's priority population status** to better understand the specific drivers of inequitable outcomes experienced by these children.
- It is important to note that there may be variability in the impact of specific aspects of child disadvantage across developmental domains.^{2,47} While it was beyond the scope of this project to identify **which indicators of child disadvantage are most predictive of children's development within each domain**, it may be useful for future work to explore this in order to inform specific policy questions (e.g., identifying children most at risk of poor language and cognitive outcomes).



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Appendices

Appendix A: Detailed rapid desktop review methodology

Search strategy

To identify relevant policy documents, the search strategy included: (1) a search of the grey literature via the internet search engine, Google; (2) targeted search of relevant websites (i.e. websites of key Australian and State and Territory government departments and agencies); and (3) recommendations based on expert opinion.

The online search for grey literature used various combinations of key phrases, in order to reduce the chance of omitting relevant sources of information. A broad range of search terms was applied including: “disadvantage” OR “vulnerability” AND “child” AND “Australia” AND “measure” OR “indicator” OR “tool” AND “data” AND “.gov.au” OR “.org.au”. Relevant hits were shortlisted by screening the titles and executive summary (if applicable). This method enabled the search to provide the most relevant results while keeping the number of hits manageable.⁶³ A thorough key word search of relevant results was also conducted (representing around 120 results) using keywords including “children”, “disadvantage”, “vulnerability”, “indicators”, “measures”, “data” and “tool”. One to two lines of text from each key word search was reviewed for relevance. The grey literature search was first performed on the 1st to 6th March 2022, and included documents as current as 1st January 2012, up until the 1st March 2022. The timeframe established indicated that most documents have up to a 10-year turnaround period so that this would most likely yield a comprehensive and update-to-date assessment of the literature.

A directed and targeted search of the websites of states and jurisdictions of interest was also conducted to screen for additional relevant documents that may have not been captured by the first search of grey literature. Lastly, we consulted three experts for their knowledge and advice on any missed key documents or known key indicators relevant to measuring disadvantage and vulnerability.

Paper selection

Search results were entered into an Excel spreadsheet and duplicates were manually removed in Excel. Unique records were then imported into Endnote X9 for review. Documents were evaluated according to the inclusion and exclusion criteria outlined in Table 1 of this report.



Appendix B: Summary of documents included in rapid review

Table B1. Detailed summary of the characteristics of the included documents (n=13) in the rapid desktop review that are relevant to the measurement of disadvantage and/or vulnerability in Australian children

Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Telethon Kids Institute (2020). Western Australian Child Development Atlas: List of Indicators²⁷				
Children and young people (0-24 years)	Provides comprehensive maps of development, wellbeing and learning outcomes for the children and young people of Western Australia to inform policy development, service planning, community programs and research.	<p><i>Pregnancy and births:</i> teenage mothers; mothers aged 20-24 years; low birthweight; preterm birth; smoking during pregnancy</p> <p><i>Physical health:</i> hospitalisations; chronic conditions; disability; alcohol and drug related injuries</p> <p><i>Mental health:</i> mental illness; mothers with mental illness; substance abuse disorder; emergency department presentations mental health related; emergency department presentations for deliberate self-harm</p> <p><i>Education:</i> AEDC outcomes; attendance at a preschool program</p> <p><i>Mortality:</i> infant mortality; child mortality; suicide</p> <p><i>Demographic and social:</i> low-income households; occupied private dwellings with internet; unemployment; proficiency in English; highest year school completed; overcrowded dwellings; one parent families</p> <p><i>Service use:</i> emergency department presentations; calls to Ngala parenting helpline</p> <p><i>Juvenile crime:</i> offences and offenders</p>	N/A	A range of administrative datasets, including: Midwives notification system, Western Australia; Hospital morbidity data collection, Western Australia; Mental health information data collection, Western Australia; Emergency department data collection, Western Australia; AEDC; registry of births, deaths and marriages, Western Australia; ABS Census of Population and Housing; Ngala helpline administrative data; Western Australian police force – incident management system data



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Australian Government: Australian Institute of Health and Welfare (AIHW; 2020). Australia's Children²⁴				
Children (aged 0-12/14 years)	Comprehensive overview of the wellbeing of children living in Australia	<p><i>Health:</i> smoking and drinking in pregnancy; teenage mothers; birthweight; immunisation; chronic conditions and burden of disease; asthma; diabetes; cancer; mental illness; children with disability; dental health; injuries; social and emotional wellbeing; overweight and obesity; physical activity; breastfeeding and nutrition; smoking and drinking behaviour; infant and child deaths</p> <p><i>Education:</i> early learning: reading to learn; early childhood education and care; the transition to school; attendance at primary school; literacy and numeracy</p> <p><i>Social support:</i> families; parental health and disability; social networks</p> <p><i>Income, finance, and employment:</i> family economic situation; sources of income; labour force status; material deprivation</p> <p><i>Housing:</i> Housing stress; overcrowding; homelessness</p> <p><i>Justice and safety:</i> crime; neighbourhood safety; child abuse and neglect; exposure to family violence; non-parental care; youth justice supervision; bullying</p>	Children from Aboriginal and Torres Strait Islander backgrounds; children from culturally and linguistically diverse backgrounds; children living in different geographical areas (remoteness); children living in areas with different socioeconomic characteristics	A range of national and sub-national data sources, including: ABS Australian Aboriginal and Torres Strait Islander Health Survey; ABS Census of Population and Housing; ABS Childhood Education and Care Survey; ABS General Social Survey; ABS National Health Survey; ABS National Nutrition and Physical Activity Survey; ABS Personal Safety Survey; ABS Survey of Disability, Ageing and Carers; ABS Survey of Income and Housing; AusPlay Survey; Australian Child Wellbeing Project; AEDC; AIHW National Drug Strategy Household Survey; Australian Secondary Schools' Alcohol and Drug Survey; Household, Income and Labour Dynamics in Australia Survey; LSAC; Multipurpose Household Survey; National Child Oral Health Study; Second Australian Child and Adolescent Survey of Mental Health and Wellbeing (Young Minds Matter); Youth Digital Participation Survey
Australian Government: Department of Social Services (2017). Contexts of Disadvantage²⁹				
Children (0-9 years)	Examine the association between family, neighbourhood and school level disadvantage and children's cognitive and social outcomes	<p><i>Family disadvantage:</i> material resources; parental employment; parental education; parental health and disability; parental social support</p> <p><i>Neighbourhood disadvantage:</i> SEIFA Index of Advantage/Disadvantage</p> <p><i>School disadvantage:</i> ICSEA</p>	N/A	LSAC



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Australian Government: Australian Institute of Family Studies (2013). The tyrannies of distance and disadvantage: Factors related to children's development in regional and disadvantage areas of Australia³⁷				
Children (0-9 years)	To investigate how children's outcomes vary by geographic locality and by disadvantage	<p><i>Family demographic and economic characteristics:</i> family composition; mothers' country of birth and English proficiency; parental education; family joblessness; financial hardships; housing tenure</p> <p><i>Parent wellbeing and parenting styles:</i> parent mental health, parental relationships, parental drinking habits; parental weight status; warm parenting; angry parenting</p> <p><i>Family social capital and access to services:</i> help from family and friends; unmet demand for social support; contact with family, friends or neighbours; involvement in volunteer or community groups; neighbourhood belonging; services use; unmet demand for services</p> <p><i>Children's educational activities:</i> books in the home; reading to children; television watching; childcare and early education; extra-curricular activities</p>	Remoteness / geographic locality; Aboriginal or Torres Strait Islander status	LSAC; Small Area Labour Market; ABS Census of Population and Housing; Census
Australian Government: Department of Families, Housing, Community Services and Indigenous Affairs (2012). Parental joblessness, financial disadvantage and the wellbeing of parents and children³¹				
Children (0-9 years)	Gain a better understanding of the effect of joblessness/short part-time hours on the wellbeing of parents and their children	<p><i>Parental employment:</i> parent employment status</p> <p><i>Economic circumstances and financial wellbeing:</i> parental income; financial hardships</p> <p><i>Social capital:</i> neighbourhood belonging; contacts with family and friends; unmet needs for support; participation in community or volunteer groups</p> <p><i>Mental health:</i> parental mental health</p>	Family type/composition; parental education; home ownership; age of child; parental poor health; Aboriginal or Torres Strait Islander status; language other than English spoken at home; unemployment rate of local area; metro/non-metro; parents' ratings of neighbourhood safety and access to services	LSAC



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Australian Government: AIHW / National Centre for Social and Economic Modelling (2014). Child social exclusion and health outcomes: A study of small areas across Australia³⁰				
Children (0-15 years)	Capture the risk of social exclusion experienced by Australian children at the small-area level (mostly Statistical Local Areas)	<p><i>Child Social Exclusion Index</i></p> <p><i>Socioeconomic circumstances:</i> sole parent family; bottom income quintile; no parent in paid work</p> <p><i>Education:</i> no family member completed Year 12; NAPLAN; AEDC</p> <p><i>Connectedness:</i> no internet at home; no parent doing voluntary work; no motor vehicle</p> <p><i>Housing:</i> high rent and low income; overcrowding</p> <p><i>Health services access:</i> ratio of GPs; ratio of dentists</p>	Statistical local areas; remoteness	ABS Census of Population and Housing 2006; NAPLAN; AEDC
Victoria State Government: Education and Training (2019). The State of Victoria's Children: Aboriginal Children and Young People³²				
Aboriginal Victoria children and young people (0-25 years)	Investigate the outcomes for Aboriginal children and young people living in Victoria	<p><i>Disadvantage and vulnerability:</i> Socioeconomic status; housing and homelessness; disability (requires assistance); youth justice (in detention, youth supervision; family violence; out-of-home care)</p> <p><i>Health and social and emotional wellbeing:</i> Immunisation; oral health; overweight and obesity; behavioural (nutrition, physical activity and sport, smoking, alcohol, and other drugs); psychological distress and mental health; bullying, violence, and racism</p> <p><i>Education:</i> kindergarten, school readiness; attitudes to school; school attendance; literacy and numeracy</p>	Aboriginal or Torres Strait Islander status	Draws together data from across Victorian Government departments and agencies and from national and non-government sources, including; ABS Census of Population and Housing; Nationally Consistent Collection of Data on School Students with Disability; Crime Statistics Agency; Department of Health and Human Services; Household, Income and Labour Dynamics in Australia; Victorian Perinatal data; Victorian public dental services; National Aboriginal and Torres Strait Islander Health Survey; National Health Survey; School Entry Health Questionnaire; AEDC; NAPLAN



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Victoria State Government: Education and Training (2017). The State of Victoria's Children Report: A focus on health and wellbeing³³				
Children and young people (0-19 years)	Enhance evidence base about children's health and wellbeing and is intended to support the development of policies that can improve lives	<p><i>A healthy start:</i> infant mortality; birthweight; breastfeeding; immunization; maternal and child health services use; early childhood education</p> <p><i>Families and the family environment:</i> household composition; family economics; parental education; household employment; earning power; poverty; low income; financial hardship; food insecurity; housing and housing stress; homelessness; family environment; parenting and family functioning; parent mental health; family violence; child abuse and child protection</p> <p><i>Inclusive and enabling communities:</i> community support; having a trusted adult in their life; voluntary work; healthy, accessible and enabling communities; physical environment; transportation; neighbourhood safety; community disorganisation and crime; youth custody and crime; youth justice supervision</p> <p><i>Physical and mental health:</i> protective factors - resilience; nutrition; sleep; physical activity; connection to culture; risk factors – smoking; drinking; drug use; sexual health; sedentary behaviours; racism; bullying; overall health; mental disorders; special health care needs and disability; dental health; asthma; allergies; healthy weight; cancer; self harm; access to services; emergency departments; hospital presentation</p> <p><i>Learning and education:</i> home learning environment; health and wellbeing at school; school engagement; expulsions; student safety</p>	Aboriginal or Torres Strait Islander status; SEIFA; diverse backgrounds; refugee arrivals; disability	Victorian Child and Adolescent Monitoring System and other relevant sources



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Victoria State Government: Education and Training (2016). The State of Victoria's Children Report 2013-14: A report on resilience and vulnerability within Victoria's children and young people³⁴				
Children (0-17 years)	Uses an ecological framework for human development to examine vulnerability, disadvantage, and resilience	<i>Early childhood and transition to school:</i> low birth weight; breastfeeding; immunisation; temperament; secure attachment; Maternal and Child Health support; kindergarten participation; school readiness; childhood injuries; hospital admissions	Aboriginal; cultural and linguistically diverse background; area disadvantage; disability; special health care needs; country of birth; languages spoken; family composition; teenage mothers; parent education; parent employment	A range of data sources, including: ABS Census of Population and Housing, NAPLAN, AEDC, Department of Health National Survey of Mental Health and Wellbeing, Department of Human Services Australian Childhood Immunisation Register, Productivity Commission Report of Government Services, Australian Institute of Family Studies Australian Temperament Project, AIHW Child Protection Australia, LSAC, Children's Court of Victoria Annual Report, Mission Australia Youth Survey
Australian Government: AIHW (2011). Headline Indicators for children's health, development and wellbeing³⁵				
0-12 years	Explores how children are faring across the Children's Headline Indicators, a set of 19 indicators designed to focus policy and attention on priorities for children's health, development and wellbeing.	<i>Health:</i> smoking in pregnancy; infant mortality; birthweight; breastfeeding; immunisation; overweight and obesity; dental health; social and emotional wellbeing; injuries <i>Early learning and care:</i> attending early childhood education programs; transition to primary school; attendance at primary school; literacy and numeracy <i>Family and community:</i> teenage births; family economic situation; child abuse and neglect; shelter; family social network	Aboriginal and Torres Strait Islander status; remoteness; culturally and linguistically diverse background; socioeconomically disadvantaged areas; state/territory; age; gender	A range of data sources, including: national perinatal data collection, AIHW national mortality database; Australian national infant feeding survey; Australian childhood immunisation register; ABS National health survey; child dental health survey; national early childhood education and care data collection; AEDC; NAPLAN; ABS Survey of Income and Housing; AIHW child protection data collection
Commonwealth of Australia (2021). Safe and Supported: the National Framework for Protecting Australia's Children 2021-2031³⁶				
0-18 years	To improve the lives of children, young people and families experiencing disadvantage or who are vulnerable to abuse and neglect.	Numbers of children receiving child protection services in each state and territory; the number of child abuse substantiations per child; types of abuse and neglect; and socioeconomic status.	Children and families with multiple and complex needs and who have experienced abuse and/or neglect; Aboriginal and Torres Strait Islander children and young people; Parents/ carers with disability	DSS performance reporting system, Dept. of Social Services Data Over Multiple Individual Occurrences, the AIHW and ABS



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
South Australia's Outcomes Framework for Children and Young People²⁸				
0-18 years	To progress the vision of South Australia being a state where the conditions exist for all children and young people to thrive, the framework is organised around a Charter for Children and Young People and five key life dimensions.	<p><i>Health:</i> Babies are born healthy (e.g., birthweight, maternal smoking, maternal teen age, antenatal visits); Children have a healthy early life (e.g., infant mortality, immunisation, developmental milestones); Children and young people are thriving (e.g., access to healthy food, tooth decay, self-considered health, emotional/mental health/behavioural problems)</p> <p><i>Safety:</i> Safe housing (e.g., family conflict, financial hardship, homelessness); preventable injury (e.g., hospitalisations, police caution/fines, swimming safety program); abuse and neglect (e.g., out-of-home care, child protection system).</p> <p><i>Wellbeing:</i> Early experiences that enhance their development (e.g., special needs services, child care services, quality pre-school program); connected to family, friends and culture (e.g., attendance to cultural activities, venues and events, connected to adults in their home, school, community); Recreational activities (e.g., organised activities outside of school hours, sport/recreational physical activities); Leading satisfied lives (e.g., optimistic about life, satisfaction with life, rate of suicide); Education: Take advantage of the learning environment, meet one or more of the AEDC domains, positive learning experience, engagement in school/education/training/work.</p>	Male and female; Aboriginal children and young people; Children and young people with disability; Children and young people living in out-of-home care; Metropolitan Adelaide and regional South Australian populations; Socioeconomic status.	Australian Bureau of Statistics, the Organisation for Economic Co-operation and Development (OECD), and accredited non-government surveys and reports.



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
Australian Government: AIHW (2019). Scoping enhanced measurement of child wellbeing in Australia³⁸				
0-18 years	To provide a preliminary summary of the current national child wellbeing data and reporting landscape, identified key data gaps and opportunities for development.	<p><i>Health:</i> Maternal and infant health (e.g., smoking in pregnancy, drinking in pregnancy, substance use during pregnancy, antenatal care, labour and birth characteristics, perinatal mortality, infant mortality, birth weight, small for gestational age, Apgar score, teenage births, breastfeeding); child health (e.g., immunisation, health checks, general practitioner consultations, child mortality, chronic conditions, cancer survival, dental health, disability, mental health conditions, social and emotional wellbeing, rebuilding resilience of abuse survivors, injuries, hospitalisations, communicable diseases, ear health, eye health, kidney disease, access and need for health care services, drug and alcohol services); protective and risk factors (e.g., overweight and obesity, physical activity, diet, nutrition, environment tobacco smoke, smoking, drinking)</p> <p><i>Social support:</i> Participation, social networks, family functioning, family support service use, parental health status, parental substance use, children as carers, language, community activity, family connection, family contact, sense of community, significant person, community functioning</p> <p><i>Justice and safety:</i> Neighbourhood safety, child abuse and neglect, child protection re-substantiations, children in grandparent care, children in non-parental care, out of home care, placement stability, carer retention, leaving care plans and preparation, placement of children with an Aboriginal or Torres Strait Islander status, cultural support plans, foster carer households, carer training, sexual abuse substantiations, children as victims of violence, children and crime, domestic violence, young people on remand, unsentenced detention</p> <p><i>Housing:</i> Shelter, housing stress, homelessness, overcrowding, children attending homelessness services, access to functional housing, social housing</p> <p>continued over page ></p>	Aboriginal children and young people; Children and young people with disability; Children and young people living in out-of-home care, remoteness, socioeconomic status, culturally and linguistically diverse groups	A range of national and sub-national data sources, including: National Perinatal Data Collection, ABS General Social Survey, ABS Census of population and housing, ABS Childhood Education and Care Survey (CEaCS), ABS Survey of Income and Housing (SIH), ABS Survey of Income and housing (SIH), AIHW National Drug Strategy Household Survey, Longitudinal Study of Australian Children (LSAC), Australian Child Wellbeing Project (ACWP) data, ABS National Early Childhood Education and Care Collection, ABS Multipurpose Household Survey (MPHS), National Mortality Database, AIHW Child Protection Data Collection, AIHW Specialist Homelessness Services data collection, Australian Early Development Census (AEDC), ABS National Health Survey, ABS Survey of Disability Ageing and Carers (SDAC), National Assessment Program-Literacy and Numeracy (NAPLAN), Australian Immunisation Register, Out-of-Home Care (OOHC) survey, National Diabetes Register, AIHW Juvenile Justice National Minimum Data Set (JJ NMDS), ACER Progress in International Reading Literacy Study (PIRLS), AIHW Australian Cancer Database (ACD), Program for International Student Assessment (PISA), Child Dental Health Survey, Household, Income and Labour Dynamics in Australia (HILDA) Survey, ABS Personal Safety survey, Trends in International Mathematics and Science Study (TIMSS), <p>continued over page ></p>



Target population	Objectives	Indicators/Measures/Variables	Priority Populations / disaggregation	Data Source
		<p><i>Education and skills:</i> Early learning, childcare, quality childcare, early childhood education, transition to primary school, attendance at primary school, literacy, numeracy, science, school satisfaction, school pressure, bullying and unfair treatment at school</p> <p><i>Income and finance:</i> Family economic situation, dependence on government payments, poverty, income inequality, information technology and internet</p> <p><i>Employment:</i> Jobless families</p>		<p>The National Child Oral Health Study, National Hospital Morbidity collection, National Community Mental Health Care (CMHC) Database, Australian Secondary School Students' Alcohol and Drug Survey (ASSAD), ABS Recorded crimes, Australian Curriculum, Assessment and Reporting Authority (ACARA) National Student Attendance Data Collection, Australian Children's Education & Care Quality Authority (ACECQA) National Quality Standard data, Mental Health of Children and Adolescents Survey</p>

Abbreviations: ABS, Australian Bureau of Statistics; AEDC, Australian Early Development Census; AIHW, Australian Institute of Health and Welfare; ICSEA, Index of Community Socio-Educational Advantage; LSAC, Longitudinal Study of Australian Children; NAPLAN, National Assessment Program – Literacy and Numeracy; SEIFA, Socio-economic Index for Areas.



Appendix C: Summary of evaluation of child disadvantage indicators

Table C1. Summary of the evaluation of child disadvantage indicators

Construct	Indicator	Availability	Simplicity	Quality	Relevance
Sociodemographic					
Material resources	Total disposable income, per financial year	■	■ Census ■ DOMINO ■ NHS ■ PAYG ■ PIT	■ Census ■ DOMINO* ■ NHS ■ PAYG* ■ PIT*	■
	Equivalised annual income, per financial year	■	■ DOMINO ■ NHS ■ PAYG ■ PIT	■ DOMINO ■ NHS ■ PAYG ■ PIT	
	Household income by decile	■	■ DOMINO ■ NHS ■ PAYG ■ PIT	■ DOMINO ■ NHS ■ PAYG ■ PIT	
	Poverty line	■	■ DOMINO ■ PAYG ■ PIT	■ DOMINO ■ PAYG ■ PIT	
	Social security payments	■	■ DOMINO	■ DOMINO*	■
	Special childcare benefit	■	■ CCMS	■ CCMS*	■
Parent education	Parent education level	■	■ AEDC ■ Census ■ NHS	■ AEDC* ■ Census ■ NHS	■
Parent occupation and employment	Parent occupation	■	■ Census ■ NHS ■ PIT	■ Census* ■ NHS ■ PIT	■
	Parent employment status	■	■ Census ■ DOMINO ■ NHS ■ PAYG ■ PIT	■ Census* ■ DOMINO ■ NHS ■ PAYG ■ PIT	■
	Years with an employed parent	■	■ DOMINO ■ PAYG ■ PIT	■ DOMINO* ■ PAYG* ■ PIT*	■
Household composition	Single-parent household	■	■ Census ■ CDLF ■ DOMINO ■ NHS	■ Census ■ CDLF* ■ DOMINO ■ NHS	■
	Household size	■	■ Census ■ CDLF ■ NHS	■ Census ■ CDLF* ■ NHS	■
Health					
Chronic health issues	Chronic health issues of parents	■	■ CENSUS ■ DOMINO ■ MBS ■ NHS ■ PBS	■ CENSUS ■ DOMINO ■ MBS* ■ NHS ■ PBS*	■
	Chronic health issues of child	■	■ AEDC ■ CENSUS ■ MBS ■ PBS	■ AEDC ■ CENSUS ■ MBS* ■ PBS*	■



Construct	Indicator	Availability	Simplicity	Quality	Relevance
Mental health issues	Parent mental health issues	■	■ MBS ■ NHS ■ PBS	■ MBS* ■ NHS ■ PBS*	■
	Child mental health issues	■	■ AEDC ■ MBS ■ PBS	■ AEDC ■ MBS* ■ PBS*	■
	Years with a parental mental health issue	■	■ MBS ■ PBS	■ MBS* ■ PBS*	■
	Child's age at mental health issue onset	■	■ MBS ■ PBS	■ MBS ■ PBS	■
	Parent's age at mental health issue onset	■	■ MBS ■ PBS	■ MBS ■ PBS	■
Health risk	Main caregiver smoking status	■	■ NHS	■ NHS	
	Main caregiver binge drinking	■	■ NHS	■ NHS	
	Main caregiver BMI	■	■ NHS	■ NHS	
Geographic					
Housing	Housing crowding	■	■ CENSUS ■ NHS	■ CENSUS* ■ NHS	■
	Tenure type	■	■ CENSUS	■ CENSUS*	■
	Dwelling type	■	■ CENSUS	■ CENSUS*	■
	Housing stress	■	■ CENSUS	■ CENSUS	
	Household five year mobility	■	■ CENSUS	■ CENSUS*	■
Risk Factors					
Education	Preschool attendance	■	■ AEDC ■ CCMS ■ CENSUS	■ AEDC* ■ CCMS* ■ CENSUS	■
	Childcare attendance	■	■ AEDC ■ CCMS	■ AEDC ■ CCMS*	■
	Average weekly childcare hours	■	■ CCMS	■ CCMS*	
	Unpaid childcare	■	■ CENSUS	■ CENSUS*	■
	Child age of entry into childcare	■	■ CCMS	■ CCMS*	■
	Child home education environment	■	■ AEDC	■ AEDC*	■
Pregnancy, birth and infancy	Maternal teen age at birth	■	■ AEDC ■ CDLF	■ AEDC* ■ CDLF*	■
	Maternal later age at birth	■	■ AEDC ■ CDLF	■ AEDC* ■ CDLF*	■
Adverse experiences	Parental death	■	■ CDLF	■ CDLF*	■
Priority populations					
Aboriginal and Torres Strait Islander status	Child's Aboriginal and Torres Strait Islander status	■	■ AEDC ■ CENSUS ■ CDLF ■ NHS	■ AEDC* ■ CENSUS ■ CDLF* ■ NHS	N/A



Construct	Indicator	Availability	Simplicity	Quality	Relevance
Cultural and linguistic diversity	Country of child's birth	■	■ AEDC ■ CENSUS ■ CDLF	■ AEDC* ■ CENSUS ■ CDLF*	N/A
	Country of parents' birth	■	■ CENSUS ■ NHS ■ CDLF	■ CENSUS ■ CENSUS ■ CDLF*	N/A
	Child's LBOTE	■	■ AEDC ■ CENSUS	■ AEDC* ■ CENSUS	N/A
	Parent LBOTE	■	■ AEDC ■ CENSUS ■ NHS	■ AEDC ■ CENSUS* ■ NHS	N/A
	Year child arrived in Australia	■	■ AEDC ■ CENSUS	■ AEDC ■ CENSUS	
	Year parent arrived in Australia	■	■ CENSUS ■ NHS	■ CENSUS	
	Child's English proficiency	■	■ AEDC ■ CENSUS	■ AEDC* ■ CENSUS	N/A
	Parent English proficiency	■	■ CENSUS ■ NHS	■ CENSUS ■ NHS	
	Child's ancestry	■	■ CENSUS	■ CENSUS	
	Ancestry of parents	■	■ CENSUS	■ CENSUS	
	Child's religion	■	■ CENSUS	■ CENSUS	
	Parent religion	■	■ CENSUS	■ CENSUS	

Criteria indicated with a ■ = High; ■ = Medium; ■ = Low.

* Indicators are selected for further evaluation and data analysis against the criterion of relevance.

Abbreviations: AEDC, Australian Early Development Census; Census, Census of Population and Housing; CCMS, Child Care Management System; DOMINO, Data Over Multiple Individual Occurrences; CDLF, Combined Demographics and Location Files; LBOTE, Language background other than English; MBS, Medicare Benefits Schedule; NHS, National Health Survey; N/A, Not applicable; PAYG, Pay As You Go; PIT, Personal Income Tax; PBS, Pharmaceutical Benefits Scheme.



Appendix D: Child disadvantage indicators selected for data analysis

Table D1. Detailed summary of indicators selected for data analysis (N=293,910; children with AEDC outcomes in 2018)

Variable	Label description	Data source	Coding	% missing (n)
AEDC Developmental outcomes				
DV1	Developmentally vulnerable on one or more domains	AEDC 2018	0: No; 1: Yes	7.2% (21,284)
OT5	Developmentally on track on all five domains	AEDC 2018	0: No; 1: Yes	0
Sample characteristics				
Child age	Child age group	AEDC 2018	0: <5 years; 1: 5 years; 2: 6 years; 3: >6 years	0
Gender	Child sex	AEDC 2018	0: Girl; 1: Boy	6.9% (20,401)
Child disadvantage indicators				
Sociodemographic				
Household income	Household income (\$AUD) was the sum of individual parent disposable income, which was aggregated from PIT, PAYG, and DOMINO welfare income for each individual parent following ABS methodology. Only parents identified in the relationship and location data who lived with the child in 2018 were counted. Parents that had no data across all three input sources were coded as missing. Income derivations will take PIT as the value. However, if PIT is 0 or not available, then the PAYG/DOMINO derivation is taken.	PIT, PAYG, DOMINO, all in 2018	Continuous	10.3% (30,282)
Equivalentised income	Equivalentised household income was derived by dividing household income by the square root of household size, which was defined based on the count of parents and children in the house in 2018.	PIT, PAYG, DOMINO, all in 2018	Continuous	10.4% (30,613)
Poverty line	Poverty line defined as 50% or less of the median equivalentised household income (i.e., \$41,092.64).	PIT, PAYG, DOMINO, all in 2018	0: Above poverty line; 1: At or below poverty line	10.4% (30,613)
Low Healthcare Card	Low Healthcare Card was defined based on the raw household income and household composition (Single-parent household: <=\$71,955; Two-parent household: <= \$74,165).	PIT, PAYG, DOMINO, all in 2018	0: No; 1: Yes	10.5% (30,816)



Variable	Label description	Data source	Coding	% missing (n)
Family Tax Benefit A	Family Tax Benefit A was defined based on the raw household income.	PIT, PAYG, DOMINO, all in 2018	0: \$99,864 or more; 1: \$56,137 to \$99,864; 2 \$56,137 or less	10.3% (30,282)
Family Tax Benefit B	Family Tax Benefit B was defined based on the raw household income.	PIT, PAYG, DOMINO, all in 2018	0: >\$100,000; 1: <=\$100,000	10.3% (30,282)
Child Care Subsidy	Child Care Subsidy was defined based on the raw household income.	PIT, PAYG, DOMINO, all in 2018	0: \$254,305 or more; 1: \$175,015 to \$254,305; 2: \$70,015 to \$175,015; 3: \$70,015 or less	10.3% (30,282)
Parent education level	Parental highest educational level (either Parent 1 or Parent 2) in the household.	AEDC 2018	0: Bachelor's degree or above; 1: Advanced Diploma or Diploma; 2: Certificate level I to IV (including trade qualification); 3: Year 12 or below	11.6% (34,061)
Maternal education level	Maternal highest education level (either Parent 1 or Parent 2) in the household. This variable was derived based on maternal age from the combined demographics file and Parent 1/2's highest education in 2018 AEDC.	AEDC 2018 and Combined demographics file	0: Bachelor's degree or above; 1: Advanced Diploma or Diploma; 2: Certificate level I to IV (including trade qualification); 3: Year 12 or below	12.8% (37,479)
Parent occupation	Parental highest occupation (either Parent 1 or Parent 2) with three categorises in the household.	Census 2016	0: Managers/Professionals; 1: Technicians/ Trade owners/Community and Personal Service workers/Sale workers; 2: Clerical and Administrative workers/ Machinery operators/Drivers and labourers	30.3% (88,960)
Parent occupation	Parental highest occupation (either Parent 1 or Parent 2) with two categorises in the household.	Census 2016	0: White collar (Managers, Professionals, Community and personal service workers, clerical and administrative workers, and sale workers); 1: Blue collar (Technicians/ trade workers, machinery operators, drivers, and labourers)	30.3% (88,960)
Parent employment status	Parental employment status (either Parent 1 or Parent 2) in the household.	Census 2016	0: Employed; 1: Not employed	26.5% (77,833)
Years with an employed parent	Parental employment duration (either Parent 1 or Parent 2) based on an average four year cut off.	PIT, PAYG, DOMINO, all in 2018	0: >4 years; 1: <=4 years	8.5% (25,115)



Variable	Label description	Data source	Coding	% missing (n)
Social support payment	Family received any type of social support payment, which includes age pension, carer payment, rent assistance, family support (i.e., it does not include Baby Bonus, Child Care Benefits, family allowance or maternity payments, but does include family tax benefits), unemployment payment, student support, or disability support.	DOMINO 2018	0: No; 1: Yes	6.9% (20,401)
Special childcare benefit	Family received any special childcare benefit, which includes at-risk childcare benefit, financial hardship childcare benefit, grandparent childcare benefit, or jobs education and training childcare fee assistance.	CCMS 2018	0: No; 1: Yes	30.1% (88,447)
Household size	Number of people living in the household with a 5-person cut off.	PIT, PAYG, DOMINO, all in 2018	0: 5 people or less; 1: 6 people or more	10.1% (29,776)
Single-parent household	The household has a single parent.	DOMINO 2018	0: No; 1: Yes	9.2% (26,921)
Health conditions				
Chronic health issues of parents	At least one parent with chronic health service/script access between birth and 2018.	MBS, PBS, from child birth to 2018	0: No; 1: Yes	7.1% (20,893)
Chronic health issues of child	Child used chronic health service/script access between birth and 2018.	MBS, PBS, from child birth to 2018	0: No; 1: Yes	7.0% (20,534)
Parent mental health issues	At least one parent with mental health service/script access between one year prior to birth and 2018.	MBS, PBS, from one year prior to birth to 2018	0: No; 1: Yes	7.1% (20,893)
Child mental health issues	Child used mental health service/script access between birth and 2018.	MBS, PBS, from child birth to 2018	0: No; 1: Yes	7.0% (20,534)
Years with a parent mental health issue	The duration of at least one parent with mental health service/script access between one year prior to birth and 2018.	MBS, PBS, from one year prior to birth to 2018	0: Parent has no mental health issues or has had a mental health issue less than one year; 1: Parent has had a mental health issue greater than one year	7.1% (20,893)
Years with a child mental health issue	The duration of child mental health issue between birth to 2018 (MBS/PBS).	MBS, PBS, from birth to 2018	0: Child has no mental health issues or has had a mental health issue less than one year; 1: Child has had a mental health issue greater than one year	7.0% (20,534)



Variable	Label description	Data source	Coding	% missing (n)
Geographic				
House crowding (3 bedrooms needed)	House crowding with three or more additional bedrooms needed in the household where the child lived.	Census 2016	0: 1-2 bedrooms extra bedrooms needed/ none needed/spare bedrooms; 1: 3 or more extra bedrooms needed	23.6% (69,237)
House crowding (1 bedroom needed)	House crowding with one or more additional bedrooms needed in the household where the child lived.	Census 2016	0: None needed/Spare bedrooms; 1: One or more extra bedrooms needed	23.6% (69,237)
Dwelling type	Dwelling type was classified into the following categories: Occupied private dwellings, Non-private dwellings, Migratory, Off-shore, Shipping.	Census 2016	0: Occupied private dwellings; 1: Collective dwellings (Non-private dwellings, Migratory, Off-shore, or Shipping)	21.0% (61,808)
Tenure type	Tenure type was classified into the following categories: Owned outright, Owned with a mortgage, Being purchased under a shared equity scheme, Rented, Being occupied rent-free, Being occupied under a life tenure scheme, Other tenure type.	Census 2016	0: Own (Owned outright, Owned with a mortgage, Being purchased under a shared equity scheme); 1: Rent/occupied (Rented, Being occupied rent-free, Being occupied under a life tenure scheme, Other tenure type)	22.3% (65,493)
Household five year mobility	It indicates if all, some, or none of the usual residents of a household on 10 August 2021 have a different usual address compared to five years earlier (i.e. 10 August 2016).	Census 2016	0: No (No residents aged five years and over had a different address five years ago); 1: Yes (All residents in the household aged five years and over had a different address five years ago, or Some residents aged five years and over had a different address five years ago)	23.2% (68,050)
Risk factors				
Preschool attendance	A child was defined as having attended preschool if they were marked as having attended preschool in the AEDC dataset and/or had at least 600 hours of Long Day Care (LDC) in the CCMS in the year before school.	AEDC, CCMS, all in 2018	0: No; 1: Yes	10.9% (32,071)
Childcare attendance	Childcare attendance was identified using data from the CCMS. If a child had a record in the CCMS at any time, they were flagged as having attended childcare.	CCMS, from child birth to 2018	0: No; 1: Yes	6.9% (20,401)



Variable	Label description	Data source	Coding	% missing (n)
Average weekly childcare hours	Children's average weekly childcare hours were identified based on CCMS quarterly charged hours. For each child, the average quarterly childcare hours for all time were converted to average annual hours and divided through to find average daily hours. Then average daily hours were multiplied by seven to find average weekly hours.	CCMS 2018	Continuous	30.9% (90,706)
Unpaid childcare	A child was identified as being exposed to unpaid childcare if any parent self-reported providing unpaid childcare for their own or other children in the past two weeks in the 2016 Census.	Census 2016	0: No; 1: Yes	16.2% (47,615)
Child age of entry into childcare	Child's age at childcare entry years was identified as the time difference between the first quarter of CCMS attendance and the child's birth.	CCMS 2018	0: 0-2 years; 1: 3 or more years	30.1% (88,447)
Child home education environment	Child is regularly read to at home.	AEDC 2018	0: No (Not true); 1: Yes (Very true or somewhat true)	9.5% (27,794)
Maternal age (teenage)	Maternal age at birth was identified using the month and year of birth for both the mother and the child. Two categories were created using the 20 years or younger as cut off.	AEDC 2018 and Combined demographics file	0: >=20 years; 1: <20 years	8.2% (24,044)
Maternal age (later age)	Maternal age at birth was identified using the month and year of birth for both the mother and the child. Two categories were created using the 35 years or older as cut off.	AEDC 2018 and Combined demographics file	0: <35 years; 1: >=35 years	8.2% (24,044)
Parental death	Parental death was identified as the death of a child's parent in the time period after the child's birth but prior to the completion of the AEDC.	AEDC 2018 and Combined demographics file	0: No; 1: Yes	6.9% (20,401)
Priority populations				
Aboriginal and Torres Strait Islander status	Children were identified as Aboriginal and Torres Strait Islander if they were recorded as Aboriginal and Torres Strait Islander in 50% or more of the data sources in which their Aboriginal and Torres Strait Islander status was known. There were four datasets used: AEDC, Census, DEX and CCMS.	AEDC 2018, Census 2016, DEX 2018, CCMS 2018	0: No; 1: Yes	6.9% (20,423)
Child's country of birth	Child's country of birth was the child's place of birth.	AEDC 2018	0: Australia; 1: Other English-Speaking country; 2: Other country	0.3% (735)



Variable	Label description	Data source	Coding	% missing (n)
Parent's country of birth	Country of parents' birth was identified using the country of birth indicator available in the combined demographics file. Country of parents' birth was categorised into three groups: Australia, other Organisation for Economic Co-operation and Development (OECD), and non-OECD.	Combined demographics file	0: Australia; 1: Other English-Speaking country (Other OECD); 2: Other country (non-OECD)	7.0% (20,496)
Child's language background other than English	Child has a language background other than English.	AEDC 2018	0: No; 1: Yes	6.9% (20,401)
Parents language background other than English	At least one parent has a language background other than English	Census 2016	0: No; 1: Yes	15.8% (46,446)
Child's English proficiency	Child is not proficient in English	AEDC 2018	0: No (Very good, good, average); 1: Yes (Very poor or poor)	0.1% (239)

Abbreviations: AEDC, Australian Early Development Census; AUD, Australian dollars; Census, Census of Population and Housing; CCMS, Child Care Management System; DOMINO, Data Over Multiple Individual Occurrences; DV1, Developmentally vulnerable on one or more domain(s); MBS, Medicare Benefits Schedule; OT5, Developmentally on track on five domains; PAYG, Pay As You Go; PIT, Personal Income Tax; PBS, Pharmaceutical Benefits Scheme.



Appendix E: Participant characteristics

Table E1. Participant characteristics for children with AEDC outcomes in 2018 (N=293,910)

	N	% (n) or mean [SD]
Sample characteristics		
Child's age group:	293,910	
Less than 5 years		2.6% (7,523)
5 years		78.4% (230,458)
6 years		19.0% (55,722)
Greater than 6 years		0.1% (207)
Gender:	273,509	
Girl		49.5% (135,491)
Boy		50.5% (138,018)
Indicators		
Sociodemographic		
Household income (\$AUD)	263,628	106,066.6 [120,652.9]
Equivalised household income (\$AUD)	263,297	31,890.7 [47,024.9]
Poverty line:	263,297	
Above poverty line		86.3% (227,198)
Poverty line or below		13.7% (36,099)
Family eligible for a Low Income Healthcare Card	263,094	35.8% (94,256)
Family Tax Benefit A, based on income group:	263,628	
Greater than \$99,864		50.7% (133,591)
\$56,137 to \$99,864		22.3% (58,696)
\$56,137 or less		27.1% (71,341)
Family Tax Benefit B, based on income group:	263,628	
Greater than \$100,900		50.1% (132,174)
\$100,900 or less		49.9% (131,454)
Child Care Subsidy, based on income group:	263,628	
Greater than \$254,305		6.7% (17,589)
Greater than \$175,015 to \$254,305		12.6% (33,200)
Greater than \$70,015 to \$175,015		46.7% (123,082)
\$0 to \$70,015		34.0% (89,757)
Child Care Subsidy with income threshold:	263,628	
Greater than \$70,015		66.0% (173,871)
\$70,015 or less		34.0% (89,757)



		N	% (n) or mean [SD]
Parental highest education level:		259,849	
	Bachelor's degree or above		45.7% (118,785)
	Advanced Diploma or Diploma		18.5% (48,201)
	Certificate level I to IV ^a		21.9% (56,995)
	Year 12 or below		13.8% (35,868)
Maternal highest education level:		256,431	
	Bachelor's degree or above		45.6% (116,976)
	Advanced Diploma or Diploma		18.6% (47,661)
	Certificate level I to IV ^a		22.0% (56,417)
	Year 12 or below		13.8% (35,377)
Parent highest occupation:		204,950	
	Managers / Professionals		52.7% (107,972)
	Technicians / Other types of workers ^b		29.3% (60,115)
	Labourers / Others ^c		18.0% (36,863)
Parent highest occupation:		204,950	
	White collar		73.6% (150,772)
	Blue collar		26.4% (54,178)
Parent was not employed		216,077	7.2% (15,658)
Parent employment average duration:		268,795	
	Greater than 4 years		70.4% (189,100)
	4 years or less		29.6% (79,695)
Social support payment:			
	Age pension support payment	273,509	0.2% (483)
	Carer support payment	273,509	7.1% (19,310)
	Rent assistance support payment	273,509	37.1% (101,445)
	Family support payment	273,509	93.5% (255,657)
	Employment support payment	273,509	13.4% (36,712)
	Student support payment	273,509	2.1% (5,845)
	Disability support payment	273,509	2.4% (6,649)
	Any type of social security payments	273,509	93.7% (256,245)
Special childcare benefit:			
	At risk childcare benefit	205,463	2.8% (5,747)
	Financial hardship childcare benefit	205,463	4.2% (8,631)
	Grandparent childcare benefit	205,463	0.5% (1,125)
	Jobs education and training childcare benefit	205,463	4.2% (8,729)
	Any special childcare benefit payments	205,463	10.0% (20,523)
Child with a lone parent family		266,989	25.2% (67,295)



	N	% (n) or mean [SD]
Household size with 6 or more people	264,134	5.2% (13,652)
Health conditions		
Parent has had any chronic health issue(s)	273,017	33.1% (90,495)
Child has had any chronic health issue(s)	273,376	12.3% (33,670)
Parent has had any mental health issue(s)	273,017	58.8% (160,574)
Parent mental health issue duration (>1 year)	273,017	40.3% (110,027)
Child has had any mental health issue(s)	273,376	7.7% (21,013)
Child mental health issue duration (> 1 year)	273,376	1.8% (4,968)
Geographic		
House crowding (3 or more additional bedrooms needed)	224,673	0.6% (1,242)
House crowding (1 or more additional bedrooms needed)	224,673	8.9% (20,099)
Dwelling type:	232,102	
Private dwellings		99.7% (231,452)
Collective dwellings		0.3% (650)
Tenure type:	228,417	
Own		64.4% (147,192)
Rent/Occupied		35.6% (81,225)
Child has moved residence address in the last 5 years	225,860	63.0% (142,285)
Risk factors		
Preschool non-attendance	261,839	6.8% (17,922)
Childcare non-attendance	273,509	24.9% (68,046)
Average childcare attendance, weekly hours	203,204	24.2 [11.5]
Unpaid childcare	246,295	93.8% (230,953)
Child's age group at childcare entry:	205,463	
0-2 years		84.0% (172,492)
3-6 years		16.0% (32,971)
Not regularly read to at home	266,116	6.4% (16,936)
Mother's age at birth (20 years or younger)	269,866	3.1% (8,334)
Mother's age at birth (greater than 35 years)	269,866	28.7% (77,416)
Parental death	273,509	0.2% (595)
Priority populations		
Child Aboriginal and Torres Strait Islander status	273,487	6.1% (16,571)
Child country of birth:	293,175	
Australia		92.4% (270,851)
Other English-Speaking country		2.0% (5,836)
Other country		5.6% (16,488)



	N	% (n) or mean [SD]
Parent country of birth:	273,414	
Australia		60.7% (165,837)
Other English-Speaking country		13.6% (37,133)
Other country		25.8% (70,444)
Child LBOTE	273,509	23.1% (63,268)
Parent LBOTE	247,464	24.0% (59,375)
Child not proficient in English	293,671	4.6% (13,368)

^a Certificate level I to IV including trade qualification.

^b Technicians, trade workers, community and personal service workers, and sales workers.

^c Clerical and administrative workers, machinery operators and driver, and labourers.

Abbreviations: AEDC, Australian Early Development Census; AUD, Australian dollars; LBOTE, Language background other than English; SD, Standard deviation.



Appendix F: Distribution of the child disadvantage indicators and AEDC outcomes

Table F1. Distribution of the child disadvantage indicators and two AEDC outcomes

	DV1 (N=57,050)		OT5 (N=162,429)	
	N	% (n) or mean [SD]	N	% (n) or mean [SD]
Sociodemographic				
Poverty line:	262,443		263,297	
Above poverty line		20.2% (45,662)		57.0% (129,525)
Poverty line or below		25.5% (9,168)		50.4% (18,203)
Family eligible for a Low Healthcare Card	262,242		263,094	
No		16.4% (27,528)		61.4% (103,685)
Yes		29.0% (27,206)		46.7% (44,002)
Family Tax Benefit A, based on income group:	262,773		263,628	
Greater than \$99,864		14.9% (19,908)		63.2% (84,419)
\$56,137 to \$99,864		23.7% (13,847)		52.5% (30,796)
\$56,137 or less		29.7% (21,124)		45.9% (32,718)
Family Tax Benefit B, based on income group:	262,773		263,628	
Greater than \$100,900		14.9% (19,626)		63.3% (83,616)
\$100,900 or less		26.9% (35,253)		48.9% (64,317)
Child Care Subsidy, based on income group:	262,773		263,628	
Greater than \$254,305		11.2% (1,973)		68.7% (12,089)
Greater than \$175,015 to \$254,305		13.4% (4,433)		65.6% (21,778)
Greater than \$70,015 to \$175,015		18.2% (22,299)		58.9% (72,453)
\$0 to \$70,015		29.3% (26,174)		46.4% (41,613)
Child Care Subsidy with income threshold:	262,773		263,628	
Greater than \$70,015		16.6% (28,705)		61.1% (106,320)
\$70,015 or less		29.3% (26,174)		46.4% (41,613)
Parental highest education level:	259,034		259,849	
Bachelor's degree or above		14.3% (16,981)		64.2% (76,283)
Advanced Diploma or Diploma		21.1% (10,119)		54.4% (26,218)
Certificate level I to IV b		24.6% (13,994)		51.2% (29,203)
Year 12 or below		34.1% (12,180)		41.8% (14,975)



		DV1 (N=57,050)		OT5 (N=162,429)	
		N	% (n) or mean [SD]	N	% (n) or mean [SD]
Maternal highest education level:		255,627		256,431	
	Bachelor's degree or above		14.3% (16,618)		64.4% (75,290)
	Advanced Diploma or Diploma		21.0% (9,990)		54.4% (25,932)
	Certificate level I to IV b		24.6% (13,823)		51.3% (28,930)
	Year 12 or below		34.0% (11,995)		41.8% (14,794)
Parent highest occupation:		204,276		204,950	
	Managers / Professionals		13.9% (14,936)		64.8% (69,984)
	Technicians / Other types of workers ^c		20.0% (11,996)		55.9% (33,624)
	Labourers / Others ^d		23.0% (8,450)		52.9% (19,511)
Parent highest occupation:		204,276		204,950	
	White collar		15.8% (23,709)		62.2% (93,852)
	Blue collar		21.6% (11,673)		54.0% (29,267)
Parent employment status		215,372		216,077	
	Employed		17.2% (34,350)		60.2% (120,682)
	Not employed		26.8% (4,180)		49.2% (7,698)
Parent employment average duration:		267,924		268,795	
	Greater than 4 years		17.3% (32,541)		60.2% (113,868)
	4 years or less		29.8% (23,631)		46.1% (36,736)
Parent received social support payment:					
	Age pension support payment	272,626		273,509	
	No		20.9% (56,868)		56.1% (153,163)
	Yes		37.8% (182)		41.2% (199)
	Carer support payment	272,626		273,509	
	No		20.0% (50,703)		57.1% (145,194)
	Yes		33.0% (6,347)		42.3% (8,168)
	Rent assistance support payment	272,626		273,509	
	No		16.3% (27,972)		61.7% (106,236)
	Yes		28.8% (29,078)		46.5% (47,126)
	Family support payment	272,626		273,509	
	No		13.9% (2,481)		65.1% (11,627)
	Yes		21.4% (54,569)		55.4% (141,735)
	Employment support payment	272,626		273,509	
	No		18.9% (44,599)		58.4% (138,315)
	Yes		34.0% (12,451)		41.0% (15,047)
	Student support payment	272,626		273,509	



		DV1 (N=57,050)		OT5 (N=162,429)	
		N	% (n) or mean [SD]	N	% (n) or mean [SD]
	No		20.8% (55,369)		56.3% (150,674)
	Yes		28.9% (1,681)		46.0% (2,688)
	Disability support payment	272,626		273,509	
	No		20.5% (54,450)		56.5% (150,898)
	Yes		39.2% (2,600)		37.1% (2,464)
	Any type of social security payments	272,626		273,509	
	No		13.6% (2,344)		65.6% (11,318)
	Yes		21.4% (54,706)		55.4% (142,044)
Parent received special childcare benefit:					
	At risk childcare benefit	204,822		205,463	
	No		20.1% (40,023)		56.7% (113,155)
	Yes		43.5% (2,495)		33.3% (1,911)
	Financial hardship childcare benefit	204,822		205,463	
	No		20.2% (39,689)		56.6% (111,421)
	Yes		32.9% (2,829)		42.2% (3,645)
	Grandparent childcare benefit	204,822		205,463	
	No		20.6% (41,978)		56.2% (114,753)
	Yes		48.2% (540)		27.8% (313)
	Jobs education and training childcare benefit	204,822		205,463	
	No		20.3% (39,720)		56.6% (111,437)
	Yes		32.2% (2,798)		41.6% (3,629)
	Any special childcare benefit payments	204,822		205,463	
	No		19.2% (35,460)		57.7% (106,771)
	Yes		34.5% (7,058)		40.4% (8,295)
Child with a lone parent family		266,124		266,989	
	No		18.1% (35,947)		59.3% (118,457)
	Yes		29.1% (19,532)		46.8% (31,467)
Household size with 6 or more people		263,275		264,134	
	5 people or less		20.9% (52,072)		56.1% (140,642)
	6 people or more		21.3% (2,899)		55.5% (7,577)
Health conditions					
Parent has had any chronic health issue(s)		272,134		273,017	
	No		19.4% (35,330)		57.9% (105,660)
	Yes		23.9% (21,544)		52.5% (47,507)



		DV1 (N=57,050)		OT5 (N=162,429)	
		N	% (n) or mean [SD]	N	% (n) or mean [SD]
Child has had any chronic health issue(s)		272,495		273,376	
	No		19.5% (46,607)		57.7% (138,260)
	Yes		31.0% (10,410)		44.6% (15,029)
Parent has had any mental health issue(s)		272,134		273,017	
	No		18.5% (20,717)		59.2% (66,531)
	Yes		22.6% (36,157)		54.0% (86,636)
Parent mental health issue duration:		272,134		273,017	
	Parent has no mental health issues or has had a mental health issue less than one year		19.0% (30,907)		58.5% (95,294)
	Parent has had a mental health issue greater than one year		23.7% (25,967)		52.6% (57,873)
Child has had any mental health issue(s)		272,495		273,376	
	No		19.7% (49,513)		57.5% (145,016)
	Yes		35.8% (7,504)		39.4% (8,273)
Child mental health issue duration:		272,495		273,376	
	Child has no mental health issues or has had a mental health issue less than one year		20.6% (55,165)		56.4% (151,510)
	Child has had a mental health issue greater than one year		37.4% (1,852)		35.8% (1,779)
Geographic					
House crowding (3 or more additional bedrooms needed)		223,973		224,673	
	No		19.1% (42,588)		58.0% (129,586)
	Yes		38.4% (476)		37.8% (470)
House crowding (1 or more additional bedrooms needed)		223,973		224,673	
	No		18.3% (37,264)		59.0% (120,695)
	Yes		29.0% (5,800)		46.6% (9,361)
Dwelling type:		231,375		232,102	
	Private dwellings		19.5% (44,897)		57.6% (133,395)
	Collective dwellings		18.9% (122)		61.2% (398)
Tenure type:		227,696		228,417	
	Own		15.7% (23,097)		62.2% (91,507)
	Rent/Occupied		25.9% (20,930)		49.8% (40,465)
Child has moved residence address in the last 5 years		225,164		225,860	
	No		17.6% (14,684)		60.0% (50,168)
	Yes		20.2% (28,584)		56.6% (80,598)



		DV1 (N=57,050)		OT5 (N=162,429)	
		N	% (n) or mean [SD]	N	% (n) or mean [SD]
Risk factors					
Preschool attendance		261,042		261,839	
	No		34.7% (6,203)		41.9% (7,507)
	Yes		19.5% (47,301)		57.7% (140,763)
Childcare attendance		272,626		273,509	
	No		21.4% (14,532)		56.3% (38,296)
	Yes		20.8% (42,518)		56.0% (115,066)
Average childcare attendance, weekly hours		42,117	25.3 [12.1]	113,673	23.7 [11.2]
Unpaid childcare		245,509		246,295	
	No		30.8% (4,710)		44.2% (6,787)
	Yes		19.1% (44,062)		58.0% (134,063)
Child's age group at childcare entry:		204,822		205,463	
	0-2 years		20.4% (35,133)		56.3% (97,197)
	3-6 years		22.5% (7,385)		54.2% (17,869)
Regularly read to at home		265,357		266,116	
	No		68.5% (11,580)		12.0% (2,038)
	Yes		16.9% (41,944)		60.0% (149,487)
Mother's age at birth		268,995		269,866	
	20 years or greater		20.3% (52,891)		56.8% (148,497)
	21 years or younger		38.9% (3,240)		36.4% (3,035)
Mother's age at birth		268,995		269,866	
	Younger than 35 years		21.9% (41,921)		55.1% (105,955)
	35 years or older		18.4% (14,210)		58.9% (45,577)
Parental death		272,626		273,509	
	No		20.9% (56,852)		56.1% (153,083)
	Yes		33.3% (198)		46.9% (279)

^a Per financial year.

^b Certificate level I to IV including trade qualification.

^c Technicians, trade workers, community and personal service workers, and sales workers.

^d Clerical and administrative workers, machinery operators and driver, and labourers.

Abbreviations: AEDC, Australian Early Development Census; DV1, Developmentally vulnerable on one or more domain(s); OT5, Developmentally on track on five domains.



Appendix G: Associations between child disadvantaged indicators and AEDC outcomes

Table G1. Associations between four disadvantaged lens and AEDC outcomes*.

Indicators		DV1	OT5
		RR (95% CI)	RR (95% CI)
Sociodemographic			
Poverty line:			
	Above poverty line	Reference	Reference
	Poverty line or below	1.26 (1.24, 1.29)	0.88 (0.87, 0.89)
Family eligible for a Low Healthcare Card		1.77 (1.74, 1.80)	0.76 (0.75, 0.77)
Family Tax Benefit A, based on income group:			
	Greater than \$99,864	Reference	Reference
	\$56,137 to \$99,864	1.58 (1.55, 1.62)	0.83 (0.82, 0.84)
	\$56,137 or less	1.99 (1.95, 2.02)	0.73 (0.72, 0.73)
Family Tax Benefit B, based on income group:			
	Greater than \$100,900	Reference	Reference
	\$100,900 or less	1.81 (1.78, 1.83)	0.77 (0.77, 0.78)
Child Care Subsidy, based on income group:			
	Greater than \$254,305	Reference	Reference
	Greater than \$175,015 to \$254,305	1.19 (1.13, 1.25)	0.95 (0.94, 0.97)
	Greater than \$70,015 to \$175,015	1.62 (1.55, 1.69)	0.86 (0.85, 0.87)
	\$0 to \$70,015	2.60 (2.49, 2.71)	0.67 (0.67, 0.68)
Child Care Subsidy with income threshold:			
	Greater than \$70,015	Reference	Reference
	\$70,015 or less	1.77 (1.74, 1.79)	0.76 (0.75, 0.76)
Parental highest education level:			
	Bachelor's degree or above	Reference	Reference
	Advanced Diploma or Diploma	1.47 (1.44, 1.50)	0.85 (0.84, 0.85)
	Certificate level I to IV ^a	1.72 (1.68, 1.75)	0.80 (0.79, 0.81)
	Year 12 or below	2.37 (2.33, 2.42)	0.65 (0.64, 0.66)
Maternal highest education level:			
	Bachelor's degree or above	Reference	Reference
	Advanced Diploma or Diploma	1.48 (1.44, 1.51)	0.85 (0.84, 0.85)
	Certificate level I to IV ^a	1.72 (1.69, 1.76)	0.80 (0.79, 0.80)
	Year 12 or below	2.38 (2.34, 2.43)	0.65 (0.64, 0.66)



Indicators		DV1	OT5
		RR (95% CI)	RR (95% CI)
Parent highest occupation:			
	Managers / Professionals	Reference	Reference
	Technicians / Other types of workers ^b	1.44 (1.41, 1.47)	0.86 (0.86, 0.87)
	Labourers / Others ^c	1.66 (1.62, 1.70)	0.82 (0.81, 0.83)
Parent highest occupation:			
	White collar	Reference	
	Blue collar	1.37 (1.34, 1.40)	0.87 (0.86, 0.88)
Parent was not employed		1.56 (1.51, 1.60)	0.82 (0.80, 0.83)
Parent employment average duration:			
	Greater than 4 years	Reference	Reference
	4 years or less	1.72 (1.70, 1.75)	0.77 (0.76, 0.77)
Social support payment:			
	Age pension support payment	1.81 (1.61, 2.03)	0.73 (0.66, 0.82)
	Carer support payment	1.65 (1.61, 1.68)	0.74 (0.73, 0.75)
	Rent assistance support payment	1.76 (1.74, 1.79)	0.75 (0.75, 0.76)
	Family support payment	1.54 (1.48, 1.59)	0.85 (0.84, 0.86)
	Employment support payment	1.80 (1.77, 1.83)	0.70 (0.69, 0.71)
	Student support payment	1.39 (1.33, 1.45)	0.82 (0.79, 0.84)
	Disability support payment	1.91 (1.86, 1.97)	0.66 (0.64, 0.68)
	Any type of social security payments	1.57 (1.51, 1.63)	0.85 (0.84, 0.86)
Special childcare benefit:			
	At risk childcare benefit	2.16 (2.10, 2.23)	0.59 (0.57, 0.61)
	Financial hardship childcare benefit	1.63 (1.58, 1.68)	0.75 (0.73, 0.76)
	Grandparent childcare benefit	2.34 (2.2, 2.49)	0.50 (0.45, 0.54)
	Jobs education and training childcare benefit	1.59 (1.54, 1.64)	0.73 (0.72, 0.75)
	Any special childcare benefit payments	1.79 (1.76, 1.83)	0.70 (0.69, 0.71)
Child with a lone parent family		1.61 (1.59, 1.64)	0.79 (0.78, 0.80)
Household size with 6 or more people		1.02 (0.99, 1.06)	0.99 (0.97, 1.00)
Health conditions			
Parent has had any chronic health issue(s)		1.23 (1.21, 1.25)	0.91 (0.90, 0.91)
Child has had any chronic health issue(s)		1.59 (1.56, 1.62)	0.77 (0.76, 0.78)
Parent has had any mental health issue(s)(MHI)		1.22 (1.20, 1.24)	0.91 (0.91, 0.92)
Parent mental health issue duration:			
	No MHI issues or had MHI for less than one year	Reference	Reference
	Greater than one year	1.24 (1.23, 1.26)	0.90 (0.89, 0.91)



Indicators		DV1	OT5
		RR (95% CI)	RR (95% CI)
Child has had any mental health issue(s)		1.82 (1.78, 1.86)	0.69 (0.67, 0.70)
Child mental health issue duration:			
	No MHI issues or had MHI for less than one year	Reference	Reference
	Greater than one year	1.82 (1.75, 1.88)	0.63 (0.61, 0.66)
Geographic			
House crowding (3 or more additional bedrooms needed)		2.01 (1.87, 2.16)	0.65 (0.61, 0.70)
House crowding (1 or more additional bedrooms needed)		1.58 (1.55, 1.62)	0.79 (0.78, 0.80)
Dwelling type:			
	Private dwellings	Reference	Reference
	Collective dwellings	0.97 (0.83, 1.14)	1.06 (1.00, 1.13)
Tenure type:			
	Own	Reference	Reference
	Rent/Occupied	1.64 (1.62, 1.67)	0.80 (0.79, 0.81)
Child has moved residence address in the last 5 years		1.14 (1.12, 1.16)	0.94 (0.94, 0.95)
Risk factors			
Preschool non-attendance		1.79 (1.75, 1.82)	0.73 (0.71, 0.74)
Childcare non-attendance		1.03 (1.02, 1.05)	1.00 (1.00, 1.01)
Unpaid childcare		0.62 (0.61, 0.64)	1.31 (1.29, 1.34)
Child's age group at childcare entry:			
	0-2 years	Reference	Reference
	3-6 years	1.10 (1.08, 1.12)	0.96 (0.95, 0.97)
Child not regularly read to at home		4.06 (4.00, 4.11)	0.20 (0.19, 0.21)
Mother's age is 20 years or younger		1.92 (1.87, 1.97)	0.64 (0.62, 0.66)
Mother's age is 35 years or older		0.84 (0.83, 0.86)	1.07 (1.06, 1.08)
Parental death		1.59 (1.42, 1.78)	0.84 (0.77, 0.91)

^a Certificate level I to IV including trade qualification.

^b Technicians, trade workers, community and personal service workers, and sales workers.

^c Clerical and administrative workers, machinery operators and driver, and labourers.

Abbreviations: AEDC, Australian Early Development Census; DV1, Developmentally vulnerable on one or more domain(s); MHI, Mental health issues; OT5, Developmentally on track on five domains; RR, Risk ratio.



Appendix H: Distribution of the priority population indicators and associations with AEDC outcomes

Table H1. Distribution of the priority population indicators and two AEDC outcomes, DV1 and OT5

Characteristics	DV1 (N=57,050)		OT5 (N=162,429)	
	N	n (%)	N	n (%)
Child Aboriginal and Torres Strait Islander status	272,604		273,487	
No		19.7% (50,482)		57.3% (147,341)
Yes		39.7% (6,557)		36.3% (6,013)
Child country of birth:	272,163		293,175	
Australia		20.8% (54,057)		55.8% (151,039)
Other English-Speaking country		20.3% (773)		57.4% (3,347)
Other Non-English speaking country		24.7% (2,118)		46.5% (7,662)
Parent country of birth:	272,531		273,414	
Australia		21.4% (35,377)		55.9% (92,723)
Other English-Speaking country		18.5% (6,827)		58.6% (21,760)
Other Non-English speaking country		21.1% (14,817)		55.1% (38,840)
Child LBOTE	272,626		273,509	
No		20.0% (41,895)		57.4% (120,695)
Yes		24.1% (15,155)		51.6% (32,667)
Parent LBOTE	246,677		247,464	
No		19.3% (36,233)		58.1% (109,311)
Yes		21.9% (12,943)		53.9% (32,009)
Child proficiency in English	272,448		293,671	
Proficient		17.9% (46,759)		57.9% (162,315)
Not Proficient		≥90% (≥9,718)		0.4% (59)

Abbreviations: AEDC, Australian Early Development Census; DV1, Developmentally vulnerable on one or more domain(s); LBOTE, Language background other than English; OT5, Developmentally on track on five domains.



Table H2. Associations between the priority population indicators and AEDC outcomes.

		DV1	OT5
		RR (95% CI)	RR (95% CI)
Child Aboriginal and Torres Strait Islander status		2.01 (1.97, 2.05)	0.63 (0.62, 0.65)
Child country of birth:			
	Australia	Reference	Reference
	Other English-Speaking country	0.98 (0.92, 1.04)	1.03 (1.01, 1.05)
	Other country	1.19 (1.14, 1.23)	0.83 (0.82, 0.85)
Parent country of birth:			
	Australia	Reference	
	Other English-Speaking country	0.86 (0.84, 0.88)	1.05 (1.04, 1.06)
	Other country	0.99 (0.97, 1.00)	0.99 (0.98, 0.99)
Child LBOTE		1.20 (1.18, 1.22)	0.90 (0.89, 0.91)
Parent LBOTE		1.13 (1.11, 1.15)	0.93 (0.92, 0.94)
Child not proficient in English		5.29 (5.24, 5.34)	0.01 (0.01, 0.01)

Abbreviations: AEDC, Australian Early Development Census; DV1, Developmentally vulnerable on one or more domain(s); LBOTE, Language background other than English; OT5, Developmentally on track on five domains; RR, Risk ratios.



The Centre for Community Child Health
The Royal Children's Hospital Melbourne
50 Flemington Road
Parkville 3052 VIC

www.rch.org.au/ccch

The Centre for Community Child Health is a department of The Royal Children's Hospital
and a research group of the Murdoch Children's Research Institute.