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PRESCHOOL PARTICIPATION
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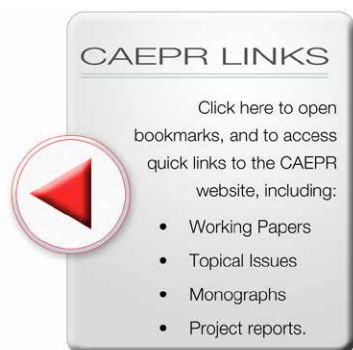
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Preschool participation

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Abstract

Results of the 2016 Census show that, at a national level, the preschool participation rate among Indigenous children has increased substantially over the past decade. Furthermore, preschool participation rates for Indigenous and non-Indigenous children have converged over this period, most markedly in the Northern Territory. Preschool participation rates among Indigenous children varied between and within jurisdictions, but (based on analysis at the fairly broad geographical level of Indigenous region) increased in all but a few regions.

While preschool participation rates among Indigenous children have generally increased, children in relatively disadvantaged circumstances, who might gain the most from a preschool service that meets their needs, are less likely to be attending. Rates of preschool participation were markedly lower among children (whether Indigenous or non-Indigenous) living in households with no employed parent, compared with children living in households where a parent was employed. This may be partly because parents who are not employed have less need for the child care provided by preschool. However, limited financial resources and various other factors are likely to affect these families' ability to access preschool.

Keywords: Aboriginal and Torres Strait Islander, Indigenous, early childhood education, preschool

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Acronyms

ABS	Australian Bureau of Statistics
ANU	The Australian National University
CAEPR	Centre for Aboriginal Economic Policy Research
COAG	Council of Australian Governments
ERP	estimated resident population
NECECC	National Early Childhood Education and Care Collection

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Introduction and overview

Aim and structure of this report

This report examines what the 2016 Australian Census of Population and Housing can tell us about preschool participation among the Aboriginal and Torres Strait Islander Australian population. Census analysis is supplemented with information from the National Early Childhood Education and Care Collection (NECECC) to provide a holistic picture of Australian children's participation in preschool programs.

The term 'preschool education' is used in this report to refer to education programs aimed at children, generally aged 4–5 years, who are in the year before full-time school. The term 'preschool participation' is used to refer to children's attendance at a service offering such programs. During the past couple of decades, an increasing body of evidence has attested to the critical importance of early childhood to human development. At the same time, Australian children's participation in formal child care services has increased. The aim of current Australian Government policy is for universal access to a quality early childhood education program for 15 hours per week for children in the year before they begin full-time school, regardless of the type of early childhood education or care service they attend.¹ The current Closing the Gap target, relating to participation in early childhood education for Indigenous children, is essentially the same (PM&C 2017).

While the focus of this report is on children in the year before full-time school, future analysis will examine younger children's participation in early learning programs. A recent Australian report argues that two years of preschool has greater benefits for children, especially those most likely to be developmentally vulnerable. The report provides a summary of existing policy and funding arrangements for '3-year-old preschool' in different jurisdictions (Fox & Geddes 2016).

This report is structured as follows.

- 'Introduction and overview' reviews evidence of the benefits of early childhood education for Indigenous children; summarises the enablers of, and barriers to, Indigenous preschool participation; and provides a broad overview of relevant early childhood education policies and services.
- 'Data sources and measurement' examines issues associated with measuring preschool participation and the strengths and limitations of key data sources.
- 'National and state/territory trends in preschool participation' describes national and state/territory trends in preschool participation rates for Indigenous and non-Indigenous children, drawing on census data from 2006, 2011 and 2016. Data from the 2016 NECECC are used to look at participation in preschool programs in different settings.
- 'Regional differences in early childhood participation' examines change in preschool participation rates at the regional level between 2011 and 2016.
- 'Household and family context of Indigenous preschool participation' looks at the household and family context of preschool participation.
- 'Summary and concluding comments' rounds off the report with a discussion of the findings and implications.

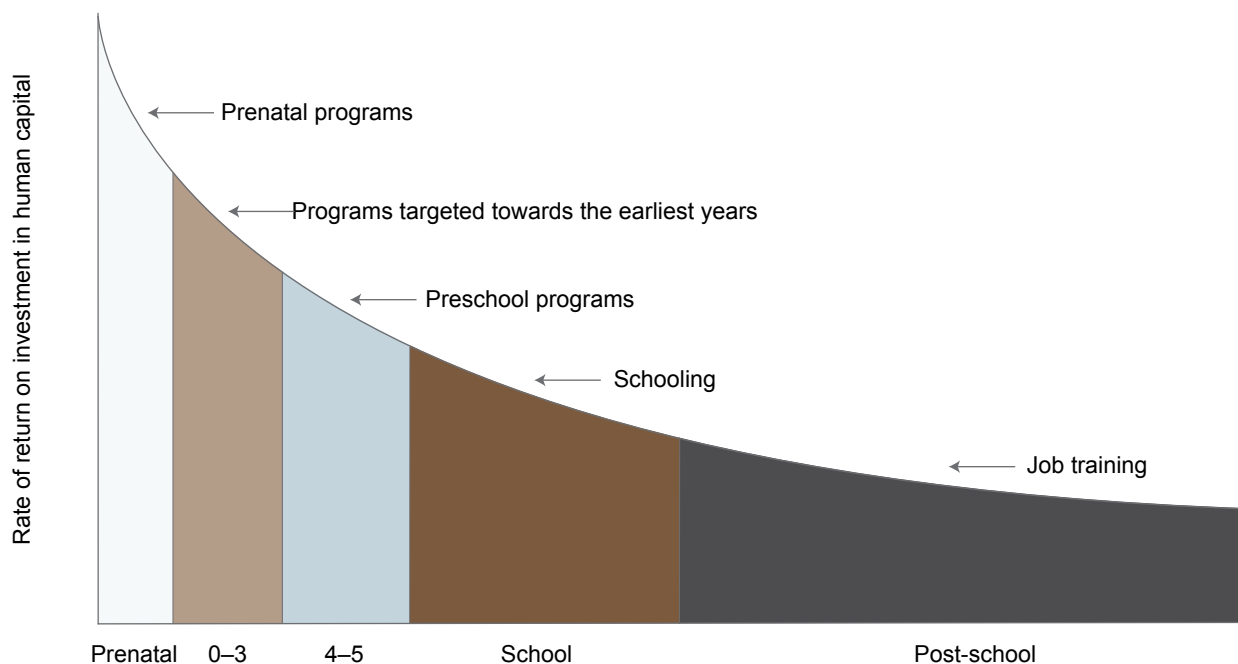
Importance of early childhood education

There is much evidence that participation in early childhood education has a positive effect on children's development (see reviews in Baxter & Hand 2013, PC 2014, AIHW 2015, SCRGSP 2016, Warren et al. 2016, Biddle et al. 2017). In 'Schools, skills, and synapses', Nobel prize-winning economist James Heckman (2008) argued that investing in human capital in the early years gives the greatest return. This is summarised in Fig. 1. It has been argued that 'investing in early childhood development is both economically efficient and fair, especially compared to other methods that attempt to "level the playing field." Later remediation is costly and frequently ineffective'.²

A small number of quantitative studies have examined the benefits of early childhood education and care for Aboriginal and Torres Strait Islander children. Findings from these are as follows:

- Indigenous preschool attendance was associated with greater school readiness, with the caution that this might be due to those who attend preschool having different characteristics to begin with (Biddle & Bath 2013).
- Preschool attendance resulted in improved cognitive and developmental outcomes for Indigenous children at ages 7–9 years (Arcos Holzinger & Biddle 2015).
- The positive effects of preschool participation were more significant than those of child care participation, and very long hours attended in a child care setting were found to be detrimental to children's development (Arcos Holzinger & Biddle 2015).

FIG. 1. The Heckman Curve



Source: J Heckman, <https://heckmanequation.org/resource/the-heckman-curve>

- Preschool attendance was positively associated with an overall measure of child development in an urban Aboriginal population (Grace et al. 2017).

These findings highlight the continuing need to understand the enablers of, and barriers to, preschool participation for Indigenous children, particularly those in relatively disadvantaged circumstances.

Enablers of, and barriers to, Indigenous preschool participation

As Hewitt and Walter (2014) observe, the environments in which Indigenous children engage with preschool are diverse, so that ‘for children in remote areas, preschool will be a primarily Indigenous social and cultural environment, with the majority of classmates and teachers also Aboriginal or Torres Straits Islander people ... [whereas] most urban and regional Indigenous children will attend preschools where they are racially, socially and culturally a minority’ (Hewitt & Walter 2014:42). Grace et al. (2017) note the ‘ongoing challenge in Australia to engage Indigenous people in an education system that they may not experience as culturally meaningful to them’ and restate the need to view inequities between Indigenous and non-Indigenous Australians in the context of ‘a legacy of inter-generational trauma and mistrust of government service systems for many Indigenous Australians’ (Grace et al. 2017:36).

There are several recurring themes among the mainly qualitative studies that have explored the factors that may affect preschool participation of Indigenous children. Some barriers are practical or socioeconomic (lack of services, distance, transport difficulties, cost). Other factors such as trust, communication, Indigenous involvement in providing and staffing services, and cultural awareness and respect are also important.

Factors that enable, or are positively associated with, preschool participation of Indigenous children include:

- availability of Indigenous community-controlled services (Bowes et al. 2011)
- development of services in partnership with local Indigenous communities (Bowes et al. 2011)
- cultural respect and awareness of the services (Bowes et al. 2011)
- trust families have in the early childhood education service, which can be developed through their being welcomed into the service (DET 2016)
- communication and engagement between the service or teacher and families (Grace & Trudgett 2012, DET 2016, Martin 2017)
- opportunities for parents to participate in their child’s learning (Bowes et al. 2011, DET 2016)

- engagement of the early childhood education service with nonparticipants (i.e. the wider community) through community events (DET 2016)
- early childhood services as service hubs (i.e. sites where families can access other services for their children) (Bowes et al. 2011, DET 2016)
- presence of Aboriginal and Torres Strait Islander staff (Biddle 2007, Bowes et al. 2011)
- stability of housing (Hewitt & Walter 2014)
- exposure to books at home (Hewitt & Walter 2014)
- participation in cultural events and identification with a tribal or language group, or clan (Biddle & Bath 2013).

Barriers include:

- lack of access – no services (Warren et al. 2016, citing AIHW 2005), waiting lists (Bowes et al. 2011)
- lack of transport, distance (Bowes et al. 2011; Grace & Trudgett 2012; DET 2016; Warren et al. 2016, citing AIHW 2005)
- distrust of government or services (Bowes et al. 2011, DET 2016), fear of institutions and associated regulations and paperwork (Warren et al. 2016, citing PC 2014)
- cost – fees (even if already subsidised) (Bowes et al. 2011; Warren et al. 2016, citing PC 2014), lack of awareness of relevant funding initiatives (DET 2016)
- cultural or support needs not being met (Bowes et al. 2011; Warren et al. 2016, citing PC 2014)
- feeling unwelcome – racism and discrimination, being judged negatively, family embarrassment about not being able to provide food or appropriate clothing (Bowes et al. 2011; Grace & Trudgett 2012; Biddle & Bath 2013; Warren et al. 2016, citing PC 2014)
- fear that Aboriginal culture would be undermined through participation in mainstream services (Grace & Trudgett 2012; Warren et al. 2016, citing PC 2014)
- staffing issues – lack of Aboriginal and Torres Strait Islander staff or staff fluent in local languages, poor cultural competency training of staff (Warren et al. 2016, citing PC 2014)
- low household income (Biddle 2007), or main source of household income being government benefits (Hewitt & Walter 2014)
- lower levels of parental education (Biddle 2007)
- mobility – children who had lived in two or more homes since birth were less likely to participate (Biddle & Bath 2013)
- parents' concerns about children's ability to learn preschool or school skills (Hewitt & Walter 2014)
- community divisions (Grace & Trudgett 2012).

Australian policy context

Three major national policy statements address early childhood education of Aboriginal and Torres Strait Islander children specifically or of Australian children in general:

- National Indigenous Reform Agreement³ (Closing the Gap)⁴
- National Partnership Agreement⁵ on Universal Access to Early Childhood Education – 2016 and 2017¹
- National Partnership Agreement on the National Quality Agenda for Early Childhood Education and Care – 2015–16 to 2017–18.⁶

The Closing the Gap initiative, agreed upon by the Council of Australian Governments (COAG) in 2008, established a target of 'ensuring all Indigenous four years olds in remote communities have access to early childhood education within five years' (i.e. by 2013).⁴ After that original target expired in 2013 without being met, a new target was established in December 2015: '95 per cent of all Indigenous four year-olds enrolled in early childhood education (by 2025)' (PM&C 2017).⁷

There are a couple of points to note about the revised target. First, it has been expanded to include all Indigenous children (not just those in remote Australia). Second, the window over which the target is to be achieved is much longer (10 years rather than 5). Third, the target focuses on participation rather than access. What is consistent across the two targets, however, is that there is no non-Indigenous benchmark used, unlike the other targets in the Closing the Gap agenda.

This renewed early childhood education target aligns with the National Partnership Agreement on Universal Access to Early Childhood Education – 2016 and 2017, which specifies a proxy measure for access as '95 per cent of children enrolled, in the year before full-time school, in a quality early childhood education programme for 600 hours per year'.¹

The question of what constitutes a 'quality' program for Indigenous children is an important one. Biddle (2007) suggests that, while characteristics of quality identified by Raban (2000) – more highly qualified staff, involvement of outside experts, lower child–staff ratios, parental inclusion and involvement, and low staff turnover and stable

arrangements – may also apply to Indigenous children, another important characteristic of quality early childhood education that is specifically relevant to Indigenous children (identified by various authors cited in Biddle 2007) is the involvement of Indigenous people at all levels. The importance of Indigenous involvement in the provision of early childhood education services, along with some of the more general aspects of quality, relates to many of the enablers and barriers listed in the previous section.

Early childhood education services in Australia

Analyses of Australian early childhood education provision in the academic literature refer to the historical ‘care–education divide’, with child care centres traditionally focusing on providing care for children and preschools or kindergartens traditionally focusing on education (Elliott 2006). The demand for, and use of, formal child care services have increased substantially over the past couple of decades in response to increasing female and maternal labour force participation (e.g. AIHW 2015:2–3). An increasing emphasis on education from 1996 (Raban & Kilderry 2017) was followed by the COAG National Partnership Agreement on Early Childhood Education. Noting that ‘early childhood services, policies and practices’ in Australia were quite fragmented, the agreement aimed to deliver ‘universal access to quality early childhood education in the year before full-time schooling’.⁸ One stated priority of the agreement was to increase participation among Indigenous and disadvantaged children. A focus on the participation of Indigenous children, including in remote areas, has continued through to the current National Partnership Agreement on Universal Access to Early Childhood Education – 2016 and 2017.¹

The provision of early childhood education services varies between states and territories. The two main types of preschool program providers are:

- preschool services that are stand-alone or co-located with schools that ‘provide structured educational programs to children in the year before they commence full-time schooling’ (see definition of ‘Service activity type’, Glossary, ABS 2017a)
- long day care centres – primarily a child care service providing care for children with working parents (these may be on shared premises, including school grounds, or may stand alone) and may be run by various organisations including for-profit organisations, not-for-profit organisations, local councils, community organisations and employers (see definition of ‘Service activity type’, Glossary, ABS 2017a).

There is also variation between states and territories in funding arrangements, entry-age requirements and terminology (ABS 2014a, Fox & Geddes 2016, Raban & Kilderry 2017).

One recent overview (Raban & Kilderry 2017, citing Urbis Social Policy 2011 and PC 2014) distinguishes between two main models that are predominant in different jurisdictions:

- The ‘government’ model – most preschool services are owned, funded and delivered by the state or territory government. This model applies in South Australia, Western Australia, Tasmania, the Northern Territory and the Australian Capital Territory. Even in these jurisdictions, many students access preschool programs through a long day care centre instead of, or in addition to, preschool services.
- The ‘nongovernment’ model – service provision is more mixed, and includes state government–funded services provided by nongovernment organisations, preschool programs provided in long day care centres, and a small proportion of state government–owned services. This model applies in New South Wales, Victoria and Queensland (Raban & Kilderry 2017:12–13).

Martin (2017) traces the history of Indigenous Australian early childhood education services, describing the establishment of the ‘first generation of community-controlled preschools/kindergartens’ in the 1970s. These include Multifunctional Aboriginal Children’s Services (MACS), which, Martin argues, have had a substantial impact, with many still operating. MACS are funded ‘on the basis that they operate in areas where access to mainstream or conventional childcare services is not available or commercially viable, and where there is a need for culturally competent services that meet the needs of the local Indigenous people’ and are delivered by organisations such as ‘Indigenous corporations, shire councils and not-for-profit organisations’ (ANAO 2010). While MACS are currently funded under the Australian Government’s Budget Based Funding program, these arrangements are changing from 1 July 2018.⁹ Among other providers of early childhood education and care services in Australia, those outside the state government and independent school education systems can apply for funding to provide programs for Indigenous children (Martin 2017).

Data sources and measurement

Defining preschool education and preschool participation

For the purposes of this paper, we use the term ‘preschool education’ to refer to education programs

aimed at children in the year or two before full-time school – as defined for the purposes of the NECECC (ABS 2017a) – and the term ‘preschool participation’ to refer to children’s attendance of such programs.

As discussed in the previous section, such programs can be delivered in dedicated preschool services or long day care centres. These different types of services are distinguished within the NECECC. In the census, preschool participation is framed as attendance at an educational institution, and there is no explicit reference to preschool programs provided within long day care centres. Even so, comparison of data from the 2016 NECECC and the 2016 Census suggests that the census question captures much attendance at preschool programs in long day care centres (with some variation by jurisdiction and children’s Indigenous status – see Appendix A).

Data sources

The Census of Population and Housing and the NECECC are the data sources used for the analysis in this report. In addition, there are several other sources of data, such as the Longitudinal Study of Indigenous Children, Longitudinal Study of Australian Children, Australian Early Development Census, and National Aboriginal and Torres Strait Islander Social Survey, that can be used to measure aspects of participation in early childhood education, or its association with a range of outcomes (e.g. Biddle & Bath 2013).

The Census of Population and Housing is an important, longstanding source of information about Australian children’s preschool attendance, both at a national level and for small geographical areas, collected in conjunction with a wide range of additional information about children and their families.

Census information about preschool attendance has been collected in a reasonably consistent way since preschool was included in the 1986 Census as a response category to the question about attendance at an educational institution.

The initial 2016 Census question about preschool attendance was:

Is the person attending a school or any other educational institution?

The question instructed respondents to ‘include preschool and external or correspondence students’. If the answer to this question was ‘yes’, the next question was:

What type of educational institution is the person attending?

Respondents were then provided with a list of educational institutions to select from. ‘Preschool’ was at the top of this list.

One limitation of census information is that it is only available every five years. Another possible limitation is that, because the census question is framed as ‘attending an educational institution’, it may underestimate participation in preschool programs delivered in child care settings. As noted in the introduction, delivery settings for preschool programs differ by jurisdiction. More generally, there has been substantial growth in preschool programs delivered in diverse settings, including long day care, over the past couple of decades. If the census did not fully capture participation in preschool programs in long day care centres, this would have implications for comparisons between jurisdictions and measurement of change over time.

In 2010, the NECECC was established ‘to provide nationally comparable statistics on early childhood education and care’ (ABS 2014a). Data that were previously available from various collections, including the National Preschool Census, were considered to be inadequate because of ‘inconsistencies in definition, state and territory variations, differing reporting units and the difficulty of capturing preschool programs delivered in different settings’ (ABS 2008:56). The NECECC covers all preschool education (as previously defined) and represents a significant investment in better-quality data about Australian children’s participation in early childhood education and care. Specifically, the scope of the NECECC is service providers delivering a preschool program to enrolled children aged 3 to 6, with most data (mainly sourced from administrative collections) obtained from the Australian Government, and state and territory education departments (for more information, see ABS 2017a). Information about children enrolled in and attending a preschool program derived from the NECECC has been published annually in *Preschool education, Australia* since 2012 (experimental data were published in 2010 and 2011) (ABS 2017a and previous releases).

In fact, it appears that the census does pick up much (though not all) preschool participation in diverse settings, based on our comparison of data from the 2016 Census and the 2016 NECECC (Appendix A). However, comparability of data from the 2016 Census and the 2016 NECECC varies according to jurisdiction and Indigenous status. This is the first time contemporaneous data have been available to support such a comparison of the two sources. These two main data collection methods have differing advantages and disadvantages for measuring preschool participation among Aboriginal

and Torres Strait Islander children. A summary of their strengths and limitations follows.

Census of Population and Housing

Strengths

- Longstanding collection, with information about attendance at preschool collected in a similar way since 1986, providing a historical perspective
- Covers the whole population, including those not participating in preschool – this supports calculation of population rates of preschool participation, and analysis of the characteristics of participants compared with nonparticipants
- Supports analysis of small population groups and small geographical areas
- Includes a wide range of sociodemographic information about children, and their families and households that can be used in detailed analysis

Limitations

- Infrequent collection (once every five years)
- Focus on attendance at an educational institution may result in underreporting of preschool programs provided in other settings such as long day care centres
- Information provided by householders may not be consistent between states and territories, given the different preschool delivery models and terminology that they use
- Does not capture information about the preschool setting, the hours of preschool attended or whether the child is in the year before full-time schooling
- Census undercount – provides no data on those who do not complete the census form at all
- Nonresponse to individual census questions – the percentage of ‘not stated’ responses may differ (and is often higher) among the Aboriginal and Torres Strait Islander population compared with the non-Indigenous population

National Early Childhood Education and Care Collection

Strengths

- Covers all preschool programs, regardless of setting
- Annual collection supports timely monitoring of change in a dynamic environment
- Includes information on whether the child is in the year before full-time school

- Supports analysis of the Indigenous population and small geographical areas
- Includes some sociodemographic information about children as well as more detailed information about hours of attendance, fees, service delivery setting and sector of provider

Limitations

- Relatively new collection, with information provided in relation to children since 2012 (in 2010 and 2011, data were published as ‘experimental’ – for some states, data were available for ‘episodes of attendance’ only) (ABS 2017a)
- Does not cover nonparticipants
- Ensuring that children attending multiple preschool programs are counted only once is a statistical challenge, given the complexity of early childhood education service delivery in Australia (e.g. ABS 2014b: ‘Measurement concepts’ and discussion of recent enhancements to the linking method in ABS 2017a: ‘New linking method and revised 2016 data’)
- Not fully comparable across jurisdictions or over time (ABS 2017a: ‘Jurisdictional data quality statements’)

Some of these issues are discussed in more detail in the following section.

Measurement

Measuring the preschool participation rate of Australian children presents an ongoing challenge. The participation rate is an important measure for making meaningful comparisons over time and between jurisdictions – using numbers to measure change is much less informative, as growth in numbers of preschool participants could be due to population growth alone. The preschool participation rate as defined in the performance indicator for the Closing the Gap target is the ‘proportion of children who are enrolled in (and attending, where possible to measure) a preschool program in the year before formal schooling’. This can be expressed using the formula given below, where:

- *Number of children attending preschool in the year before formal schooling* is the numerator
- *Number of children in the year before formal schooling, referred to in the remainder of this report as the *Preschool-eligible population** is the denominator. This denominator includes children who are eligible based on their age (which varies between jurisdictions) and excludes children who are already attending formal schooling. These criteria have implications for the measurement of the preschool participation rate.

Preschool participation rate (%)

$$= \frac{\text{Number of children attending preschool in the year before formal schooling}}{\text{Preschool-eligible population}} \times 100$$

The NECECC was established to provide authoritative data about preschool participants (whether enrolments or attendees), but it does not provide information about the total preschool-eligible population, which includes those not participating in preschool. Data about the preschool-eligible population therefore need to be obtained from a different source. The census and annual population estimates derived from it are the only available sources of data enabling the preschool-eligible population to be approximated, but one limitation of these data sources is that they do not provide sufficiently precise information about children's ages in years and months.¹⁰

The 2016 *Overcoming Indigenous disadvantage* report (SCRGSP 2016) identifies two main data issues that need to be addressed to improve measurement of the preschool participation rate. The first issue is to better match measures of preschool attendees with measures of the preschool-eligible population (as discussed above), allowing that the age at which children are eligible to be enrolled varies between states and territories.¹¹

The second issue is the need to improve the identification of Aboriginal and Torres Strait Islander children in the NECECC, since the quality of this information varies between states and territories (SCRGSP 2016:4.22–4.23). Indigenous identification change, which presents challenges both for analysing trends in Indigenous outcomes over time and for comparing Indigenous and non-Indigenous

outcomes, is an issue in both censuses and the NECECC (Markham & Biddle 2017). Within the census, those who identify as being Indigenous in a given census year are not necessarily the same people, or have the same characteristics, as those who identified in a previous census year. This has the potential to have a pronounced effect on apparent preschool participation rates.

National and state/territory trends in preschool participation

In this section of the paper, we consider national and state/territory trends in the preschool participation rate among the Indigenous and non-Indigenous populations (Figs 2 and 3; Table 1).

The preschool participation rate is calculated to align as closely as possible with the Closing the Gap target, drawing on information available from the census. The measure derived from the census can be expressed using the following formula. The numerator is *Number of children aged 4–5 attending preschool*. The denominator is *Preschool-eligible population (proxy measure)*, which uses the number of children aged 4–5 years who are not attending school; this is the best measure of the preschool-eligible population that can be constructed using census data.

Preschool participation rate (%)

$$= \frac{\text{Number of children aged 4–5 attending preschool}}{\text{Preschool-eligible population (proxy measure)}} \times 100$$

TABLE 1. Preschool participation rates for Indigenous and non-Indigenous 4–5-year-olds, 2006, 2011 and 2016 censuses

Jurisdiction	2006			2011			2016		
	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio
NSW	64.8	75.9	0.853	68.6	74.9	0.916	72.9	74.4	0.980
Vic	64.3	74.5	0.864	65.3	74.1	0.882	71.5	72.9	0.981
Qld	62.7	70.8	0.886	48.0	56.1	0.856	56.4	63.7	0.885
SA	71.8	84.5	0.850	74.9	83.3	0.900	75.1	72.3	1.038
WA	68.5	81.5	0.841	75.9	83.6	0.908	79.2	83.8	0.945
Tas	54.3	55.4	0.981	53.3	54.0	0.987	49.2	53.0	0.929
NT	48.3	88.7	0.545	67.7	86.7	0.780	80.9	85.6	0.946
ACT	83.5	76.7	1.089	77.2	77.7	0.994	78.0	76.3	1.022
Total	62.7	75.1	0.835	63.0	72.0	0.874	68.9	72.4	0.951

Source: Authors' calculations using the 2006, 2011 and 2016 censuses, ABS TableBuilder data

The main finding from this analysis is that, nationally, the preschool participation rate among Indigenous children increased from 63% to 69% over the decade 2006–16. Among their non-Indigenous counterparts, the preschool participation rate decreased from 75% to 72% over the same period (Figs 2 and 3). Varying jurisdictional dynamics underlie these changes at the national level. The preschool participation rate for Indigenous children increased in five jurisdictions. Most notably, in the Northern Territory, the preschool participation rate among Indigenous children increased from 48% in 2006 to 81% in 2016. In contrast, there has been a steady decline over the decade in the preschool participation rate for Indigenous children in Tasmania¹² (Fig. 2).

The significant increase in the percentage of Indigenous 4–5-year-olds who were participating in preschool over the decade from 2006 to 2016 has contributed to a convergence in the preschool participation rates of Indigenous and non-Indigenous children (Table 1).

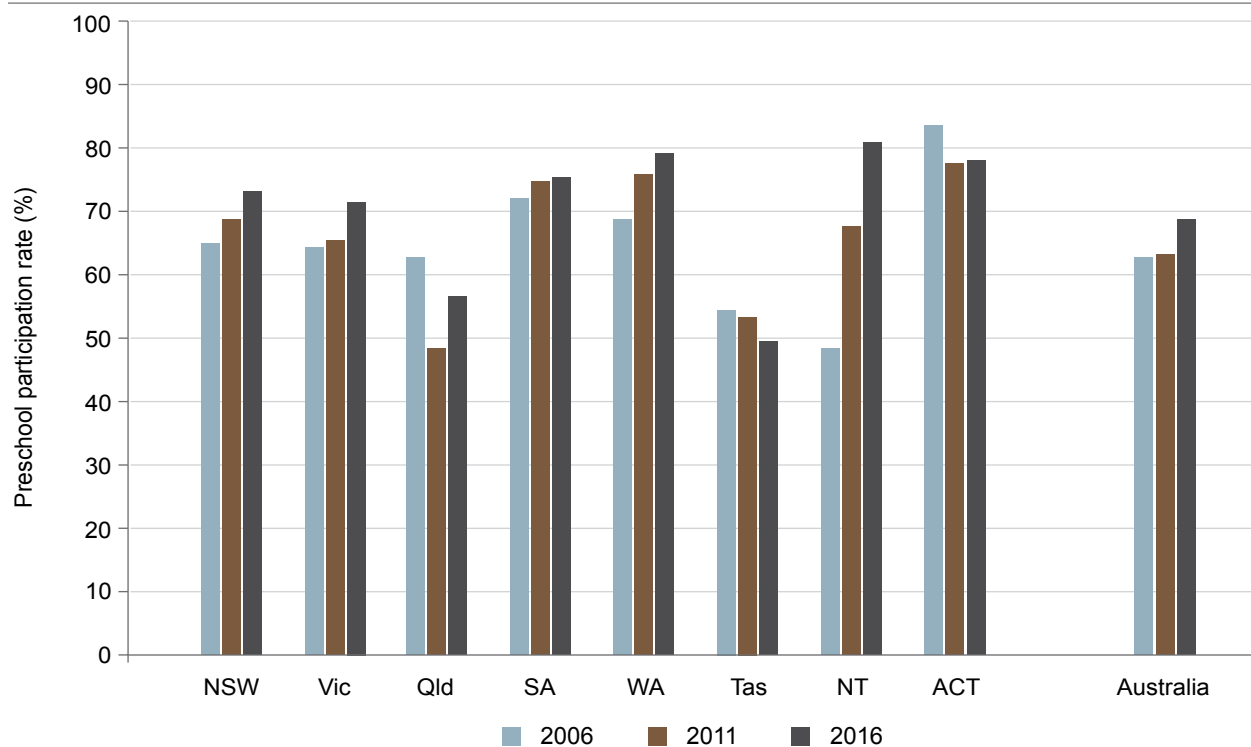
In 2006, there were 0.835 times as many Indigenous children participating in preschool as in the relevant non-Indigenous population. By 2016, this had increased to 0.951 times as many, a quite dramatic increase.

The second thing to note is that there is considerable jurisdictional variation in that rate of convergence. In 2006, apart from the ACT, every jurisdiction had a lower rate of Indigenous participation than non-Indigenous participation. By 2016, there was a higher rate of preschool participation among Indigenous children than non-Indigenous children in South Australia and the ACT, and roughly equivalent rates in New South Wales and Victoria. There has been very little convergence in Queensland, and divergence in Tasmania. In the Northern Territory, there has been dramatic convergence – in 2006, just over half (0.545 times) as many Indigenous children participated as non-Indigenous children, compared with 0.946 times as many in 2016.

As previously noted, while the census does appear to at least partially capture preschool programs delivered in other settings (Appendix A), it does not distinguish between preschool programs delivered in different settings. The NECECC does include information about the setting. Jurisdictional patterns of preschool participation by sector for Indigenous and non-Indigenous children aged 4–5 years are illustrated in Figs 4 and 5.

In 2016, across all jurisdictions except Queensland, more Indigenous preschoolers were attending stand-alone preschools dedicated to providing

FIG. 2. Preschool participation rates among Indigenous children, 2006, 2011 and 2016 censuses

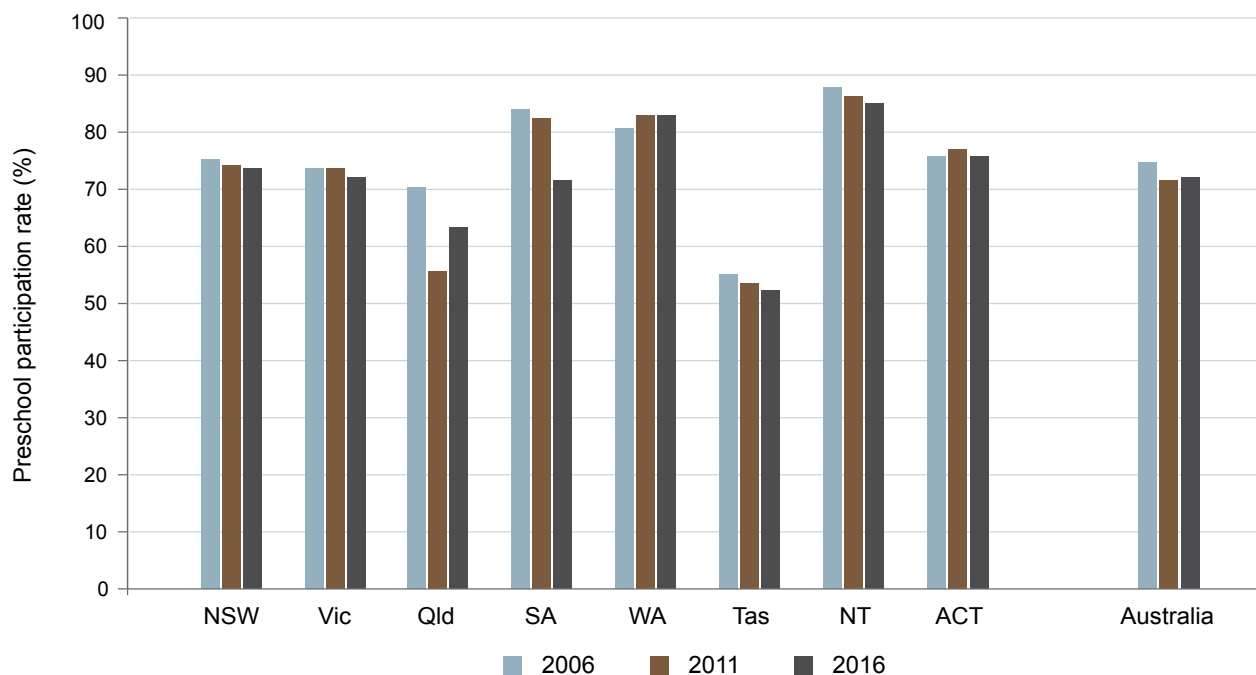


Source: Authors' calculations using the 2006, 2011 and 2016 censuses, ABS TableBuilder data

educational programs than were attending a preschool program in a long day care setting, or attending multiple provider types (Fig. 4). Even so, the proportion of Indigenous preschool attendees who were attending a preschool program in long day care (including those attending both provider types) was substantial,

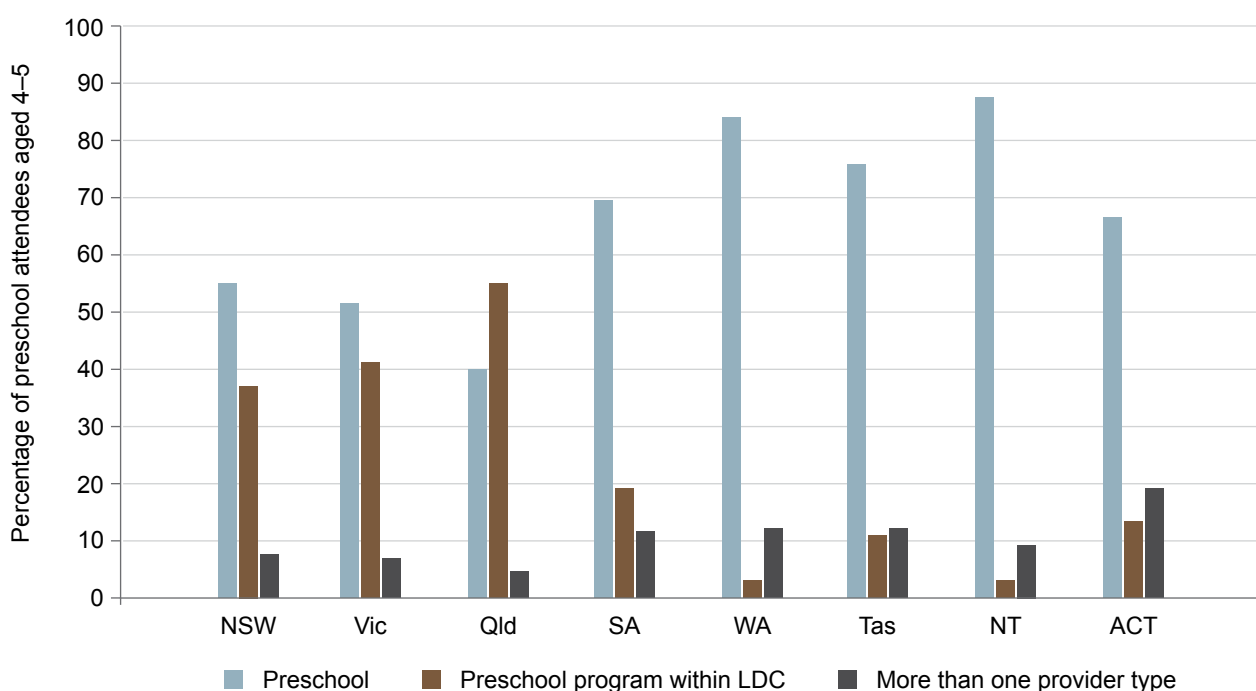
ranging from 13% in the Northern Territory to 60% in Queensland. The long day care sector was much more prominent among non-Indigenous preschool attendees, ranging from 21% in Western Australia to 70% in New South Wales (Fig. 5).

FIG. 3. Preschool participation rates among non-Indigenous children, 2006, 2011 and 2016 censuses



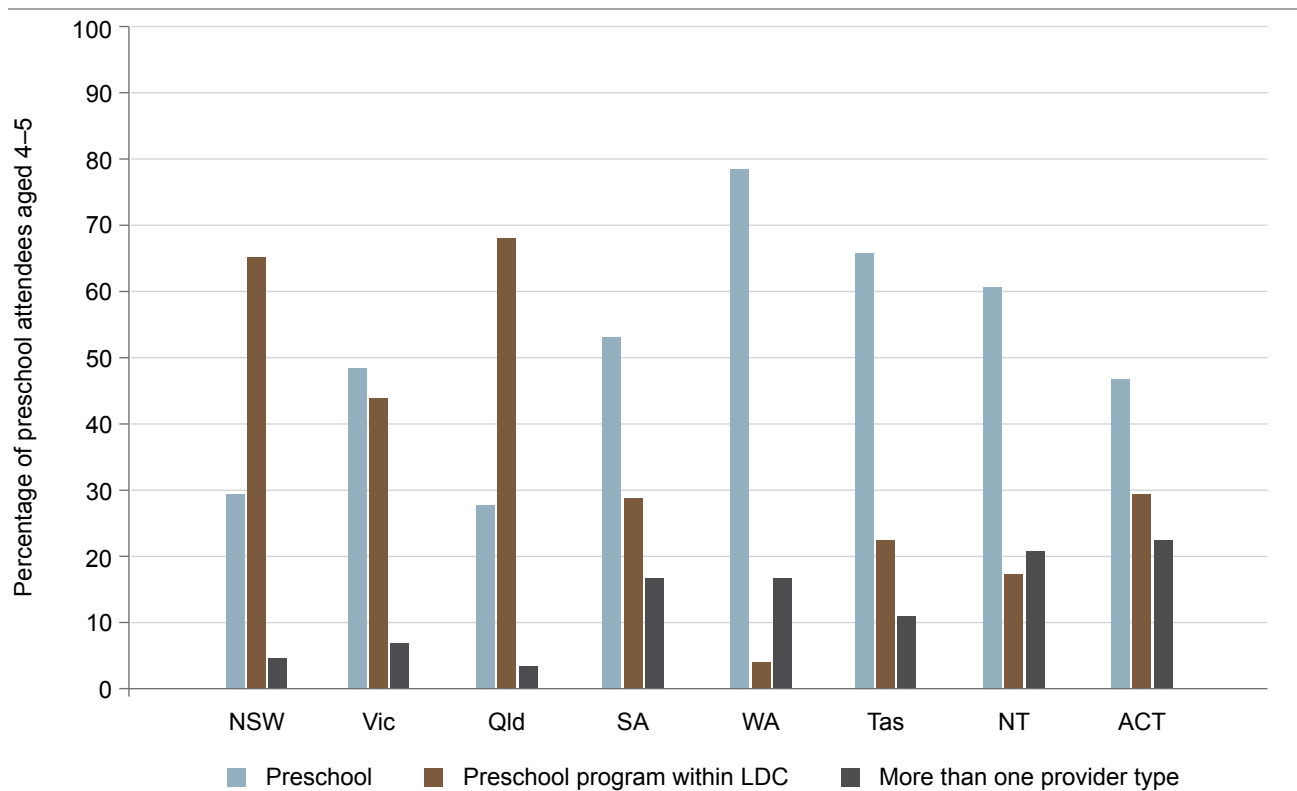
Source: Authors' calculations using the 2006, 2011 and 2016 censuses, ABS TableBuilder data

FIG. 4. Percentage of Indigenous preschool attendees aged 4–5 years in each sector, 2016 NECECC



LDC = long day care; NECECC = National Early Childhood Education and Care Collection
 Source: Authors' calculations using ABS (2017a), ABS TableBuilder data

FIG. 5. Percentage of non-Indigenous preschool attendees aged 4–5 years in each sector, 2016
NECECC



LDC = long day care; NECECC = National Early Childhood Education and Care Collection
Source: Authors' calculations using ABS (2017a), ABS TableBuilder data

Regional differences in early childhood participation

Understanding regional trends in early childhood participation is important, because families in regional and remote areas are likely to have poorer access to early childhood education services for their children. This is particularly important in relation to Aboriginal and Torres Strait Islander people, most of whom live outside major cities (Markham & Biddle 2017). The analysis presented here uses census data from 2011 and 2016.

Our analysis of census data indicates that preschool participation rates increased in most regions between 2011 and 2016. The results are illustrated in Figs 6 and 7 (with the detailed data provided in Appendix B).

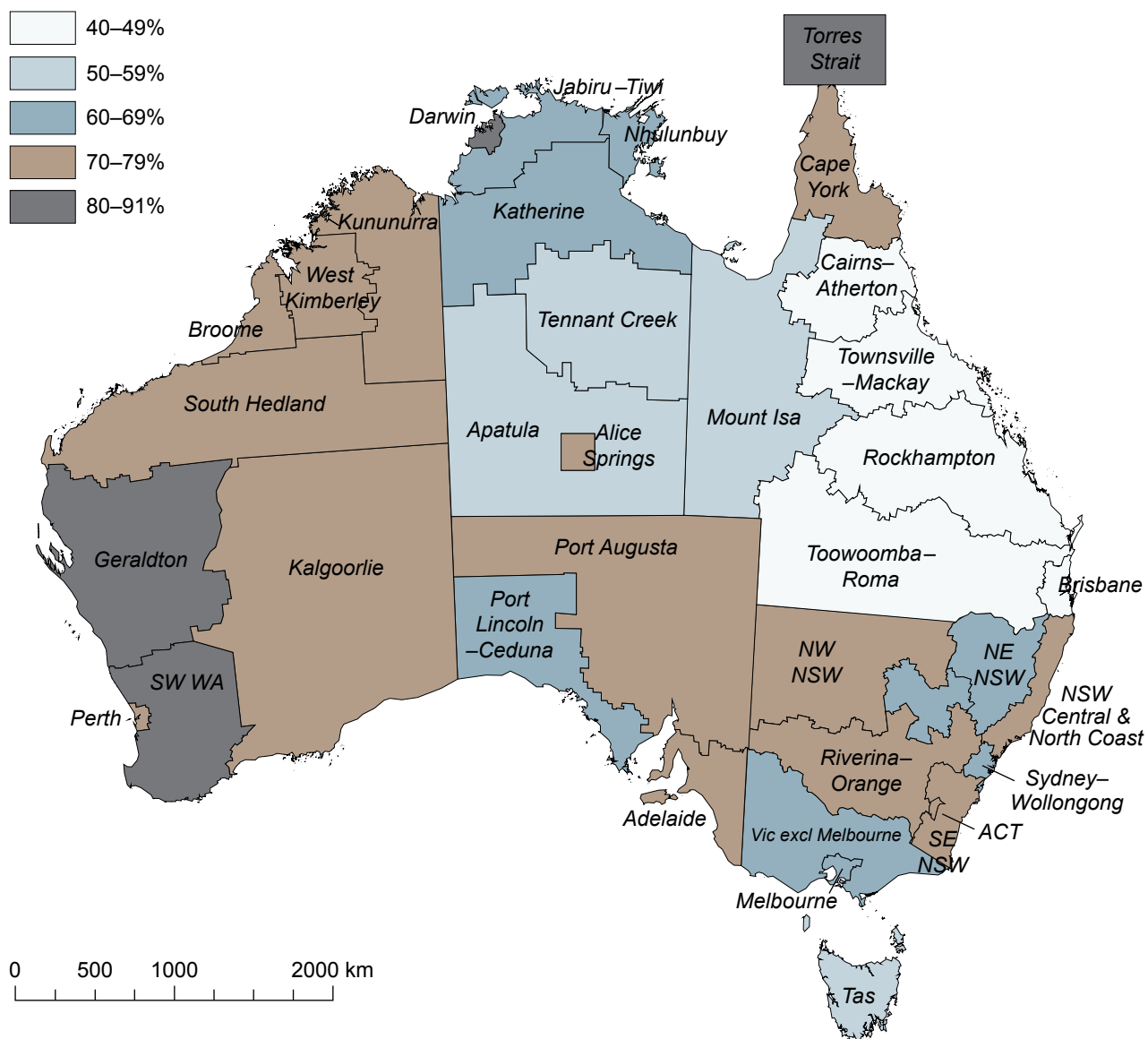
This analysis shows that the preschool participation rate among Aboriginal and Torres Strait Islander children aged 4–5 years increased in most regions between 2011 and 2016. The consistent regional pattern provides greater confidence that increases in Indigenous preschool

participation rates are not just an artefact of Indigenous identification change, because increases are occurring not only in major cities but also in regional and remote areas, where Indigenous identification change has been much slower and is less likely to be a contributing factor (e.g. Biddle & Crawford 2015).

Participation rates increased in every region except four (Appendix B) – these were:

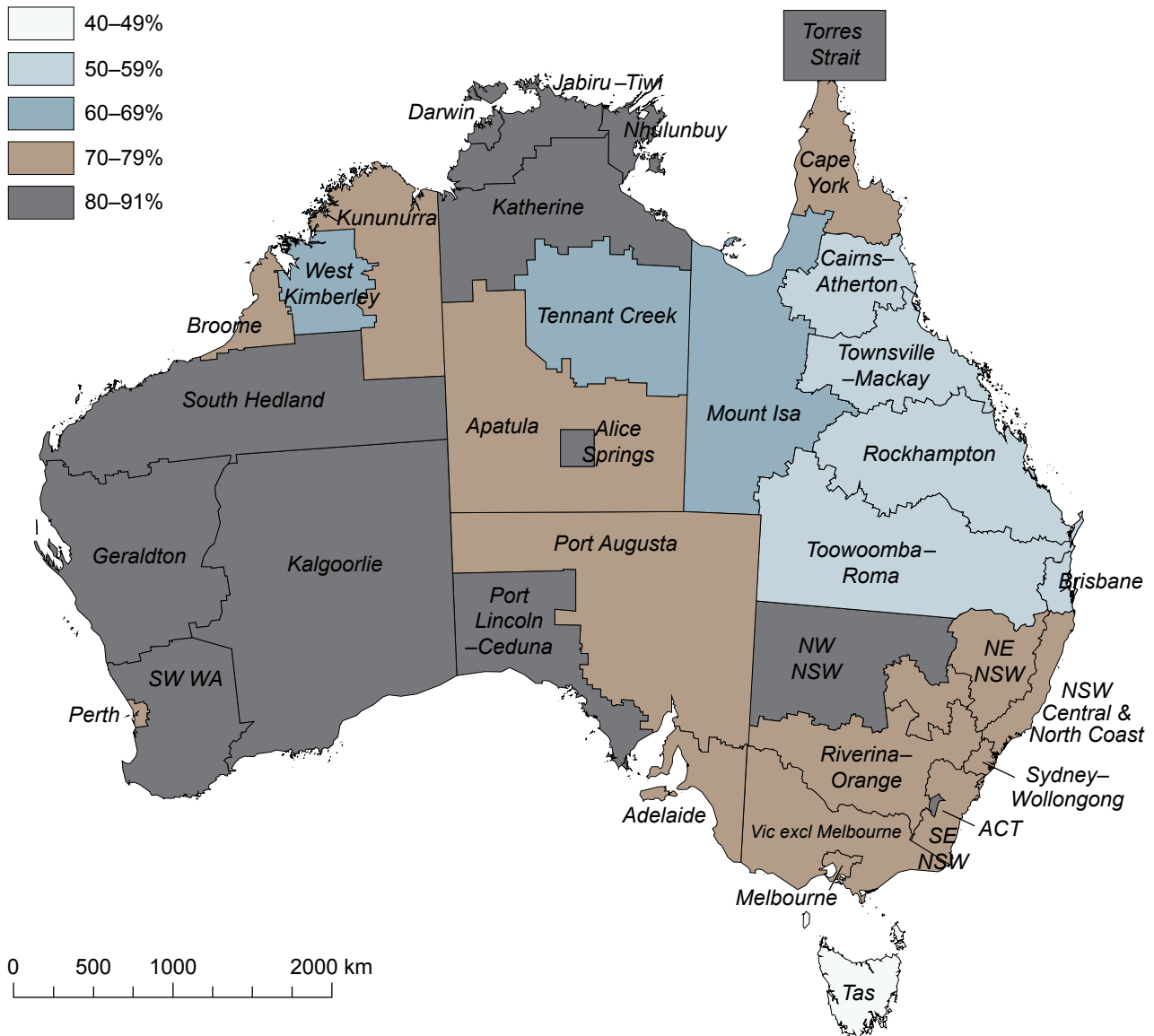
- Cape York – remained steady at a high level (70%)
- Broome – a small fall from a high level (from 78% in 2011 to 76% in 2016)
- West Kimberley – fell from 73% in 2011 to 68% in 2016, in the context of a substantial fall in the underlying number of Aboriginal and Torres Strait Islander children aged 4–5 years
- Tasmania – a small fall from 52% to 48%, remaining comparable with the non-Indigenous rate.

FIG. 6. Preschool participation rate by Indigenous region, Indigenous children aged 4–5 years, 2011 Census



Note: The Indigenous regions South-Eastern NSW and Jervis Bay were combined for this analysis.
 Source: Authors' calculations using the 2011 Census, ABS TableBuilder data

FIG. 7. Preschool participation rate by Indigenous region, Indigenous children aged 4–5 years, 2016 Census



Note: The Indigenous regions South-Eastern NSW and Jervis Bay were combined for this analysis.
 Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

Household and family context of Indigenous preschool participation

The previous sections presented census results showing that, nationally, the preschool participation rate among Indigenous children increased markedly over the past decade from 63% to 69%. There was variation between jurisdictions, with a dramatic increase in the Northern Territory from 48% to 81%. Among their non-Indigenous counterparts, the preschool participation rate fell from 75% to 72%. However, data from the NECECC show that non-Indigenous children are much more likely than their Indigenous counterparts to participate in preschool programs within long day care centres, as opposed to stand-alone preschools. Analysis of NECECC data also suggests that, while participation in preschool programs within long day care centres has increased among Indigenous and non-Indigenous children, it has increased more for non-Indigenous children over recent years. Parental employment influences decisions about children's participation in child care and preschool. Long day care centres offer longer hours of care for families where parents are working; in families where one or both parents are not working, there is less need for long hours of child care and often less capacity to pay for these services.

In this section, we consider how preschool participation varies according to family and household characteristics such as family composition, parental employment and household income.

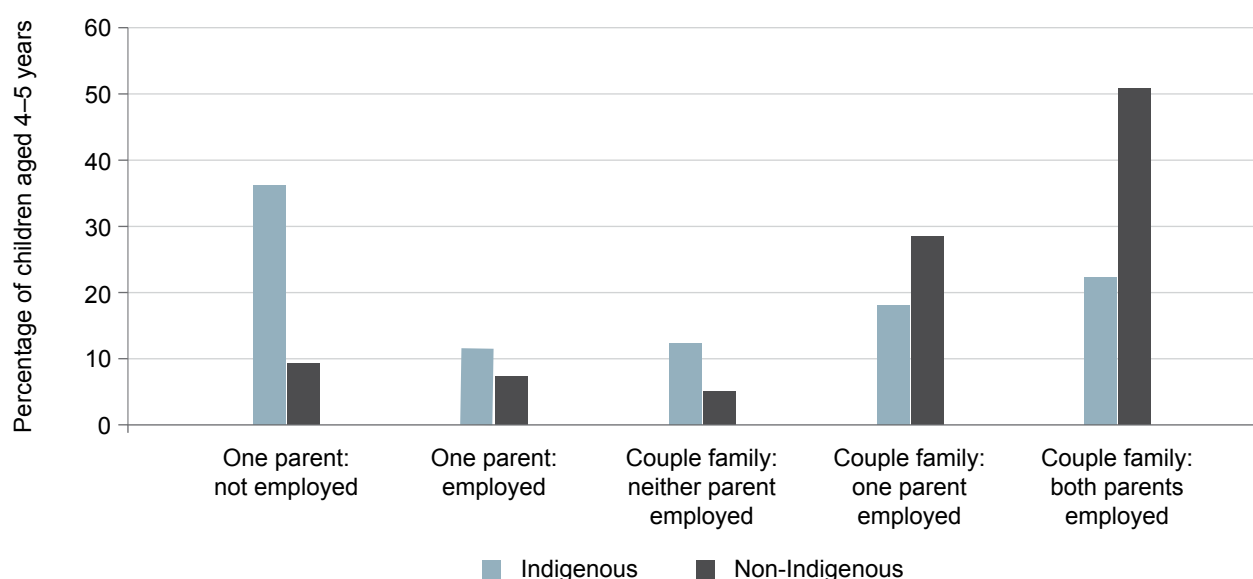
Parental employment and household income overview

To put children's preschool participation into context, it is essential to understand their family and household circumstances, particularly in relation to parental employment. A very broad analysis of results from the 2016 Census shows that these circumstances continue to be very different for Indigenous and non-Indigenous children.

Nearly half (48%) of all Indigenous children aged 4–5 years were living in households where no parent was employed, compared with 14% of non-Indigenous children (Fig. 8). In these families, there is less need to consider formal child care arrangements, and limited financial resources may result in poorer access to the full range of preschool services, not just because of fees but also because of other costs such as transport. There is also the potential for reverse causality, with low access to preschool and other child care options making it more difficult for family members to work, particularly those with the greatest caring responsibilities (who still tend to be female).

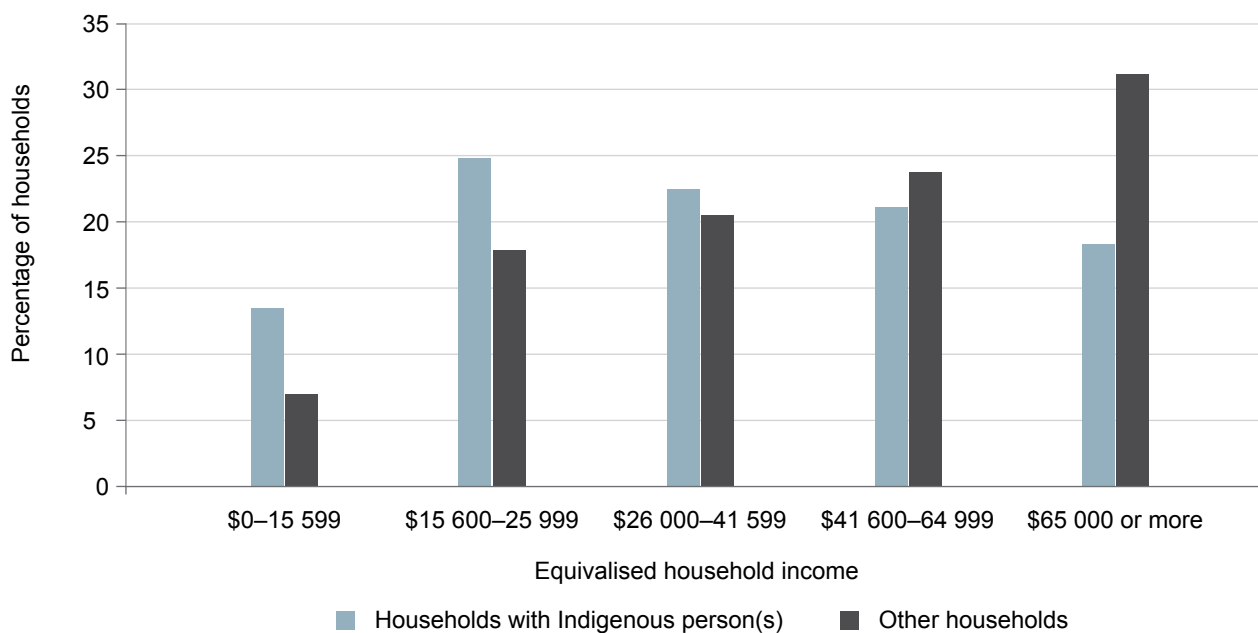
The different household income circumstances of Indigenous and other households are illustrated in Fig. 9. Among households with Indigenous residents, a much larger percentage (39%) had an 'equivalised household income'¹³ of less than \$26 000 per year than among other households (25%).

FIG. 8. Percentage of Indigenous children aged 4–5 years in different parental employment categories, 2016 Census



Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

FIG. 9. Percentage of households in equivalised total household income categories, 2016 Census



Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

Preschool participation rates by parental employment

We now look at the preschool participation rate by parental employment. Previous analysis, based on the 2011 Census, showed that rates of preschool participation were lowest among children living in families where no parent was employed. This was true for both the Indigenous and non-Indigenous populations. However, it was noted (as discussed above) that a much larger proportion of Indigenous children than non-Indigenous children lived in families with no employed parent (Biddle & Bath 2013).

In 2011, in all the family type and employment status categories presented, preschool participation rates were lower for Indigenous children than for non-Indigenous children. In contrast, in 2016, within each of these categories preschool participation rates for Indigenous children were similar to, or higher than, the participation rates for non-Indigenous children (Fig. 10). However, because preschool participation rates are lowest among children living in families with no parent employed, and a much higher proportion of Indigenous children than non-Indigenous children live in families with no parent employed, the lower preschool participation rate within this category has a greater influence on the preschool participation rate overall for Indigenous children.

This is a very important finding. The data from 2016 suggest that lower rates of preschool participation are explained more by the distribution of Indigenous children across family type than by the distribution of preschool

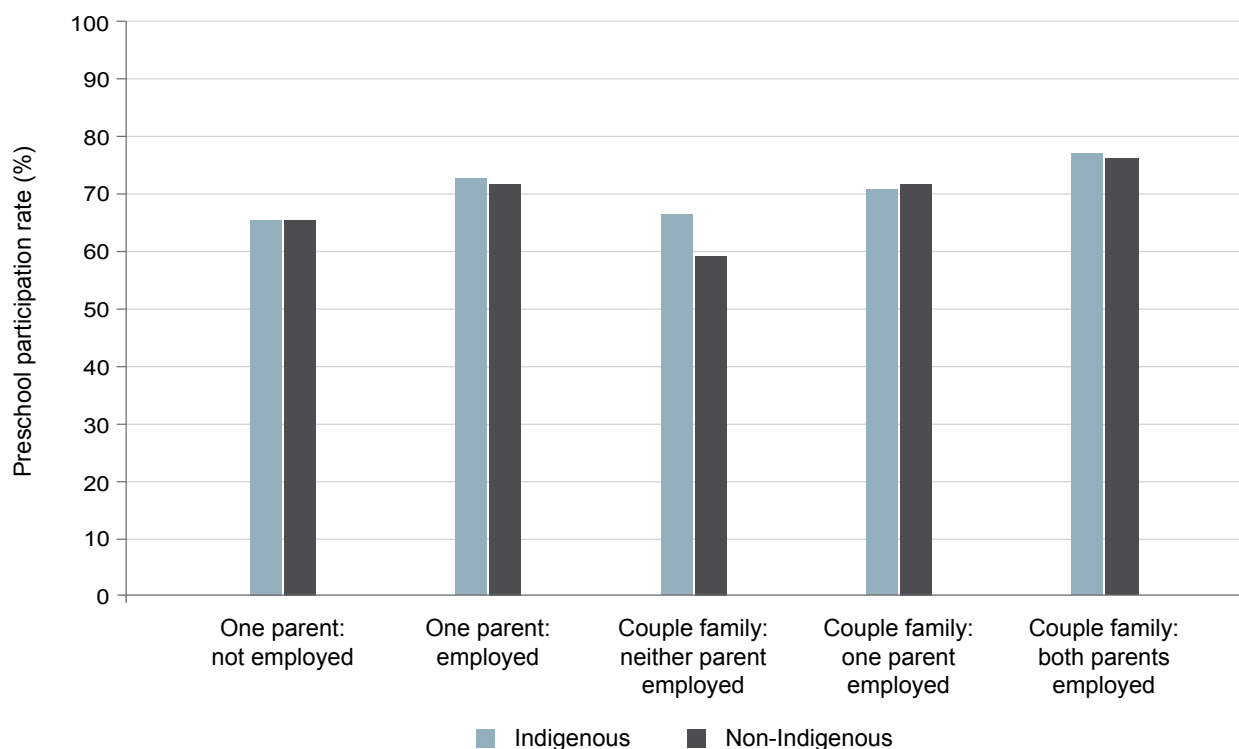
participation within family type. This is a marked change from 2011, and suggests a quite different policy focus.

Preschool participation rates by household income

The following analysis looks at preschool participation rate by equivalised total household income. In the second paper in this series, it was shown that Indigenous households tended to have lower incomes than non-Indigenous households, with some divergence at the regional level over the last few censuses for the Indigenous population.

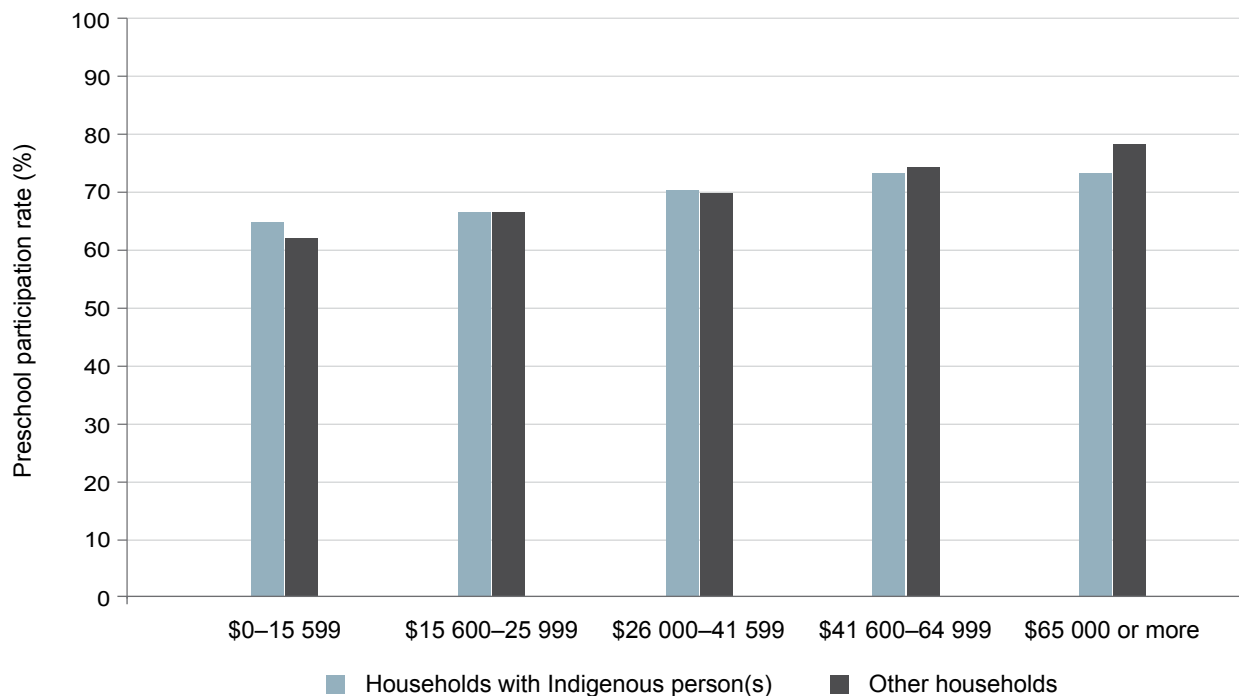
There are two main results from Fig. 11. First, participation in preschool increases as equivalised total household income increases, for both Indigenous and non-Indigenous Australians. At the lower part of the income distribution, a little over 60% of Indigenous and non-Indigenous children are participating in preschool. As previously discussed, this may be partly because low income is associated with a lack of employment, and therefore there is less need for the child care that preschool provides. However, it is also likely to be because of affordability issues. In the lowest income category, there is a higher participation rate among Indigenous children than among non-Indigenous children, possibly attesting to policy initiatives aimed at supporting these children to attend. However, children in lower-income households, whether Indigenous or non-Indigenous, are less likely to be attending preschool than children in higher-income households.

FIG. 10. Preschool participation rate by family type and employment status, 2016



Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

FIG. 11. Preschool participation rate by equivalised total household income, 2016



Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

At the upper part of the income distribution, 78% of eligible non-Indigenous children were participating in preschool, compared with 74% of their Indigenous counterparts. This highlights the second aspect of the graph – the gap between the two populations at the upper end of the distribution. While this represents a relatively small number and proportion of Indigenous households, from an Indigenous policy perspective it is important to understand why preschool participation rates among Indigenous families who are relatively well-off are lower than those of their non-Indigenous counterparts. Further research is required to understand the factors influencing preschool participation in this group.

Summary and concluding comments

What happens in early childhood matters. We know this from international early childhood education research that uses high-quality, randomised design. We also have an increasing amount of evidence for the Indigenous Australian population. The evidence does certainly indicate that quality matters, and that a low-quality preschool can do more harm than good. However, providing access to a high-quality early childhood education system is likely to have one of the highest returns on investment across social and economic policy.

It is not surprising, therefore, that access to, and participation in, early childhood education for the Indigenous population is one focus of the current Closing the Gap policy framework.

Census data show that the preschool participation rate among Indigenous children has increased substantially over the decade to 2016, both nationally and within jurisdictions – most markedly in the Northern Territory – and across most regions within jurisdictions. Importantly, there has been noticeable convergence between the Indigenous and non-Indigenous populations in preschool participation.

In this report, we drew on different sources of information about preschool participation, including the census, which has asked a consistent question over a long period of time. While it may be that the census question is becoming less relevant as more children attend preschool programs in diverse settings, our comparison of the data sources suggests that the census does capture much of this participation. This provides some confidence that census data are a useful measure of change over time in relation to Indigenous children, but may not be the best measure of the participation gap. However, the census

is currently the only longstanding source of preschool participation data.

No information in the census sheds light on the quality of preschool programs attended. The NECECC does distinguish between programs provided in a preschool and by a long day care service. As noted in the introduction, there is some evidence that preschool attendance is associated with more significant positive effects than long day care, particularly very long hours of long day care. Our analysis of the NECECC showed that Indigenous children are more likely to be attending a preschool than a long day care centre in all jurisdictions. However, there continues to be change in the early childhood education sector. The proportions of Indigenous and non-Indigenous children attending a preschool program in a long day care centre are increasing. At the same time, the continuing application of the quality standard introduced under the National Quality Standard in 2012 aims to support improvements and consistency across the early childhood education sector. Some dimensions of the National Quality Standard might have greater relevance to Indigenous children, such as children's identity and culture, and collaborative partnerships with families and communities (ACECQA 2017).

Our analysis of census data shows that children living in households where no parent is employed, and low-income households, are less likely to participate in preschool. This is an area where policy attention could be usefully focused, as research indicates that the benefits for children from relatively disadvantaged circumstances may be even greater than for other children. We did show, however, that, within many of the family type/employment classifications, Indigenous children had a higher rate of participation than their non-Indigenous counterparts. While we are not the first to say this (nor is it the first time we have made this point), the data strongly suggest that improving access to employment for Indigenous adults will have a strong impact on child development outcomes, including preschool participation.

As discussed by Arcos Holzinger and Biddle (2015), careful evaluation of Indigenous-specific and Indigenous-targeted preschool programs is required. Indigenous involvement in formal early childhood education and care services at all levels continues to be emphasised in the literature as important for engaging Indigenous families and children in preschool and supporting their continuing participation.

Appendix A Comparison of data from the 2016 Census and 2016 NECECC

The release of data from the 2016 Census provides an opportunity to juxtapose contemporaneous data from the census and the NECECC. In this appendix, data from the 2016 Census and the 2016 NECECC are analysed and compared. This provides some insights into broader participation in early childhood education among Aboriginal and Torres Strait Islander children. Our analysis also provides some information about the ongoing measurement challenges associated with each data source.

In each Australian Census of Population and Housing, some people are missed and others are counted more than once. The Census Post Enumeration Survey enables the undercount and overcount to be quantified (ABS 2017b). The census net undercount rate for the whole Australian population was 1.0% in 2016, and the highest net undercount rate for age groups was for 0–4-year-olds. The undercount rate for Aboriginal and Torres Strait Islander people is also relatively high, at 17.5%. Following each census, the Australian Bureau of Statistics (ABS) publishes estimated resident population statistics (ERPs) that adjust for census undercount and overcount.

To better understand how well preschool participation data from the 2016 Census and the 2016 NECECC compare, for the analysis presented in this appendix, 2016 Census data have been adjusted using the following method.

First, the appropriate ERPs were identified. In September 2017, the ABS released preliminary estimates of the Aboriginal and Torres Strait Islander resident population and the non-Indigenous population, disaggregated by gender by 5-year age group for each state and territory and Australia (ABS 2017c, Tables 10–11). The required ERPs are reproduced in Table A1.

Second, 2016 Census counts for Indigenous status by age and gender categories were obtained using ABS TableBuilder (Table A2).

Third, each ERP (Table A1) was divided by the census counts for the corresponding category (Table A2) to obtain adjustment factors for each 5-year age group by Indigenous status, gender and state/territory (Table A3).

Fourth, census counts of 4- and 5-year-old preschool attendees were extracted, and the adjustment factor for the relevant age group was applied (the adjustment factor for 0–4-year-olds was applied to 4-year-olds, and the adjustment factor for 5–9-year-olds was applied to 5-year-olds) (Table A4). The relevant components were then summed as required.

This analysis assumes that the adjustment factors apply uniformly across areas within each jurisdiction, and also apply equally to those attending and not attending preschool. These are both quite strong assumptions. There is likely to be regional variation in undercount. Also, those from disadvantaged backgrounds are both less likely to attend preschool and less likely to respond to the census. Applying our adjustment factors to those attending preschool might therefore lead to an over-inflation of census estimates. This might be at least part of the explanation for our adjusted census results for New South Wales and the Northern Territory being larger than the NECECC results. It is also important to note that these ERPs are preliminary – final ERPs will be released by the ABS in August 2018.

Next, we compare the numbers of children attending preschool from the two data sources, with Census 2016 data adjusted as described above. We then calculate preschool participation rates (using the formula provided in the discussion of state and territory trends) using these numbers as the numerators. Data for the denominators – the preschool-eligible population – are derived from census data (again, adjusted using the ERP adjustment factors).

The census question refers to whether a child is ‘currently attending’ preschool. In 2016, census night was 9 August. The NECECC has information about current attendance of enrolled children. In 2016, the attendance reference periods, although differing between jurisdictions, generally spanned late July to mid-August. The relevant time frames for the two collections therefore align reasonably well.

Using the NECECC, it is possible to distinguish between children attending a traditional preschool service and those attending one based in a long day care centre. Some children, of course, attend both types of services in any given week. In the following analysis, these children have been counted as ‘attending a preschool’, because this gives the best basis for comparisons with data from the census, which is framed in terms of participation at an educational institution.

TABLE A1. Preliminary estimated resident population statistics as at 30 June 2016 for Aboriginal and Torres Strait Islander 0–4- and 5–9-year-olds, non-Indigenous 0–4- and 5–9-year-olds, and all 0–4- and 5–9-year-olds, by gender and state/territory

Population	Gender, age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia ^a
Aboriginal and Torres Strait Islander	Males 0–4	16 630	3 578	13 731	2 575	5 885	1 584	3 709	486	48 186
	Females 0–4	15 347	3 536	13 250	2 369	5 606	1 544	3 529	416	45 605
	Males 5–9	16 033	3 450	13 921	2 541	5 751	1 772	3 883	437	47 797
	Females 5–9	15 376	3 334	13 442	2 481	5 668	1 699	3 712	357	46 080
Non-Indigenous	Males 0–4	240 727	203 158	148 820	50 303	82 730	13 887	6 019	14 132	759 923
	Females 0–4	228 266	191 534	141 689	47 828	78 650	13 108	6 119	13 072	720 389
	Males 5–9	239 534	195 568	155 578	50 605	81 399	15 039	5 412	13 078	756 362
	Females 5–9	227 295	184 710	147 639	48 360	77 383	14 070	5 220	12 048	716 848

a Includes 'Other territories'
Source: ABS (2017c)

TABLE A2. 2016 Census counts for Aboriginal and Torres Strait Islander 0–4- and 5–9-year-olds, non-Indigenous 0–4- and 5–9-year-olds, and all 0–4- and 5–9-year-olds, by gender and state/territory

Population	Gender, age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia ^a
Aboriginal and Torres Strait Islander	Males 0–4	13 004	2 752	11 153	1 983	4 342	1 233	2 908	383	37 769
	Females 0–4	11 957	2 725	10 706	1 809	4 063	1 201	2 691	347	35 497
	Males 5–9	12 965	2 735	11 691	2 021	4 406	1 419	3 111	372	38 726
	Females 5–9	12 391	2 669	11 186	1 948	4 250	1 366	2 902	311	37 026
Non-Indigenous population	Males 0–4	213 474	177 596	131 923	45 559	73 927	12 528	5 296	12 860	673 290
	Females 0–4	202 435	168 087	125 160	43 115	70 009	11 935	5 226	12 007	638 093
	Males 5–9	220 129	176 599	142 083	47 082	75 361	13 888	4 898	12 337	692 511
	Females 5–9	208 866	167 836	134 527	44 884	71 388	13 127	4 585	11 463	656 788

a Includes 'Other territories'
Source: Authors' calculations using the 2016 Census, ABS TableBuilder data

TABLE A3. Derived 2016 Census undercount adjustment factors for Aboriginal and Torres Strait Islander 0–4- and 5–9-year-olds, and non-Indigenous 0–4- and 5–9-year-olds, by gender and state/territory

Population	Gender, age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia ^a
Aboriginal and Torres Strait Islander	Males 0–4	1.28	1.30	1.23	1.30	1.36	1.28	1.28	1.27	1.28
	Females 0–4	1.28	1.30	1.24	1.31	1.38	1.29	1.31	1.20	1.28
Non-Indigenous	Males 5–9	1.24	1.26	1.19	1.26	1.31	1.25	1.25	1.17	1.23
	Females 5–9	1.24	1.25	1.20	1.27	1.33	1.24	1.28	1.15	1.24
Non-Indigenous	Males 0–4	1.13	1.14	1.13	1.10	1.12	1.11	1.14	1.10	1.13
	Females 0–4	1.13	1.14	1.13	1.11	1.12	1.10	1.17	1.09	1.13
Non-Indigenous	Males 5–9	1.09	1.11	1.09	1.07	1.08	1.08	1.10	1.06	1.09
	Females 5–9	1.09	1.10	1.10	1.08	1.08	1.07	1.14	1.05	1.09

^a Includes 'Other territories'

Source: Authors' calculations obtained by dividing the number in each cell in Table A1 by the number in the corresponding cell of Table A2.

TABLE A4. Unadjusted and undercount-adjusted 2016 Census data for Aboriginal and Torres Strait Islander 4- and 5-year-olds attending preschool, and non-Indigenous 4- and 5-year-olds attending preschool, by gender and state/territory

Population	Gender, age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia ^a
Aboriginal and Torres Strait Islander	Males 4 years	1 789	330	976	249	387	70	343	52	4 197
	Females 4 years	1 662	332	998	243	389	71	352	54	4 090
Non-Indigenous	4-year-olds ^b	3 445	663	1 977	488	776	139	692	101	8 283
	Males 5 years	771	205	470	94	348	41	176	19	2 126
2016 Census data)	Females 5 years	598	183	414	100	296	34	149	17	1 784
	5-year-olds ^b	1 370	388	879	192	638	78	323	40	3 917
Non-Indigenous	Males 4 years	30 370	22 787	15 231	5 809	7 227	734	817	1 648	84 646
	Females 4 years	28 915	21 874	14 384	5 630	6 808	703	811	1 571	80 710
2016 Census data)	4-year-olds ^b	59 283	44 664	29 616	11 439	14 031	1 440	1 634	3 213	165 358
	Males 5 years	13 516	14 055	5 507	2 332	4 731	479	222	896	41 750
Non-Indigenous	Females 5 years	10 341	11 665	4 664	2 031	4 327	411	181	705	34 330
	5-year-olds ^b	23 861	25 727	10 172	4 365	9 055	888	396	1 601	76 084

continued

TABLE A4. continued

Population	Gender, age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia ^a
Aboriginal and Torres Strait Islander (adjusted 2016 Census data)	Males 4 years	2 288	429	1 202	323	525	90	437	66	5 355
	Females 4 years	2 133	431	1 235	318	537	91	462	65	5 255
	4-year-olds ^b	4 421	860	2 437	642	1 061	181	899	131	10 609
	Males 5 years	953	259	560	118	454	51	220	22	2 624
	Females 5 years	742	229	497	127	395	42	191	20	2 220
	5-year-olds ^b	1 696	487	1 057	246	849	93	410	42	4 844
	Males 4–5 years	3 241	688	1 761	442	979	141	657	88	7 979
	Females 4–5 years	2 875	659	1 733	446	931	134	652	84	7 475
	4–5-year-olds ^b	6 117	1 347	3 494	887	1 910	275	1 309	173	15 453
	Males 4 years	34 247	26 067	17 182	6 414	8 088	814	929	1 811	95 537
Non-Indigenous (adjusted 2016 Census data)	Females 4 years	32 605	24 925	16 284	6 245	7 648	772	950	1 710	91 119
	4-year-olds ^b	66 852	50 992	33 465	12 659	15 736	1 586	1 878	3 521	186 657
	Males 5 years	14 707	15 565	6 030	2 506	5 110	519	245	950	45 599
	Females 5 years	11 253	12 838	5 119	2 188	4 690	441	206	741	37 469
	5-year-olds ^b	25 961	28 402	11 149	4 695	9 800	959	451	1 691	83 069
	Males 4–5 years	48 955	41 631	23 212	8 920	13 198	1 332	1 174	2 761	141 137
	Females 4–5 years	43 858	37 763	21 402	8 434	12 339	1 213	1 156	2 451	128 589
	4–5-year-olds ^b	92 813	79 395	44 614	17 354	25 536	2 545	2 329	5 212	269 726

a Includes 'Other territories'

b The sum of counts for males and females may not add to totals because of small, random adjustments made to census data as part of a confidentiality process (see www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1406.0.55.005-User%20Guide-Main%20Features-Confidentiality-100).

Source: Authors' calculations using the 2016 Census, ABS TableBuilder data (unadjusted 2016 Census data in top section of table); these were then multiplied by the relevant adjustment factor from Table A3, and components were summed to obtain information for 4–5-year-olds.

Table A5 provides a summary of the various estimates of the numbers of Indigenous and non-Indigenous children aged 4–5 years attending preschool from the 2016 Census (unadjusted and adjusted) and the NECECC.

Comparisons of the key estimates from Table A5 are illustrated in Figs A1 and A2.

There are several key findings from these results.

First, it appears that the census captures many, if not most, children attending preschool programs in long day care centres, but with some variation by jurisdiction and Indigenous status.

Second, the pattern of preschool participation varies between jurisdictions, reflecting the predominant service delivery model in each state or territory. Compared with the other states and territories, much larger proportions of preschool-eligible children are attending preschool programs in long day care centres in New South Wales, Victoria and Queensland ('nongovernment model').

This is true for both Indigenous and non-Indigenous 4–5-year-olds.

Third, irrespective of the predominant service delivery model, in every state and territory, Indigenous children aged 4–5 years participating in a preschool program are more likely to be doing so in a preschool service that is funded and delivered by the state than in a long day care centre only. In comparison, non-Indigenous children in both New South Wales and Queensland are more likely to be attending a preschool program in a long day care centre only than one funded and delivered by the state.

In general, when comparing the 2016 Census and the 2016 NECECC results, there are noticeable differences between jurisdictions. In most cases, the 2016 Census result lies somewhere between the 2016 NECECC results for the number of children attending at a preschool and the total number of children attending a preschool program in any setting.

TABLE A5. Summary of statistics from 2016 Census and 2016 NECECC relating to preschool attendance, Indigenous and non-Indigenous 4–5-year-olds

Population	Jurisdiction	Attending a preschool – unadjusted 2016 Census counts	Attending a preschool – adjusted 2016 Census estimates	Attending a preschool ^a – 2016 NECECC	Attending a preschool program in LDC only – 2016 NECECC	Total attending a preschool program – 2016 NECECC
Aboriginal and/or Torres Strait Islander aged 4–5 years	NSW	4 817	6 117	3 114	1 949	5 062
	Vic	1 047	1 347	840	602	1 442
	Qld	2 854	3 494	2 031	2 641	4 671
	SA	685	887	823	213	1 041
	WA	1 411	1 910	2 081	99	2 179
	Tas	217	275	519	81	601
	NT	1 018	1 309	1 276	55	1 328
	ACT	138	173	148	26	175
	Australia ^b	12 197	15 453	10 830	5 671	16 502
Non-Indigenous aged 4–5 years	NSW	83 144	92 813	32 516	64 792	97 306
	Vic	70 390	79 395	49 546	42 892	92 436
	Qld	39 793	44 614	18 390	46 912	65 303
	SA	15 808	17 354	14 523	6 966	21 489
	WA	23 087	25 536	30 461	2 338	32 802
	Tas	2 329	2 545	5 200	1 691	6 891
	NT	2 034	2 329	1 997	551	2 552
	ACT	4 813	5 212	4 311	2 110	6 419
	Australia ^b	241 437	269 726	156 944	168 253	325 199

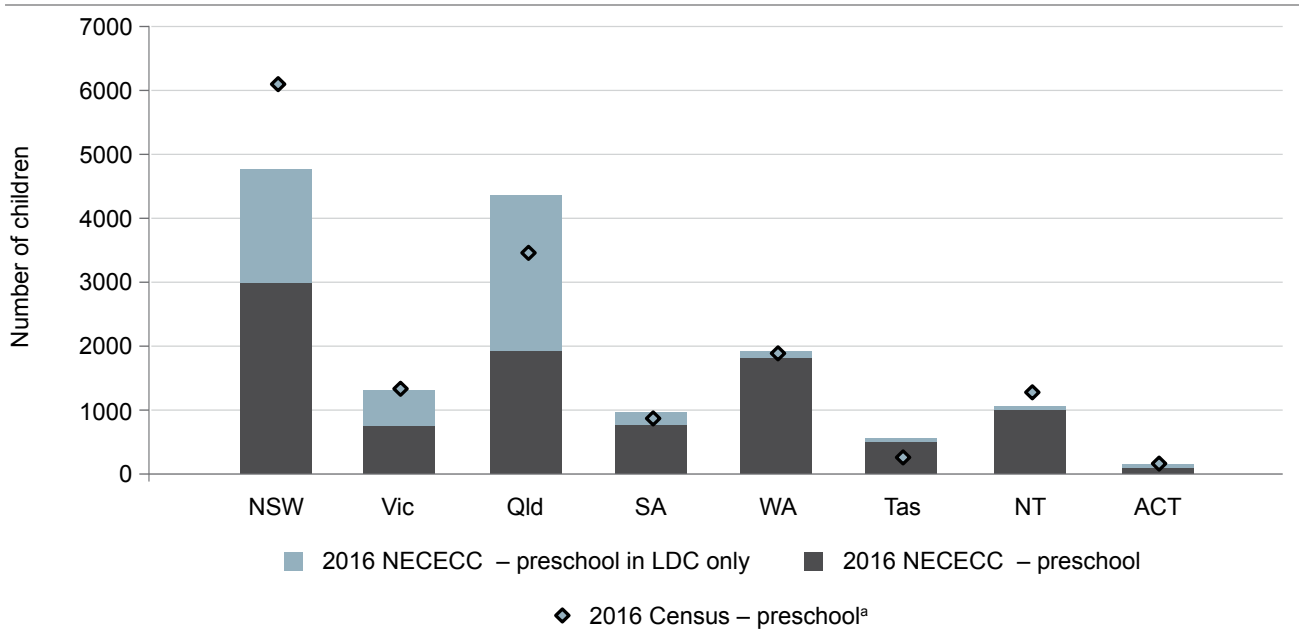
LDC = long day care; NECECC = National Early Childhood Education and Care Collection

^a Includes children attending both a preschool and a preschool program in LDC

^b Includes 'Other territories'

Sources: ABS (2017c); authors' calculations using the 2016 Census, ABS TableBuilder data; ABS (2017a), ABS TableBuilder data

FIG. A1. Number of Indigenous children aged 4–5 years attending a preschool program by state/territory, 2016 Census (adjusted) and 2016 NECECC

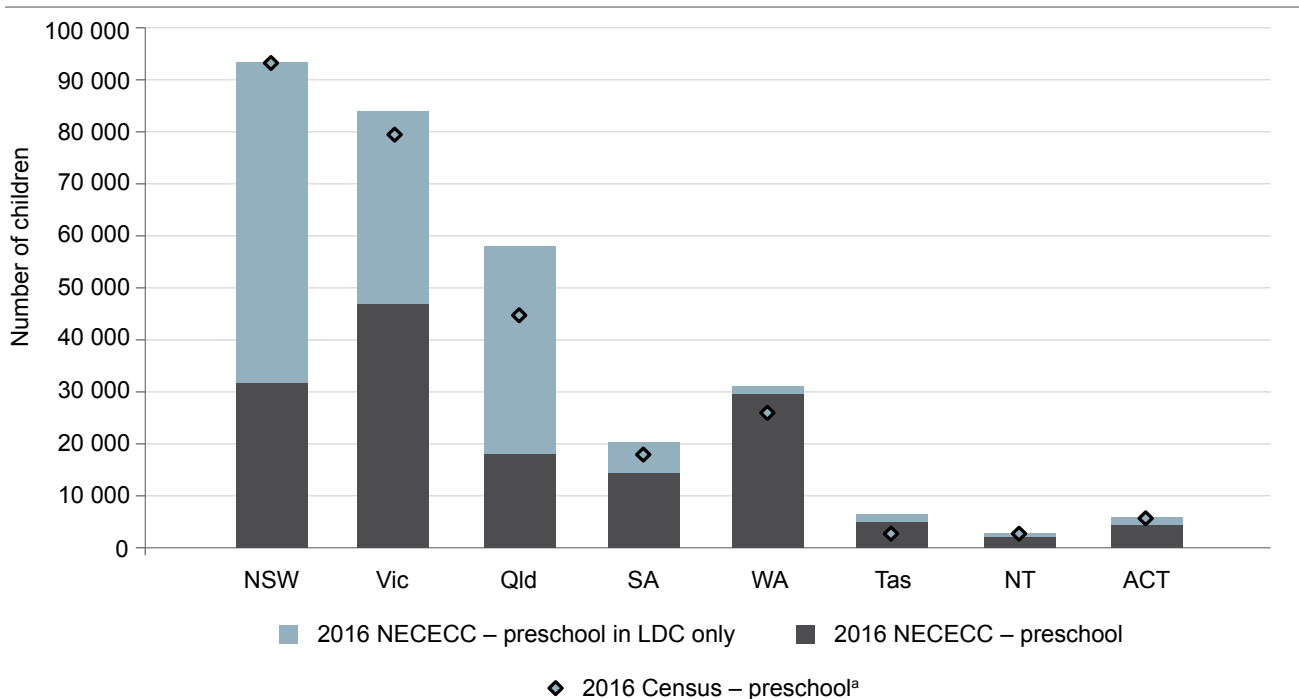


LDC = long day care; NECECC = National Early Childhood Education and Care Collection

^a Adjusted 2016 Census estimates

Sources: ABS (2017c); authors' calculations using 2016 Census, ABS TableBuilder data; ABS (2017a), ABS TableBuilder data

FIG. A2. Number of non-Indigenous children aged 4–5 years attending a preschool program by state/territory, 2016 Census (adjusted) and 2016 NECECC



LDC = long day care; NECECC = National Early Childhood Education and Care Collection

^a Adjusted 2016 Census estimates

Sources: ABS (2017c); authors' calculations using 2016 Census, ABS TableBuilder data; ABS (2017a), ABS TableBuilder data

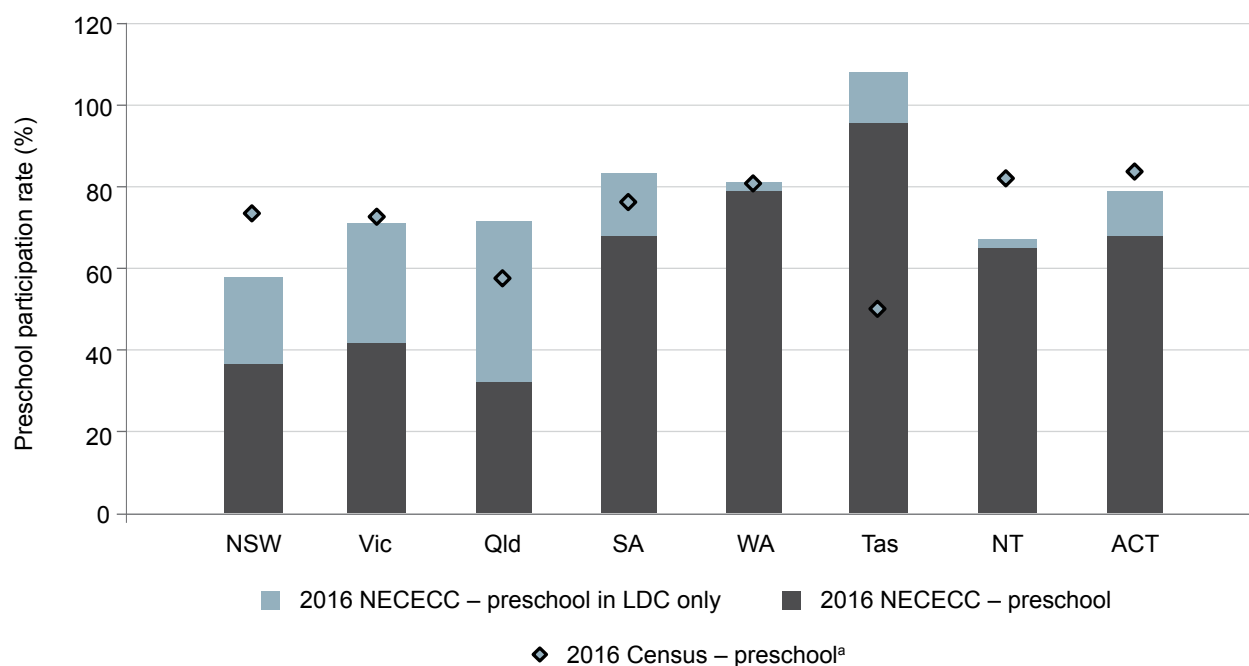
There are several possible explanations for the differences. Householders' answers to the census question may be affected by jurisdictional differences in preschool terminology ('preschool' or 'kindergarten'), the predominating service delivery model in their state or territory, and the extent of their knowledge about the type of program their child is attending (particularly in a long day care setting). The undercount adjustment factors are fairly blunt and do not account for differences in undercount among certain groups, such as likely greater undercount among those from disadvantaged backgrounds, who are also less likely to attend preschool.

Certain caveats apply to the administrative-based NECECC data too, with data users advised that NECECC data 'may not be directly comparable across all jurisdictions ... due to the differing levels of coverage, collection methodologies and alignment with the [Early Childhood Education and Care National Minimum Data Set]' (ABS 2017a). As noted in the introduction, ensuring that children attending multiple services are only counted once is also a challenge for the NECECC.

These results again illustrate discrepancies between 2016 Census and 2016 NECECC results, and highlight some potential concerns where rates greater than 100% are obtained. Once again, such results may be partly attributable to a mismatch of numerators and denominators. Another explanation is some double-counting of children in the NECECC – as noted in the discussion of data sources and measurement, one challenge associated with the administratively based data is ensuring that children attending multiple preschool programs are only counted once. The difference between the census and NECECC results is most evident in relation to Tasmania. This result merits further investigation to determine whether the explanation lies in the different preschool entry age for Tasmania, some aspect of measurement, or some other reason. Again, it is important to note that the Indigenous and non-Indigenous ERPs we used to adjust census data are preliminary; changes to these estimates would change the adjusted census numbers and the participation rates.

Preschool participation rates derived from the 2016 Census and the 2016 NECECC are illustrated in Figs A3 and A4.

FIG. A3. Preschool participation rates, Indigenous children aged 4–5 years, 2016 Census (adjusted) and 2016 NECECC

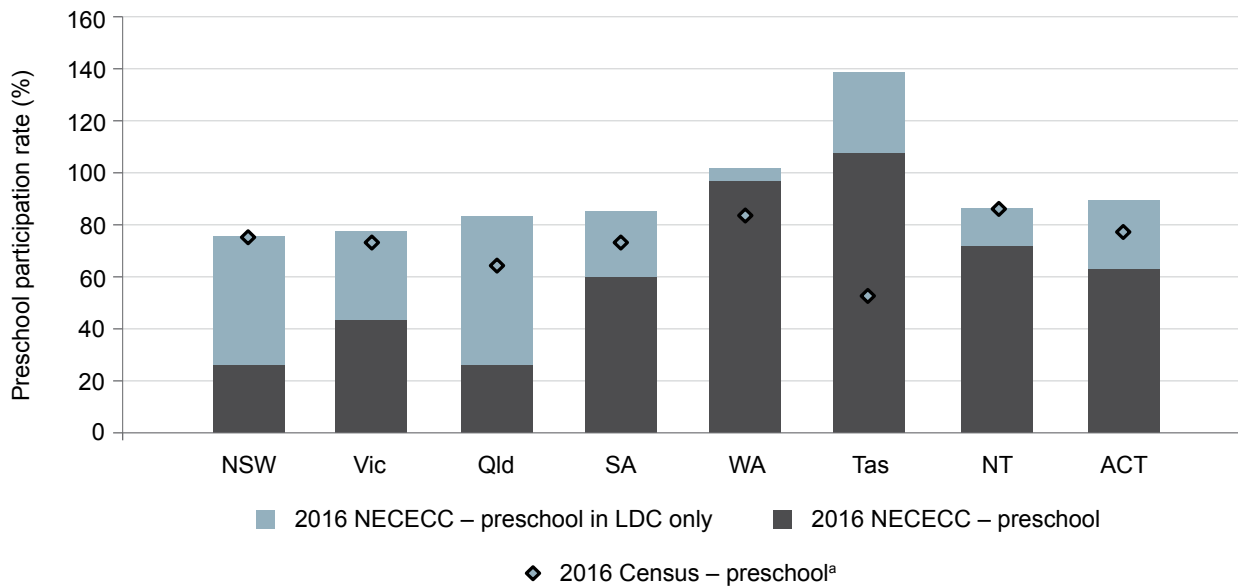


LDC = long day care; NECECC = National Early Childhood Education and Care Collection

^a Adjusted 2016 Census estimates

Sources: ABS (2017c); authors' calculations using 2016 Census, ABS TableBuilder data; ABS (2017a), ABS TableBuilder data

FIG. A4. Preschool participation rates, non-Indigenous children aged 4–5 years, 2016 Census (adjusted) and 2016 NECECC



LDC = long day care; NECECC = National Early Childhood Education and Care Collection

^a Adjusted using derived 2016 Census undercount adjustment factors.

Sources: ABS (2017c); authors' calculations using 2016 Census, ABS TableBuilder data; ABS (2017a), ABS TableBuilder data

In summary, the analysis presented in this section suggests that the census captures most preschool participation, including preschool programs in long day care centres, across most jurisdictions. The census appears to have limitations for comparing between jurisdictions, because of differences in terminology, starting ages, and the balance between state/territory-funded services and other services in each jurisdiction. It also has limitations for comparing change over time, because of changes in this balance over time in this dynamic sector. However, the NECECC also has limitations. As a relatively new data source, it does not have a long time series of data to draw on. Another limitation is the lack of comparability across jurisdictions due to differences in collection methodology and the degree of alignment with the Early Childhood Education and Care National Minimum Dataset.

Appendix B Preschool participation rates by region

TABLE A6. Preschool participation rates by Indigenous region, Aboriginal and Torres Strait Islander children aged 4–5 years, 2011 and 2016 censuses

Region	Preschool participation rate (%)		Population aged 4–5 years (n)		Aged 4–5 years attending preschool (n)		Aged 4–5 years not attending full-time schooling (n)	
	2011	2016	2011	2016	2011	2016	2011	2016
Dubbo	67	72	609	648	262	320	391	442
North-Eastern NSW	64	71	921	1060	360	475	562	670
North-Western NSW	74	83	385	328	155	178	209	214
SW Central & North Coast	70	74	2702	3325	1172	1610	1681	2179
Riverina-Orange	70	71	1075	1233	457	574	649	813
South-Eastern NSW	74	76	583	651	267	342	359	454
Sydney-Wollongong	68	72	2558	2909	1041	1318	1540	1833
Melbourne	64	71	759	908	321	451	499	631
Victoria excl. Melbourne	66	72	1067	1201	472	591	717	821
Brisbane	48	59	2715	3232	801	1101	1661	1882
Cairns-Atherton	44	51	1190	1171	327	314	735	619
Cape York	70	70	433	447	184	165	262	236
Mount Isa	52	60	373	379	113	142	218	237
Rockhampton	44	52	994	1143	292	328	661	627
Toowoomba-Roma	42	54	926	970	243	294	579	548
Torres Strait	80	80	332	355	126	139	158	173
Townsville-Mackay	45	51	1105	1302	309	368	682	728
Adelaide	74	73	1005	1148	375	502	507	683
Port Augusta	77	78	335	320	137	143	177	183
Port Lincoln – Ceduna	67	91	97	110	31	40	46	44
Broome	78	76	225	224	91	89	116	117
Geraldton	80	86	336	283	152	135	189	157
Kalgoorlie	72	83	283	257	120	104	166	126
Kununurra	71	74	280	211	109	57	153	77
Perth	75	79	1295	1261	599	530	800	674

continued

TABLE A6. *continued*

Region	Preschool participation rate (%)		Population aged 4–5 years (n)		Aged 4–5 years attending preschool (n)		Aged 4–5 years not attending full-time schooling (n)	
	2011	2016	2011	2016	2011	2016	2011	2016
South Hedland	73	83	282	387	111	170	152	206
South-Western WA	80	82	626	569	338	267	421	327
West Kimberley	73	68	250	207	90	62	124	91
Tasmania	52	48	956	1017	241	213	462	441
Alice Springs	79	85	220	175	83	82	105	96
Apatula	54	75	380	344	91	121	170	162
Darwin	82	88	528	508	226	240	276	273
Jabiru-Tiwi	62	80	566	439	184	176	296	221
Katherine	66	81	434	413	159	182	242	226
Nhulunbuy	66	84	458	354	156	180	237	215
Tennant Creek	59	68	165	154	47	45	80	66
Australian Capital Territory	78	80	228	272	105	138	134	172
Jervis Bay	0	100	12	12	0	4	0	4

Source: Authors' calculations using 2016 Census, ABS TableBuilder data

Notes

1. www.federalfinancialrelations.gov.au/content/npa/education/national-partnership/2016_2017_universal_access_NP.pdf
2. https://cehd.uchicago.edu/?page_id=126
3. National Agreements 'define the objectives, outcomes, outputs and performance indicators, and clarify the roles and responsibilities that guide the Commonwealth and the States in the delivery of services in key sectors' (www.federalfinancialrelations.gov.au/content/national_agreements.aspx).
4. www.federalfinancialrelations.gov.au/content/npa/health/_archive/indigenous-reform/national-agreement_sept_12.pdf
5. National Partnerships facilitate payments from the Commonwealth to the states and territories to 'support the delivery of specified projects, facilitate reforms or reward those jurisdictions that deliver on nationally significant reforms' (www.federalfinancialrelations.gov.au/content/national_agreements.aspx).
6. www.federalfinancialrelations.gov.au/content/npa/education/national-partnership/National-Quality-Early-Childhood-Education-2018-NP.pdf
7. The performance indicator specified to measure progress against this target is: 'Proportion of Indigenous children who are enrolled in (and attending, where possible to measure) a preschool program in the year before formal schooling' (expressed as a percentage) with a baseline year of 2011. See <http://meteor.aihw.gov.au/content/index.phtml/itemId/645344>.
8. www.federalfinancialrelations.gov.au/content/npa/education/other/past/early_childhood_education_NP_2009.pdf
9. See <https://www.education.gov.au/budget-based-funded-program-1>.
10. Information about whether a child is in the year before formal schooling is not available from the census or census-based population estimates. Information about date of birth (yielding age in years and months) is required to determine whether a child is in the year before formal schooling. While date of birth is collected as part of the census, the only age information included on census data files available to researchers is age in whole years. Therefore, the best proxy measure of the preschool-eligible population using census data is the number of children aged 4–5 years not attending full-time school.
11. The difficulties of measuring progress against the early childhood education target are apparent in the 2017 Prime Minister's Closing the Gap report, which reports proportions of children enrolled in early childhood education in the year before full-time school as being 'over 100 per cent but displayed as 100 per cent' in a number of jurisdictions (PM&C 2017:28–29). It is not clear from the report exactly how these preschool participation rates were calculated, but, again, it appears these results are due to a mismatch of numerators and denominators.
12. It is important to note that children in Tasmania may start preschool at an age up to 6 months older than those in other jurisdictions, while, in Queensland, there have been ongoing changes to the provision of early childhood education over this period – see <http://education.qld.gov.au/library/edhistory/state/chronology/2000.html>.
13. 'Equivalised total household income' is household income adjusted to enable the income levels of households of different sizes and compositions to be compared. It allows that larger households usually need more income to support a similar standard of living than smaller ones, but that in larger households there is also some sharing of costs (e.g. housing costs, heating). Equivalised total household income can be regarded as indicating the income available to each individual in a household (ABS 2016).

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