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**Australian Institute of
Health and Welfare**

Educational Outcomes for children in care

Linking 2013 child protection and NAPLAN data



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*Authoritative information and statistics
to promote better health and wellbeing*

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Australian Institute of Health and Welfare
Canberra

Cat. no. CWS 54

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ISBN 978-1-74249-819-5 (PDF)

ISBN 978-1-74249-820-1 (Print)

Suggested citation

Australian Institute of Health and Welfare 2015. Educational outcomes for children in care: linking 2013 child protection and NAPLAN data. Cat. no. CWS 54. Canberra: AIHW.

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Published by the Australian Institute of Health and Welfare

This publication is printed in accordance with ISO 14001 (Environmental Management Systems) and ISO 9001 (Quality Management Systems). The paper is sourced from sustainably managed certified forests.



Please note that there is the potential for minor revisions of data in this report. Please check the online version at <www.aihw.gov.au> for any amendments.

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Acknowledgments

The author of this report was Nicole Hunter. Rose Karmel carried out the data linkage process. Kristy Raithel, Sam Chambers, Justine Boland and members of the project working group provided valuable input and feedback.

The Australian Institute of Health and Welfare (AIHW) would like to gratefully acknowledge the state and territory departments/agencies that provided data for this report – this project would not have been possible without their ongoing support:

- New South Wales (NSW) Department of Family and Community Services
- NSW Board of Studies, Teaching and Educational Standards
- Victoria (Vic) Department of Health and Human Services
- Vic Curriculum and Assessment Authority
- Western Australia (WA) Department for Child Protection and Family Support
- WA Department of Education
- Tasmania (Tas) Department of Health and Human Services
- Tas Department of Education
- Australian Capital Territory (ACT) Community Services Directorate
- ACT Education and Training Directorate
- Northern Territory (NT) Department of Children and Families
- NT Department of Education.

The former Standing Council on Community and Disability Services Advisory Council (SCCDSAC) provided funding for this project.

Abbreviations

ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
CP NMDS	Child Protection National Minimum Data Set
CSD	Community Services Directorate
CWPHU	Child Welfare and Prisoner Health Unit
DLU	Data Linkage Unit
ETD	Education and Training Directorate
FMR	estimated false match rate
KBL	key-based linkage
LBOTE	language background other than English
NAPLAN	National Assessment Program—Literacy and Numeracy
National Framework	National Framework for Protecting Australia’s Children 2009–2020
National Standards	National Standards for Out-of-Home Care
NMS	national minimum standard
NSW	New South Wales
NT	Northern Territory
SLK	statistical linkage key
PID	project-specific person identifier
PMN	project-specific match number
Tas	Tasmania
Vic	Victoria
WA	Western Australia

Symbols

–	nil or rounded to zero
..	not applicable
n.a.	not available

Summary

This report covers the academic performance of children in care, by linking the data from the Child Protection National Minimum Data Set (CP NMDS) and the National Assessment Program – Literacy and Numeracy (NAPLAN). Privacy was protected during the linkage process through the use of de-identified data and data separation principles. The study population included children involved in 2013 NAPLAN testing for Years 3, 5, 7 or 9, who were in care at the time of testing (see Box 2.1). The report is based on data for around 3,500 children that 6 states and territories (NSW, Vic, WA, Tas, ACT and NT) provided.

Findings

The national minimum standard (NMS) achievement rate indicates the proportion of students achieving at or above the NMS. Students whose NAPLAN results were below the NMS have not achieved the learning outcomes expected for their year level, and are considered at risk of being unable to progress satisfactorily at school without targeted intervention. Key findings include:

- Among the study population, NMS achievement rates varied across the 5 assessment domains (reading, writing, spelling, grammar and punctuation, and numeracy). Rate ranges were 74–82% for Year 3 students, 67–83% for Year 5, 56–75% for Year 7, and 44–69% for Year 9.
- A higher proportion of the study population were at or above the NMS than below the NMS (except for Year 9 writing). Across the year levels and assessment domains, 13–36% achieved at the NMS, while 26–65% achieved above the NMS.
- The study population had lower NMS achievement rates than all students in Australia (13–39 percentage points lower across assessment domains and year levels).

In interpreting the findings presented here it is important to note that the academic achievement of children in care is likely to be affected by complex personal histories and multiple aspects of disadvantage (including poverty, maltreatment, family dysfunction and instability in care and schooling), and recognise that children often have low educational performance when entering child protection services. As well, at the time of testing, around one-third of the study population had been in their current care situation (that is order or living arrangement) for less than 1 year.

Next steps

The findings of this report provide further evidence that children in care are an academically disadvantaged group. This reinforces the importance of continuing to monitor the academic progress of these children, to facilitate regular reporting of key national indicators under the *National Framework for Protecting Australia's Children 2009–2020*, the *National Standards for Out-of-Home Care* and the *Report on Government Services*. Continued national reporting will require regular linkage of child protection and NAPLAN data, supported by ongoing collaboration between the AIHW and relevant state and territory departments/agencies. Further work will be required to enable the inclusion of data for all states and territories and all school sectors.

Online reporting of the National Framework and National Standards indicators on the AIHW website will complement this report; this is expected to be available in December 2015 <<http://www.aihw.gov.au/>>.

1 Introduction

In Australia, state and territory governments have a statutory responsibility for the welfare of around 59,000 children who are in care, including those on care and protection orders and/or in out-of-home care (AIHW 2015). To date, there has been very limited national information available on the educational outcomes of children in care.

Education is particularly important for children in care, as it is integral to their overall development and wellbeing, and provides an important gateway to future employment and life opportunities. However, numerous studies, both local and international, have found that children in care have poorer educational results than other children (AIHW 2013a). Lost educational opportunities can have a cumulative effect on children in care as they move through the various stages of education and development (AIHW 2013a).

Improving the educational outcomes of children in care has been a government priority action area in recent years. The following education-specific indicators in the *National Framework for Protecting Australia's Children 2009–2020* (FaHCSIA 2012) and the *National Standards for Out-of-Home Care* (FaHCSIA 2010) reinforce the importance of regular national reporting on this topic:

- Proportion of children on guardianship and custody orders achieving at or above the national minimum standards for literacy and numeracy (National Framework indicator 4.5).
- Proportion of children and young people in out-of-home care achieving national reading and numeracy benchmarks (National Standards measure 6.1).

An existing data source was not available for these indicators to allow national reporting. To close this data gap, a project was undertaken to create a linked data set from 2 administrative data sources:

- Child Protection National Minimum Data Set (CP NMDS)
- National Assessment Program—Literacy and Numeracy (NAPLAN).

This data linkage project received funding support from the former Standing Council on Community and Disability Services Advisory Council (SCCDSAC), and built on data development work that the AIHW had previously carried out in this area (AIHW 2011a, 2013a). The AIHW was commissioned to do this work in collaboration with the state and territory departments/agencies responsible for child protection and education.

This report provides an overview of the characteristics of the study population (Chapter 2), the NAPLAN results of the study population, including differences to a comparison group (Chapter 3), some exploratory analysis of characteristics associated with the study population's NAPLAN results (Chapter 4), and a discussion of the findings (Chapter 5). Detailed data tables are also provided (Appendix A), along with detailed information on the data linkage process (Appendix B) and statistical methods (Appendix C).

The terms 'children' and 'students' are used interchangeably throughout the report.

Online reporting of the National Framework and National Standards indicators (listed above) on the AIHW website will complement this report; this is expected to be available in December 2015 <<http://www.aihw.gov.au/>>.

2 Overview of study population

This chapter presents a brief overview of the study population (defined in Box 2.1), including their demographic and child protection-related characteristics. Detailed data are provided in Appendix A (tables A1–A6).

Box 2.1: Study population

The study population included all children who:

- participated in 2013 NAPLAN testing for Years 3, 5, 7 or 9 (including those recorded as exempt, absent or withdrawn)
- were ‘in care’ at the time of testing (14–16 May 2013). ‘In care’ is defined as children aged 0–17 whose care arrangements have been ordered through the Children’s Court, where parental responsibility for the child or young person has been transferred to the Minister/Chief Executive. This definition was selected to align with the agreed scope for the *National Standards for Out-of-Home Care* (FaHCSIA 2010)
- had data that were able to be linked across the CP NMDS and NAPLAN data sets (refer to Appendix B for the data linkage process).

Six jurisdictions provided data for this study: NSW, Vic, WA, Tas, ACT and NT.

Where possible, the study population includes NAPLAN data for government and non-government school students; however, the data that AIHW was able to access varied across jurisdictions (Table A1).

The study population had the following general characteristics (Table 2.1):

- Data were available for 3,583 children, across 6 states and territories.
- Over half were from NSW (53%), a further 35% were from Vic and WA, and the remaining 12% were from Tas, ACT and NT.
- There were similar proportions of children across Years 3, 5, 7 and 9 (23–27%).

Table 2.1: Children in the study population, 2013

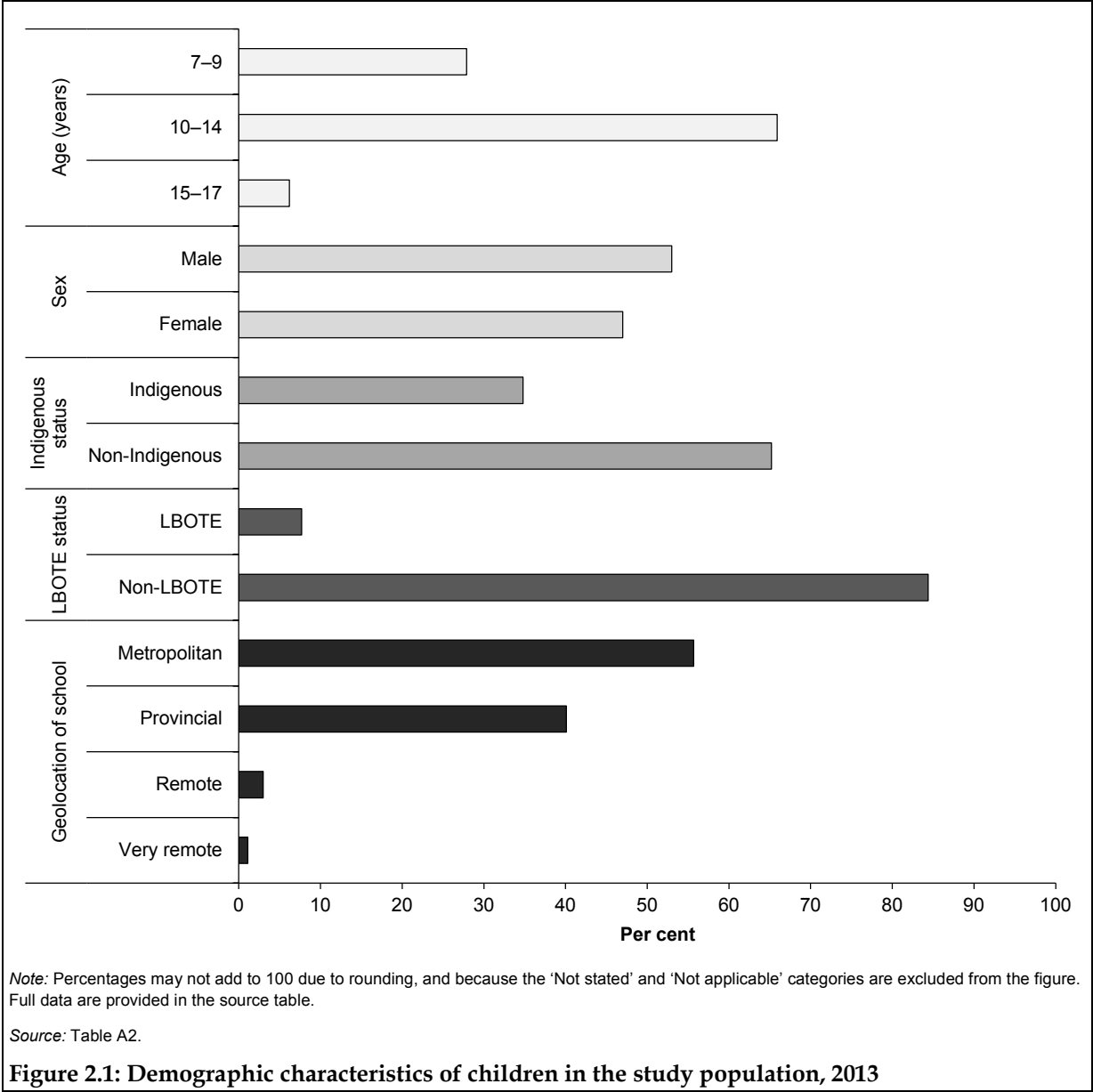
	Number					Per cent of study population				
	Year 3	Year 5	Year 7	Year 9	Total	Year 3	Year 5	Year 7	Year 9	Total
NSW	525	518	454	404	1,901	14.7	14.5	12.7	11.3	53.1
Vic	151	169	135	189	644	4.2	4.7	3.8	5.3	18.0
WA	155	173	149	128	605	4.3	4.8	4.2	3.6	16.9
Tas	61	50	58	49	218	1.7	1.4	1.6	1.4	6.1
ACT	28	18	17	13	76	0.8	0.5	0.5	0.4	2.1
NT	37	39	36	27	139	1.0	1.1	1.0	0.8	3.9
Total	957	967	849	810	3,583	26.7	27.0	23.7	22.6	100.0

Note: The scope of the study population is described in Box 2.1. The data linkage methodology is described in Appendix B.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

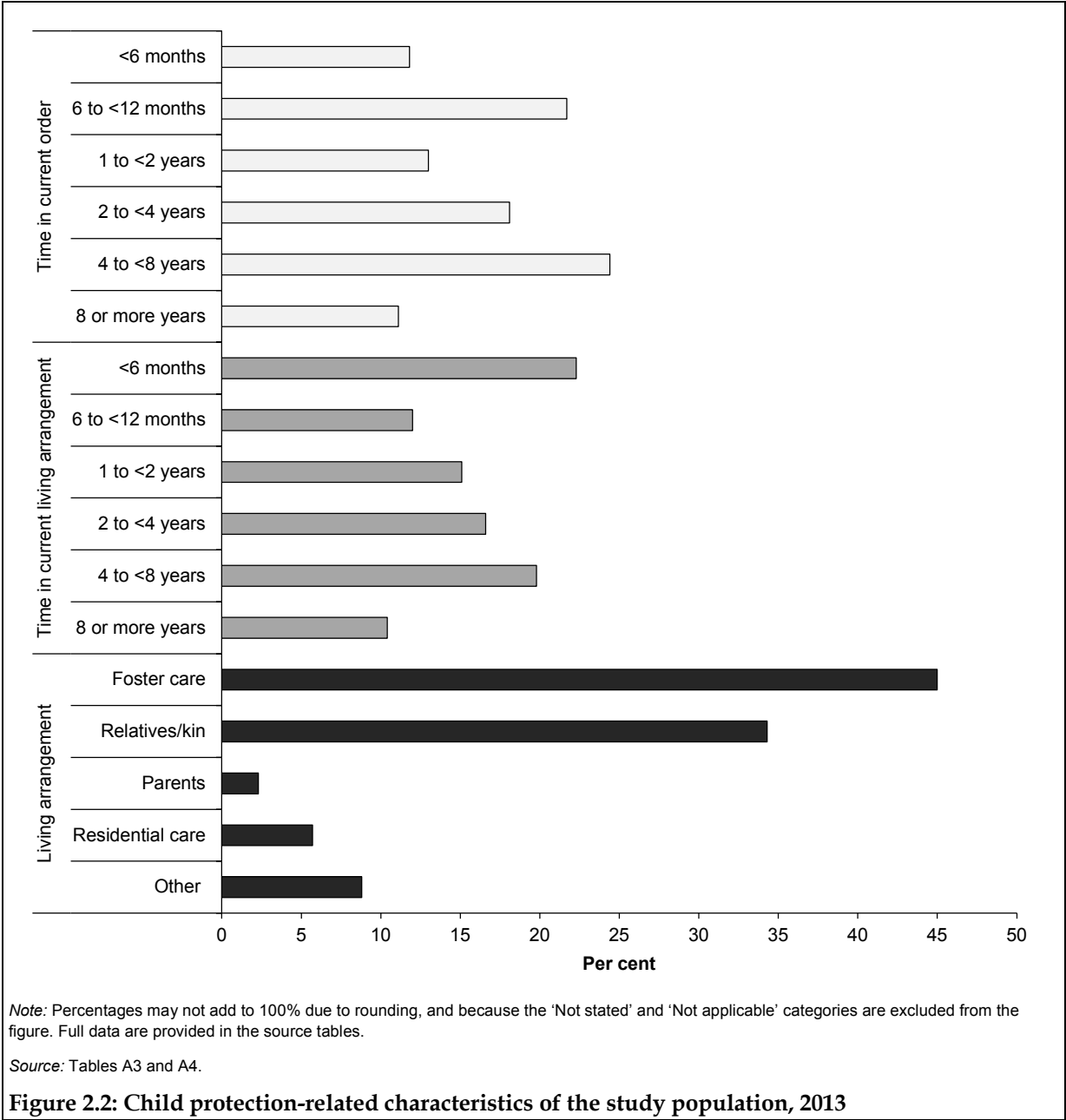
The study population had the following demographic characteristics (Figure 2.1):

- Ages ranged between 7 and 17, with most children (66%) aged 10–14.
- There were similar proportions of males and females (53% and 47%, respectively).
- Around 1 in 3 children (35%) were Aboriginal or Torres Strait Islander.
- Around 1 in 12 children (8%) had a language background other than English (LBOTE).
- Less than 1 in 20 children (4%) were attending schools in remote or very remote locations.



The study population had the following child protection-related characteristics:

- The length of time children had been on their current order varied considerably, ranging from less than 6 months (12%) to 8 or more years (11%) (Figure 2.2).
- For around half of the children (53%), their current order was the first time they had been admitted to a care and protection order; the remaining 47% had previously been on an order (Table A5).
- Most children were living with foster carers (45%), or relatives/kin other than their parents (34%) (Figure 2.2).
- The length of time children had been in their current living arrangement varied greatly, ranging from less than 6 months (22%) to 8 or more years (10%) (Figure 2.2).



3 NAPLAN results

This chapter presents an overview of the NAPLAN results of students in the study population, including their participation in assessment, achievement of the national minimum standards (NMS), and NAPLAN test scores. Detailed data tables are provided in Appendix A (tables A7–A23).

The NAPLAN tests are conducted annually in May for all students across Australia in Years 3, 5, 7 and 9. All students in the same year level are assessed on the same test items in the 5 assessment domains of reading, writing, spelling, grammar and punctuation, and numeracy. For each domain a NMS has been defined and can be located on the achievement scale for each year level. Refer to Appendix D for further details.

This chapter includes comparisons of the NAPLAN results for the study population with all students involved in NAPLAN testing in Australia. The ‘All students’ group includes the study population; while it would have been preferable to compare children in the study population only with those not in the study population, this was not possible given the data available. As a consequence, the reported analyses likely underestimate any differences between the study population and the comparison group.

Results have not been disaggregated by state/territory due to the small number of children in the study population for some jurisdictions (see Table 2.1). National-level findings may not apply at the state/territory level.

3.1 Participation in assessment

Students in both government and non-government schools undertake NAPLAN assessment. In general, students in special schools and learning support units are not required to take part in the assessment. The categories of participation are described in Box 3.1.

Box 3.1: Participation in NAPLAN assessment

The following 4 categories are used to describe students’ participation in each assessment domain:

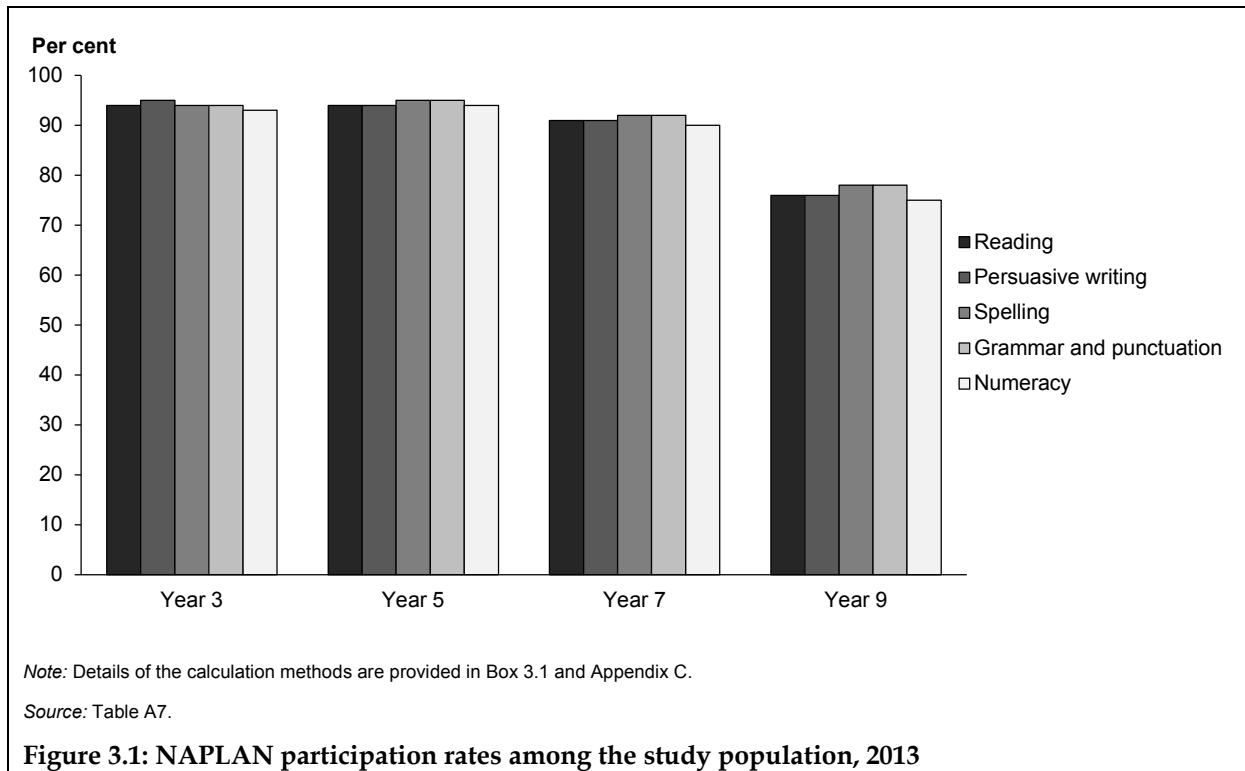
- **Present:** Students who sat the test.
- **Exempt:** Students may be granted a formal exemption where testing may not be appropriate – for example, LBOTE students who arrived from overseas less than a year before the tests, and students with significant disabilities may be exempted from testing.
- **Absent:** Absent students are students who did not sit the tests because they were not present at school when the test was administered, or were unable to sit the test as a result of an accident or mishap.
- **Withdrawn:** Students may be withdrawn from the testing program by their parent/carer. Withdrawals are intended to address issues such as religious beliefs and philosophical objections to testing.

The ‘**participation rate**’ is the assessed students (present + exempt) as a percentage of total students (present + exempt + absent + withdrawn).

Source: ACARA 2013.

Among the study population:

- Within each year level, participation rates were similar across the 5 assessment domains – participation rates were 93–95% for Year 3 students, 94–95% for Year 5, 90–92% for Year 7, and 75–78% for Year 9 (Figure 3.1).
- Participation rates were somewhat lower than rates among all students in Australia, notably among the older year levels – participation rates among all students were 95% for Year 3, 95–96% for Year 5, 95–96% for Year 7, 91–93% for Year 9 (Table A7).
- The proportion of exemptions ranged from 9–13% across year levels and assessment domains (Table A7) – much higher than that among all students in Australia (2% exempt).
- The proportion of absences ranged from 2–22% across year levels and assessment domains (Table A7) – considerably higher than that among all students in Australia (2–7% absent). Among the study population, absences generally rose with increasing year level (from 2–3% in Years 3 and 5 to 20–22% in Year 9).
- The proportion of withdrawals ranged from 1–4% across year levels and assessment domains (Table A7) – similar to that among all students in Australia (1–2% withdrawn).



3.2 Achievement of national minimum standards

For each of the 5 assessment domains under NAPLAN, a NMS is defined and located on the achievement scale for each year level (Figure D1).

The NMS is 'the agreed minimum acceptable standard of knowledge and skills without which a student will have difficulty making sufficient progress at school' (ACARA 2013:v). Students who are below the NMS have not achieved the learning outcomes expected for their year level – they are considered at risk of being unable to progress satisfactorily at school without targeted intervention (ACARA 2015a).

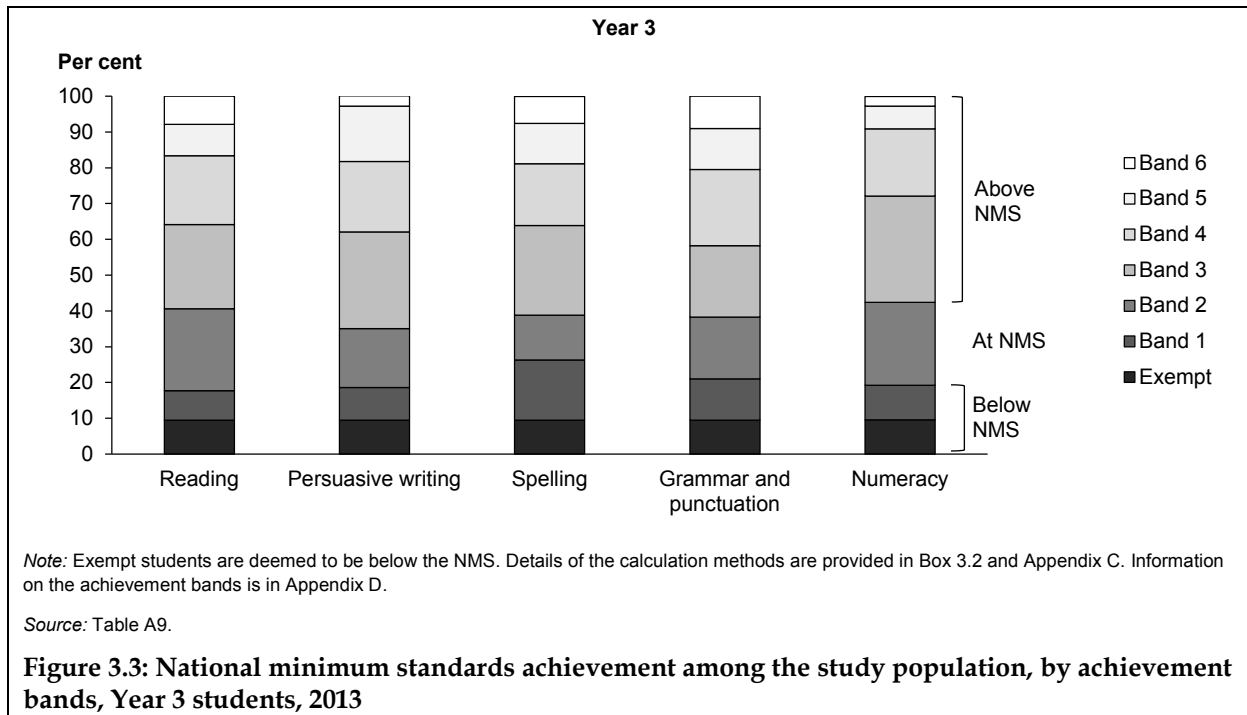
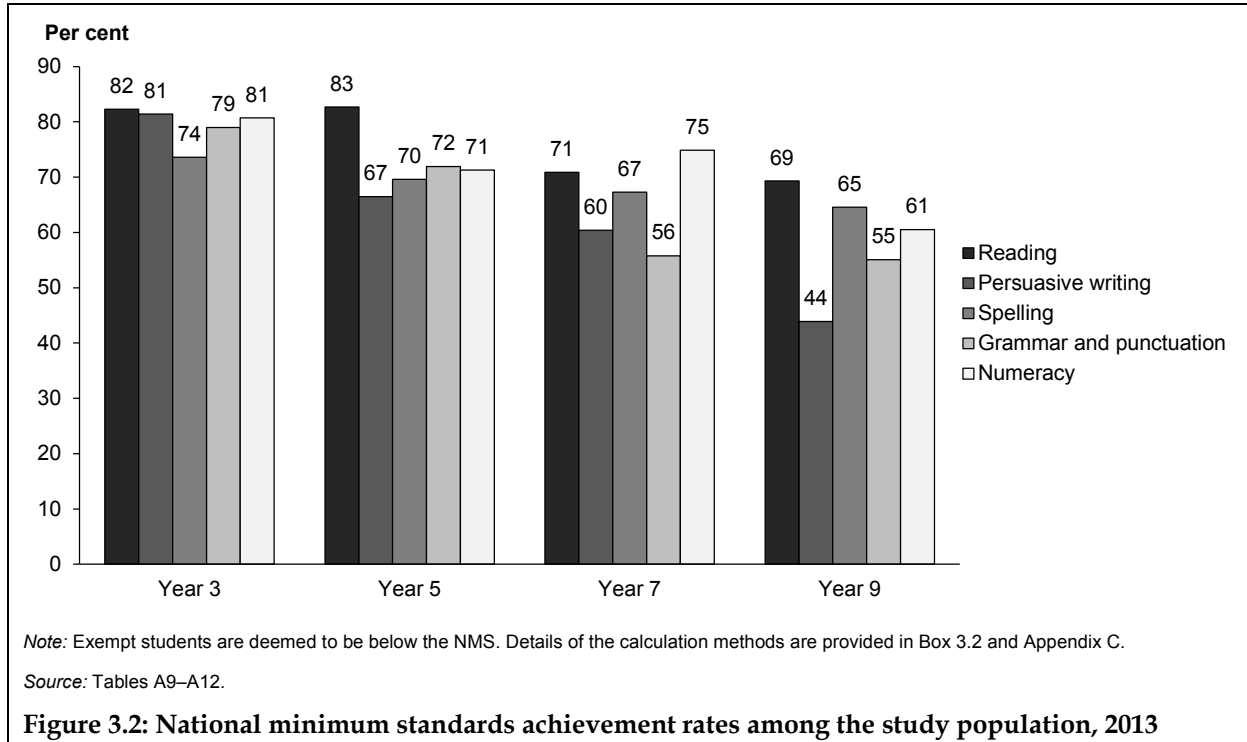
Box 3.2: Achievement of national minimum standards (NMS)

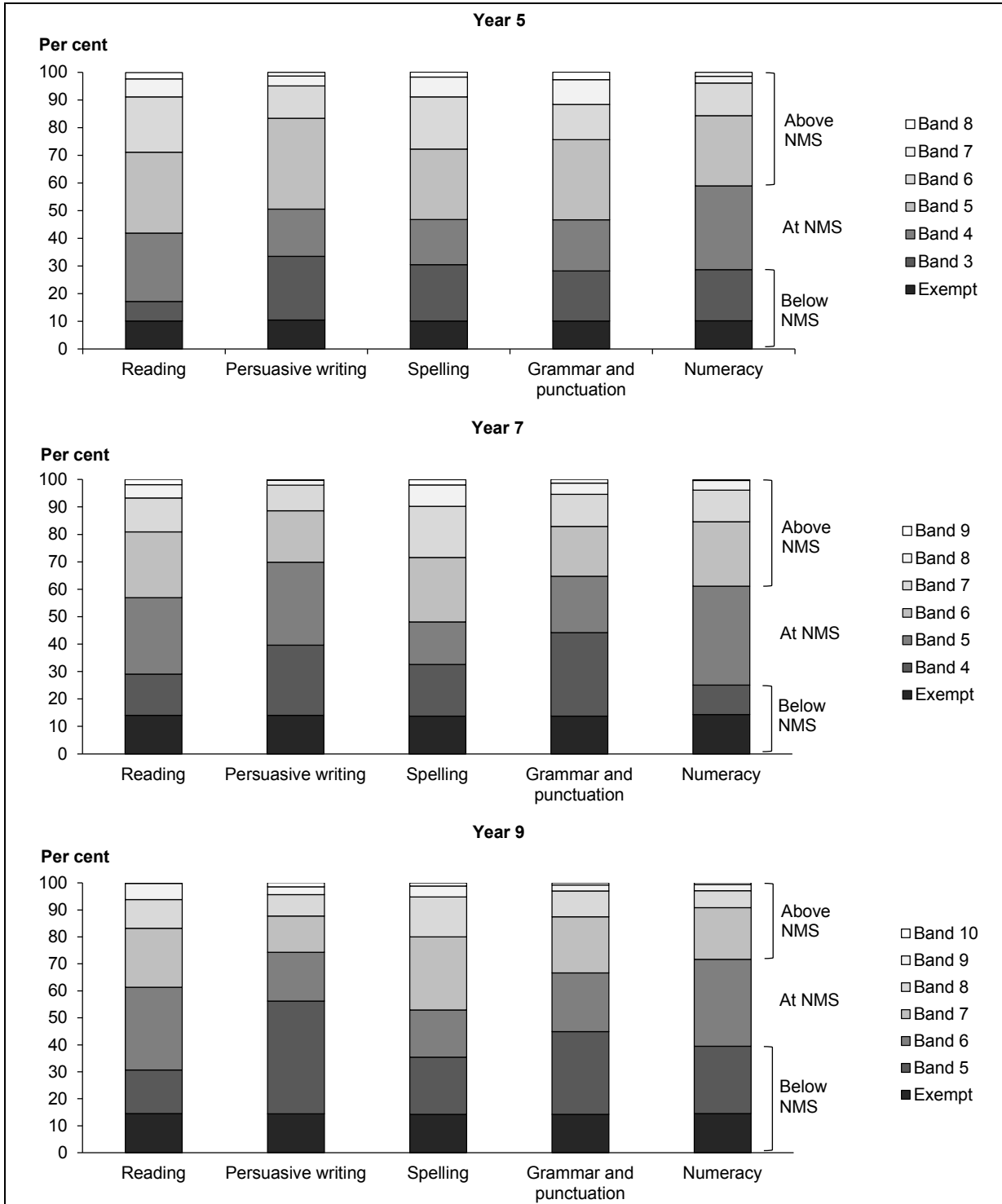
- For the study population, the 'NMS achievement rate' is the assessed students achieving the NMS ('present' students whose score was at or above the NMS) as a proportion of all assessed students (all present + exempt). Exempt students are deemed to be below the NMS. Absent and withdrawn students are excluded from the rate.
- For the 'All students' comparison group, the NMS achievement rates are sourced from published data (ACARA 2013), and include results for absent and withdrawn students that have been statistically imputed. Exempt students are deemed to be below the NMS.

Further information on the methodology is provided in Appendix C. Box 3.1 provides descriptions of the student participation categories.

Among the study population:

- Within each year level, the NMS achievement rates varied across the 5 assessment domains – rates were 74–82% for Year 3 students, 67–83% for Year 5, 56–75% for Year 7, and 44–69% for Year 9 (Figure 3.2).
- NMS achievement rates generally fell with increasing year level – for most assessment domains, rates generally declined from Year 3 to Year 9 (Figure 3.2).
- When looking at the specific bands of achievement across the year levels and assessment domains, 13–36% achieved at the NMS, while 26–65% achieved above the NMS (Figures 3.3 and 3.4). Except for the Year 9 writing test, a higher proportion of students were at or above the NMS than below the NMS. Further information on the achievement bands is provided in Appendix D.





Note: Exempt students are deemed to be below the NMS. Details of the calculation methods are provided in Box 3.2 and Appendix C. Information on the achievement bands is in Appendix D.

Source: Tables A10–A12.

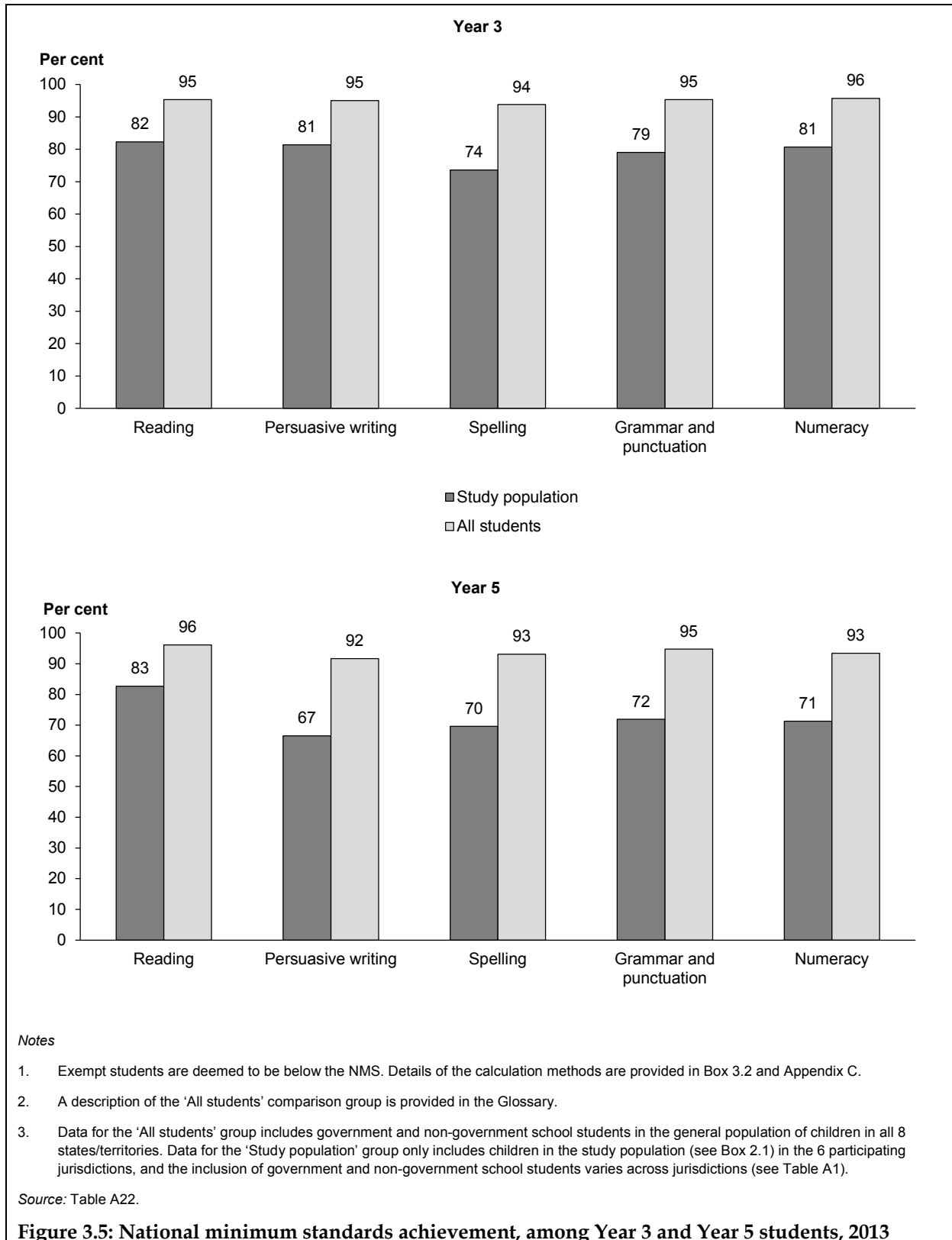
Figure 3.4: National minimum standards achievement among the study population, by achievement bands, Year 5, 7 and 9 students, 2013

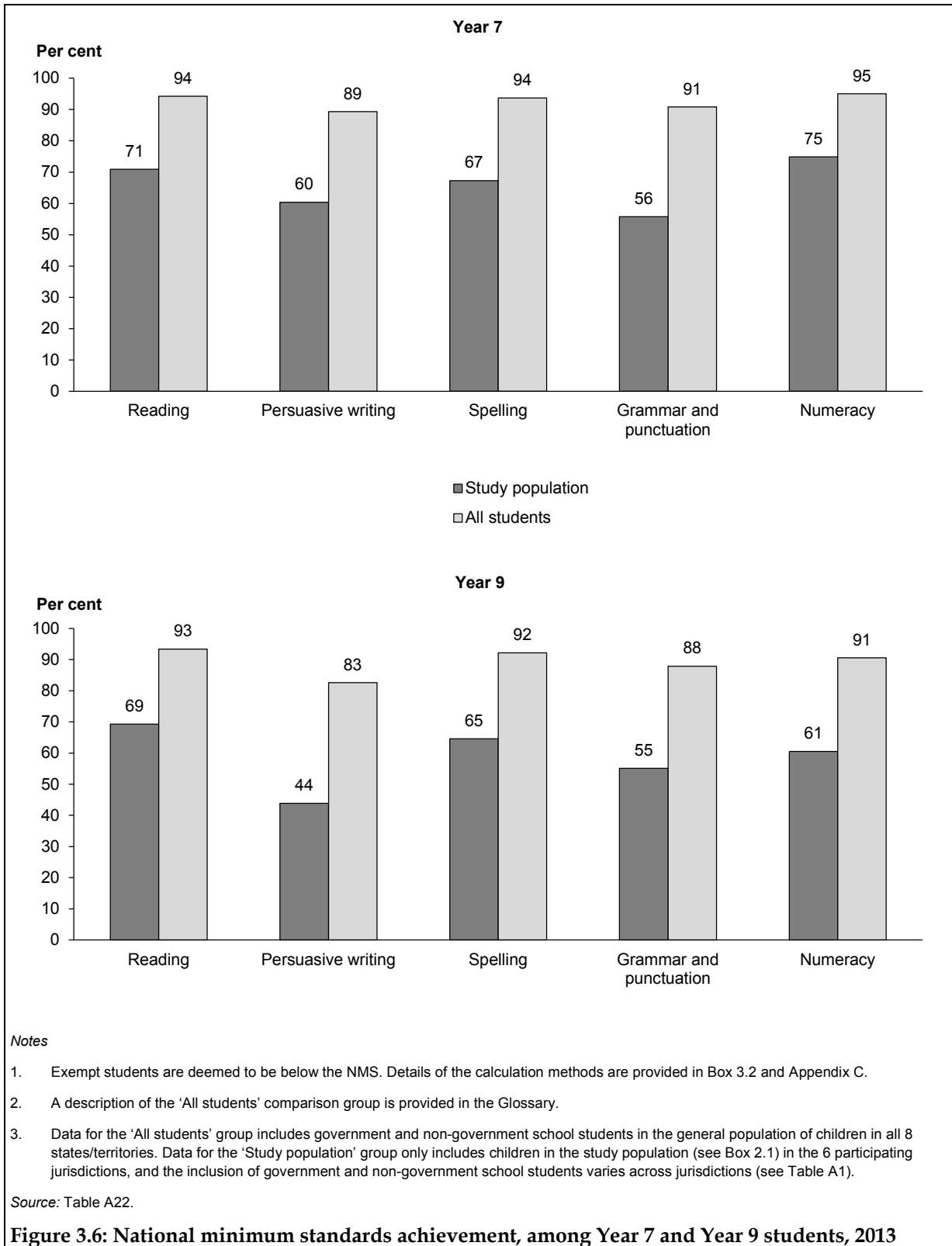
An exploration of reading and numeracy NMS achievement rates among the study population, by various demographic and child protection characteristics showed:

- Rates were generally lower among male students (except for Year 7 numeracy) – across assessment domains and year levels, rates for males ranged from <1 percentage points higher (Year 7 numeracy) to 12 percentage points lower (Year 9 reading) than rates for female students (Table A13).
- Rates were generally lower among Indigenous students (except for Year 3 reading and Year 7 numeracy) – across assessment domains and year levels, rates for Indigenous students ranged from 2 percentage points higher (Year 3 reading) to 13 percentage points lower (Year 5 numeracy) than rates for non-Indigenous students (Table A14).
- Rates were generally higher among LBOTE students (except for Year 5 numeracy) – across assessment domains and year levels, rates for LBOTE students ranged from 11 percentage points higher (Year 9 reading) to 11 percentage points lower (Year 5 numeracy) than rates for non-LBOTE students (Table A15).
- Rates were consistently lower among students attending schools in remote/very remote locations – across assessment domains and year levels, rates for remote/very remote students were 4–39 percentage points lower than rates for metropolitan students and 3–36 percentage points lower than rates for provincial students (Table A16).
- Rates were generally highest among students living with relatives/kin (except for Year 3 reading) – across assessment domains and year levels, rates for students living with relatives/kin ranged from <1 percentage points lower (Year 3 reading) to 8 percentage points higher (Year 7 numeracy) than rates for students in foster care, 17–34 percentage points higher than rates for students in residential care, and 7–19 percentage points higher than rates for students in other living arrangements (Table A17).
- There were no clear patterns for the length of time students had been on orders (tables A18 and A19) or the length of time in their living arrangements (tables A20 and A21).

In exploring differences between the study population and comparison group:

- The study population had consistently and considerably lower NMS achievement rates than all students in Australia (figures 3.5–3.6) – study population rates were 13–39 percentage points lower across assessment domains and year levels (Table A22).
- The gap between the NMS achievement rates of the study population and all students in Australia generally rose with increasing year level (figures 3.5–3.6) – across assessment domains, rates were lower among the study population by 13–20 percentage points for Year 3 students, 13–25 percentage points for Year 5 students, 20–35 percentage points for Year 7 students, and 24–39 percentage points for Year 9 students (Table A22).



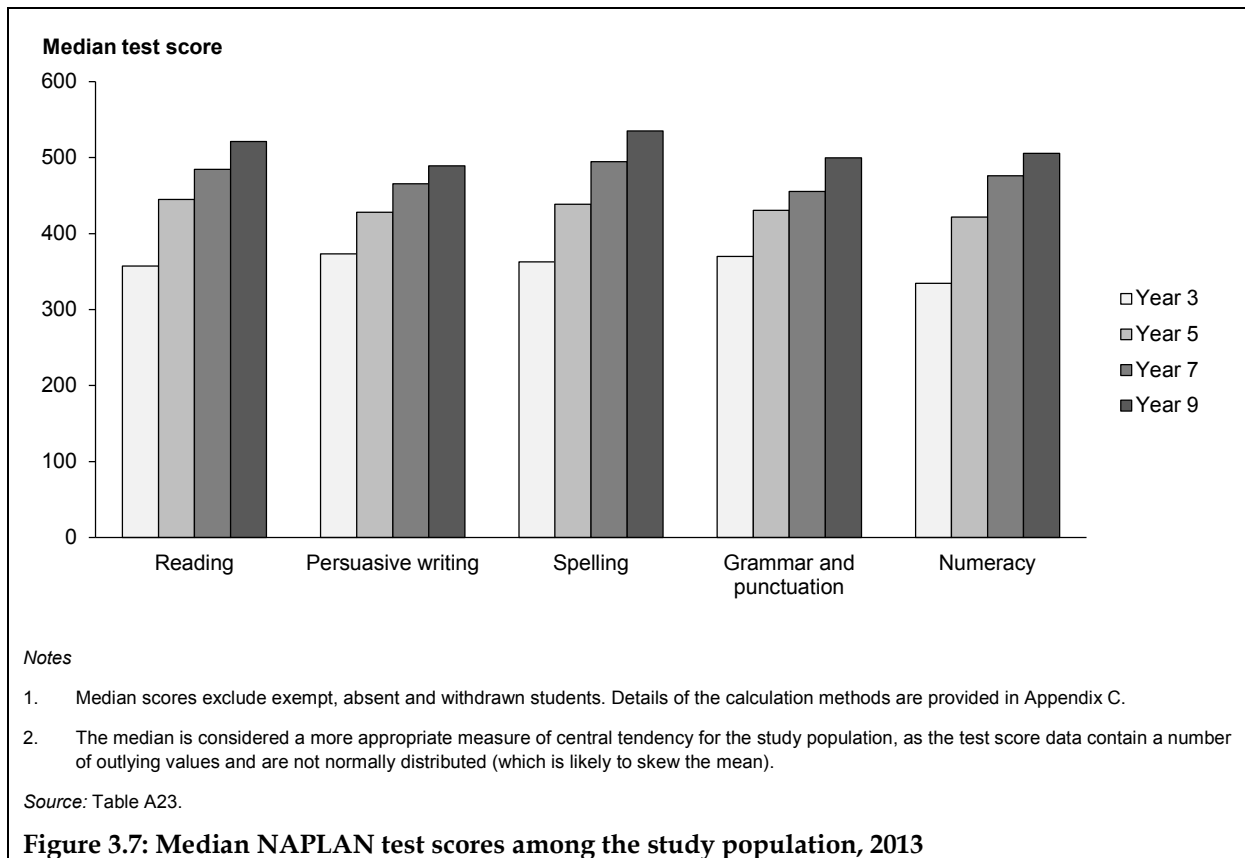


3.3 Test scores

The median and mean scale scores for the study population are presented in Table A23 (refer to Appendix D for more information on scale scores). Scores were only available for ‘present’ students in the study population; as such, scores exclude exempt, absent and withdrawn students (refer to Box 3.1 for more information on these categories).

Among the study population:

- The median and mean scale scores rose with increasing year level – that is, Year 3 students had the lowest scores and Year 9 students had the highest scores, within each assessment domain (Figure 3.7; Table A23). It is expected that students will achieve increasingly higher test scores as they progress through the year levels, largely due to how the national achievement scale is constructed – Year 9 students are assessed on more complex knowledge and skills than Year 3 students, and this is reflected in higher test scores on the scale (refer to Appendix D).



4 Characteristics associated with NAPLAN results

This chapter presents the results of exploratory analysis of the relationship between demographic and child protection-related characteristics of children in the study population, and their NAPLAN results. Regression analysis (see Box 4.1) was used to explore these links.

Box 4.1: Regression analysis

Regression is a statistical procedure used to analyse the relationship between an outcome variable, and 2 or more predictor variables. Binary logistic regression is used when the outcome variable is dichotomous (that is, it has 2 categories, such as yes/no). Binary logistic regression analyses were used to identify the key 'predictors' of the achievement of national minimum standards for reading and numeracy, based on the data available for the study population regarding their demographic and child protection-related characteristics.

NMS achievement was selected as the outcome variable as it was most closely aligned with the national indicators of interest (see Chapter 1), and it includes exempt students. Reading and numeracy NMS achievement were modelled separately. Further information on the methodology used is provided in Appendix C.

The regression models can only identify statistical relationships or associations between NMS achievement and other factors – causal relationships cannot be inferred on the basis of these data alone.

As indicated by the R-square values, the regression models explained only 7-9% of the variance in reading and numeracy NMS achievement among the study population (Table 4.1). As such, the following results should be interpreted with caution. Also, findings from these national-level models may not apply at the state/territory level.

Year level and living arrangement type were found to have statistically significant associations with NMS achievement across all 4 models (Table 4.1):

- For reading, compared to Year 3 students in the study population, Year 7 and 9 students were statistically significantly less likely to achieve the NMS, while Year 5 students were significantly more likely to achieve the NMS. For numeracy, compared to Year 3 students in the study population, Year 9 students were statistically significantly less likely to achieve the NMS.

This finding may reflect accumulated difficulties in acquiring the increasingly complex knowledge and skills required to achieve the NMS from Year 3 to Year 9; it may also reflect the somewhat higher proportion of exempt students in the older year levels (9% for Year 3, 11-13% for Years 7 and 9). Exempt students are deemed to be below the NMS.

- For both reading and numeracy, compared to children in the study population who were living in foster care, children living with relatives/kin were significantly more likely to achieve the NMS, and children in residential care were significantly less likely to achieve the NMS. The 'relatives/kin' category in these models excludes parents and other non-reimbursed relative/kin carers (refer to Appendix C for more details).

Some other variables were found to be statistically significant, but not consistently across the models. State/territory was not a statistically significant variable in any of the models (Table 4.1).

Table 4.1: The relationships between various characteristics and NMS achievement^(a) among the study population, 2013

Predictor variable	Category ^(c)	Includes WA and NT ^(b)		Excludes WA and NT ^(b)	
		Reading	Numeracy	Reading	Numeracy
Intercept		1.113 ***	0.751 ***	1.582 ***	0.738 **
State/territory	<i>NSW</i>				
	Vic	-0.070	0.030	-0.137	0.012
	WA	-0.085	-0.028	n.a.	n.a.
	Tas	0.210	-0.068	0.160	-0.101
	NT	-0.268	-0.231	n.a.	n.a.
	ACT	-0.050	0.192	-0.134	0.118
Year level	<i>Year 3</i>				
	Year 5	0.372 ***	-0.033	0.362 ***	0.029
	Year 7	-0.262 ***	0.177 *	-0.283 **	0.148
	Year 9	-0.326 ***	-0.524 ***	-0.290 **	-0.492 ***
Sex	<i>Female</i>				
	Male	-0.163 ***	-0.032	-0.205 ***	-0.019
Indigenous status	<i>Non-Indigenous</i>				
	Indigenous	0.000	-0.145 **	0.035	-0.077
LBOTE status	<i>Non-LBOTE</i>				
	LBOTE	0.202 *	0.097	0.348 **	0.185
Geolocation of school	<i>Metropolitan</i>				
	Provincial	0.067	0.208 *	-0.286	0.279
	Remote/Very remote	-0.337	-0.502 **	0.421	-0.620 *
Living arrangement ^(d)	<i>Foster care</i>				
	Relatives/kin	0.434 ***	0.436 ***	0.505 ***	0.531 ***
	Residential care	-0.674 ***	-0.557 ***	-0.821 ***	-0.672 ***
	Other	0.008	-0.162	-0.043	-0.276
Time in current order ^(e)		0.000	-0.002	-0.001	-0.003
Time in continuous episode of orders ^(e)		0.000	-0.001	-0.004	-0.003
Time in current living arrangement ^(e)		0.002	0.000	0.005 **	0.002
Time in continuous episode of out-of-home care ^(e)		-0.005 *	-0.002	-0.001	0.000
Number of placements in continuous episode of out-of-home care		n.a.	n.a.	0.025	0.020
R-square		0.08	0.08	0.09	0.07
Number of children ^(f)		2,772	2,762	2,367	2,357

(a) The outcome variable was dichotomous (yes/no)—the outcome modelled was achieving the NMS. Separate models were used for reading and numeracy NMS achievement.

(b) WA and NT did not have data available for 'Number of placements'. As such, 2 sets of models were used: 1 set excluded WA and NT and included Number of placements; the other set included WA and NT and excluded Number of placements.

(c) For categorical variables, an italicised entry indicates the reference category. Refer to the Glossary for definitions.

(d) In these models, only funded out-of-home care placement types are included. Further details are provided in Appendix C.

(e) Length of time in months.

(f) The models exclude all missing, not stated and not applicable records. As such, each model only includes students with complete data for all variables in the model (so if a student has missing data for 1 variable they will be excluded from the model).

Note: Asterisks indicate statistical significance at the following levels: * <0.05, ** <0.01, *** <0.001.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

5 Discussion and next steps

Education is especially important for children in care, as it is integral to their overall development and wellbeing, and provides an important gateway to future employment and life opportunities. Lost educational opportunities can have a cumulative effect on children in care as they move through the various stages of education and development. This study builds on previous Australian research into the educational achievement of children in care.

Key findings

The findings of this report provide further evidence that children in care are an academically disadvantaged group.

Among the study population, 44–83% achieved the NMS (across assessment domains and year levels); conversely 17–56% of students did not achieve the NMS. Except for the Year 9 writing test, a higher proportion of students were at or above the NMS than below the NMS—13–36% achieved at the NMS, while 26–65% achieved above the NMS (refer to Section 3.2). Students who are below the NMS have not achieved the learning outcomes expected for their year level—they are considered at risk of being unable to progress satisfactorily at school without targeted intervention (ACARA 2015a). In interpreting these findings it is also important to note that the academic achievement of children in care is likely to be affected by complex personal histories and multiple aspects of disadvantage, including poverty, maltreatment, family dysfunction, removal from parents, and instability in care and schooling.

The study population had considerably and consistently lower NMS achievement rates than all students in Australia (13–39 percentage points lower, refer to Section 3.2). These findings are consistent with several Australian and overseas studies that have found that children in care generally have lower achievement of national benchmarks, below average literacy/numeracy skills, and perform more poorly on standardised tests than their peers (AIHW 2011a; CREATE Foundation 2006; Eckenrode et al. 1993; Queensland Government 2003; Rees 2013; Sawyer & Dubowitz 1994; Townsend 2012).

Among the study population, median test scores rose with year level. However, this doesn't necessarily mean that older students are also more likely to achieve the NMS for their year level. For example, Year 9 students had the highest median test scores (refer to Section 3.3), but the lowest NMS achievement rates (refer to Section 3.2). This may largely reflect how the national achievement scale is constructed—Year 9 students are assessed on more complex knowledge and skills than Year 3 students, and this is reflected in higher test scores on the scale, but the NMS is also set higher for Year 9 (refer to Appendix D). It was not considered appropriate to make comparisons between the mean test scores for the study population and the published mean test scores for the 'All students' comparison group (see Appendix C).

The number of students who are formally exempted from testing affects the NMS achievement rates—exempt students are deemed to be below the national minimum standard. The proportion of exempt students was much higher among the study population (9–13%) than among all students (2%) (refer to Section 3.1). There may be a higher rate of students with severe or profound disability (including intellectual and learning disability) among the study population, for whom NAPLAN testing is considered inappropriate, and who are therefore granted an exemption.

Exploratory regression analysis, based on the data available for the study population, revealed that year level and living arrangement type had statistically significant associations with NMS achievement (refer to Section 4). However, the predictive power of the regression models was quite low – explaining only 7–9% of the variance in NMS achievement among the study population – so the results should be interpreted with caution.

It is also recognised that children often have low educational performance when entering the child protection system (CREATE Foundation 2006; Evans et al. 2004; Sawyer & Dubowitz 1994). As well, at the time of NAPLAN testing, around one-third of the study population had been in their current care situation (that is, order or living arrangement) for less than a year – 34% had been in their current living arrangement for less than 1 year, and 33% had been on their current order for less than 1 year (although only 11% had been in a continuous episode of orders for less than 1 year) (refer to the Glossary for definitions).

Results have not been disaggregated by state/territory due to the small number of children in the study population for some jurisdictions (see Table 2.1). National-level findings may not apply at the state/territory level.

Next steps

As noted above, the findings of this report provide further evidence that children in care are an academically disadvantaged group. This reinforces the importance of continuing to monitor the academic progress of these children, to facilitate regular reporting of key national indicators.

- The following indicators under the *National Framework for Protecting Australia's Children 2009–2020* (FaHCSIA 2012) and the *National Standards for Out-of-Home Care* (FaHCSIA 2010) are to be reported at the national level:
 - Proportion of children on guardianship and custody orders achieving at or above the national minimum standards for literacy and numeracy (National Framework indicator 4.5).
 - The proportion of children and young people in out-of-home care achieving national reading and numeracy benchmarks (National Standards measure 6.1).
- The following indicator under the *Report on Government Services* is to be reported at the state/territory level (if possible):
 - Improved education – the proportion of children on guardianship and custody orders to the Chief Executive/Minister achieving national benchmarks in reading and numeracy, compared with all children (SCRGSP 2015:15.56).

These indicators do not currently have an ongoing national data source. To enable continued reporting over the remaining lifespan of the National Framework (to 2020), regular linkage of child protection and NAPLAN data will be needed. This will require ongoing collaboration between the AIHW and the state and territory departments/agencies responsible for child protection and education. Further work will be required to enable the inclusion of data for all states and territories, and all school sectors.

Future enhancement of the monitoring and reporting on the education of children in care could include an expanded range of variables (for example, school attendance, Year 12 completion, extra demographic characteristics) and/or developing a longitudinal data set, to provide a more complete picture of their academic pathways and outcomes, and better inform policy, practice and planning of activities to support these children. Previous scoping work (AIHW 2013c) may provide a useful starting point.

Appendix A: Detailed tables

Characteristics of the study population

Table A1: NAPLAN data included in the study population, by school sector

	School sector			
	Government	Catholic	Independent	Christian
NSW	✓	✓	✓	..
Vic	✓	✓	✓	..
WA	✓	x	x	..
Tas	✓	x	x	..
ACT	✓	✓	✓	..
NT	✓	x	x	✓

Note: The protocols and requirements for releasing NAPLAN data vary across states/territories. Where possible, the study population includes NAPLAN data for government and non-government school students.

**Table A2: Study population,
demographic characteristics, 2013**

	Number	Per cent
Age^(a)		
7–9 years	1,000	27.9
10–14 years	2,360	65.9
15–17 years	223	6.2
Sex^(a)		
Male	1,882	52.5
Female	1,701	47.5
Indigenous status^(a)		
Indigenous	1,246	34.8
Non-Indigenous	2,336	65.2
Not stated	1	0.0
LBOTE status^(a)		
LBOTE	276	7.7
Non-LBOTE	3,023	84.4
Not stated	284	7.9
Geolocation of school^(a)		
Metropolitan	1,994	55.7
Provincial	1,435	40.1
Remote	107	3.0
Very remote	41	1.1
Not stated	6	0.2
Total children	3,583	100.0

(a) Refer to the Glossary for definitions.

Note: Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A3: Study population, length of time in orders and living arrangements, 2013

	Number	Per cent
Time in current order ^(a)		
<6 months	423	11.8
6 to <12 months	777	21.7
1 to <2 years	465	13.0
2 to <4 years	649	18.1
4 to <8 years	873	24.4
8 or more years	396	11.1
Time in continuous episode of orders ^(a)		
<6 months	177	4.9
6 to <12 months	216	6.0
1 to <2 years	417	11.6
2 to <4 years	852	23.8
4 to <8 years	1,186	33.1
8 or more years	735	20.5
Time in current living arrangement ^(a)		
<6 months	798	22.3
6 to <12 months	430	12.0
1 to <2 years	541	15.1
2 to <4 years	594	16.6
4 to <8 years	709	19.8
8 or more years	372	10.4
Not applicable ^(b)	139	3.9
Time in continuous episode of out-of-home care ^(a)		
<6 months	124	3.5
6 to <12 months	211	5.9
1 to <2 years	349	9.7
2 to <4 years	634	17.7
4 to <8 years	1,194	33.3
8 or more years	820	22.9
Not applicable ^(c)	251	7.0
Total children	3,583	100.0

(a) Refer to the Glossary for definitions.

(b) This category includes children who were not in a recorded living arrangement during the NAPLAN testing period.

(c) This category includes children who were not in a recorded living arrangement during the NAPLAN testing period, and children whose current living arrangement is not a funded out-of-home care placement.

Note: Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A4: Study population, living arrangements, 2013

Living arrangement ^(a)	Total	
	Number	Per cent
Parents	84	2.3
Relatives/kin, not reimbursed	3	0.1
<i>Total family care</i>	<i>87</i>	<i>2.4</i>
Foster care	1,611	45.0
Relatives/kin, reimbursed	1,226	34.2
Other home-based care	220	6.1
<i>Total home-based care</i>	<i>3,057</i>	<i>85.3</i>
Residential care	203	5.7
Family group home	57	1.6
Independent living	1	0.0
Other living arrangements	39	1.1
Not applicable ^(b)	139	3.9
Total children	3,583	100.0

(a) Refer to the Glossary for definitions.

(b) Includes children who were not in a recorded living arrangement during the NAPLAN testing period.

Note: Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A5: Study population, first order status, 2013

	Number	Per cent
First order ^(a)	1,883	52.6
Not first order ^(b)	1,700	47.4
Total children	3,583	100.0

(a) The child's current order is the first time they had been admitted to a care and protection order in the reporting state/territory.

(b) The child had previously been on a care and protection order in the reporting state/territory (prior to the current order).

Note: Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A6: Study population, number of placements during the continuous episode of out-of-home care, 2013

Number of placements ^(a)	Total	
	Number	Per cent
1	534	14.9
2	577	16.1
3	451	12.6
4	319	8.9
5	268	7.5
6–10	443	12.4
11 or more	75	2.1
Not applicable ^(b)	251	7.0
Not stated	665	18.6
Total	3,583	100.0

(a) Refer to the Glossary for a definition.

(b) Includes children who were not in a recorded living arrangement during the NAPLAN testing period, and children whose current living arrangement is not a funded out-of-home care placement.

Note: Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

NAPLAN results

Table A7: Participation in NAPLAN assessment, among study population and comparison group, 2013

	Study population				All students			
	Year 3	Year 5	Year 7	Year 9	Year 3	Year 5	Year 7	Year 9
Reading								
Present	84.8	84.6	78.4	64.6	93.3	93.9	93.9	90.5
Exempt	8.9	9.5	12.7	11.0	1.9	1.9	1.6	1.6
<i>Participation rate</i>	<i>93.7</i>	<i>94.1</i>	<i>91.2</i>	<i>75.6</i>	<i>95.2</i>	<i>95.8</i>	<i>95.5</i>	<i>92.1</i>
Absent	2.6	2.1	7.5	22.0	2.5	2.4	3.2	6.2
Withdrawn	3.7	3.8	1.3	2.5	2.3	1.8	1.3	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Persuasive writing								
Present	85.5	84.1	78.2	64.8	93.2	93.8	94.0	90.8
Exempt	9.0	9.8	12.7	10.9	1.9	1.9	1.6	1.6
<i>Participation rate</i>	<i>94.5</i>	<i>93.9</i>	<i>90.9</i>	<i>75.7</i>	<i>95.1</i>	<i>95.7</i>	<i>95.6</i>	<i>92.4</i>
Absent	2.0	2.2	7.8	21.9	2.6	2.5	3.1	5.9
Withdrawn	3.6	3.9	1.3	2.5	2.3	1.8	1.3	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Spelling								
Present	85.4	85.0	79.2	66.5	93.5	94.0	94.2	91.0
Exempt	9.0	9.5	12.7	11.0	1.9	1.9	1.6	1.6
<i>Participation rate</i>	<i>94.4</i>	<i>94.5</i>	<i>91.9</i>	<i>77.5</i>	<i>95.4</i>	<i>95.9</i>	<i>95.8</i>	<i>92.6</i>
Absent	2.0	1.8	6.8	20.0	2.3	2.3	2.9	5.7
Withdrawn	3.7	3.7	1.3	2.5	2.3	1.8	1.3	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Grammar and punctuation								
Present	85.4	85.0	79.2	66.5	93.5	94.0	94.2	91.0
Exempt	9.0	9.5	12.7	11.0	1.9	1.9	1.6	1.6
<i>Participation rate</i>	<i>94.4</i>	<i>94.5</i>	<i>91.9</i>	<i>77.5</i>	<i>95.4</i>	<i>95.9</i>	<i>95.8</i>	<i>92.6</i>
Absent	2.0	1.8	6.8	20.0	2.3	2.3	2.9	5.7
Withdrawn	3.7	3.7	1.3	2.5	2.3	1.8	1.3	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Numeracy								
Present	84.2	84.4	76.9	64.2	93.0	93.5	93.5	89.8
Exempt	9.0	9.6	12.8	10.9	1.9	1.9	1.6	1.6
<i>Participation rate</i>	<i>93.2</i>	<i>94.0</i>	<i>89.8</i>	<i>75.1</i>	<i>94.9</i>	<i>95.4</i>	<i>95.1</i>	<i>91.4</i>
Absent	3.2	2.4	9.0	22.3	2.9	2.9	3.6	6.9
Withdrawn	3.6	3.6	1.3	2.6	2.2	1.7	1.3	1.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes

1. Refer to Box 3.1 for participation categories. Details of the calculation methods are provided in Box 3.1 and Appendix C.
2. Data for the 'All students' group includes government and non-government school students in the general population of children in all 8 states/territories. Data for the 'Study population' group only includes children in the study population (see Box 2.1) in the 6 participating jurisdictions, and the inclusion of government and non-government school students varies across jurisdictions (see Table A1).
3. Percentages may not add to 100 due to rounding.

Sources: ACARA 2013 and AIHW 2013 Linked child protection and NAPLAN data set.

Table A8: Participation in NAPLAN assessment among the study population, 2013

Assessment domain	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
Present	812	84.8	818	84.6	666	78.4	523	64.6
Exempt	85	8.9	92	9.5	108	12.7	89	11.0
<i>Participation rate</i>	897	93.7	910	94.1	774	91.2	612	75.6
Absent	25	2.6	20	2.1	64	7.5	178	22.0
Withdrawn	35	3.7	37	3.8	11	1.3	20	2.5
Persuasive writing								
Present	818	85.5	813	84.1	664	78.2	525	64.8
Exempt	86	9.0	95	9.8	108	12.7	88	10.9
<i>Participation rate</i>	904	94.5	908	93.9	772	90.9	613	75.7
Absent	19	2.0	21	2.2	66	7.8	177	21.9
Withdrawn	34	3.6	38	3.9	11	1.3	20	2.5
Spelling								
Present	817	85.4	822	85.0	672	79.2	539	66.5
Exempt	86	9.0	92	9.5	108	12.7	89	11.0
<i>Participation rate</i>	903	94.4	914	94.5	780	91.9	628	77.5
Absent	19	2.0	17	1.8	58	6.8	162	20.0
Withdrawn	35	3.7	36	3.7	11	1.3	20	2.5
Grammar and punctuation								
Present	817	85.4	822	85.0	672	79.2	539	66.5
Exempt	86	9.0	92	9.5	108	12.7	89	11.0
<i>Participation rate</i>	903	94.4	914	94.5	780	91.9	628	77.5
Absent	19	2.0	17	1.8	58	6.8	162	20.0
Withdrawn	35	3.7	36	3.7	11	1.3	20	2.5
Numeracy								
Present	806	84.2	816	84.4	653	76.9	520	64.2
Exempt	86	9.0	93	9.6	109	12.8	88	10.9
<i>Participation rate</i>	892	93.2	909	94.0	762	89.8	608	75.1
Absent	31	3.2	23	2.4	76	9.0	181	22.3
Withdrawn	34	3.6	35	3.6	11	1.3	21	2.6
Total	957	100.0	967	100.0	849	100.0	810	100.0

Notes

1. Refer to Box 3.1 for participation categories. Details of the calculation methods are provided in Box 3.1 and Appendix C.
2. Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A9: National minimum standards achievement among the study population, Year 3 students, 2013

Assessment domain	Below national minimum standard		At national minimum standard	Above national minimum standard				At or above national minimum standard	Total
	Exempt	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6		
	Number								
Reading	85	74	205	211	173	78	71	738	897
Persuasive writing	86	82	149	244	178	139	26	736	904
Spelling	86	152	113	227	155	102	68	665	903
Grammar and punctuation	86	104	156	180	192	104	81	713	903
Numeracy	86	86	207	265	168	56	24	720	892
	Per cent								
Reading	9.5	8.2	22.9	23.5	19.3	8.7	7.9	82.3	100.0
Persuasive writing	9.5	9.1	16.5	27.0	19.7	15.4	2.9	81.4	100.0
Spelling	9.5	16.8	12.5	25.1	17.2	11.3	7.5	73.6	100.0
Grammar and punctuation	9.5	11.5	17.3	19.9	21.3	11.5	9.0	79.0	100.0
Numeracy	9.6	9.6	23.2	29.7	18.8	6.3	2.7	80.7	100.0

Notes

1. Details of the calculation methods are provided in Box 3.2 and Appendix C. Information on the achievement bands is provided in Appendix D.
2. Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A10: National minimum standards achievement among the study population, Year 5 students, 2013

Assessment domain	Below national minimum standard		At national minimum standard	Above national minimum standard				At or above national minimum standard	Total
	Exempt	Band 3	Band 4	Band 5	Band 6	Band 7	Band 8		
	Number								
Reading	92	65	225	267	182	59	20	753	910
Persuasive writing	95	209	155	298	106	33	12	604	908
Spelling	92	186	149	233	173	65	16	636	914
Grammar and punctuation	92	165	169	265	116	82	25	657	914
Numeracy	93	168	275	231	107	22	13	648	909
	Per cent								
Reading	10.1	7.1	24.7	29.3	20.0	6.5	2.2	82.7	100.0
Persuasive writing	10.5	23.0	17.1	32.8	11.7	3.6	1.3	66.5	100.0
Spelling	10.1	20.4	16.3	25.5	18.9	7.1	1.8	69.6	100.0
Grammar and punctuation	10.1	18.1	18.5	29.0	12.7	9.0	2.7	71.9	100.0
Numeracy	10.2	18.5	30.3	25.4	11.8	2.4	1.4	71.3	100.0

Notes

1. Details of the calculation methods are provided in Box 3.2 and Appendix C. Information on the achievement bands is provided in Appendix D.
2. Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A11: National minimum standards achievement among the study population, Year 7 students, 2013

Assessment domain	Below national minimum standard		At national minimum standard	Above national minimum standard				At or above national minimum standard	Total
	Exempt	Band 4	Band 5	Band 6	Band 7	Band 8	Band 9		
	Number								
Reading	108	117	215	186	96	37	15	549	774
Persuasive writing	108	198	234	144	72	14	2	466	772
Spelling	108	147	121	183	145	61	15	525	780
Grammar and punctuation	108	237	160	142	91	32	10	435	780
Numeracy	109	82	274	179	88	27	3	571	762
	Per cent								
Reading	14.0	15.1	27.8	24.0	12.4	4.8	1.9	70.9	100.0
Persuasive writing	14.0	25.6	30.3	18.7	9.3	1.8	0.3	60.4	100.0
Spelling	13.8	18.8	15.5	23.5	18.6	7.8	1.9	67.3	100.0
Grammar and punctuation	13.8	30.4	20.5	18.2	11.7	4.1	1.3	55.8	100.0
Numeracy	14.3	10.8	36.0	23.5	11.5	3.5	0.4	74.9	100.0

Notes

1. Details of the calculation methods are provided in Box 3.2 and Appendix C. Information on the achievement bands is provided in Appendix D.
2. Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A12: National minimum standards achievement among the study population, Year 9 students, 2013

Assessment domain	Below national minimum standard		At national minimum standard	Above national minimum standard				At or above national minimum standard	Total
	Exempt	Band 5	Band 6	Band 7	Band 8	Band 9	Band 10		
Number									
Reading	89	99	187	134	65	37	1	424	612
Persuasive writing	88	256	111	82	49	18	9	269	613
Spelling	89	133	110	170	93	26	7	406	628
Grammar and punctuation	89	193	137	130	60	14	5	346	628
Numeracy	88	152	196	116	38	14	4	368	608
Per cent									
Reading	14.5	16.2	30.6	21.9	10.6	6.0	0.2	69.3	100.0
Persuasive writing	14.4	41.8	18.1	13.4	8.0	2.9	1.5	43.9	100.0
Spelling	14.2	21.2	17.5	27.1	14.8	4.1	1.1	64.6	100.0
Grammar and punctuation	14.2	30.7	21.8	20.7	9.6	2.2	0.8	55.1	100.0
Numeracy	14.5	25.0	32.2	19.1	6.3	2.3	0.7	60.5	100.0

Notes

1. Details of the calculation methods are provided in Box 3.2 and Appendix C. Information on the achievement bands is provided in Appendix D.
2. Percentages may not add to 100 due to rounding.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A13: Reading and numeracy national minimum standards achievement among the study population, by sex, 2013

Sex ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
Male	386	79.8	365	79.9	295	69.7	190	63.1
Female	352	85.2	388	85.7	254	72.4	234	75.2
Total	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
Male	384	79.8	319	70.0	313	75.1	176	58.5
Female	336	81.8	329	72.6	258	74.8	192	62.5
Total	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A14: Reading and numeracy national minimum standards achievement among the study population, by Indigenous status, 2013

Indigenous status ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
Indigenous	289	83.3	279	81.6	178	69.0	104	63.8
Non-Indigenous	449	81.6	474	83.6	371	71.9	320	71.3
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
Indigenous	270	78.3	219	63.5	189	75.0	87	54.0
Non-Indigenous	450	82.3	429	76.2	382	74.9	281	62.9
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

(b) Total includes children whose Indigenous status was 'not stated' (<0.1% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A15: Reading and numeracy national minimum standards achievement among the study population, by LBOTE status, 2013

LBOTE status ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
LBOTE	68	85.0	53	84.1	48	72.7	36	78.3
Non-LBOTE	612	81.7	648	82.9	453	70.6	347	67.5
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
LBOTE	64	82.1	38	61.3	52	80.0	31	67.4
Non-LBOTE	601	80.6	568	72.4	467	73.7	300	58.7
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

(b) Total includes children whose LBOTE status was 'not stated' (around 8% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A16: Reading and numeracy national minimum standards achievement among the study population, by geolocation of school, 2013

Geolocation of school ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
Metropolitan	423	83.4	422	84.2	325	74.0	251	72.8
Provincial	289	81.9	307	83.4	203	67.0	164	65.6
Remote/Very remote	26	70.3	23	57.5	20	64.5	8	53.3
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
Metropolitan	408	81.6	373	74.3	324	75.3	220	64.3
Provincial	289	81.4	261	71.3	224	74.9	141	56.2
Remote/Very remote	23	62.2	14	35.0	22	71.0	6	46.2
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

(b) Total includes children whose school geolocation was 'not stated' (around 0.1% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A17: Reading and numeracy national minimum standards achievement among the study population, by living arrangement, 2013

Living arrangement ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
Foster care	367	82.8	343	82.7	282	71.0	191	71.8
Relatives/kin	297	82.3	327	86.5	191	76.7	141	73.4
Residential care	3	60.0	14	63.6	17	47.2	27	52.9
Other	49	75.4	51	69.9	45	68.2	42	60.9
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
Foster care	352	79.6	302	72.9	294	74.8	165	61.6
Relatives/kin	296	82.5	275	73.3	201	82.4	125	64.8
Residential care	3	60.0	13	56.5	16	48.5	24	48.0
Other	49	75.4	41	54.7	46	70.8	37	54.4
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions. In this table, 'Relatives/kin' includes relatives/kin (reimbursed and not reimbursed) and parents; 'Other' includes family group homes, other home-based care, independent living, and other living arrangements.

(b) Total includes children who were not in a recorded living arrangement during the NAPLAN testing period (around 3% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A18: Reading and numeracy national minimum standards achievement among the study population, by length of time in current order, 2013

Time in current order ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
<6 months	96	83.5	82	82.0	59	66.3	40	66.7
6 to <12 months	176	79.6	158	83.2	114	71.7	91	72.8
1 to <2 years	110	85.3	93	83.0	64	75.3	51	73.9
2 to <4 years	141	81.5	142	83.5	92	70.8	66	61.1
4 to <8 years	192	84.2	207	82.1	140	72.9	89	70.6
8 or more years	23	74.2	71	82.6	80	67.2	87	70.2
Total	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
<6 months	96	84.2	64	66.0	60	67.4	35	62.5
6 to <12 months	173	79.0	142	74.3	122	77.7	81	63.8
1 to <2 years	112	86.8	78	68.4	68	78.2	47	67.1
2 to <4 years	142	81.6	127	76.0	95	75.4	63	58.3
4 to <8 years	175	77.4	184	72.2	148	79.6	73	58.9
8 or more years	22	73.3	53	62.4	78	66.7	69	56.1
Total	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A19: Reading and numeracy national minimum standards achievement among the study population, by length of time in continuous episode of orders, 2013

Time in continuous episode of orders ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
<6 months	37	80.4	32	86.5	22	73.3	17	60.7
6 to <12 months	46	80.7	49	81.7	24	68.6	24	82.8
1 to <2 years	106	82.8	76	81.7	60	75.9	35	64.8
2 to <4 years	198	81.8	187	84.2	113	70.2	89	68.5
4 to <8 years	281	84.4	275	82.8	192	71.4	110	67.5
8 or more years	70	76.9	134	80.7	138	69.0	149	71.6
Total	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
<6 months	38	84.4	26	70.3	21	67.7	12	44.4
6 to <12 months	45	78.9	39	67.2	23	67.6	24	82.8
1 to <2 years	105	82.7	67	70.5	64	80.0	34	63.0
2 to <4 years	198	81.5	154	70.3	120	75.9	78	61.4
4 to <8 years	271	82.1	249	74.8	207	78.7	101	60.8
8 or more years	63	70.0	113	67.7	136	69.4	119	58.0
Total	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A20: Reading and numeracy national minimum standards achievement among the study population, by length of time in current living arrangement, 2013

Time in current living arrangement ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
<6 months	150	77.7	142	82.6	109	67.3	88	69.3
6 to <12 months	81	78.6	75	80.6	78	76.5	58	73.4
1 to <2 years	124	83.8	127	83.0	81	73.0	48	63.2
2 to <4 years	142	83.0	143	84.1	80	70.8	68	68.0
4 to <8 years	182	85.8	173	84.0	109	72.2	64	66.7
8 or more years	37	78.7	75	79.8	78	71.6	75	75.0
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
<6 months	155	80.7	125	71.8	111	69.8	75	59.1
6 to <12 months	84	80.0	67	72.0	83	82.2	49	63.6
1 to <2 years	120	81.1	105	69.1	84	77.8	47	62.7
2 to <4 years	136	80.0	129	76.8	90	79.6	61	60.4
4 to <8 years	170	81.3	144	70.2	112	76.2	59	60.2
8 or more years	35	74.5	61	64.2	77	72.0	60	59.4
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

(b) Total includes children who were not in a recorded living arrangement during the NAPLAN testing period (around 3% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A21: Reading and numeracy national minimum standards achievement among the study population, by length of time in continuous episode of out-of-home care, 2013

Time in continuous episode of out-of-home care ^(a)	Year 3		Year 5		Year 7		Year 9	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Reading								
<6 months	26	83.9	24	82.8	13	72.2	13	72.2
6 to <12 months	46	79.3	42	82.4	22	68.8	29	74.4
1 to <2 years	84	84.8	73	85.9	55	74.3	24	57.1
2 to <4 years	165	82.5	131	82.9	88	73.3	68	73.9
4 to <8 years	296	84.1	280	82.1	189	73.8	105	67.3
8 or more years	79	74.5	170	82.5	154	66.4	152	70.7
Total^(b)	738	82.3	753	82.7	549	70.9	424	69.3
Numeracy								
<6 months	30	96.8	19	65.5	12	60.0	12	63.2
6 to <12 months	45	75.0	37	72.5	20	62.5	24	68.6
1 to <2 years	84	84.8	61	70.1	58	79.5	26	60.5
2 to <4 years	163	80.7	109	69.9	95	79.2	51	55.4
4 to <8 years	282	81.0	249	73.2	199	80.6	102	63.4
8 or more years	73	70.2	144	69.9	158	69.3	123	57.5
Total^(b)	720	80.7	648	71.3	571	74.9	368	60.5

(a) Refer to the Glossary for definitions.

(b) Total includes children who were not in a recorded living arrangement during the NAPLAN testing period, and children whose current living arrangement is not a funded out-of-home care placement (around 6% of assessed students). As such, the Total may not equal the sum of the subcategories.

Note: 'Per cent' is the NMS achievement rate (those achieving the NMS). 'Number' is the numerator of the rate. Details of the calculation methods are provided in Box 3.2 and Appendix C.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table A22: National minimum standards achievement, among study population and comparison group, 2013

	Assessment domain	Study population		All students	
		Per cent	N	Per cent	N ^(a)
Year 3	Reading	82.3	897	95.3	282,019
	Persuasive writing	81.4	904	95.0	281,979
	Spelling	73.6	903	93.8	281,927
	Grammar and punctuation	79.0	903	95.3	281,927
	Numeracy	80.7	892	95.7	281,974
Year 5	Reading	82.7	910	96.1	275,787
	Persuasive writing	66.5	908	91.7	275,735
	Spelling	69.6	914	93.1	275,956
	Grammar and punctuation	71.9	914	94.8	275,956
	Numeracy	71.3	909	93.4	275,688
Year 7	Reading	70.9	774	94.2	278,664
	Persuasive writing	60.4	772	89.3	278,543
	Spelling	67.3	780	93.7	278,642
	Grammar and punctuation	55.8	780	90.8	278,642
	Numeracy	74.9	762	95.0	278,493
Year 9	Reading	69.3	612	93.4	280,845
	Persuasive writing	43.9	613	82.6	280,885
	Spelling	64.6	628	92.2	281,099
	Grammar and punctuation	55.1	628	87.9	281,099
	Numeracy	60.5	608	90.6	280,888

(a) Derived from published participation rates and numbers.

Notes

1. 'Per cent' is the NMS achievement rate (those achieving the NMS). 'N' is the denominator of the rate, so includes students who did and didn't achieve the NMS. Details of the calculation methods are provided in Box 3.2 and Appendix C.
2. A description of the 'All students' comparison group is provided in the Glossary.
3. Data for the 'All students' group includes government and non-government school students in the general population of children in all 8 states/territories. Data for the 'Study population' group only includes children in the study population (see Box 2.1) in the 6 participating jurisdictions, and the inclusion of government and non-government school students varies across jurisdictions (see Table A1).

Sources: ACARA 2013 and AIHW 2013 Linked child protection and NAPLAN data set.

Table A23: NAPLAN scale scores among the study population, 2013

	Assessment domain	Median^(a)	Mean^(a)	Standard deviation	N
Year 3	Reading	357.4	359.6	84.2	812
	Persuasive writing	373.5	355.7	86.8	818
	Spelling	362.7	357.3	84.0	817
	Grammar and punctuation	369.9	363.5	97.2	817
	Numeracy	334.6	342.3	64.3	806
Year 5	Reading	445.0	448.7	62.6	818
	Persuasive writing	428.3	417.4	88.2	813
	Spelling	438.5	437.5	75.7	822
	Grammar and punctuation	430.7	437.5	77.4	822
	Numeracy	421.6	424.1	61.9	816
Year 7	Reading	484.6	482.5	69.3	666
	Persuasive writing	465.5	444.3	92.7	664
	Spelling	494.7	492.4	76.3	672
	Grammar and punctuation	455.5	458.2	85.7	672
	Numeracy	476.2	481.1	51.5	653
Year 9	Reading	521.1	527.8	66.0	523
	Persuasive writing	489.0	466.1	127.4	525
	Spelling	535.2	530.2	74.6	539
	Grammar and punctuation	499.5	502.8	79.9	539
	Numeracy	505.7	509.5	65.0	520

(a) The median is considered a more appropriate measure of central tendency for the study population, as the test score data contain a number of outlying values and are not normally distributed (which is likely to skew the mean).

Note: Table excludes students who were exempt, absent or withdrawn, as scale scores were not available for these students in the study population (excludes 15–16% of Year 3 students, 15–16% of Year 5 students, 21–23% of Year 7 students, and 34–36% of Year 9 students).

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Appendix B: Data linkage process

The AIHW Data Linkage Unit (DLU) carried out the linkage of CP NMDS and NAPLAN data for 5 jurisdictions: New South Wales, Victoria, Western Australia, Tasmania and the Northern Territory.

For the Australian Capital Territory, the ACT Education and Training Directorate undertook the linkage between the 2 data sets.

When undertaking the linkage, all children recorded in the CP NMDS as being aged 5–17 at the time of 2013 NAPLAN testing were included, to allow for age variation within year levels (Years 3, 5, 7 and 9 undertake NAPLAN testing).

Data linkage undertaken by AIHW

Linkage process

The protection of the privacy of individuals is very important when linking data sets. There are 2 main ways of protecting privacy in a data linkage project:

- Excluding full name and possibly other identifying items from the data sets being linked (de-identifying)
- Using processes that ensure that only identifying data, and other items which assist accurate linkage, are included in the data sets used for record linkage, and that identifying data are excluded from analysis data sets (the separation principle) (AIHW 2006).

Both of these approaches were used in this study. First, a record linkage process centred around a statistical linkage key (SLK) was used, which allows data linkage but preserves privacy by including only part of the name data. Second, linkage and analysis data were kept separate, as follows:

1. The CP NMDS and NAPLAN data custodians separately sent linkage files containing only those data items specifically required for data linkage to the AIHW DLU. The CP NMDS and NAPLAN linkage files contained a project-specific person identifier (PID) for their respective clients.
2. Linkage was undertaken by the DLU. The linkage process resulted in a concordance map of PIDs and corresponding project-specific match numbers (PMNs) for linked CP NMDS and NAPLAN records. DLU provided each data custodian with a list of their PIDs that could be linked, and the related PMNs.
3. CP NMDS and NAPLAN data custodians then extracted analysis data for the linked PIDs. Analysis files that included the relevant analysis data and the PMN (but not the PID) were then forwarded to the AIHW Child Welfare and Prisoner Health Unit (CWPHU).
4. CWPHU merged the de-identified NAPLAN and CP NMDS analysis files using the PMNs, to create a single linked data set for analysis.

This process is illustrated in Figure B1.

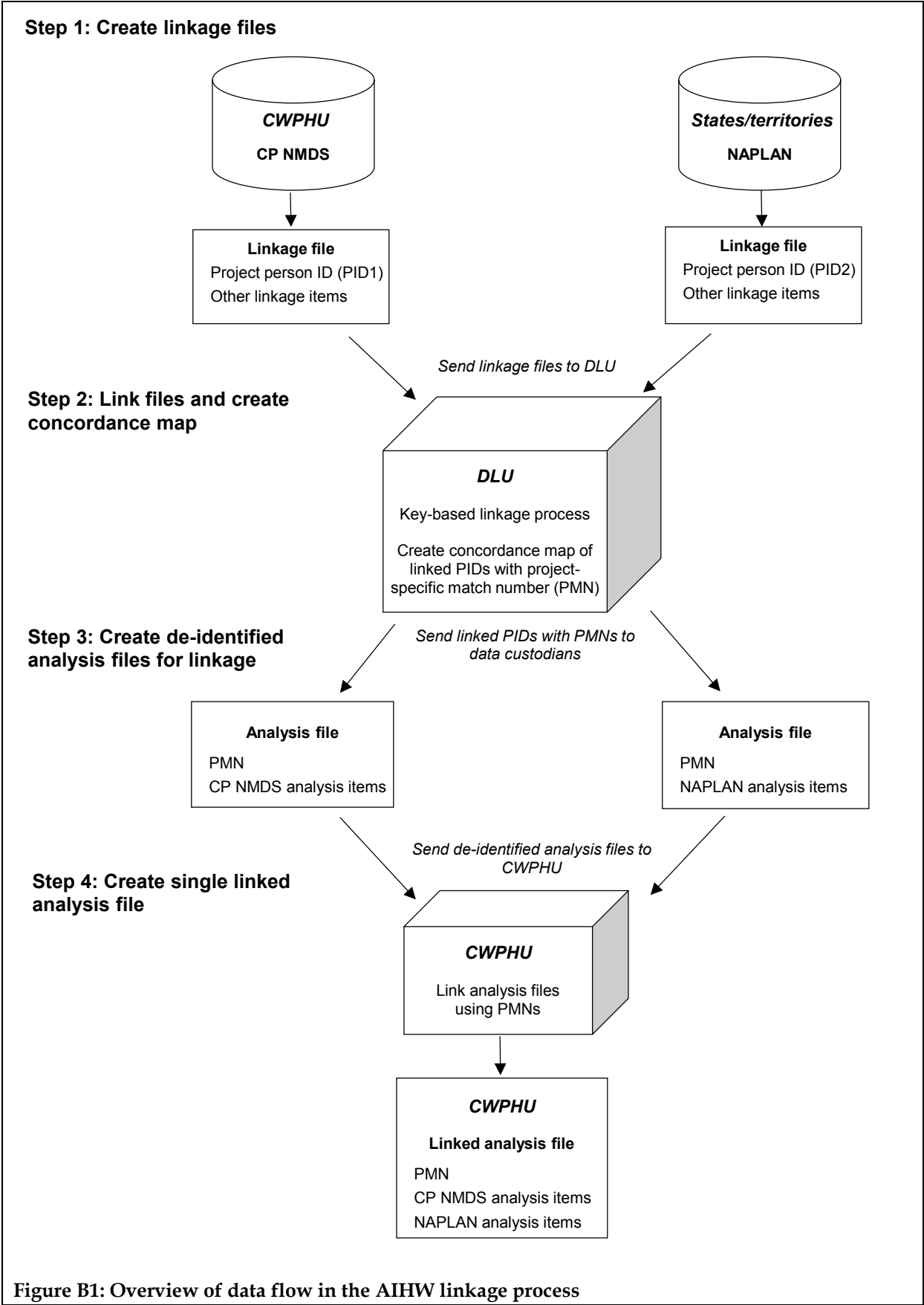


Figure B1: Overview of data flow in the AIHW linkage process

Linkage strategy

The CP NMDS data set does not include full name information, but does contain the statistical linkage key SLK-581. SLK-581 consists of 5 selected letters of name, full date of birth and sex. Consequently, for the 5 jurisdictions (NSW, Vic, WA, Tas, NT), record linkage between the CP NMDS and NAPLAN data sets was undertaken using key-based linkage (KBL) centred on the SLK-581. This method maximises the value of the SLK-581 for linkage and has been used in a number of projects (for example Karmel et al. 2010, AIHW 2014b).

The KBL process involves matching via multiple deterministic match passes, using linkage keys derived from data items available for linkage in order of key quality. This process uses 3 measures – calculated for each match key – to decide suitable linkage keys and their order of use:

- the *estimated false match rate* (FMR) for links established using the match key (the lower the better)
- the *estimated marginal trade-off* (m_tf) between additional true and additional false matches for links established using the match key, when compared with matches made by a slightly more precise key (the higher the better)
- a measure of *discriminating power* (expressed as %). This is the product of the unique key rates for the 2 data sets being linked, where the unique key rate is the proportion of records within a data set that have a unique value for the key in question (the higher the better).

The first 2 of these are used to identify keys to be used in the linkage process by setting cut-offs, while the third determines their order of use (highest to lowest). The derivation of these measures and a more detailed description of KBL are provided in Karmel et al. 2010 and AIHW 2011c. Note that the number of keys selected for a linkage process depends on a range of issues, including the size of the groups being matched, the match rate and the number of variables available for inclusion in the linkage keys.

As well as allowing for differences in the information reported for a person in the 2 data sets being linked, KBL can allow for variation in reported values of match key elements for clients within a data set. For individual keys, the number of versions allowed when using a particular key is limited by max_FMR/FMR. For example, if max_FMR is set to 1% then up to 5 different versions (altogether) of the information for the unit being matched would be considered when matching using a key with FMR = 0.2% ($1/0.2=5$). Versions of key elements are assigned a priority ranking to decide their order of use.

As noted above, SLK-581 consists of 5 letters of name, full date of birth and sex. To link CP and NAPLAN data the KBL process used linkage keys based on components of this statistical linkage key and, where available, postcode of usual residence. The 4 main constituents of SLK-581, and the related KBL key components, are:

- 2nd, 3rd and 5th letters of surname (giving 4 components: S23, S25, S35, S235)
- 2nd and 3rd letters of given name (giving 1 component: F23)
- day, month and year of birth (giving 3 components: d, m, y)
- sex (providing 1 component: s)

Four key components indicating region were derived from postcode, where available:

- p4, p3 p2, p1, where p4 is all 4 digits of postcode, p3 is the first 3 digits of postcode, and so on.

The SLK-581 data for all jurisdictions were well-reported, with only a small proportion of NAPLAN records having missing or poor data for SLK-581 – less than 0.2% for each jurisdiction (Table B1). The CP NMDS had just 2 records with poor SLK-581 data across all jurisdictions being linked by the AIHW. By contrast, postcode was available in the NAPLAN linkage data only for Tasmania and the Northern Territory, with 100% and 93% of Tasmanian and Northern Territory records, respectively, either reporting postcode or suburb of usual residence from which postcode could be derived (Table B1). Only 2 CP NMDS records from the Northern Territory had missing postcode, with 63 records from Tasmania missing postcode data. Possible variation in the postcode reported on the CP and NAPLAN data sets was explicitly allowed for by using reported suburb information to find all postcodes that related to that suburb. For the jurisdictions without postcode in the NAPLAN linkage data (that is, New South Wales, Victoria and Western Australia), jurisdiction state was used in the linkage process (denoted as ‘st’ when labelling linkage keys below).

Due to the different data available for data linkage for the various jurisdictions, 2 KBL processes were used:

- For New South Wales, Victoria and Western Australia, the KBL process used an FMR limit of 5% and m_tf limit of 5. The lack of postcode data for these 3 jurisdictions, along with the fact that we were linking a large data set (almost 704,000 records) to a much smaller data set (nearly 14,300 records), meant that only 1 key was selected for linkage (SLK-581 + state).
- For Tasmania and the Northern Territory, the KBL process used an FMR limit of 1%, a max_fm of 1% and an m_tf limit of 5. This strategy resulted in 49 keys being selected for use when linking Tasmanian records, and 42 keys being selected for linkage for the Northern Territory (tables B2 and B3). Note that the small numbers in the CP NMDS data sets affected the accuracy of the statistical measures (especially m_tf) used to select the keys for Tasmania and the Northern Territory, and so the estimated FMR limit was set more conservatively for this linkage process.

Linkage results

As noted above, when undertaking the linkage, all children recorded in the CP NMDS as being aged 5–17 at the time of 2013 NAPLAN testing were included, to allow for age variation within year levels (Years 3, 5, 7 and 9 undertake NAPLAN testing).

All students in Years 3, 5, 7 and 9 are expected to take part in NAPLAN testing (ACARA 2015b). As such, it is assumed that all students in these year levels will have a NAPLAN record available for linkage. Student participation may be recorded as present, exempt, absent, or withdrawn (see Box 3.1) – so even if a student did not sit the tests, they should have a NAPLAN record.

Overall, 3,517 CP NMDS clients were matched to NAPLAN students (Table B4). The final data set (see Table 2.1) excludes 10 children from Victoria whom the AIHW was able link, but for whom NAPLAN data were subsequently unavailable.

The proportion of CP NMDS clients who were linked was quite similar across jurisdictions, ranging from 21% in New South Wales to 27% in Tasmania. Looking from the perspective of the much larger NAPLAN data sets, between 0.2% and 1.4% of NAPLAN students were matched to a CP NMDS client (Table A1). The match rates reflect that:

- The CP NMDS data set used for linkage had a broad scope to allow for age variation within year levels – the included age range (5–17 years) encompasses students in all 12

school year levels, and could include children not enrolled in school. However, linkage is only possible with the 4 year levels that participate in NAPLAN assessment. It is estimated that around 28% of children in the CP NMDS data set may have been in Years 3, 5, 7 or 9, and so could potentially have been matched to the NAPLAN data.

- The number of children included in the CP NMDS data set used for linkage represented around 0.6% of the general population of children aged 5–17 at 30 June 2013 (AIHW 2014a). The NAPLAN match rates are broadly consistent with this.
- NAPLAN data were not available for all school sectors in all participating jurisdictions (see Table A1). This will have affected the CP NMDS match rates in relevant jurisdictions (WA, Tas and NT) as there will be some children who were included in the CP NMDS data set and participated in NAPLAN assessment, but who could not be matched to the NAPLAN data since their school sector was excluded from the NAPLAN data set. These exclusions will result in a downward bias in the CP NMDS match rates for the affected jurisdictions.

The effect on the NAPLAN match rates is less clear-cut. For example, if a jurisdiction's NAPLAN data set only includes government school students, and if CP NMDS clients are more likely to be attending government schools than non-government schools, the NAPLAN match rate will overestimate the proportion of all students participating in NAPLAN assessment who were CP NMDS clients. On the other hand, the reverse is true if CP NMDS clients are more likely to be attending non-government schools.

Table B5 shows the keys used to find matches for each jurisdiction. As stated above, only 1 key was used for 3 of the states (SLK-581 + state). This key had an estimated FMR of 1.5%. For Tasmania, just 11 of the 49 selected keys made matches, and for the Northern Territory, just 8 of the 42 selected keys made matches. Much of the variation allowed for by these keys was in reported postcode (Table B5). However, some keys allowed for minor name variation and variation in reported day of birth; these keys added only a small number of matches. All but 8 of the Tasmanian matches and 7 of those for the Northern Territory were made using keys with an estimated FMR of 0.1% or less (Table B6).

The final accuracy of the matches depends on how often children's names change, and how consistently linkage items like date of birth and sex are recorded across data sets. Experience in linking aged care data sets suggests KBL using SLK-581 identifies at least 90% of matches, depending on the added linkage data available (AIHW 2011b, AIHW 2011c, AIHW 2013b).

It is uncertain how many records should have been matched across the data sets (as the number of children in the CP NMDS file who were actually in Years 3, 5, 7 or 9 at the time of NAPLAN testing is not known). There may be differences between the children in the matched records and non-matched records, but the nature, extent and impact of potential biases in the final matched data used for analysis is uncertain. This should be taken into account when interpreting the results of the analyses in this report.

Table B1: Quality of linkage data for key-based linkage, by state/territory and data set

	Poor surname data	Poor first name data	Poor sex data	Poor DOB data	Any poor SLK data ^(a)	Poor postcode data	Total number
Per cent within state/territory							
NAPLAN							
New South Wales	0.13	0.00	—	0.03	0.16	100.00	355,729
Victoria	0.00	0.00	—	0.00	0.00	100.00	270,110
Western Australia	0.01	0.02	—	—	0.03	100.00	78,079
Tasmania	—	—	—	—	—	—	17,131
Northern Territory	0.03	—	—	—	0.03	8.99 ^(b)	9,850
CP NMDS							
New South Wales	—	—	0.01	—	0.01	37.55	9,051
Victoria	—	—	—	—	—	10.47	2,761
Western Australia	—	—	—	—	—	100.00	2,452
Tasmania	—	0.12	—	—	0.12	7.77	811
Northern Territory	—	—	—	—	—	0.33	598
Number							
NAPLAN							
New South Wales	453	12	—	107	569	355,729	355,729
Victoria	5	4	—	1	10	270,110	270,110
Western Australia	8	17	—	—	25	78,079	78,079
Tasmania	—	—	—	—	—	—	17,131
Northern Territory	3	—	—	—	3	886 ^(b)	9,850
CP NMDS							
New South Wales	—	—	1	—	1	3,399	9,051
Victoria	—	—	—	—	—	289	2,761
Western Australia	—	—	—	—	—	2,452	2,452
Tasmania	—	1	—	—	1	63	811
Northern Territory	—	—	—	—	—	2	598

(a) Records may have more than 1 type of poor SLK data, so 'Any poor SLK data' may not equal the sum of the preceding 4 columns (3 records had poor surname data and poor DOB data).

(b) Postcode was derived from suburb for an extra 194 students (or 1.97%).

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table B2: Discriminating power and estimated false match rate of linkage keys selected for Tasmania

Pass number	Linkage key	Discriminating power	Estimated false match rate (FMR)
1	S235|F2|d|m|y|s|pc4	99.6973	0.0121
2	S35|F2|d|m|y|s|pc4	99.6973	0.0232
3	S235|F2|d|m|y|s|pc3	99.6973	0.0236
4	S235|F2|d|m|y|_|pc4	99.6973	0.0240
5	S25|F2|d|m|y|s|pc4	99.6973	0.0358
6	S23|F2|d|m|y|s|pc4	99.6973	0.0410
7	S235|F2|d|m|y|s|pc2	99.6973	0.0460
8	S35|F2|d|m|y|_|pc4	99.6973	0.0461
9	S235|F2|d|m|y|_|pc3	99.6973	0.0468
10	S35|F2|d|m|y|s|pc3	99.6973	0.0489
11	S25|F2|d|m|y|_|pc4	99.6857	0.0711
12	S23|F2|d|m|y|_|pc4	99.6973	0.0813
13	S235|F2|d|m|y|s|pc1	99.7181	0.0823
14	S25|F2|d|m|y|s|pc3	99.6973	0.0855
15	S235|F2|d|m|y|_|pc2	99.6857	0.0914
16	S35|F2|d|m|y|s|pc2	99.6740	0.0954
17	S23|F2|d|m|y|s|pc3	99.6857	0.0958
18	S35|F2|d|m|y|_|pc3	99.6857	0.0971
19	S235|F2|d|_|y|s|pc4	99.6624	0.1443
20	S235|F2|d|m|_|s|pc4	99.6740	0.1454
21	S235|F2|d|m|y|_|pc1	99.6949	0.1637
22	S235|F2|d|m|y|s|_|	99.7181	0.1645
23	S25|F2|d|m|y|s|pc2	99.6508	0.1669
24	S25|F2|d|m|y|_|pc3	99.6857	0.1699
25	S35|F2|d|m|y|s|pc1	99.6599	0.1707
26	S23|F2|d|m|y|s|pc2	99.6508	0.1869
27	S35|F2|d|m|y|_|pc2	99.6158	0.1897
28	S23|F2|d|m|y|_|pc3	99.6740	0.1902
29	S35|F2|d|_|y|s|pc4	99.6508	0.2768
30	S235|F2|d|_|y|s|pc3	99.6391	0.2788
31	S35|F2|d|m|_|s|pc4	99.6740	0.2790
32	S235|F2|d|m|_|s|pc3	99.6740	0.2826
33	S235|F2|d|_|y|_|pc4	99.6391	0.2863
34	S235|F2|d|m|_|_|pc4	99.6740	0.2885
35	S25|F2|d|m|y|s|pc1	99.6133	0.2987
36	S235|F2|_|m|y|s|pc4	99.6857	0.3102
37	S23|F2|d|m|y|s|pc1	99.5202	0.3329
38	S25|F2|d|m|y|_|pc1	99.4736	0.5945

(continued)

Table B2 (continued): Discriminating power and estimated false match rate of linkage keys selected for Tasmania

Pass number	Linkage key	Discriminating power	Estimated false match rate (FMR)
39	S25|F2|d|m|y|s|_	99.6133	0.5973
40	S235|F2|_|m|y|s|pc3	99.6158	0.6041
41	S23|F2|d|m|y|_|pc1	99.3222	0.6627
42	S23|F2|d|m|y|s|_	99.5202	0.6658
43	S35|F2|d|m|y|_|_|	99.5900	0.6794
44	S25|F2|d|_|y|_|pc4	99.5460	0.8471
45	S25|F2|d|m|_|_|pc4	99.6508	0.8536
46	S235|_|d|m|y|s|pc3	96.4186	0.8829
47	S235|_|d|m|y|_|pc4	95.0601	0.8999
48	S23|F2|d|_|y|_|pc4	99.5925	0.9608
49	S23|F2|d|m|_|_|pc4	99.6275	0.9756

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table B3: Discriminating power and estimated false match rate of linkage keys selected for the Northern Territory

Pass number	Linkage key	Discriminating power	Estimated false match rate (FMR)
1	S235|F2|d|m|y|s|pc4	99.8908	0.0393
2	S35|F2|d|m|y|s|pc4	99.8908	0.0647
3	S235|F2|d|m|y|_|pc4	99.8908	0.0785
4	S25|F2|d|m|y|s|pc4	99.8908	0.0879
5	S23|F2|d|m|y|s|pc4	99.8908	0.1084
6	S35|F2|d|m|y|_|pc4	99.8908	0.1293
7	S25|F2|d|m|y|_|pc4	99.8908	0.1759
8	S23|F2|d|m|y|_|pc4	99.8908	0.2168
9	S235|F2|d|m|_|s|pc4	99.8908	0.4711
10	S235|F2|d|_|y|s|pc4	99.8908	0.4711
11	S235|F2|d|m|y|s|pc3	99.8689	0.0293
12	S35|F2|d|m|y|s|pc3	99.8689	0.0483
13	S235|F2|d|m|y|_|pc3	99.8689	0.0587
14	S25|F2|d|m|y|s|pc3	99.8689	0.0657
15	S23|F2|d|m|y|s|pc3	99.8689	0.0805
16	S35|F2|d|m|y|_|pc3	99.8689	0.0966
17	S25|F2|d|m|y|_|pc3	99.8689	0.1314
18	S23|F2|d|m|y|_|pc3	99.8689	0.1609
19	S235|F2|d|m|_|s|pc3	99.8689	0.3521
20	S235|F2|d|m|y|s|pc2	99.8471	0.0658
21	S35|F2|d|m|y|s|pc2	99.8471	0.1084
22	S23|F2|d|m|y|s|pc2	99.8471	0.1815
23	S235|F2|d|_|y|s|pc3	99.8471	0.3521
24	S235|F2|d|m|y|_|pc2	99.8252	0.1317
25	S25|F2|d|m|y|s|pc2	99.8034	0.1463
26	S35|F2|d|m|y|_|pc2	99.7815	0.2169
27	S25|F2|d|m|y|_|pc2	99.7815	0.2926
28	S235|F2|_|m|y|s|pc3	99.7815	0.7548
29	S23|F2|d|m|y|_|pc2	99.7597	0.3630
30	S235|F2|d|m|y|s|pc1	99.7360	0.0638
31	S35|F2|d|m|y|s|pc1	99.7360	0.1051
32	S235|F2|d|m|y|s|_	99.7360	0.1230
33	S35|F2|d|m|y|s|_	99.7360	0.2025
34	S23|F2|d|m|y|s|pc1	99.7156	0.1760
35	S23|F2|d|m|y|s|_	99.7156	0.3393
36	S25|F2|d|m|y|s|pc1	99.6953	0.1419
37	S25|F2|d|m|y|s|_	99.6953	0.2734
38	S235|F2|d|m|y|_|pc1	99.6750	0.1277
39	S235|F2|d|m|y|_|_	99.6750	0.2459
40	S35|F2|d|m|y|_|pc1	99.6344	0.2103
41	S25|F2|d|m|y|_|pc1	99.6344	0.2838
42	S23|F2|d|m|y|_|pc1	99.5938	0.3521

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table B4: Matches between CP NMDS and NAPLAN data sets using key-based linkage: numbers of matches and match rates by NAPLAN jurisdiction

Data set	NSW	Vic	WA	Tas	NT	Total
Number						
NAPLAN	355,729	270,110	78,079	17,131	9,850	730,899
CP NMDS	9,051	2,761	2,452	811	598	15,673
Matches	1,901	654 ^(a)	605	218	139	3,517
Match rate %						
With respect to NAPLAN	0.5	0.2	0.8	1.3	1.4	0.5
With respect to CP NMDS	21.0	23.7	24.7	26.9	23.2	22.4

(a) The final data set (see Table 2.1) excludes 10 children from Victoria whom the AIHW was able to link, but for whom NAPLAN data were subsequently unavailable.

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table B5: Matches between CP NMDS and NAPLAN data sets, by linkage key and NAPLAN jurisdiction (number)

Linkage key ^(a)	NSW	Vic	WA	Tas	NT	Total
S235|F2|d|m|y|s|p4	129	80	209
S235|F2|d|m|y|_|p4	1	—	1
S23|F2|d|m|y|s|p4	—	1	1
S235|F2|d|m|y|s|p3	17	15	32
S23|F2|d|m|y|s|p3	—	1	1
S235|F2|d|_|y|s|p4	1	—	1
S235|F2|d|m|y|s|p2	41	32	73
S235|F2|_|m|y|s|p3	—	1	1
S235|F2|d|_|y|s|p3	1	—	1
S235|F2|d|m|y|s|st ^(b)	1,901	654	605	..	..	3,160
S235|F2|d|m|y|s|p1	22	4	26
S235|F2|d|m|y|s _	—	5	5
S235|F2|_|m|y|s|p4	2	..	2
S23|F2|d|m|y|s|p1	1	—	1
S235|_|d|m|y|s|p3	2	—	2
S23|F2|d|_|y|_|p4	1	..	1
Total	1,901	654^(c)	605	218	139	3,517

(a) Components excluded from a key are denoted by '_'. Thus key S235|F2|_|m|y|s|p3 was used in pass 28, and was made up of S235, F2, month of birth, year of birth, sex and first 3 digits of postcode; day of birth was excluded from the key in this pass.

(b) This key was used only for those jurisdictions without postcode data reported in the NAPLAN linkage data. It is similar to the key directly below in the table. In the key label, 'st' refers to the jurisdiction collating the NAPLAN or CP data.

(c) The final data set (see Table 2.1) excludes 10 children from Victoria whom the AIHW was able to link, but for whom NAPLAN data were subsequently unavailable.

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Table B6: Matches between CP NMDS and NAPLAN data sets using key-based linkage, by estimated false match rate (FMR) and NAPLAN jurisdiction (number)

FMR (%)	NSW	Vic	WA	Tas	NT	Total
0-<0.1	..	..	..	210	132	342
0.1-<0.2	..	..	..	1	6	7
0.2-<0.5	..	..	..	4	—	4
0.5-<1	..	..	..	3	1	4
1-<2	1,901	654	605	..	..	3,160
Total	1,901	654^(a)	605	218	139	3,517

(a) The final data set (see Table 2.1) excludes 10 children from Victoria whom the AIHW was able to link, but for whom NAPLAN data were subsequently unavailable.

Note: The 'Linkage strategy' section above describes the key-based linkage process in detail.

Source: AIHW 2013 Linked child protection and NAPLAN data set.

Data linkage undertaken by the ACT

Linkage of ACT data was undertaken through collaboration between the ACT Community Services Directorate and the Education and Training Directorate, in line with existing local data sharing activities and processes.

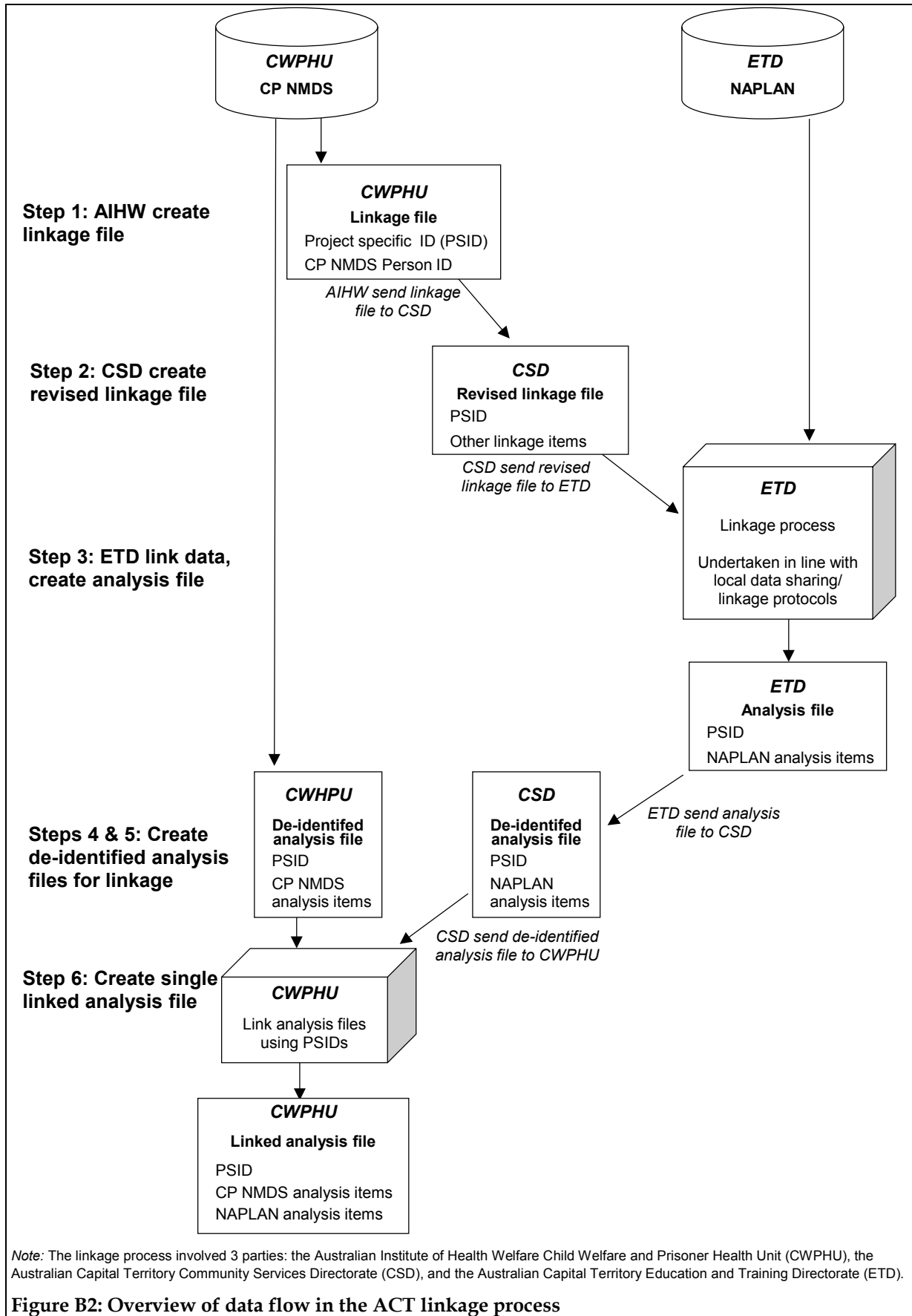
Linkage process

The main difference between the linkage process used by the ACT and the AIHW process is that the ACT used full name data (in line with local data sharing arrangements).

The process that the ACT used is as follows:

1. The AIHW Child Welfare and Prisoner Health Unit (CWPHU) sent a CP NMDS linkage file (containing only ACT data) to the ACT Community Services Directorate (CSD). This file included a project-specific person identifier (PSID) created by the AIHW, and the CP NMDS Person ID originally created by CSD. CSD are the original data supplier and 'owner' of ACT CP NMDS data, so this is essentially a return to source exercise.
2. CSD created a revised CP NMDS linkage file for provision to the ACT Education and Training Directorate (ETD), including all linkage data items agreed by CSD and ETD. The PSID was retained in this file. The CP NMDS Person ID was removed from this file.
3. The ETD carried out the linkage. NAPLAN data was linked to those children included in the revised CP NMDS linkage file. A NAPLAN analysis file (including the PSID) was provided to CSD.
4. CSD ensured the NAPLAN analysis file was de-identified, including only the required analysis items and the PSID, and provided the file to CWPHU.
5. CWPHU created the CP NMDS analysis file containing the analysis data items and the PSID (but not the CP NMDS Person ID).
6. CWPHU merged the de-identified NAPLAN and CP NMDS analysis files using the PSID, to create a single linked data set for analysis.

This process is illustrated in Figure B2.



Appendix C: Statistical methods

Participation rate

There are 4 categories used to describe students' participation in NAPLAN assessment (see Box 3.1).

The 'participation rate' is the assessed students (present + exempt) as a percentage of total students (present + exempt + absent + withdrawn) in the year level.

$$\text{Participation rate} = \frac{\text{Present} + \text{Exempt}}{\text{Present} + \text{Exempt} + \text{Absent} + \text{Withdrawn}} \times 100$$

Participation rates for the comparison groups were sourced from published data (ACARA 2013).

The participation rates for the study population and the comparison groups have been calculated using the same formula.

NMS achievement rate

Student raw scores on tests are converted to a NAPLAN 'scale score'. The scale scores are then placed on the national scale for each domain, to determine the student's achievement of the national minimum standards (NMS) (refer to Appendix D for further details).

For the study population, the 'NMS achievement rate' is the assessed students achieving the NMS ('present' students whose score was at or above the NMS) as proportion of all assessed students (present + exempt). Exempt students are deemed to be below the national minimum standard. Absent and withdrawn students are excluded from the rate as scale scores were not available for these students within the study population.

$$\text{NMS achievement rate (study)} = \frac{\text{Present achieving NMS}}{\text{Present} + \text{Exempt}} \times 100$$

NMS achievement rates for the comparison group were sourced from published data (ACARA 2013). The published rates are calculated including scale scores for absent and withdrawn students that have been statistically imputed.

$$\text{NMS achievement rate (comp.)} = \frac{(\text{Present} + \text{Absent} + \text{Withdrawn}) \text{ achieving NMS}}{\text{Present} + \text{Exempt} + \text{Absent} + \text{Withdrawn}} \times 100$$

The statistically imputed scores for absent and withdrawn students were created for national reporting on all students (ACARA 2013). As such, the use of these imputed scores may not be appropriate for the study population, which is a small sub-population of all students. Notably, absent rates were comparatively high among the study population (see Section 3.1).

The AIHW does not publish confidence intervals for indicators or performance reporting as they are not applicable where the data are derived from administratively based collections (rather than sample surveys). Most administrative data sets are subject to non-sample errors (for example, errors in recording or processing data, definition and classification errors, missing or mis-reported data), but may not be subject to sample errors (especially if they are 'complete counts'). The usual methods for calculating confidence intervals only take account of sample errors, and so may not be representative of the true underlying variation in an administrative data set – the results may imply significant differences when none exist.

Median and mean test scores

The median, mean and standard deviation of test scores include 'present' students only – exempt, absent and withdrawn students were excluded as scale scores were not available for these students in the study population (excludes 15–16% of Year 3 students, 15–16% of Year 5 students, 21–23% of Year 7 students and 34–36% of Year 9 students).

The median is considered a more appropriate measure of central tendency for the study population, as the test score data contain a number of outlying values and are not normally distributed (which is likely to skew the mean).

Due to these issues, it was not considered appropriate to make comparisons between the mean test scores for the study population and the published mean test scores for the 'All students' comparison group (which include imputed data for absent and withdrawn students) (ACARA 2013).

Median test scores for 'All students' have not been published, so were not available for comparison with the study population.

Binary logistic regression

Regression is a statistical procedure used to analyse the relationship between an outcome variable, and 2 or more predictor variables. Binary logistic regression is used when the outcome variable is dichotomous (that is, it has 2 categories, such as yes/no). Binary logistic regression analyses were used to identify the key 'predictors' of the achievement of national minimum standards for reading and numeracy, based on the data available for the study population.

NMS achievement was selected as the dependent/outcome variable, as:

- it was most closely aligned to the national indicators of interest (see Chapter 1)
- it includes exempt students (the study population had a comparatively high proportion of exempt students)
- it was not necessary to do separate models for each year level (using the scale score as the outcome variable would require separate models for each year level).

Reading and numeracy NMS achievement were modelled separately.

Where possible, all 'characteristics' variables were included in the regression models as predictor/independent variables. Due to the relatively small number of variables, all variables were included in the final models regardless of whether they were statistically significant.

The models exclude all missing, not stated and not applicable records. The final model only includes students with complete data for all variables in the model (so if a student has missing data for 1 variable they will be excluded from the model).

The reference categories for relevant variables were selected based on largest sample size. Due to small sample sizes, the full sets of subcategories for the 'Geolocation of school' and 'Living arrangement' variables were condensed into 3 and 4 subcategories, respectively.

In the models, the 'Living arrangement' variable includes funded out-of-home care placements only:

- the 'Foster care' subcategory includes foster care
- the 'Relatives/kin' subcategory includes relatives/kin who are reimbursed (excludes parents, and relatives/kin who are not reimbursed)
- the 'Residential care' subcategory includes residential care
- the 'Other' subcategory includes family group homes, independent living, other home-based care, and some cases of other living arrangements (refer to the Glossary for definitions).

The 'Time in continuous episode of out-of-home care' variable excludes cases where the child's current living arrangement is not a funded out-of-home care placement, and as such, these cases will be excluded from the models. As a result, the 'Living arrangement' variable in the models excludes relatives/kin who are not reimbursed, parents, and some cases of other living arrangements (around 3% of total cases in the study population).

Western Australia and the Northern Territory did not have data available for 'Number of placements'. As such, 2 sets of models were undertaken:

- Two models excluded WA and NT and included Number of placements (1 model each for reading and numeracy).
- Two models included WA and NT and excluded Number of placements (1 model each for reading and numeracy).

The results provided in Table 4.1 are based on the analysis of maximum likelihood estimates, which includes parameter estimates and p-values for the Wald chi-square test.

Data quality and comparability

This study included data from 6 jurisdictions: New South Wales, Victoria, Western Australia, Tasmania, the Australian Capital Territory and the Northern Territory. As such, the data in this report may not be nationally representative.

Results have not been disaggregated by state/territory due to the small number of children in the study population for some jurisdictions (see Table 2.1). National-level findings may not apply at the state/territory level.

As noted in Appendix B, it is uncertain how many records should have been matched across the data sets (as the number of children in the CP NMDS file who were actually in Years 3, 5, 7 or 9 at the time of NAPLAN testing is not known). There may be differences between the children in the matched records and non-matched records, but the nature, extent and impact of potential biases in the final matched data used for analysis is uncertain. This should be taken into account when interpreting the results of the analyses in this report.

In this report, differences between the study population and the 'All students' comparison group (refer to Glossary) were explored. Results for the comparison group were sourced

from published data (ACARA 2013). Several issues should be taken into account when interpreting the data:

- Data for the comparison group will include students from the study population. As such, the comparisons made are not exclusively between students in the study population, and students not in the study population. However, this is likely to reduce, rather than increase, the capacity to find a difference between the groups.
- Data for the study population include 6 jurisdictions (NSW, Vic, WA, Tas, ACT and NT), whereas data for the comparison groups include all 8 jurisdictions.
- Data for the study population do not include all government and non-government school sectors (see Table A1), whereas data for the comparison group do include all sectors. Disaggregation by school sector was not available for the study population or the comparison group.
- The method for calculating NMS achievement rates differs for the study population and comparison group (see relevant section above for further details).

Appendix D: NAPLAN background

The NAPLAN tests are conducted annually in May for all students across Australia in Years 3, 5, 7 and 9.

NAPLAN results are reported using common underlying national achievement scales, 1 for each of the 5 assessment domains of reading, writing, spelling, grammar and punctuation, and numeracy.

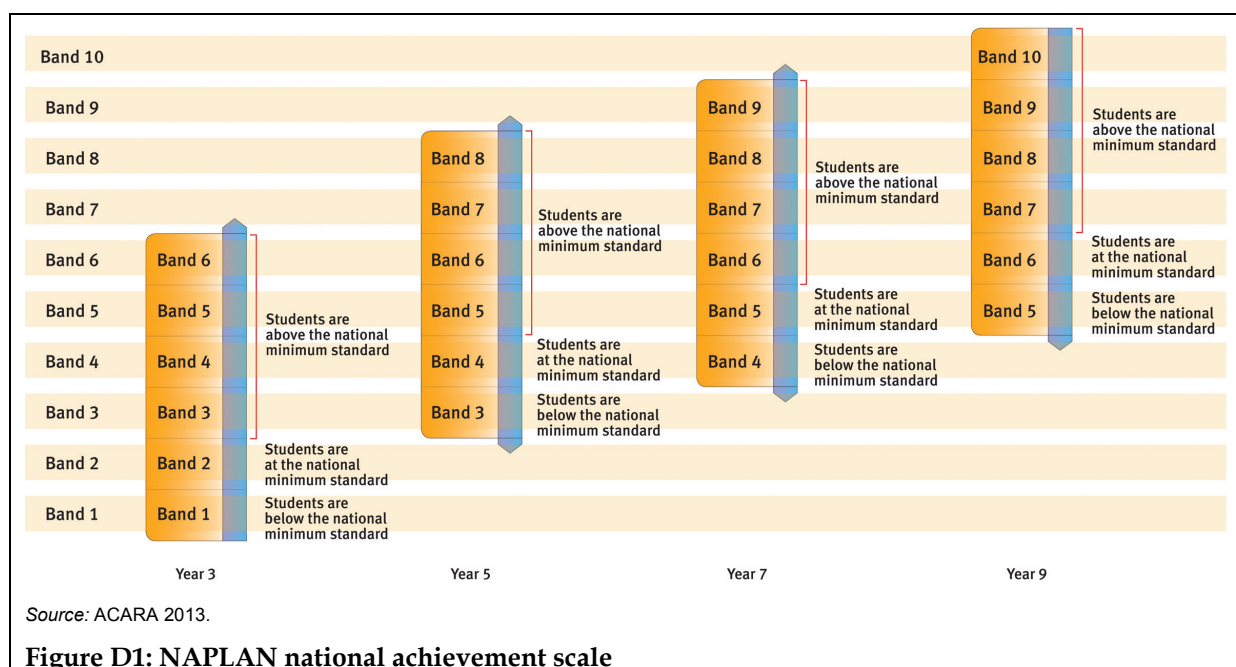
The scales span all the year levels from Year 3 to Year 9, and are divided into 10 bands. Not all bands are reported for each year level (Figure D1).

A national minimum standard is defined and located on the achievement scale for each year level. Band 2 is the minimum standard for Year 3, band 4 is the minimum standard for Year 5, band 5 is the minimum standard for Year 7, and band 6 is the minimum standard for Year 9. These standards represent the increasingly complex knowledge and skills from Year 3 to Year 9, and require increasingly higher scores on the NAPLAN scale (ACARA 2015a).

Student raw scores on tests are converted to a NAPLAN 'scale score'. The scale scores are then placed on the national scale for each domain, to assess the student's achievement.

In 2013, results for writing are reported on the persuasive writing scale (ACARA 2013). From 2011 to 2014, the NAPLAN writing test was a persuasive writing task. From 2008 to 2010, the NAPLAN writing test was a narrative writing task. As these tasks use different achievement scales, persuasive writing scores should not be compared with narrative writing scores from previous years.

For further information, refer to the NAPLAN website <<http://www.nap.edu.au/naplan/naplan.html>>.



Glossary

age: The age of a person at 16 May 2013 (last day of NAPLAN testing; allows for children that had a birthday during the testing period). Derived from date of birth, as recorded in the CP NMDS.

all students: Comparison group comprising all students in Australia with NAPLAN results, as published in ACARA 2013.

family group home: Homes for children provided by a department or community-sector agency which have live-in, non-salaried carers who are reimbursed and/or subsidised for the provision of care.

foster care: A form of out-of-home care where the caregiver is authorised and reimbursed (or was offered but declined reimbursement) by the state/territory for the care of the child. (This category excludes relatives/kin who are reimbursed). There are varying degrees of reimbursement made to foster carers.

geolocation of school: The Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA) Schools Geographic Location Classification System is based on the locality of individual schools and is used to disaggregate data according to Metropolitan, Provincial, Remote and Very Remote, as recorded in the NAPLAN.

independent living: Accommodation including private board and lead tenant households.

Indigenous: Includes children of Aboriginal or Torres Strait Island descent who identify and are identified as an Aboriginal or Torres Strait Islander, as recorded in the CP NMDS.

LBOTE: A student is classified as LBOTE if either the student or parents/guardians speak a language other than English at home, as recorded in the NAPLAN.

living arrangement: The type of care in which a child was residing on the night of 14 May 2013 (first day of NAPLAN testing). See also the living arrangement categories: **family group home, foster care, independent living, other home-based care, other living arrangements, relatives/kin who are not reimbursed, relatives/kin who are reimbursed, residential care, parent.**

non-Indigenous: Includes children who have not been identified as being of Aboriginal or Torres Strait Islander descent (this excludes children of unknown Indigenous status), as recorded in the CP NMDS.

non-LBOTE: A student is classified as non-LBOTE if neither the student nor parents/guardians speak a language other than English at home, as recorded in the NAPLAN.

other home-based care: Where the child was in home-based out-of-home care, other than with relatives/kin who are reimbursed or in foster care.

other living arrangements: Living arrangements not otherwise classified, including unknown living arrangements. For children on orders, this also includes any placements made in disability services; psychiatric services; juvenile justice facilities; specialist homelessness services and overnight child care services; boarding schools; hospitals; hotels/motels; and the defence forces. These living arrangements may have rostered and/or paid staff, and are generally not a home-like setting.

parent: A natural or substitute parent; spouse of a natural parent; adoptive parent or spouse of an adoptive parent; or any other person who has an ongoing legal responsibility for the care and protection of a child.

relatives/kin who are not reimbursed: Relatives/kin (other than parents) who are not reimbursed by the state/territory for the care of the child.

relatives/kin who are reimbursed: Where the caregiver is: a relative (other than parents); or considered to be family or a close friend; or a member of the child or young person's community (in accordance with their culture); and who is reimbursed by the state/territory for the care of the child (or who has been offered but declined reimbursement). For Aboriginal and Torres Strait Islander children, a kinship carer may be another Indigenous person who is a member of their community, a compatible community or from the same language group.

residential care: Where the placement is in a residential building whose purpose is to provide placements for children and where there are paid staff.

sex: The biological sex of a person, as recorded in the CP NMDS.

time in continuous episode of orders: Length of time the child has been in a continuous episode of orders at 16 May 2013 (last day of NAPLAN testing; allows for children that entered scope during the testing period). An episode includes 1 or more care and protection orders, including the current order. All order types are included in an episode.

time in continuous episode of out-of-home care: Length of time the child has been in a continuous episode of out-of-home care at 14 May 2013 (first day of NAPLAN testing; excludes change in living arrangement during the testing period). An episode includes 1 or more funded out-of-home care placements, including the current placement. Children whose current living arrangement is not a funded out-of-home care placement are excluded.

time in current living arrangement: Length of time the child has been in their current living arrangement at 14 May 2013 (first day of NAPLAN testing; excludes change in living arrangement during the testing period).

time in current order: Length of time the child has been on their current care and protection order at 16 May 2013 (last day of NAPLAN testing; allows for children that entered scope during the testing period). Current orders are limited to the particular order types that are in scope for this study (see Box 2.1).

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This report presents a snapshot of the academic performance of Australian children in the care of child protection services in 2013. Findings are based on the linkage of data from the Child Protection National Minimum Data Set and the National Assessment Program—Literacy and Numeracy. This report shows that the proportion of children in care meeting the national minimum standards (NMS) for literacy and numeracy varied (ranging from 44% to 83% across assessment domains and year levels).