NSW Early Childhood Test Case

Final Report – March 2022

National Disability Data Asset

Project team

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Abbreviations

ACRONYM	DEFINITION
AEDC	Australian Early Development Census
AIHW	Australian Institute of Health and Welfare
APC	NSW Annual (Community) Preschool Census
APDC	NSW Admitted Patient Data Collection
ATT	NSW School Attendance
BSKA	NSW Best Start Kindergarten Assessment
CCS/CCB	Child Care Subsidy/ Child Care Benefit
CHeReL	Centre for Health Record Linkage
DCJ	NSW Department of Communities and Justice
DIP-HLSN	NSW Disability and Inclusion Program - Higher Learning Support Needs
DOMINO	Data Over Multiple Individual Occurrences
DS-NMDS	Disability Services National Minimum Data Set and Commonwealth State/Territory Disability Agreement National Minimum Data Set
ECE	Early Childhood Education (includes APC, MYC-GP and CCS/CCB)
EDDC	NSW Emergency Department Data Collection
ESD-IF	NSW Department of Education Student Disability Data collection: Integration Funding Support
ESD-SC	NSW Department of Education Student Disability Data collection: SCAS (Support Class Administration System)
MBS	Medicare Benefits Scheme
MCD	Medicare Consumer Directory
MYC-EI	NSW Mid-Year Census - Early Intervention
MYC-GP	NSW Mid-Year Census - Government Preschool
NAPLAN	NSW National Assessment Program - Literacy and Numeracy
NCCD	Nationally Consistent Collection of Data on School Students with Disability
NDDA	National Disability Data Asset
NDIS	National Disability Insurance Scheme
NDIS-ECEI	National Disability Insurance Scheme - Early Childhood Early Intervention
NSW	New South Wales
OOHC	Out-of-home care
PDC	NSW Perinatal Data Collection
PDSP	NSW Preschool Disability Support Program
PPN	Project-specific person number
RBDM	NSW Registry of Births, Deaths and Marriages
ROSH	Risk of significant harm
SER	NSW School Enrolment Record
SSE	NSW School Suspensions and Expulsions
YBFS	Year Before Full-time Schooling (Children aged 4 years)

1 Executive summary

1.1 Purpose of this report

This report provides key insights into the:

    (i)   classification of disability using administrative data linked across state and commonwealth jurisdictions;

    (ii)   prevalence of disability and early childhood developmental vulnerability among children aged <7 years;

    (iii)   types of services being used by children with disability prior to school entry, and;

    (iv)   educational and health outcomes of children identified with disability or developmental vulnerability.

Findings referenced in this report are from the National Disability Data Asset (NDDA) Pilot. These findings are not nationally representative and are only applicable to NSW residents from records spanning 2003-2020.

1.2 Data sources

Twenty-three Commonwealth and NSW record sets linked under the auspices of the NSW Early Childhood Test Case provided the data used in this report. Table 1 (page 10) lists the linked record sets. Data linkages were conducted by the Centre for Health and Record Linkage and the Australian Institute of Health and Welfare, with appropriate ethical approvals (2020_ETH01682; EO2020-3-1186).

1.3 Population definition

The study population is all NSW children and young people born between 1 January 2003 and 31 December 2019, including a total population of 2,330,929 children (age range birth to <17 years) selected from records spanning 2003-2020.

1.4 Prevalence of disability and developmental vulnerability in the population

Among all children in NSW aged <7 years:

- 13.2% (n=306,982) were identified with Any Disability (across all available record sets)
- 11.1% (n=258,183) were identified to have a Medically Verified Disability as recorded in the NDIS, MBS and the DS-NMDS

Among 462,124 children in NSW with an Australian Early Development Census (AEDC) record between 2009-2018:

- 9.76% (n=45,147) were identified as Developmentally Vulnerable on ≥2 AEDC domains at school entry

1.5 Support services used by children with disability

Of the 306,982 of children identified with disability (identified by age 7 years);
- 99.99% (n=306,945) had accessed any kind of support service (<18 years)
- 99.7% (n=306,184) had accessed a health service (<18 years)
- 80.6% (n=247,423) had an Early Childhood Education enrolment (<7 years)
- 56.7% (n=173,918) had a NSW Government school enrolment (<18 years)
- 25.9% (n=79,548) children received child protection services (<18 years)
- 46.5% (n=142,612) children received Centre-based Day Care (<7 years)
- 48.0% (n=147,364) had been provided with targeted disability support (<18 years)

1.6 Early childhood development, academic achievement and school attendance for children identified with disability or developmental vulnerability

Of the 306,982 children in the population identified with Any Disability:
- 14.7% were identified as vulnerable on ≥2 domains of the AEDC
- 23.1% were identified as achieving below national minimum standard on the Grade 3 NAPLAN on at least 1 domain

Of the 45,147 children in the population that were identified as Developmentally Vulnerable (on ≥2 AEDC domains):
- 35.6% were identified as achieving below national minimum standard on the Grade 3 NAPLAN on at least 1 domain

1.7 Key Lessons applicable to the NSW study population

- Children with disability access health services early in life.
- Early Childhood Education is well accessed by children with disability and developmental vulnerability and is associated with better educational outcomes in middle childhood for all children.
- Early interventions for children with disability can be provided in mainstream preschool and school settings.
- Education data sets do not capture all children with disability; inclusion of linked data sets from other jurisdictions identified more than double the number of children with disability that is typically identified by Education department records.
- The availability of some Commonwealth data only for children who were 'flagged' as being potentially vulnerable limited the type of analyses that could be conducted; whole-of-population samples would provide a more robust platform on which to base policy decisions.

2 Background

2.1 Context and Aims

The National Disability Data Asset (NDDA) Pilot was established to lead a system transformation to deliver improved life outcomes for people with disability, via cross-agency, evidence-informed system delivery. As part of the establishment of the NDDA Pilot, state-led Test Case data sets were convened according to priority areas of investment, including the NSW Early Childhood Test Case, focused on improving the lives of young people with disability and developmental vulnerability.

This report was commissioned by the NSW Government Department of Education as the lead agency of the NDDA NSW Early Childhood Test Case, with a key aim to inform policy and services to facilitate the best possible outcomes for children identified with disability (or developmental vulnerability), in early childhood. This was the first time that comprehensive data collected by NSW Government-run preschools, NSW Government-funded community and mobile preschools, and Commonwealth-funded Centre-based Day Care (pre-school) services could be viewed together, owing to the complexity of Australian education funding arrangements and associated administrative data.

3 Record sets and linkage

3.1 Record sets

Twenty-three Commonwealth and NSW record sets were used in the NSW Early Childhood Test Case. Table 1 (overpage) lists the record sets, the years spanned of available data and the number of children retained in each record set for analyses after data cleaning.

Appendix A provides a detailed description of the content and purpose of data collections contained in each record set. The DOMINO record set was approved for linkage in all related ethics applications but was not supplied to researchers for inclusion in these analyses.

Table 1. Record sets, years spanned, and the number of children contributing to this report of the NSW Early Childhood Test Case data.

RECORD SETS	YEARS SPANNED	CHILDREN (N)[e]
COMMONWEALTH		
Medicare Consumer Directory	1st Jan 2003 – 30th Dec 2019	2,180,095
National Disability Insurance Scheme (including Early Childhood Early Intervention[a])	1st July 2013 – 15th May 2019	98,152
Medicare Benefits Scheme	1st Jan 2003 – 30th June 2020	1,292,154
Child Care Subsidy/ Child Care Benefit	1st Jan 2003 – 30th June 2020	1,490,548
Australian Early Development Census [b]	2009, 2012, 2015, 2018	462,124
NATIONAL		
Disability Services National Minimum Data Set and Commonwealth State/Territory Disability Agreement National Minimum Data Set	1st July 2003 – 30th June 2019	50,350
National Death Index[c]	1st Jan 2003 – 30th June 2020	8,004
NSW		
NSW Department of Education Student Disability Data collection:	1st Jan 2011 – 31st Dec 2019	
Integration Funding Support		20,238
SCAS (Support Class Administration System)		29,890
NSW School Enrolment Record[d]	1st Jan 2010 – 31st Dec 2019	940,243
NSW Annual (Community) Preschool Census	1st Jan 2009 – 9th Aug 2019	232,984
NSW Mid-Year Census:	1st Jan 2014 – 31st Dec 2019	
Government Preschool		25,077
Early Intervention		3,780
NSW Preschool Disability Support Program	2015 – 2017	5,366
NSW Disability and Inclusion Program - Higher Learning Support Needs	2018 – 2019	3,108
NSW Best Start Kindergarten Assessment[f]	1st Jan 2010 – 31st Dec 2017	541,384
Nationally Consistent Collection of Data on School Students with Disability[d]	1st Jan 2015 – 31st Dec 2019	241,788
NSW School Suspensions and Expulsions[d]	1st Jan 2012 – 31st Dec 2019	68,400
NSW School Attendance[d]	1st Jan 2018 – 31st Dec 2019	786,805
National Assessment Program - Literacy and Numeracy (for NSW)		609,740
	1st Jan 2010 – 31st Dec 2019 (Year 3)	552,420
	1st Jan 2012 – 31st Dec 2019 (Year 5)	408,784
	1st Jan 2014 – 31st Dec 2019 (Year 7)	232,241
	1st Jan 2016 – 31st Dec 2019 (Year 9)	121,284
NSW Registry of Births, Deaths and Marriages	1st Jan 2003 – 28th Dec 2019	1,584,044
NSW Perinatal Data Collection	1st Jan 2003 – 31st Dec 2019	1,597,221
NSW Emergency Department Data Collection	1st Jan 2005 – 31st Dec 2019	1,486,863
NSW Admitted Patient Data Collection	1st Jan 2003 – 31st Dec 2019	1,724,328
NSW ChildStory	1st Jan 2003 – 31st Dec 2019	331,062

Note: [a]The NDIS-ECEI is part of the NDIS record set, but for the purpose of this report the NDIS-ECEI is occasionally reported separately from other NDIS data (these are not mutually exclusive groups); [b]AEDC administration was conducted in 2009 (n=105,099 children), 2012 (n=116,259 children), 2015 (n=119,525 children) and 2018 (n=121,184 children); [c]Children who died before age 7 years were removed (n=7,353) from all record sets; [d]These record sets are restricted to NSW Government Schools; [e]Children retained exclude those with duplicate records and PPNs, and children who died before age 7 years; [f]no data from the NSW Best Start Kindergarten Assessment was analysed for the present report.

3.2   Linkage

There were two-stages of data linkage conducted by the Centre for Health Record Linkage (CHeReL), and the Australian Institute of Health and Welfare (AIHW), respectively.

In the first stage of linkage the CHeReL created the NSW Child State Spine comprising any child born between 2003-2019 that were represented in the NSW Registry of Births Deaths and Marriages - Births Registration (RBDM) record set, or the NSW Ministry of Health's Admitted Patient (APDC) or Emergency Department Data Collections (EDDC), or the NSW Department of Education's School Enrolment (SER) record set. Within this NSW cohort, the CHeReL flagged a sub-group of children as having a disability, developmental delay or being at increased risk of disability or developmental delay, using seven criteria (see Appendix A).

The second stage of linkage was undertaken by the AIHW, who created a National Linkage (Personal Identifier) Map from identifying information in the MCD, DOMINO, National Death Index (NDI) record sets. Children identified in this map were flagged as being at risk of disability or developmental delay using an additional six criteria (See Appendix A). The National Linkage Map was then linked to the NSW cohort. The AIHW supplied MBS, DS NMDS and NDIS record sets for only the flagged sub-group, whereas AEDC, CCS/CCB and NDI record sets were supplied for the entire NSW cohort.

Further information about the flagging criteria and linkage processes can be found in the full linkage report produced by the AIHW, which also reports the linkage rates across NSW and AIHW cohorts for each record set (AIHW, 2021)[1].

4   Population definition

The cohort for the NSW Early Childhood Test Case comprised children born between 1st January 2003 and 31st December 2019, with an age range birth to <18 years, represented in records spanning 2003-2020. The research team removed duplicate PPNs, children who died before age 7 years, and those without valid data on age and sex, resulting in a **final cohort of 2,330,929 children used in the production of this report**.

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[1] AIHW. (2021). National Disability Data Asset: Early Childhood Supports in NSW Test Case – Linkage report (EO2020-3-1186 / 2020.26). Canberra: AIHW.

5 Identification of disability and developmental vulnerabilities in administrative records

5.1 Record sets used to define disability and developmental vulnerability

Of the 23 record sets used in this Test Case, 10 record sets were used to determine disability and developmental vulnerability among children before age 7 years of age (Table 2).

Specifically, three sub-cohorts of children were delineated in the population:

- **Any Disability:** Children with a disability or disability support service(s) recorded or adjustments in school in the NDIS, DS-NMDS, MBS, AEDC-Special Needs, NCCD[2], ESD (IF and SC), DIP-HLSN, APC, MYC (GP and EI), and the PDS record sets
- **Medically Verified Disability:** Children identified with a disability in the national disability (NDIS or the DS-NMDS) or medical services (MBS) record sets, which by their nature, will have required medical verification of that disability for this administrative data to be recorded
- **Developmental Vulnerability:** Children who scored in the lowest 10 percentiles (according to the 2009 national distribution) on two or more domains of the AEDC[3]. This group is not necessarily representative of a 'disability' as per the groups above, but represents a broader group of children with needs that may not be otherwise receiving appropriate supports. Children with Developmental Vulnerability may also be identified in the above two sub-cohorts

Table 2. Record sets used to identify children disability and/or developmental vulnerability.

Cohort		Record sets used to identify cohort
Any Disability 306,982 children	Medically Verified Disability 258,183 children	National Disability Insurance Scheme incl Early Childhood Early Intervention pathway Medicare Benefits Schedule Disability Services-National Minimum Data Set
		Australian Early Development Census – Special Needs Status and Disability Items Nationally Consistent Collection Data on School Students with Disability NSW Disability and Inclusion Program – Higher Learning Support Needs NSW Preschool Disability Support Program NSW DoE Student Disability Data collection: Integration Funding Support and Support Class NSW Annual (Community) Preschool Census NSW Mid-Year Census: Government Preschools and Early Intervention
Developmental Vulnerability 45,147 children		Australian Early Development Census – developmental vulnerability on at least 2 domains (Note: children with *special needs* are not included in this category. These children have already been identified by schools as having substantial developmental needs and there is no data on AEDC domain categories provided for these children).

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[2] Note: the NCCD is a measure of students with a disability who are provided with an in-school adjustment based on teacher judgement or adjustments required and may not necessarily reflect a formal diagnosis of disability.

[3] Developmental vulnerability on ≥2 domains is an established AEDC indicator (DV2); this was a sub-cohort of interest in this report that is referred to as the 'Developmental Vulnerability' sub-cohort.

5.2 Record sets used to define Types of Disability

Disability was categorised differently across the records sets in terms of the number of disabilities recorded and the typology used. Table 3 presents the number of disabilities reported for each child (range 0-21 per child), and the number of disability *types* that could be recorded for a child (range 0-80 types).

Data relating to *disability type* was limited to the available data recorded (see Section 6.2 for prevalence of various types of disability). From the records providing information on the type of disability, we determined a common set of 5 Disability Type categories (including 'Other') among record sets with at least 4 categories recorded. We also determined a common set of 19 Disability Subtype categories (including 'Other') among some record sets with at least 18 categories recorded (Further details regarding composition of these Disability Sub/Types are provided in Appendix A).

Table 3. Number of disabilities and disability type recorded, and proportion of children <7 years identified with disability, per record set.

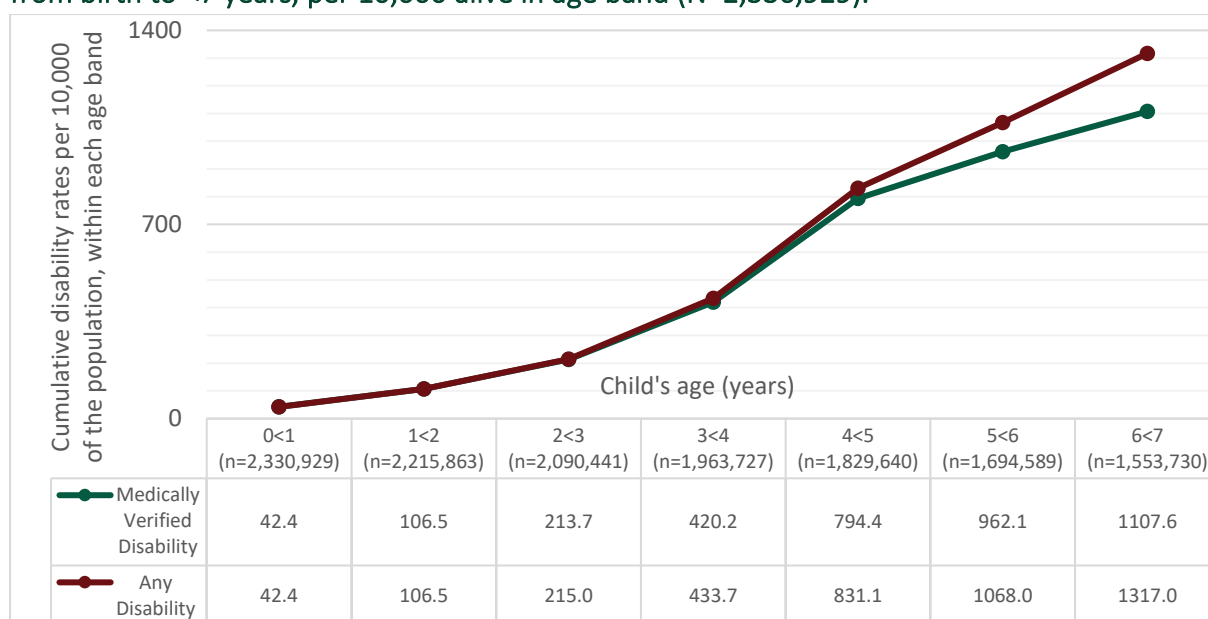| Record Set	Number of disabilities recorded per child	Number of disability types categories	Number of Children	% of NSW Test Case population (N=2,330,929)	% of Any Disability (N=306,982)
National Disability Insurance Scheme	Up to 18	18	40,706	1.8%	13.3%
National Disability Insurance Scheme Early Childhood Early Intervention	Up to 18	18	9,384	0.4%	3.1%
Medicare Benefits Schedule	Up to 6	6	224,010	9.6%	73.0%
Disability Services and Commonwealth State/Territory Disability Agreement National Minimum Data Set	Up to 12	12	45,739	2.0%	14.9%
Nationally Consistent Collection of Data on School Students with Disability	1	4	60,739	2.6%	19.8%
NSW Department of Education Student Disability: Integration Funding Support	1	21	7,567	0.3%	2.5%
NSW Department of Education Student Disability: SCAS (Support Class Administration System)	1	21	12,565	0.5%	4.1%
NSW Preschool Disability Support Program	0	0	5,366	0.2%	1.8%
NSW Disability and Inclusion Program – Higher Learning Support Needs	1	58	3,108	0.1%	1.0%
NSW Annual (Community) Preschool Census	1	80	21,664	0.9%	7.1%
NSW Mid-Year Census: Government Preschools	0	0	997	0.0%	0.3%
NSW Mid-Year Census: Early Intervention	1	11	3,780	0.2%	1.2%
Australian Early Development Census – Special Needs and Disability Diagnoses	Up to 21	21	21,186	0.9%	6.9%

6 Prevalence of disability

6.1 Identification of Disability

Within this NSW Test Case population (N=2,330,929):
- 13.2% (n=306,982) of children were identified with **Any Disability**
- 11.1% (n=258,183) of children were identified with **Medically Verified Disability**

Figure 1 shows the cumulative rate of Any Disability and Medically Verified Disability identified in this Test Case, by age band. The rates are similar for each group until approximately age 5 years where the groups diverge with Any Disability group at a higher rate, as children were starting to reach school age and were therefore captured by the education record sets.

Figure 1. Cumulative identification of disability Any Disability and Medically Verified Disability from birth to <7 years, per 10,000 alive in age band (N=2,330,929).

	0<1 (n=2,330,929)	1<2 (n=2,215,863)	2<3 (n=2,090,441)	3<4 (n=1,963,727)	4<5 (n=1,829,640)	5<6 (n=1,694,589)	6<7 (n=1,553,730)
Medically Verified Disability	42.4	106.5	213.7	420.2	794.4	962.1	1107.6
Any Disability	42.4	106.5	215.0	433.7	831.1	1068.0	1317.0

6.1.1 Identification of Medically Verified Disability

Figure 2 shows the rates, per 10,000, of children identified with a Medically Verified Disability. The MBS record set identified more children with disability, across all age bands with a large spike at age 4 years. Up to age 5 the DS-NMDS identified children with Medically Verified Disability at a greater rate than the NDIS. From age 5 years onwards, the NDIS identified children at a higher rate than the DS-NMDS, this is most likely due to the transition of the DS-NMDS over to the NDIS commencing in July 2013.

Figure 2. Rates of Medically Verified Disability (per 10,000 population) identified within each age band from birth to <7 years, according to record set.
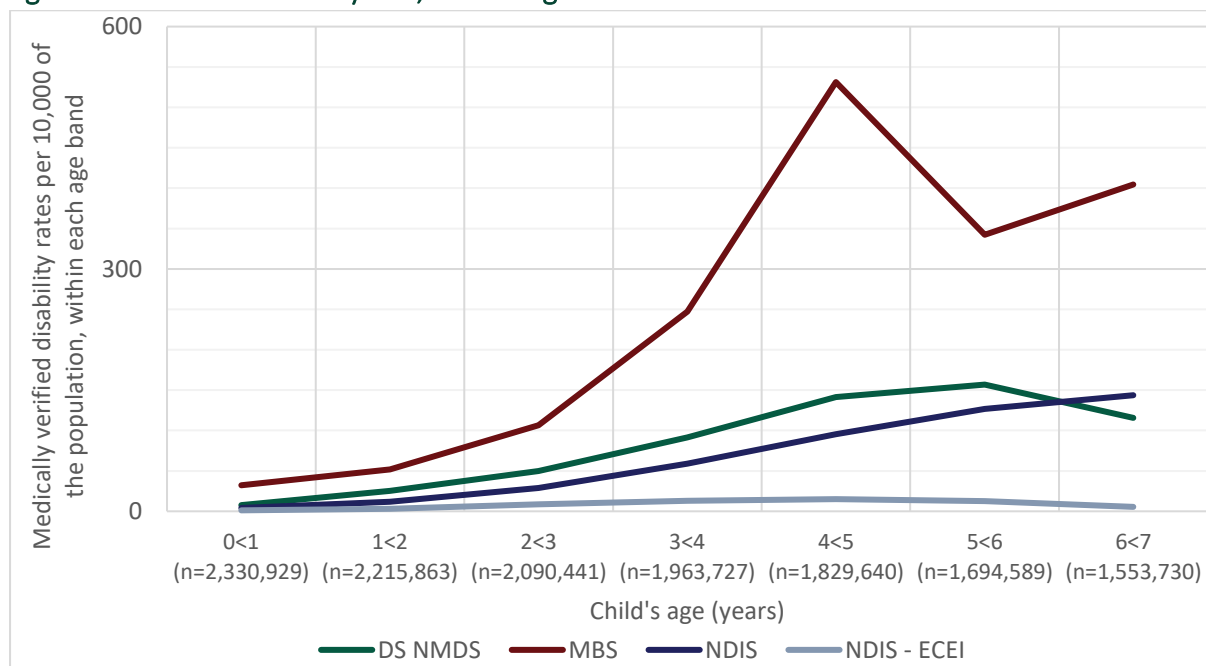
NOTE regarding the use of MBS items to define disability.

MBS items referring to health assessment including items 701 (brief), 703 (standard), 705 (long), 707 (prolonged) are assigned for primary health assessments undertaken for people who meet at least one criteria including intellectual disability (as well as to children at risk of chronic disease; people over 75 years of age; residents of residential aged care facilities; refugees/other humanitarian entrants). Despite these non-relevant criteria, we used these items from the health assessments to attempt to identify Intellectual disability in this Test Case, with knowledge that the age-group under study would not be residents of aged care facilities or over 75 years of age, and despite the potential mis-attribution of disability to a small number of children met other criteria for health-checks under these items.

However, changes in the health assessments to include the 'Healthy Kids Check' service between May 2010 and April 2016 meant that, rather than being primarily a service for children with intellectual disability, universal health checks for 4-year-olds were captured under these MBS assessment items. We therefore did not use these items as indicators of disability in this six-year period, as this would have resulted in nearly all children aged 4 years being (sometimes falsely) presumed to have an intellectual disability.

Owing to these issues, we cannot be sure of the accuracy of rates of intellectual disability. This illustrates how changes in data collection and or policy can impact on the identification of disability and estimates of prevalence.

6.1.2   Identification of Developmental Vulnerability

Among 462,124 children in NSW with an AEDC record between 2009-2018:

- 9.76% (n=45,147) were identified as **Developmentally Vulnerable** (i.e., scoring in the lowest 10 percentiles according to the 2009 national distribution) on ≥2 AEDC domains at school entry

With regard to the specific number of domains on which these children were deemed developmentally vulnerable on in the AEDC (among 462,124 children with data available):

- 4.7% (n=21,817) were developmentally vulnerable on two domains at school entry
- 2.6% (n=11,990) were developmentally vulnerable on three domains at school entry
- 1.5% (n=7,132) were developmentally vulnerable on four domains at school entry
- 0.8% (n=3,768) were developmentally vulnerable on all five domains at school entry

6.1.3   First identification of disability

Figure 3 shows the rates (per 10,000 of the population alive) at which the children were first identified with a Medically Verified Disability. The MBS record set first identified more children with disability, across all age bands with a large spike at age 4 years. Fewer children were first identified in the NDIS-ECEI record set compared to other record sets.

Figure 3. Age of Medically Verified Disability first identified from birth to <7 years, per 10,000 of the population alive.
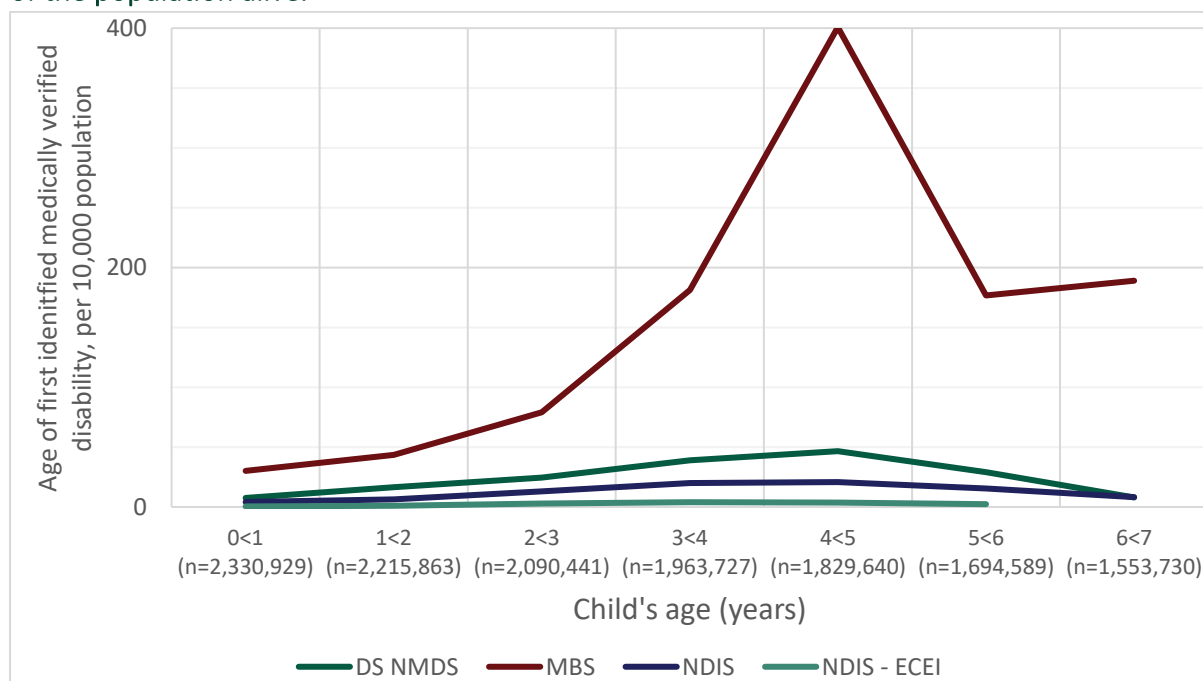
6.2 Types of disability

Information on disability type was available for a total of 296,113 (96.5%) children with Any Disability. That is, for 10,869 children (3.5%) with Any Disability the data available in this test Case provided no information about the type of disability.

Table 3 presented the record sets that provided data for use to define a set of Five Disability Subtypes and 19 Disability Types in children with Any Disability and Medically Verified Disability, respectively. Appendix A provides information about how each type of disability recorded in contributing record sets was classified into these typologies.

6.2.1 Five Disability Subtypes

Children identified with Any Disability were classified into five disability types:

- **Physical/Diverse**: including physical and neurodiverse disabilities (e.g., cerebral palsy, acquired brain injury, chronic health conditions and muscular dystrophy)
- **Intellectual/Learning**: including intellectual and learning disabilities (e.g., autism, down syndrome, spina bifida, intellectual disability)
- **Sensory/Speech:** including sensory and speech impairments (e.g., hearing impairment, visual impairment, apraxia, language delay)
- **Psychosocial**: including psychological and social problems (e.g., anxiety, attention deficit, Tourette's syndrome, behavioural disorders)
- **Other Disability**: including a range of impairments and issues which were captured in the administrative records for disability supports however could not be classified into one of the above categories (e.g., multi-categorical disability, renal failure, malignant neoplasm of brain)

6.2.1.1 Five Disability Subtypes among those diagnosed with Any Disability

Of the children identified with Any Disability (N=306,982):
- 14.9% (n=45,847) had a disability characterised as Physical/Diverse
- 55.0% (n=168,745) had a disability characterised as Intellectual/Learning
- 18.5% (n=56,775) had a disability characterised as Sensory/Speech
- 39.6% (n=121,522) had a disability characterised as Psychosocial
- 6.9% (n=21,119) had a disability characterised as Other Disability

These groups are not mutually exclusive; that is, children with multiple disabilities could be represented in multiple disability types. The proportion of children with each disability type are presented in Figure 4, by age band. Figure 4 shows a peak in the identification of Intellectual/Learning Disability at age 4 years that may reflect the increased capacity for identification when beginning formal preschool. Conversely, the decrease in identification of Physical/Diverse and Sensory/Speech Disability types at school entry likely reflects these types of disabilities being identified at much younger age.

Figure 4. Classification of disability type among children with Any Disability, according to 5 disability types (N=306,982), by age band.
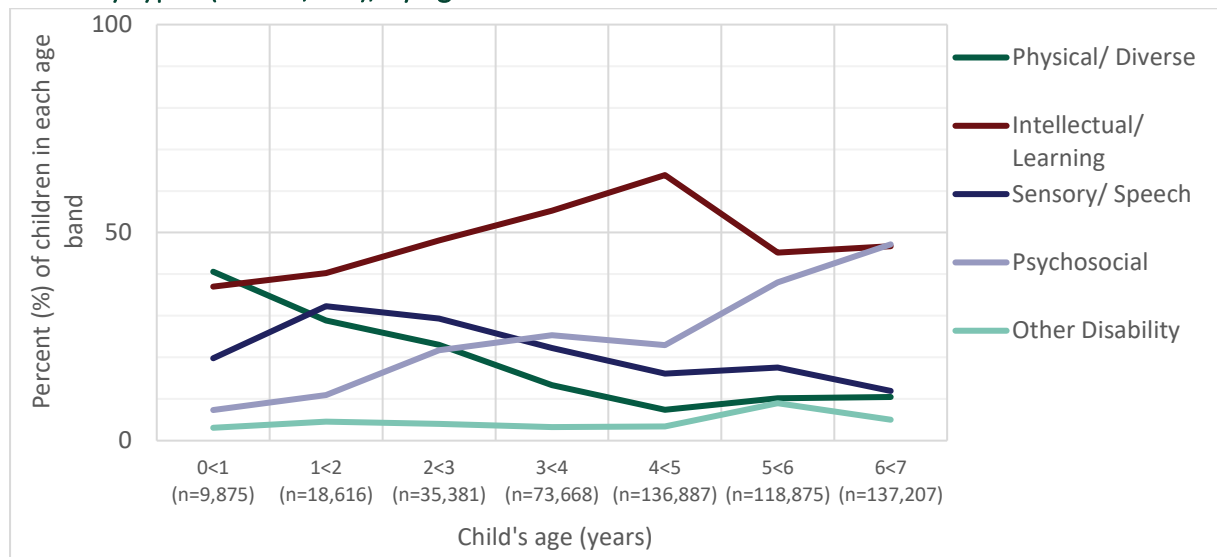
6.2.1.2 Single and Multiple Disability Subtypes

Of the children with Any Disability (N=306,982), 69.7% (n=213,830) children were identified with a single disability and 26.7% (n=82,065) children had multiple disabilities. Of the children with multiple disabilities, Figure 8 shows the rate per 10,000 children identified with a disability, for each combination of disability types.

Figure 5. Multiple disability types per 10,000 of the population of children with Any Disability.
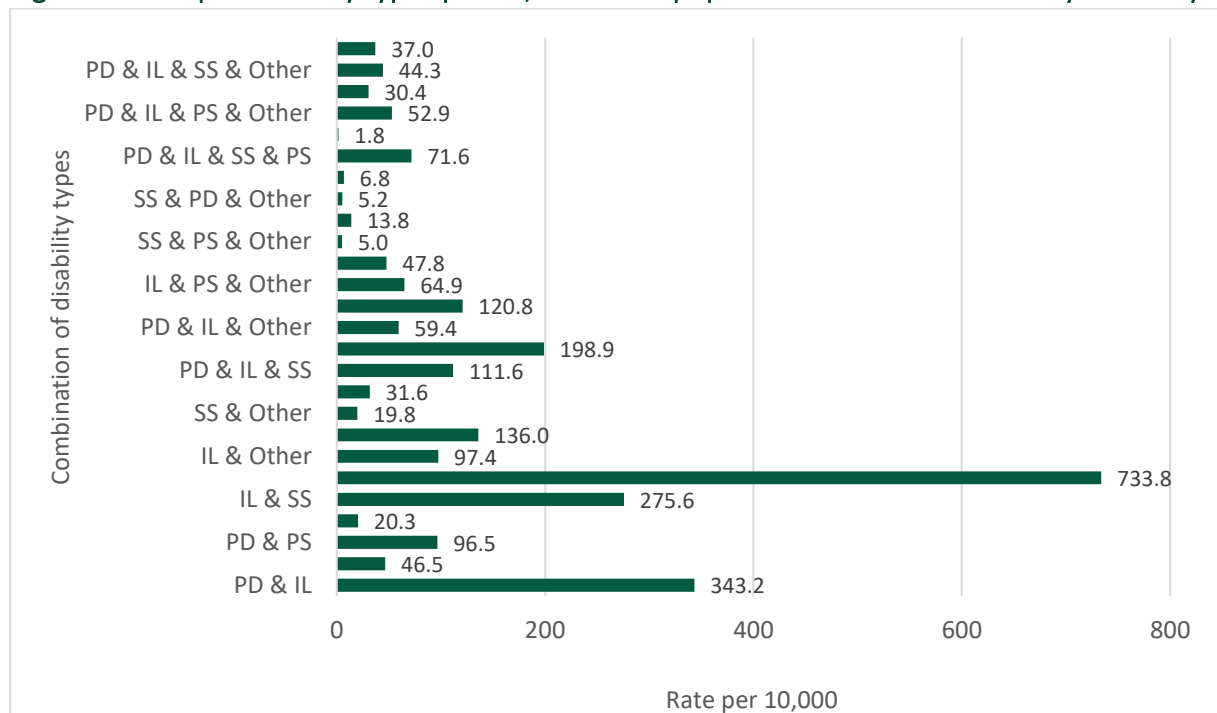
Note: PD = Physical/Diverse Disability; IL = Intellectual/Learning Disability; SS = Sensory/Speech Disability; PS = Psychosocial Disability; Other = Other Disability.

6.2.2 Nineteen Disability Subtypes

Children identified with Medically Verified Disability were further classified into 19 disability subtypes (See Appendix A).

The 19 Disability Types were:

1. Cerebral Palsy
2. Spinal Cord Injury
3. Acquired Brain Injury
4. Multiple Sclerosis
5. Stroke
6. Other Physical
7. Other Neurological
8. Chronic Health Conditions
9. Autism
10. Down Syndrome
11. Intellectual Disability
12. Developmental Delay
13. Global Developmental Delay
14. Hearing Impairment
15. Visual Impairment
16. Other Sensory/Speech
17. Psychosocial Disability
18. Other Disability
19. Missing (see Appendix A).

The proportion of children with each of these 19 disability types among the Medically Verified Disability sub-cohort is presented, by age-band, in Figure 6.

Figure 6. Classification of disability subtype among children identified with Medically Verified Disability according to 19 Subtypes (n=258,183).
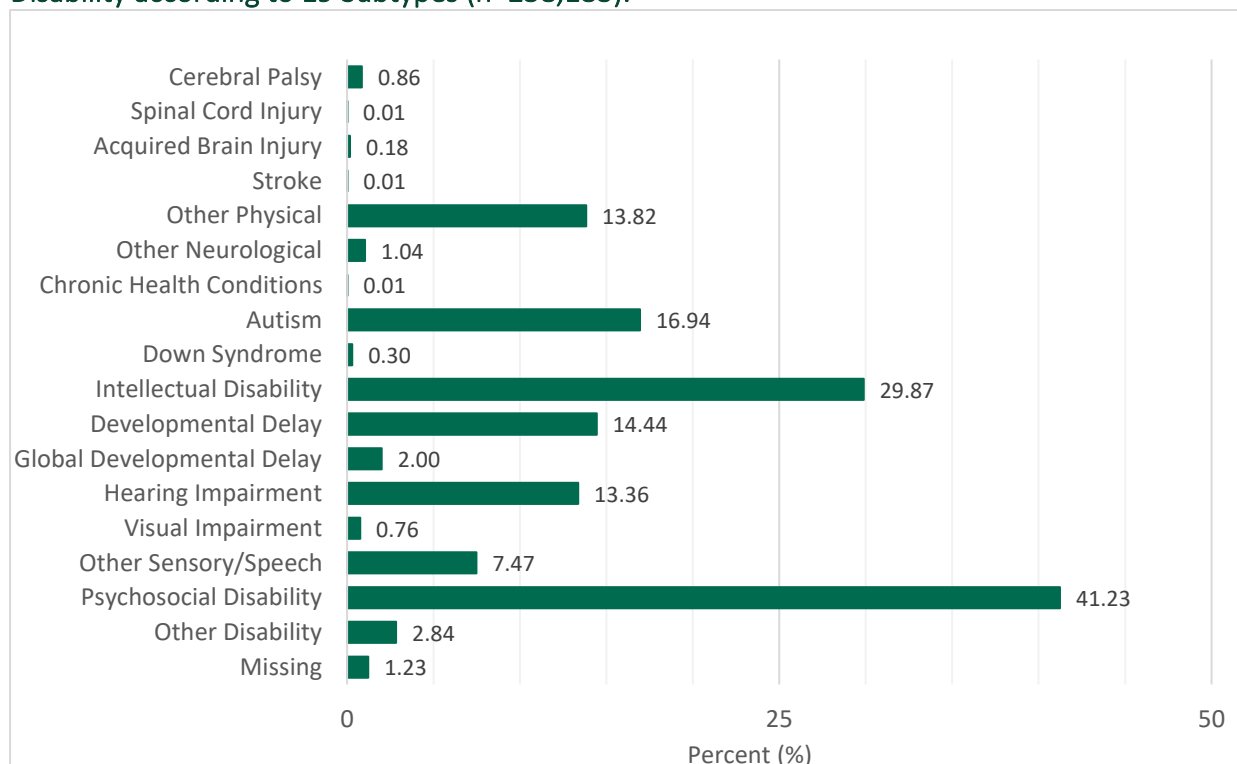
7   Support services provided to children with disability

Support services were categorised into those pertaining to health, education (preschool and school), and social (targeted disability services, child protection services and other childcare) supports. Definitions for each of these categories are provided in their respective sub-sections below.

7.1.1   Key insights

- Of the children with Any Disability (N=306,982), 99.99% (n=306,945) had accessed any kind of health, education or social support service before adulthood (<18 years), specifically:
    - 99.7% (n=306,184) accessed health support services (<18 years)
    - 80.6% (n=247,423) attended Early Childhood Education services (<7 years)
    - 56.7% (n=173,918) attended NSW Government schools (5 to <18 years)
    - 25.9% (n=79,548) came to the attention of child protection services (<18 years)
    - 46.5% (n=142,612) children accessed childcare under the CCS/CCB (<17 years)
    - 48.0% (n=147,364) accessed a targeted disability support service (<18 years)

- A higher proportion of children with Any Disability had at least one contact with the child protection services (25.9% compared to 12.4% of children with No Disability)

- More than 1 in 3 children (37%) who had been placed in out of home care were identified with a disability, which is nearly 3 times higher than the disability prevalence rate for children before the age of 7 (13.2%).

7.2 Health support service use

NSW and Commonwealth health supports were examined for services delivered through NSW's primary and secondary health network, namely hospitals and general practitioners (GP). Data was available up to a maximum age of 18 years for children in this cohort, and health services provided under the Medical Benefits Scheme (MBS) that were available up to a maximum age of 7 years for children in this cohort, only for the flagged group in this Test Case (see descriptions of Data Linkage processes on page 8).[4]

Data presented below therefore represents:

- Emergency department presentations (for any reason) to NSW hospitals (captured by the EDDC)
- Admissions (for any reason) to NSW hospitals (captured by the APDC)
- Mental health services subsidised under Medicare (captured by the MBS)
- General practitioner (GP) services subsidised under Medicare (captured by the MBS).

7.2.1 Key insights

- Of children with Any Disability (N=306,982):
  - 99.7% (n=306,184) had received a health support service (<18 years)
  - 99.5% (n=305,418) had seen a GP, subsidised under Medicare (<7 years)
  - 35.6% (n=109,341) had accessed a mental health service subsidised under Medicare (<7 years)
  - 78.5% (n=240,848) had at least one emergency department presentation in NSW (<18 years)
  - 47.6% (n=146,000) had at least one hospital admission in NSW (<18 years)

- A higher proportion of children with disability used GP services, and had emergency department and hospital admissions in their first 3 years of childhood, whereas mental health service use was highest in older children with disability (4-7 years).

7.2.2 Health supports and disability sub-cohorts

The proportion of health services (e.g., at least one ED presentation) accessed by children who were identified with Any Disability or with Developmental Vulnerability is presented in Figure 7. These data suggest that a higher proportion of children with disability access each health service than children who *do not* have an identified disability.

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[4] It was not possible to compare the use of Commonwealth health services among children with and without disability owing to the flagging procedure used to identify vulnerable children for whom Commonwealth data was made available to the research team.

The proportion of children receiving these types of health services among Any Disability or Developmental Vulnerability sub-cohorts are presented in Figure 8. Similar patterns of health service use were evident for children with Any Disability and Developmental Vulnerability, with the exception of mental health services which was not accessed as often by those children identified with Developmental Vulnerability.

Figure 7. Proportion of children with Any Disability, Developmental Vulnerability, and No Disability who accessed specific health services.
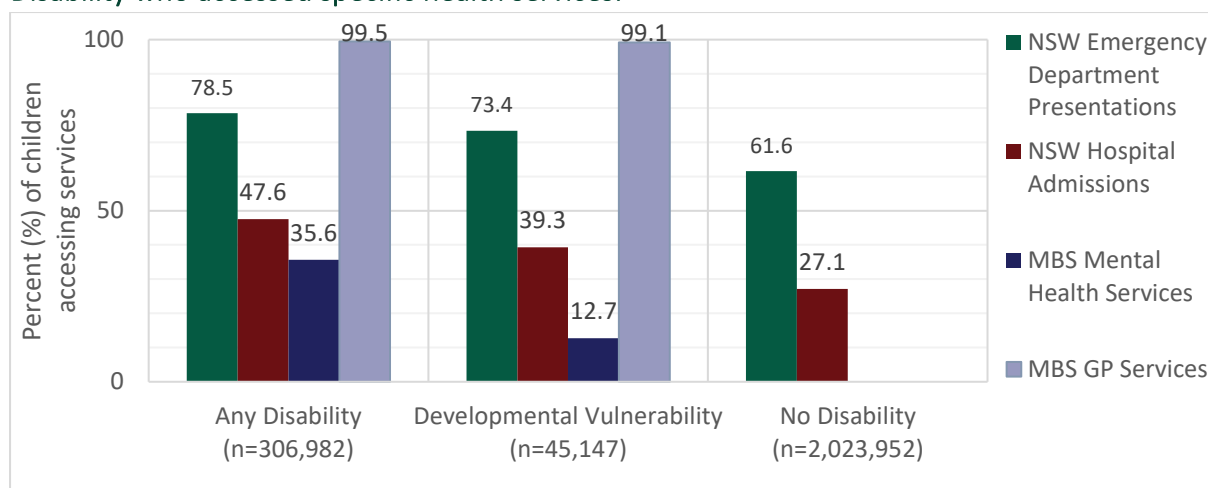
Note, there is no data available for MBS services for the sub-cohort of children with No Disability because of the "flagging" of children for whom Commonwealth data was provided to researchers.

Figure 8. Proportion of service events for children with Any Disability, Developmental Vulnerability, and No Disability.
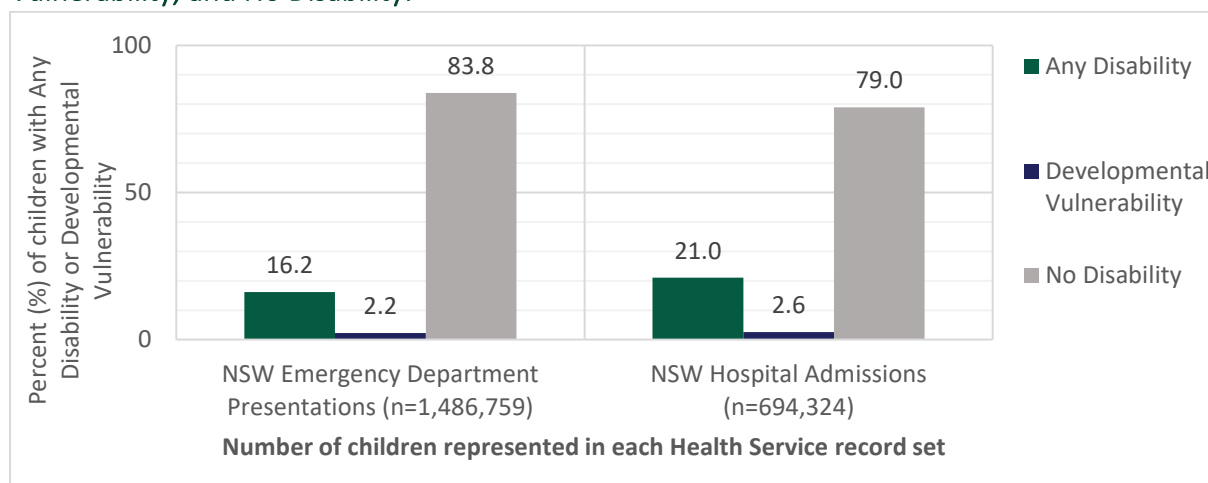
### 7.2.3 Age of health support use (individual health events)

The proportion of health services used at different ages are presented in Figures 9 and 10 for children with Any Disability and Developmental Vulnerability, respectively. For NSW health service events, data was available to report age-bands spanning 'birth to <3 years', '3 to <7 years' and '7 to <18 years', whereas Commonwealth health service events were limited to the first two age bands (owing to these data provided up to age 7 years).

Figure 9. Health service events by age band for children identified with Any Disability.
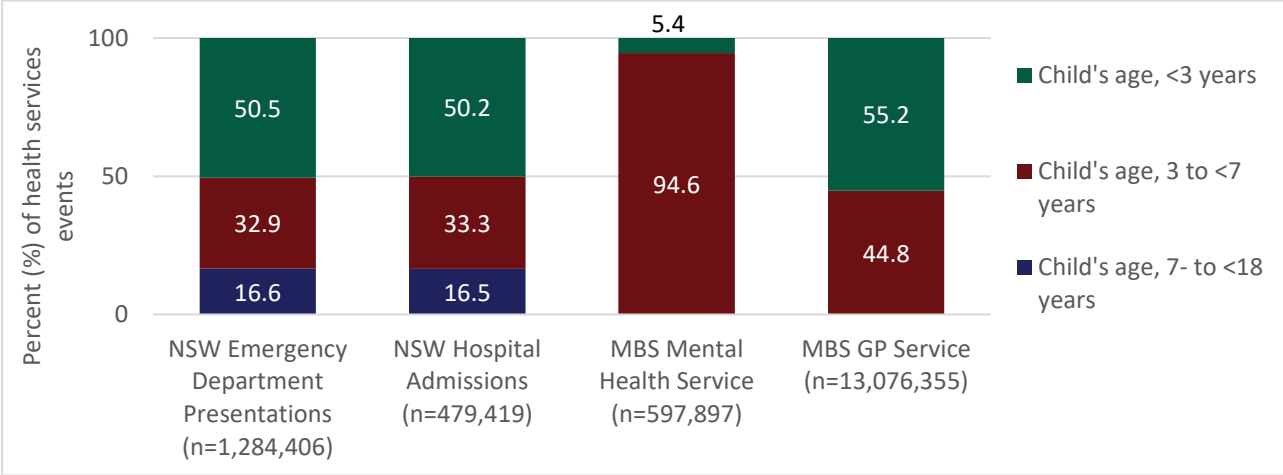

A higher proportion of health service use (with the exception of mental health services) was evident at a younger age (0 to <3 years) among children identified with a disability. For example, the first bar in Figure 9 shows that, for children with Any Disability, 50.5% of emergency department presentations occurred between birth and age <3 years, 32.9% occurred between age 3 and <7 years, and 16.6% occurred between age 7 and <18 years. This pattern was not as stark among children with Developmental Vulnerability (Figure 10).

Figure 10. Health service events by age band for children with Developmental Vulnerability.
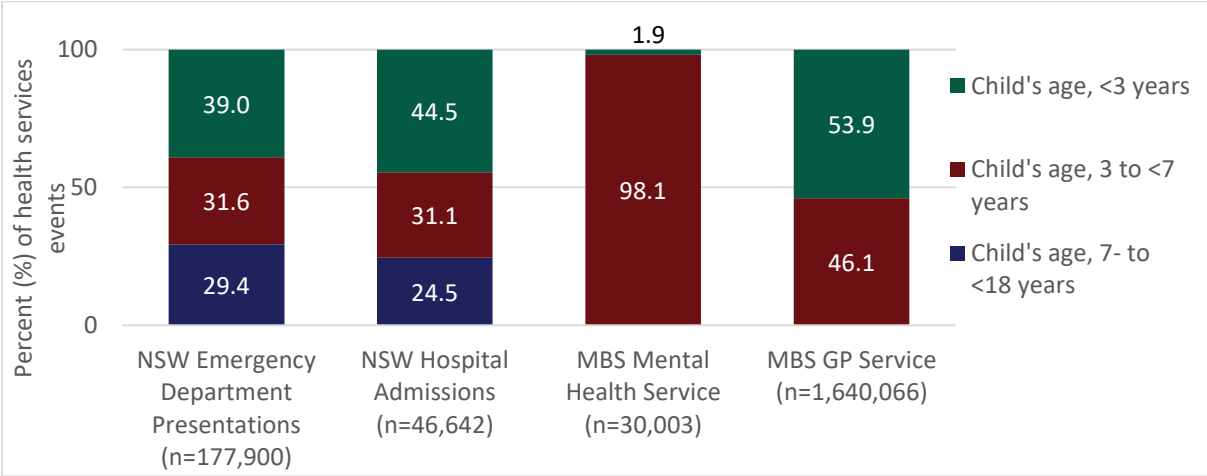
The proportion of children within each sub-cohort who received at least one health services in each age band, are presented in Figures 11 and 12 for State and Commonwealth-provided health services, respectively. Figure 11 shows that for the children with Any Disability, 62.2% had at least one emergency department presentation between birth and age <3 years, and 33.3% had at least one hospital admission in this age band.

Figure 11. NSW health service events (up to age 18 years) among children identified with Any Disability or Developmental Vulnerability.
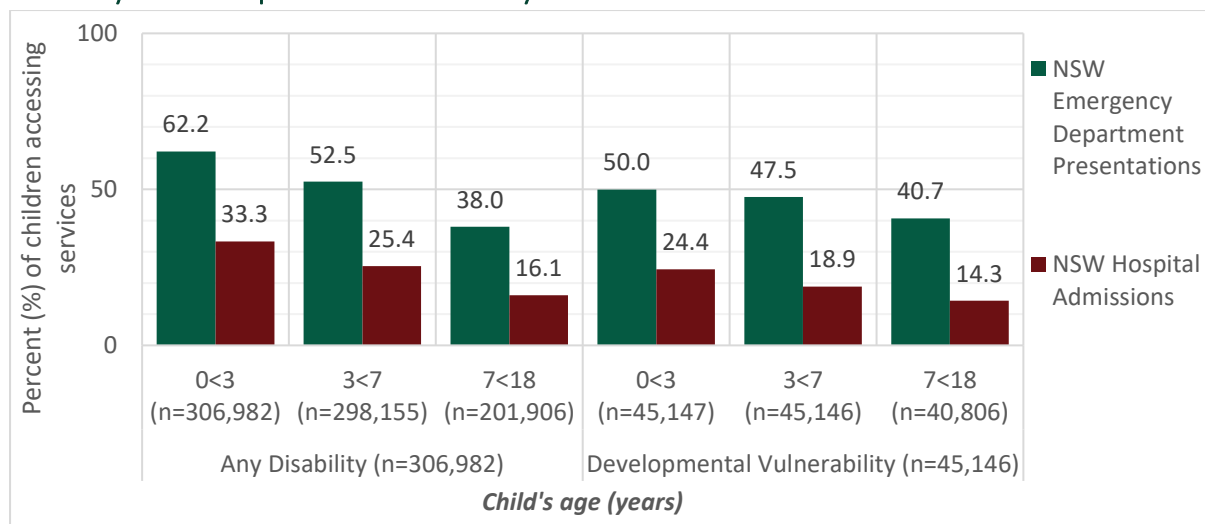
Note. The NDDA Test Case cohort is convened from children with a range of birth years, as such the whole cohort will not be represented in all age bands (the sample size under each age band represents the number of children in each set).

Figure 12. MBS health service events (up to age 7 years) among children identified with Any Disability or Developmental Vulnerability.
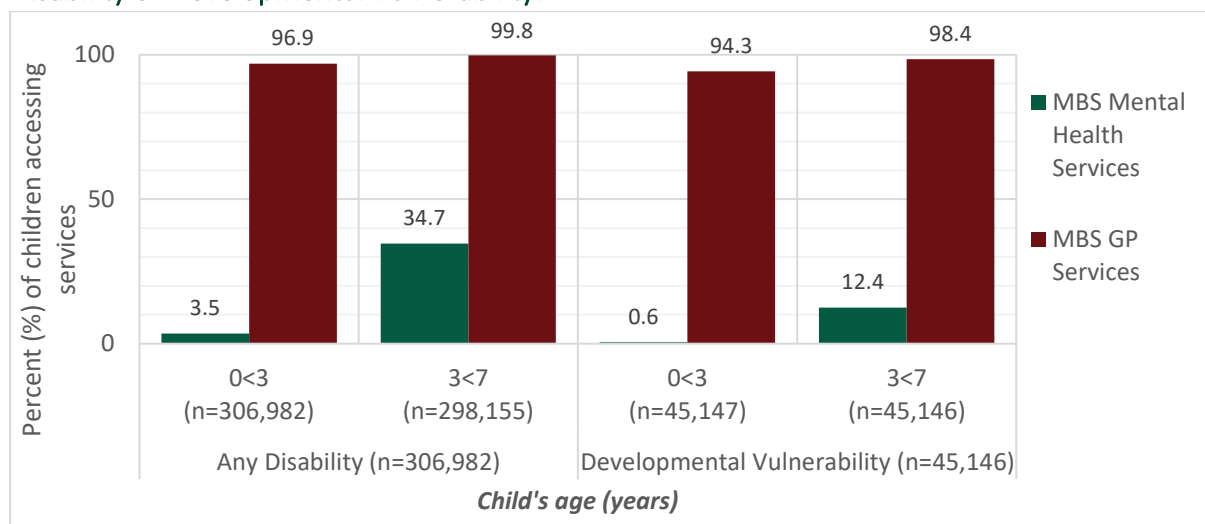

Note. The NDDA Test Case cohort is convened from children with a range of birth years, such that the entire cohort will not be represented in all age bands (please see the sample size for the number of children captured in each age-band).

7.2.4   Health supports and disability types

The proportion of children with each disability type who received at least one of each health service is presented in Figure 13. A similar pattern of health service use was evident for all disability types, with the exception of mental health service use which was substantially higher for children with a Psychosocial disability (i.e., more than 87% of children with Psychosocial disability received at least one MBS mental health services before age 7 years).

Figure 13. Proportion of children within each disability type who accessed health support services.
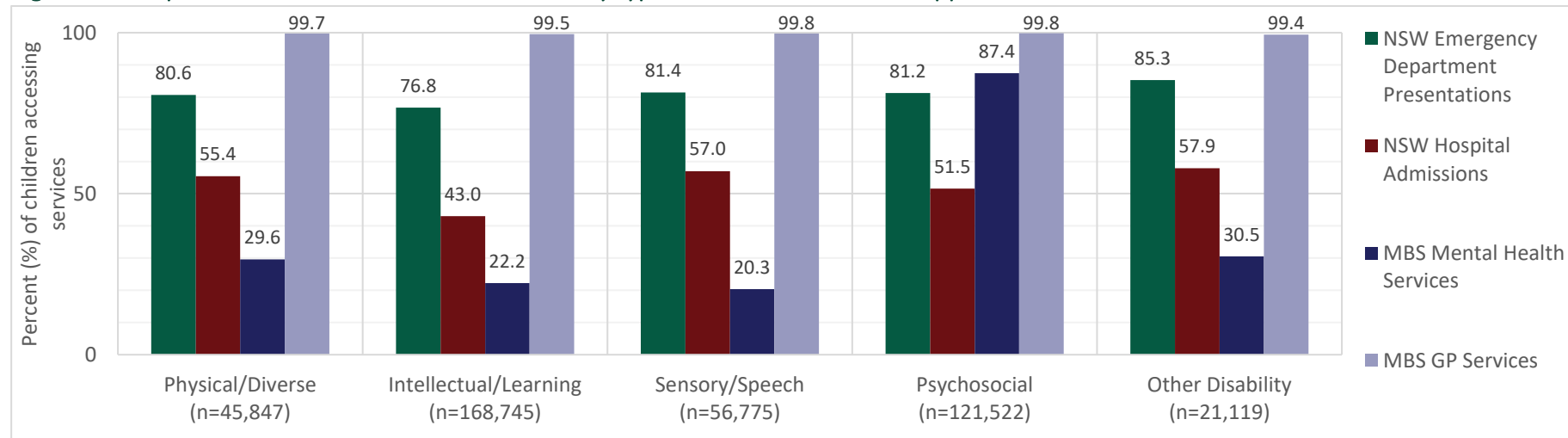
7.2.5 Health supports according to the severity of functional limitation

Access to health supports can vary between children with different levels of functional limitation. Information about the severity of disability was available for children with NDIS records, in which the NDIS provides ratings for low, medium, or high functional limitation.

Figure 14 presents the proportion of children within each level of functional limitation (low, medium, or high) who accessed state and commonwealth -supported health services. It is perhaps not surprising that GP services were accessed universally by the NDIS cohort, regardless of their level of functional limitation. However, a greater proportion of children with medium functional limitation accessed at least one mental health service (51.3%), relative to children with high (39.5%) and low functional limitation (33.2%).

Access to state government health services were similar among children with different levels of functional limitation: over 75% of children had at least one emergency department presentation and around 50% had at least one hospital admission, before age 17 years, with the highest proportion of state-based health service use among those with high functional limitation.

Figure 14. Health support services according to the level of functional limitation.
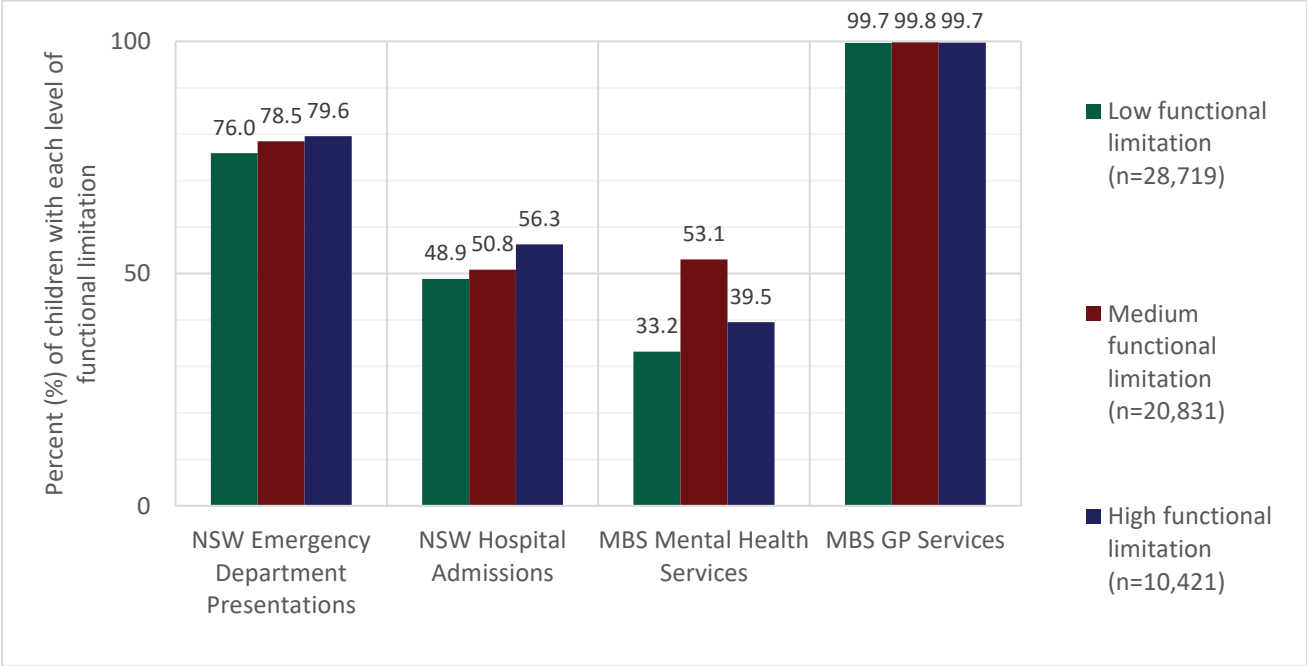
7.3 Education support services

Education supports[5] examined in this Test Case included:

- **Early Childhood Education (ECE) services** for children who were enrolled in a preschool program in NSW Community Preschools, Government Preschools or Centre-Based Day Care (such as Long Day Care and Occasional Care)
- **School-based education services** for children who were enrolled in NSW Government schools (typically aged 5-17 years) including those in supported classes, mainstream classes, schools for specific purposes (all of whom may have been the subject of school-based adjustments for disability).

7.3.1 Key insights

Early Childhood Education services

Among the children in this Test Case Identified with Any Disability (n=306,982):

- 80.4% (n=246,688) attended an Early Childhood Education service
- 21% (n=64,608) attended an NSW Government or Community Preschool
- 70.6% (n=216,836) attended Centre-based Day Care
- Almost half (47.8%, n= 3,780) of those enrolled in NSW Government Preschools received preschool disability supports (i.e., n=7,907 with disability enrolled in NSW Government Preschools).

School-based education services

Among 173,918 students with disability (prior to age 7 years) who attended NSW Government schools (aged 5 to <18 years):

- 90.5% (n=157,364) attended a mainstream school only
- 5% (n= 8,755) attended schools for specific purposes only

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[5] Age restrictions apply to early childhood services and should be considered when interpreting information presented in this section. Specifically:
- APC data captures children aged 2-6 years;
- MYC-EI and MYC-GP data capture children aged 3-5 years;
- PDSP and DIP-HLSN data captures children aged 3-6 years;
- CCS/CCB (centre-based) data captures children aged 0-6 years;
- ECE (Early Childhood Education services, includes APC, MYC-GP and CCS/CCB [centre-based]) captures children aged 0-6 years.

7.3.2 Early Childhood Services

Early Childhood Education services represent services delivered in:
- NSW Government Preschools (captured by the MYC-GP record set)
- NSW Community Preschools (captured by the APC record set)
- Centre-based Day Care (captured by the CCS/CCB record set).

Targeted disability services provided in preschools include:
- 'Government Preschool Early Intervention' classes, which provide targeted disability services delivered through NSW Government Preschools (captured by the MYC-EI record set)
- 'Preschool Disability Support Program' which provides targeted disability services delivered through NSW Community Preschools (captured by the PDSP record set)
- 'Disability and Inclusion Program – Higher Learning Support Needs' which provides targeted disability services delivered through NSW Community Preschools (captured by DIP-HLSN record set)[6].

Disability-specific financial supports for early childhood services included provision for:
- Community and Government Preschools funded by the NSW Government (captured by the APC and MYC-GP record sets)
- Centre-based Day Care attendance subsidised under the Child Care Subsidy/Benefit Schemes which may be funded by either the NSW or Commonwealth Governments (captured by the CCS/CCB record set).

7.3.2.1 Early Childhood Education services

The proportion of children in each sub-cohort who were enrolled in Early Childhood Education services is presented in Figure 15, showing that 77.9% of children with Any Disability enrolled in an ECE service, with the majority enrolled in Centre-based day care.

Figure 15. Early Childhood Education support service types accessed by children in each disability sub-cohort.
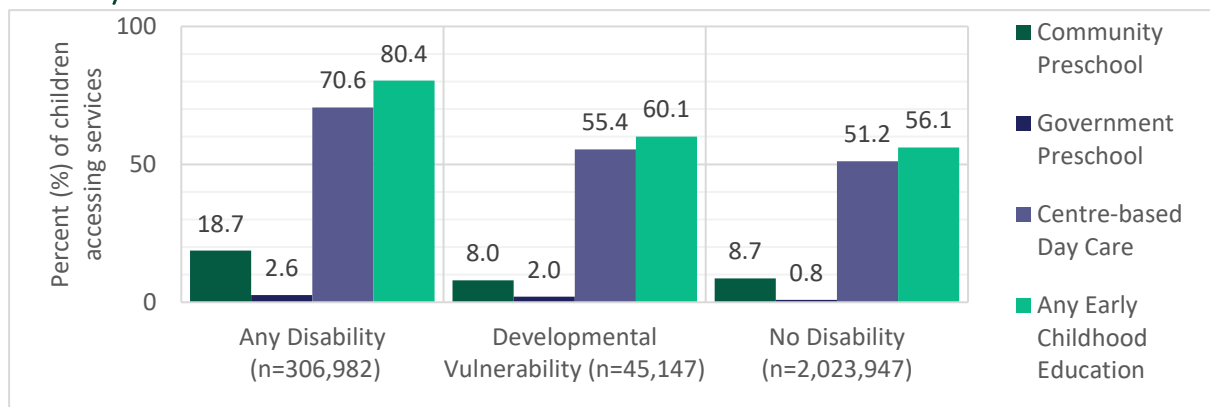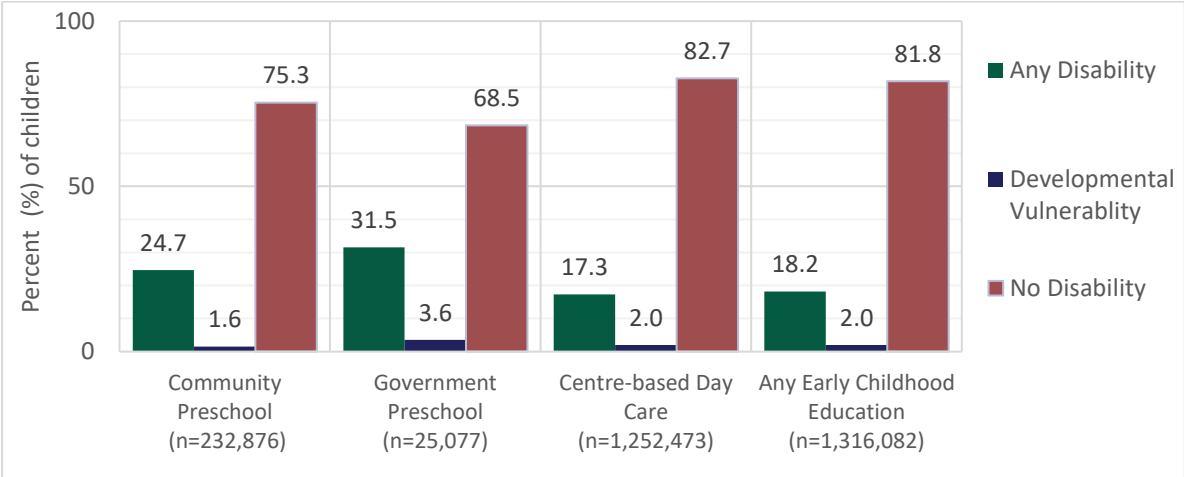

Note: Children with No Disability may be represented in the Developmental Vulnerability group.

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[6] The Disability and Inclusion Program superseded the Preschool Disability Support Program in 2018.

Conversely, the proportion of children receiving Early Childhood Education services who were identified with Disability or Developmental Vulnerability is presented in Figure 16. This shows that a higher proportion of children enrolled in Community Preschools and Government Preschools were identified with disability than the proportion identified in other Early Childhood Education service types. This is likely due to the targeted disability services operating in these preschool settings.
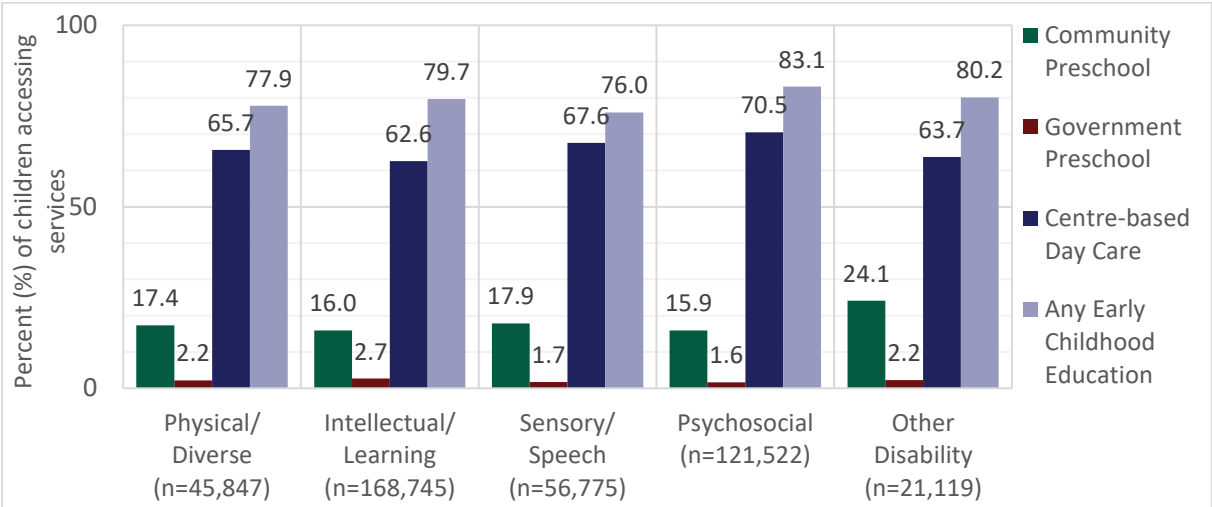
Figure 16. Proportion of children with Any Disability or Developmental Vulnerability who accessed Early Childhood Education support services.

Note: Children with No Disability may be represented in the Developmental Vulnerability group

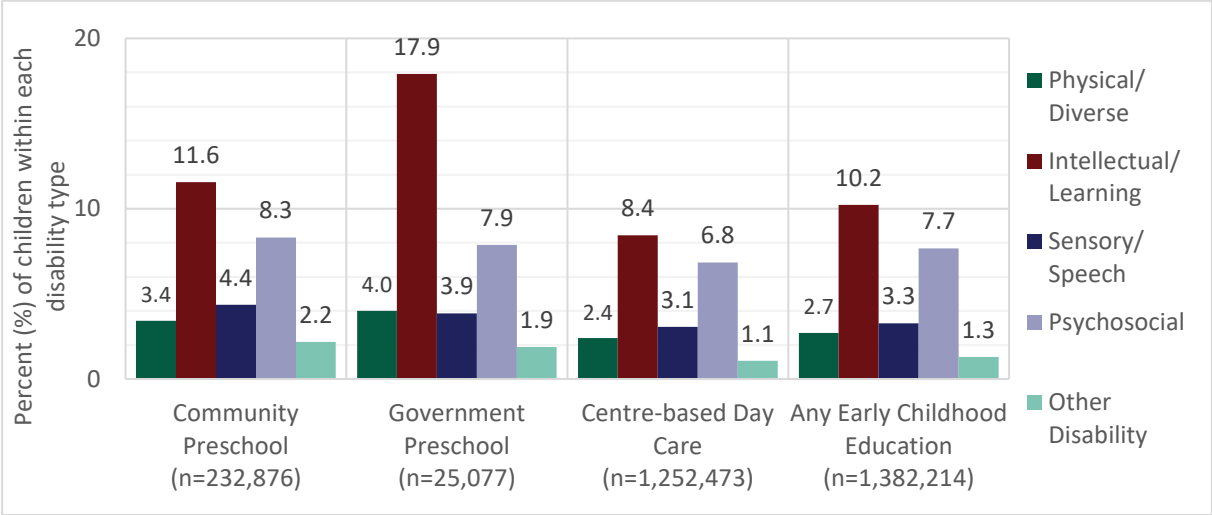The proportion of children within each disability type who accessed Early Childhood Education services is presented in Figure 17. This shows that variety of Early Childhood Education services were being accessed by children with different disabilities in a broadly consistent pattern regardless of their disability types.

Figure 17. Early Childhood Education services accessed by children with different disability types.

Conversely, the proportion of children receiving Early Childhood Education services who were identified with each disability type is presented in Figure 18. This shows that the predominant types of disabilities present in all preschool settings are Intellectual/Learning disabilities, followed by Psychosocial disabilities.

Figure 18. Early Childhood Education service use according to disability type.

7.3.2.2 Targeted disability services in Early Childhood Education settings

The proportion of children who received targeted disability services who were identified in each disability sub-cohort is presented in Figure 19. All children were identified with a disability by nature of accessing these services. It is worth noting that most of these children had a Medically Verified Disability, indicating these services were mostly targeting children with an official medical diagnosis.

Figure 19. Proportion of children in receiving targeted disability services by sub-cohort.
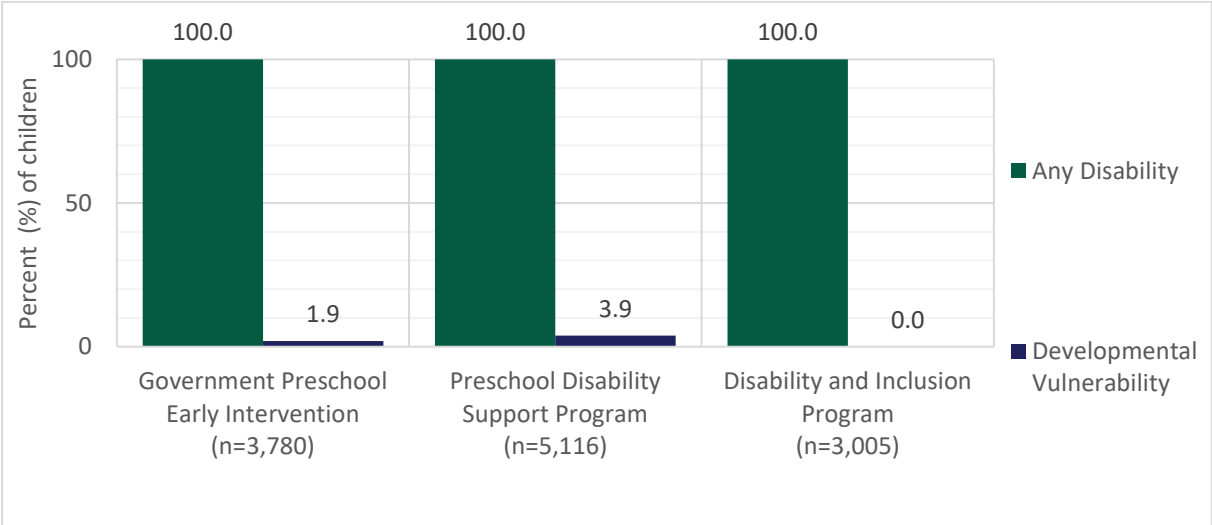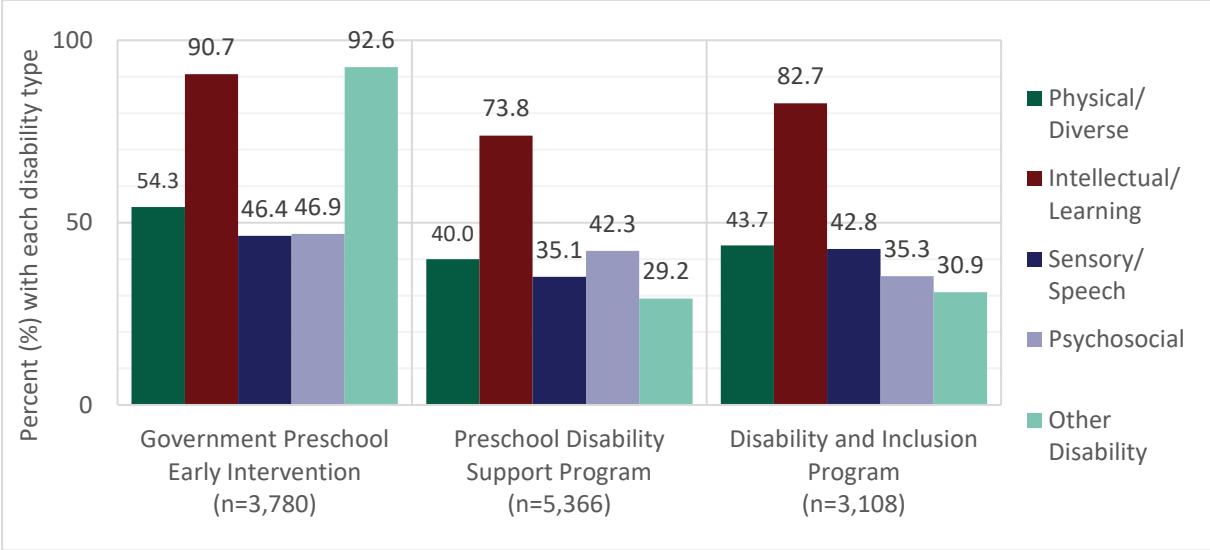
Figure 20 shows the proportion of children receiving Targeted Disability Supports by disability type. Children with Intellectual/Learning disability are highly represented among those accessing all type of preschool support programs, alongside a high proportion of children receiving Government Preschool intervention categorised in the 'Other' disability type.

Figure 20. Percentage of children accessing each Early Childhood Education service according to disability type.

7.3.2.3 NSW Government and Commonwealth funded Early childhood services

The proportion of children within each sub-cohort who were provided State and/or Commonwealth funded early childhood services is presented in Figure 21. A higher proportion of children with Any Disability and Developmental Vulnerability were enrolled in Early Childhood Education services than the proportion of children with no disability. This is likely a result of the NSW targeted funding program towards the ECE sector in recent years.

Figure 21. Early childhood services accessed by children in each sub-cohort.
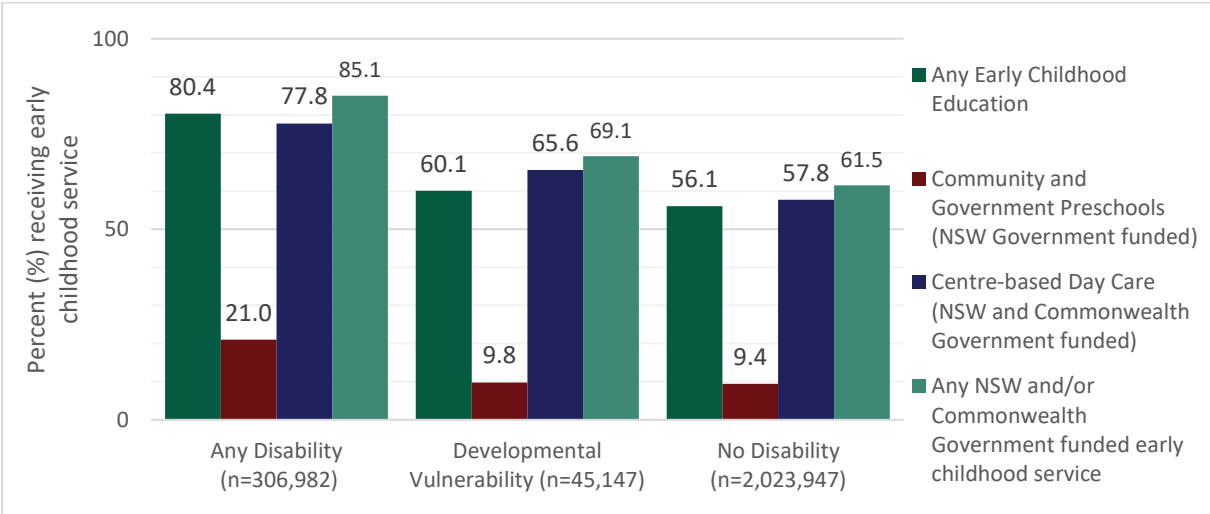
Note: Children with No Disability may be represented in the Developmental Vulnerability group.

7.3.3   School based supports

School-based supports included services delivered in NSW Government schools via:

- 'Specialist support classes' in mainstream schools, in which school-based financial adjustments are available for students with moderate to high level learning and support needs to attend a specially supported class in mainstream or school for specific purpose (captured by the ESC-SC record set)
- 'Integration funding support', in which schools are helped to provide financial adjustments for students with disability who have moderate to high level learning and support needs to attend mainstream classes within a mainstream school (captured by the ESD-IF record set)
- 'Mainstream classes' (within a mainstream school, captured by the SER record set)
- 'Schools for specific purposes' (previously known as special schools), provide specialist and intensive support in a dedicated setting for students with moderate to high learning and support needs (captured by the SER record set).

Information on school-based supports was limited to a subsample of 173,918 children with a disability who were enrolled in NSW Government schools. This subsample was further restricted to a sample of 167,485 children who were born before 2015, of which 94.0% were enrolled in a mainstream school only. Disability support was delivered to:

- 12.5% (n=21,665) via specialist support classes (captured in the ESD-SC)
- 9.0% (n=15,702) via integration funding support (captured in the ESD-IF)
- 5.0% (n=8,755) via schools for specific purposes (captured though the SER).

Reminder: Given the focus on Early Childhood diagnosis of disability in this Test Case, the disability sub-cohort required a disability diagnosis before age 7 years; thus, there may be children represented in the No Disability sub-cohort who received a disability diagnosis after age 7 years. Owing to this methodology, it is not unexpected that there are children classed here as having No Disability who are nevertheless receiving support from the Integration Funding Support program (which requires a disability diagnosis); children within the No Disability sub-cohort who received support under this program will have had a diagnosed disability after age 7 years.

The proportion of children within each sub-cohort who received school-based disability supports services is presented in Figure 22, showing that 5.9% of children with Any Disability received integration support to attend a mainstream (Government) class, and 59% attended a mainstream class without such support. A higher proportion of children with Developmental Vulnerability attended schools for specific purposes than children with disability (Figure 22).

Figure 22. Proportion of children who accessed school-based support services within each disability sub-cohort (for children born between 2003-2015).
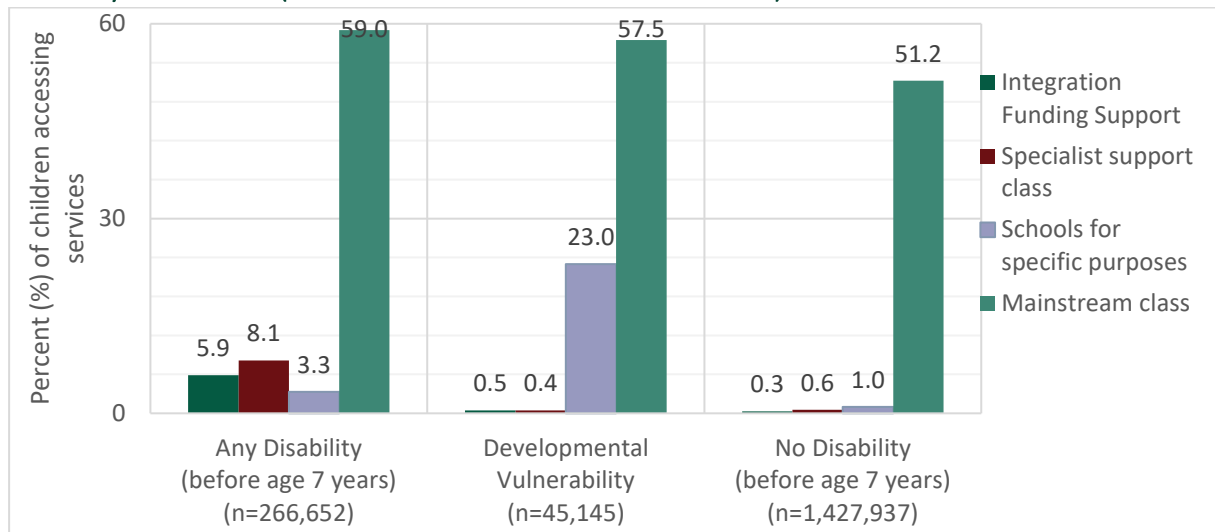
Note: Children with No Disability may be represented in the Developmental Vulnerability sub-cohort. Only children with a disability diagnosis before age 7 years are included in the Any Disability sub-cohort. Some children represented in the school-based supports groups for the Developmental Vulnerability and No Disability sub-cohorts will include children diagnosed with a disability after age 7 years.

Conversely, the proportion of children receiving school-based disability support services identified with Disability or Developmental Vulnerability is presented in Figure 23, showing that 77.6% of children for whom integration funding support was provided for their attendance in mainstream (Government) classes were identified with Any Disability; in contrast, 17.7% of children attending mainstream classes were identified with Any Disability.

Figure 23 Proportion of children accessing school-based support services who were identified in the Disability or Developmental Vulnerability sub-cohorts (for children born between 2003-2015).
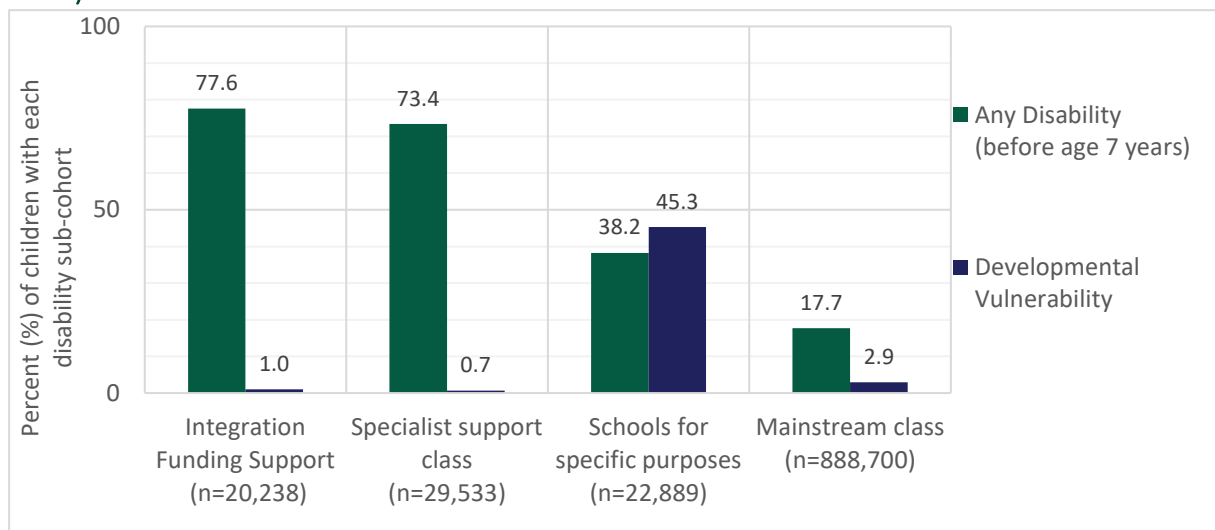
Note: Only children with a disability diagnosis before age 7 years are included in the Any Disability sub-cohort. The IFS program requires all students to have a disability confirmation however, some students will have received their diagnosed disability after 7 years of age. Some children represented in the Developmental Vulnerability sub-cohort may include children diagnosed with a disability after 7 years.

The proportion of children with each disability type who received school-based disability support services is presented in Figure 24; showing that 12.5% of children with a Physical/Diverse disability received disability support delivered though mainstream (Government) classes.

Figure 24. Access to school support services by children with each disability type (for children born between 2003-2015).
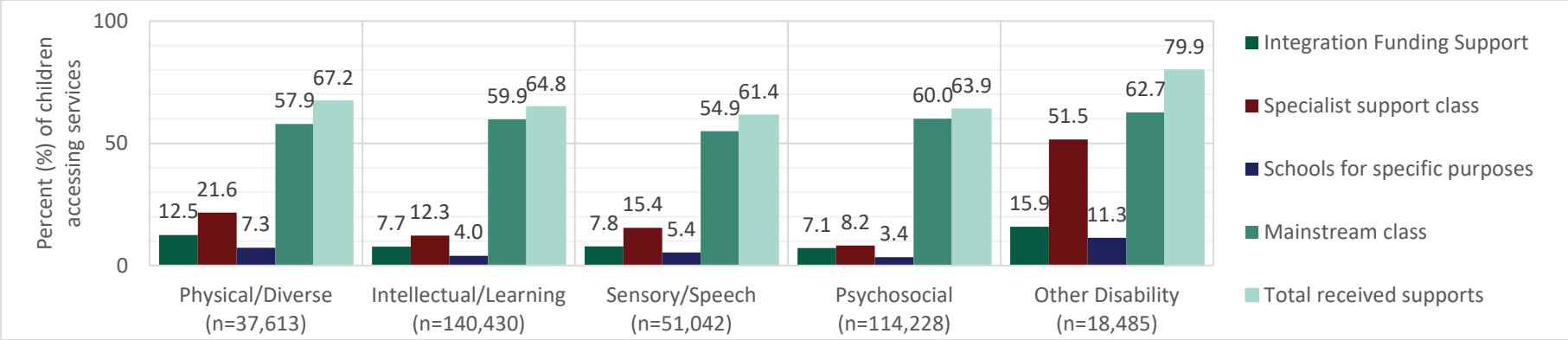
Conversely, the proportion of children receiving school-based disability support services according to each disability type is presented in Figure 25; 53.4% of children Integration Funding Support to attend mainstream (Government) classes had an Intellectual/Learning Disability.

Figure 25. Proportion of children diagnosed with disability before age 7 years who accessed school support services according to disability type (for children born between 2003-2015).
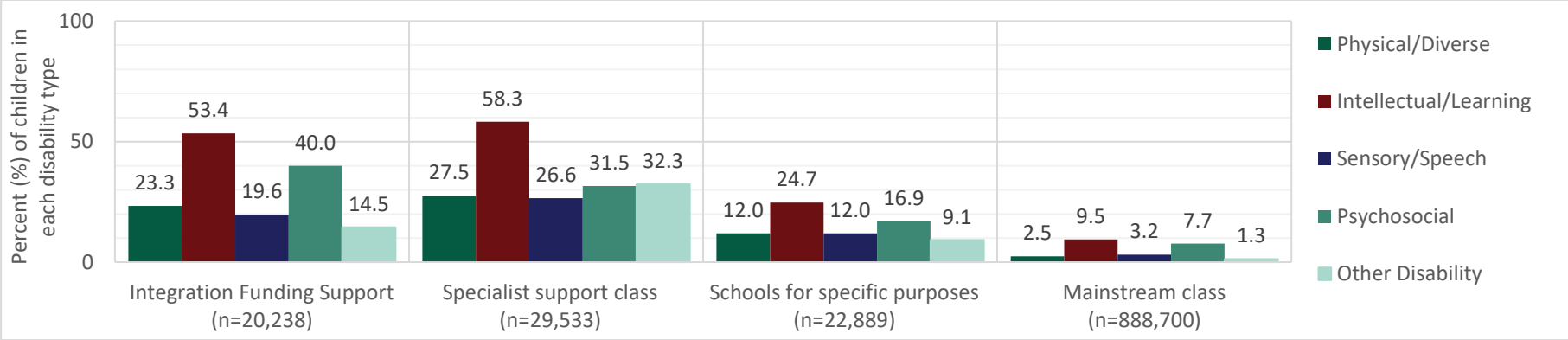
7.4 Social support service use

Social support services included targeted health and welfare services provided to children via the National Disability Insurance Scheme (NDIS), the NDIS Early Childhood Early Intervention (NDIS-ECEI) gateway, or by child protection services, or childcare services (distinct from Early Childhood Education services). These childcare services included financial support for family day care, out of school hours care, or in-home care (before age 7 years) that were subsidised under the CCS/CCB.

Key insights

- Among children in this Test Case identified with Any Disability (N=306,982):
  - 59.6% (n=182,914) received some kind of social support service
  - 20.1% (n=61,702) were supported under an NDIS plan
  - 3.1%% (n=9,384) were supported via the NDIS-ECEI gateway
  - 46.5% (n=142,612) of received other childcare services (e.g., family day care, out of school hours care, or in-home care, before age 7 years) supported the CCS/CCB
  - 25.9% (n=79,548) had been the subject of a report to child protection services before age 18 years

- More than half (52.8%) of the children who participated in the NDIS-ECEI pathway were subsequently given an NDIS approved plan

- Prior to the roll-out of NDIS, almost 15.0% of children accessed pre-NDIS Disability Services (captured by the DS-NMDS record set)

- Among children with Any Disability who had been in contact with child protection services (N=79,548):
  - 13.7% (n=10,900) had been placed in out-of-home care (OOHC)
  - 18.6% (n=14,819) had been the subject of a substantiated risk of significant harm (ROSH) report
  - 53.9% (n=42,887) had been the subject of a non-substantiated ROSH report
  - 14.8% (n=11,808) had been the subject of a non-ROSH report

- One third (33.9%, n=15,285) of children with Developmental Vulnerability (n=45,147) at school entry were brought to the attention of child protection service.

7.4.1   Targeted disability supports use

Disability specific services were examined for national disability services delivered under the auspices of the NDIS (captured by the NDIS and NDIS-ECEI record sets) as well Pre-NDIS Disability Services of this nature (captured by the DS-NMDS record set). NSW fully transitioned from the Disability Services program to the NDIS in 2018.
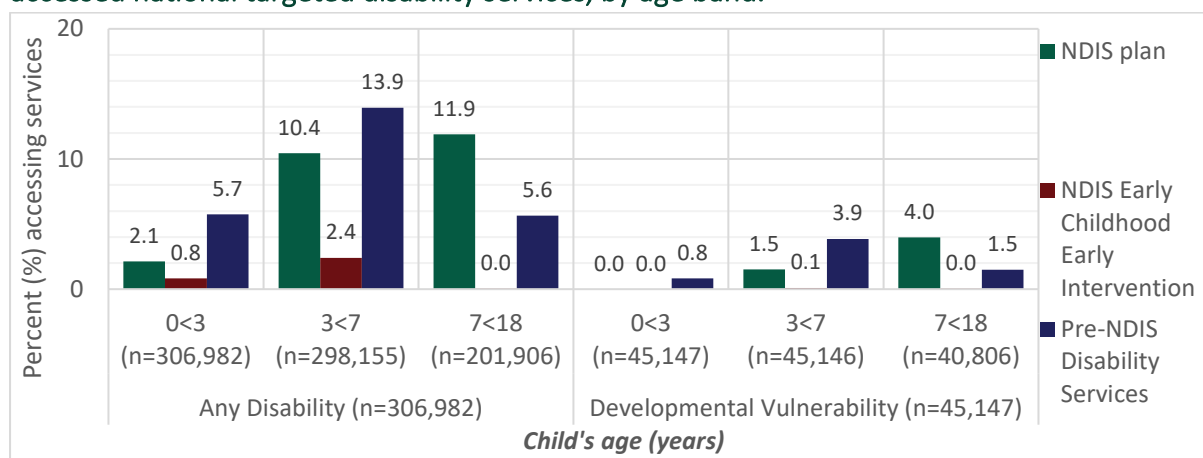
National disability services included services received as part of:

- An 'NDIS plan', which is an approved financial support plan under the NDIS program for those with permanent and significant disability to access the supports required to participate in everyday activities (captured by the NDIS record set)
- The 'NDIS Early Childhood Early Intervention' pathway, which provides supports for children with disability or developmental delay in a targeted, timely and individualised approach before age 7 years (captured by the NDIS-ECEI record set)
- 'Pre-NDIS Disability Services' were services for children with disability provided under the National Disability Agreement prior to the NDIS (captured by the DS-NMDS record set).

The proportion of children within each sub-cohort who received targeted disability support services are presented in Figure 26, by age band. This shows that 2.1% of children identified with Any Disability had an NDIS plan in their first three years of life. This should be considered in the context of approximately 20.0% of all children identified with disability in NSW having an approved NDIS plan, and 3.0% having participated in the NDIS Early Childhood Early Intervention gateway (which facilitates quick access to NDIS support for children under the age of 7 years). More than half (52.8%) of the children who participated in the NDIS-ECEI pathway were subsequently given an NDIS approved plan.

Conversely, the proportion of children receiving services under these three types of targeted disability services who were identified with Any Disability and Developmental Vulnerability are presented in Figures 27 and 28, respectively.

Figure 26. Proportion of children with Any Disability and Developmental Vulnerability who accessed national targeted disability services, by age band.

Note: Birth dates range from 2003-2019, therefore not all children are represented in all age bands.

Figure 27. Proportion of children accessing national targeted disability services who were identified with Any Disability, by age band.
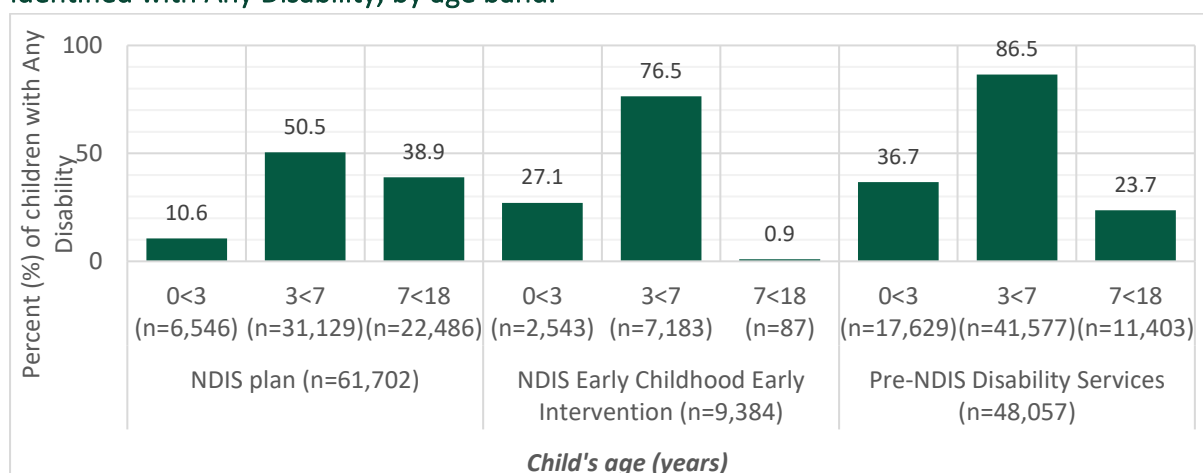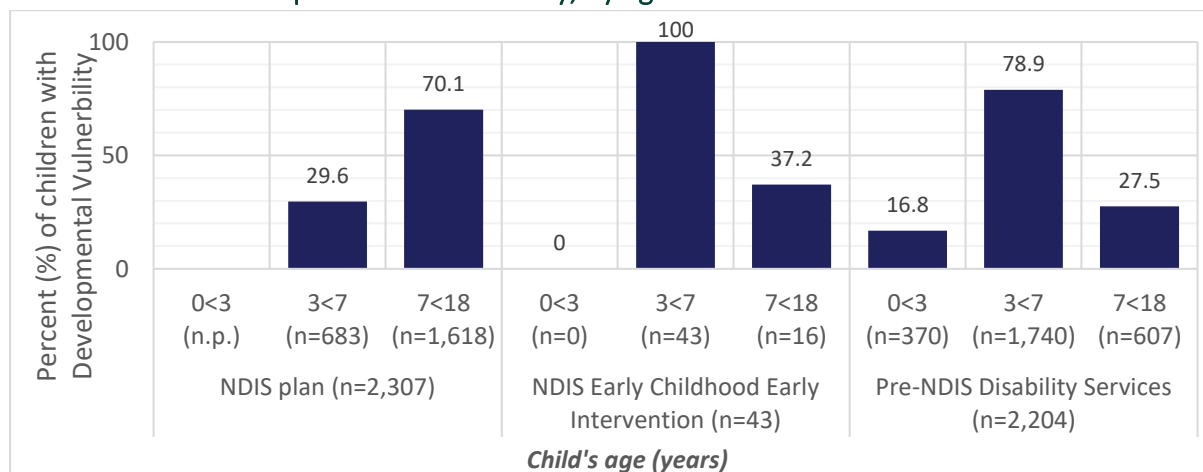

Figure 28. Proportion of the children accessing national targeted disability services who were identified with Developmental Vulnerability, by age band.

7.4.1.1 National disability services and Language Background other than English

The proportion of children receiving national targeted disability support services is presented by language background in Figure 29, for a subsample of 177,987 children who were identified with Any Disability and had information available on language background other than English. It shows that a small proportion of children from non-English speaking backgrounds received disability services, compared to the proportion of children from English speaking backgrounds who received these services (Figure 34).

Figure 29. Proportion of children with disability who accessed support services according to language background other than English (LBOTE).
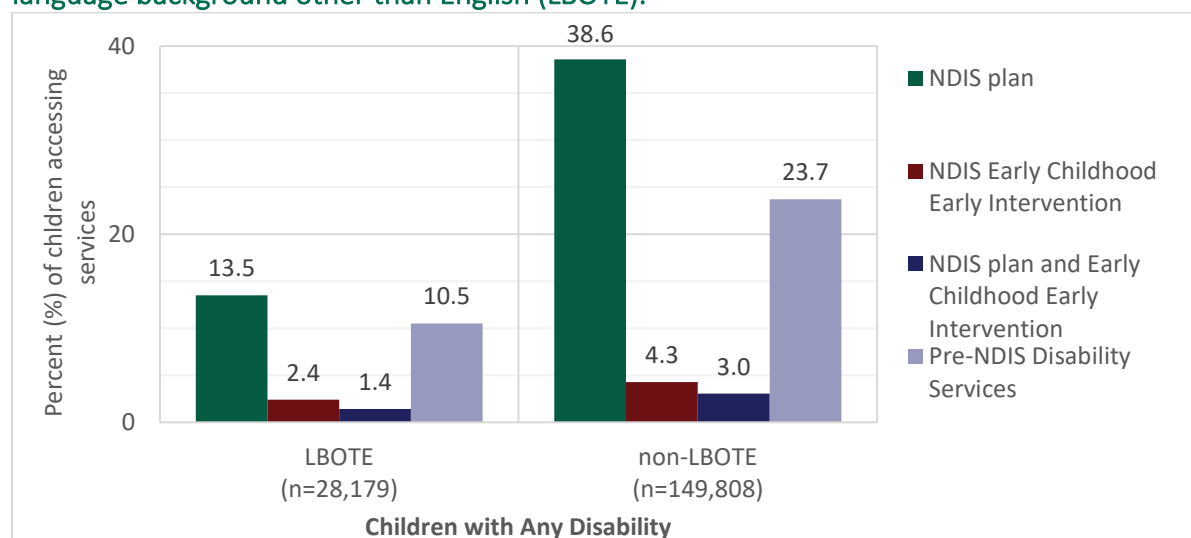
For example, 13.5% of children with disability who had a language background other than English received an NDIS plan, relative to 38.6% children with disability from an English-only speaking background who received an NDIS plan.

A similar pattern of access to disability support services was observed in other NDIS Early Interventions Services, and records of service provision prior to the NDIS (i.e., DS-NMDS). For example, 10.5% of children with a language background other than English receiving Pre-NDIS Disability Services, relative to 24.0% of children with disability from an English-only speaking background. This is despite almost universal access (>99%) to GP services as the typical pathway to these specialised services.

7.4.2 Children brought to the attention of Child Protection Services

In this Test Case, 332,258 (14.3%) of children had at least one contact with child protection services prior to age 18. Approximately 24.0% (n=79,548) of all children known to child protection services by age 18 years had been identified with Any Disability prior to age 7 years.

Contact with child protection services included all levels of contact, whether "screened in" for further investigation by support workers, or not (i.e., some reports reach a defined threshold of risk of significant harm, and these may be subject to in-person or telephone follow-up in attempt to substantiate any suspected risk of harm).

The number of children who had been in contact with child protection services among each of the Any Disability and/or Developmental Vulnerability sub-cohorts is presented in Figure 30. More than 25% of children who had been identified with a disability before age 7 years, and more than 33% of those identified with Developmental Vulnerability at age 5 years, had been in contact with child protection services (i.e., were the subject of at least one child protection report) at any time up to the age of 18 years.

Figure 30. Proportion of children with Any Disability and/or Developmental Vulnerability with any type of child protection contact
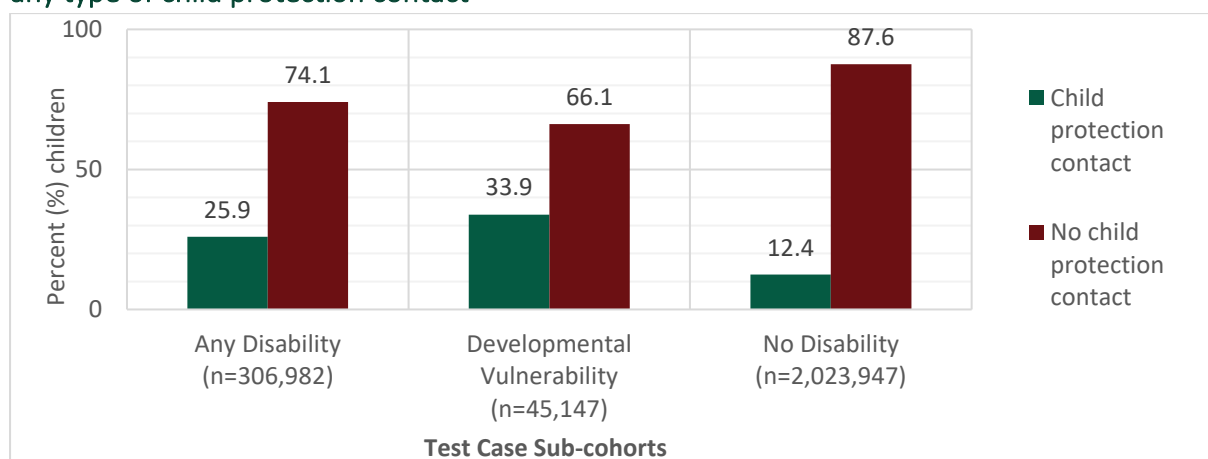
The number of children with each disability type is presented as a proportion of all children with disability and at least one child protection contact (79,548) in Figure 31.

Figure 31. Types of disability among children identified with Any Disability and at least one child protection contact (n=79,548)
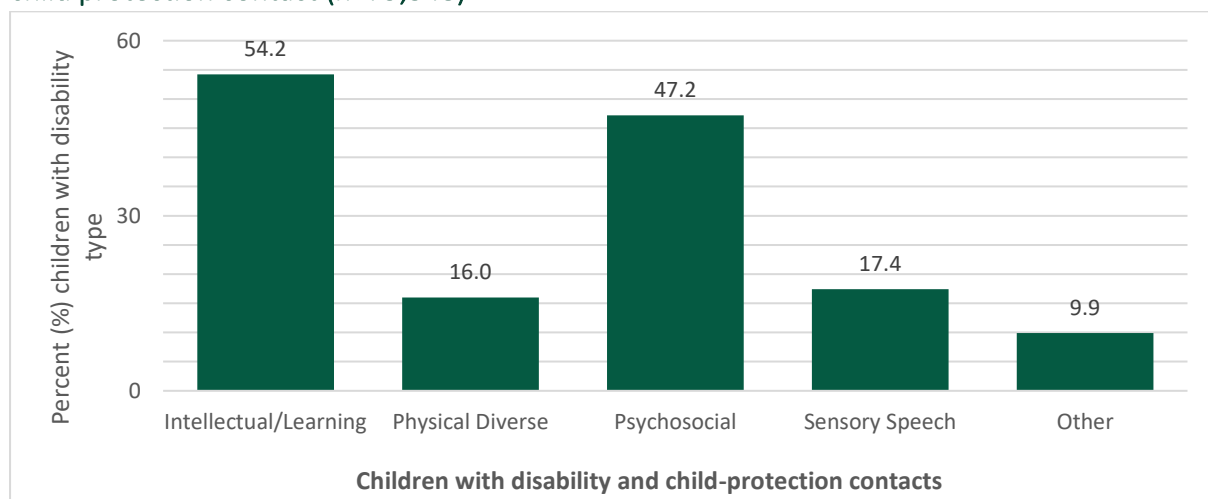
7.4.2.1 Levels of child protection services

Child protection contacts can be considered according to their highest level of contact, ranging from (highest to lowest): out-of-home care (OOHC) placements, substantiated risk of significant harm (ROSH) reports, unsubstantiated ROSH reports, and non-ROSH reports (reports that do not meet the ROSH threshold of harm).

Figure 32 shows the proportion of children identified within each disability sub-cohorts (who had at least one contact with child protection services) according to the level of service received. More than 50% of children from each sub-cohort had been the subject of at least one unsubstantiated ROSH report. There was a common pattern of the distribution of child protection service levels for all disability sub-cohorts.

Figure 32. Proportion of children with disability and developmental vulnerability (who had been in contact with child protection services) who were the subject of different types of child protection contacts (a child can be represented in more than one category).
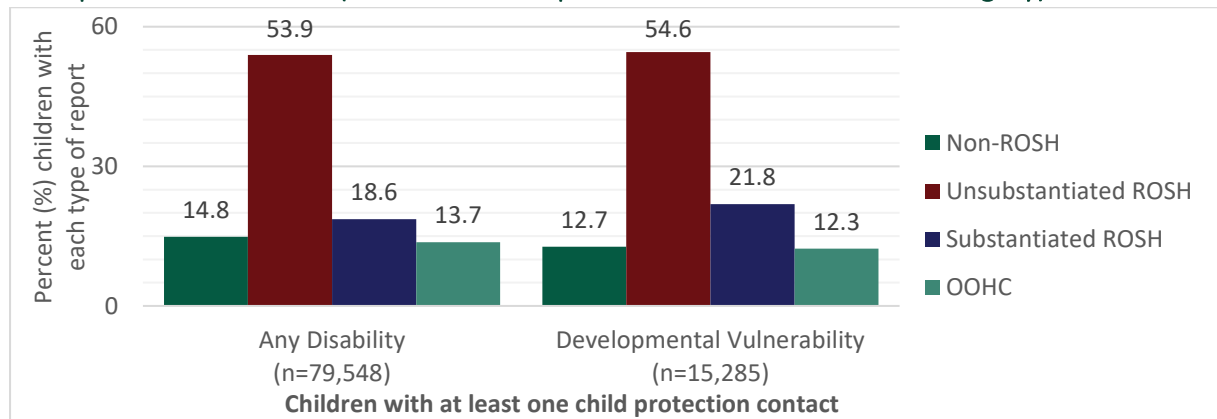
Conversely, the proportion of child protection service types provided to each of the sub-cohorts in this Test Case are presented in Figure 33, showing that 20.9% of children with a non-ROSH contact were identified with Any Disability, while 37.0% of children who had been in OOHC at least once were identified with Any Disability.

Figure 33. Proportion of children receiving different levels of child protection services according disability status.
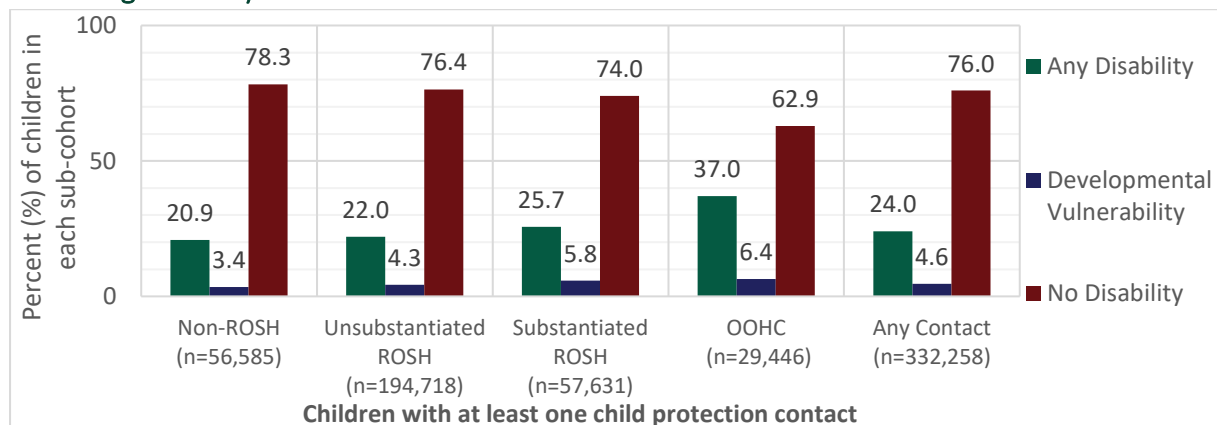
7.4.2.2 Contact with child protection services and disability type

Children who had been the subject of each level of possible child protection services is presented as a proportion of each of five disability types in Figure 34 (note that these are not mutually exclusive groups as a child can be represented in several disability type categories). This suggests that rates of child protection contact are relatively similar for all disability types.

Figure 34. Child protection service use according to the five types of disability.
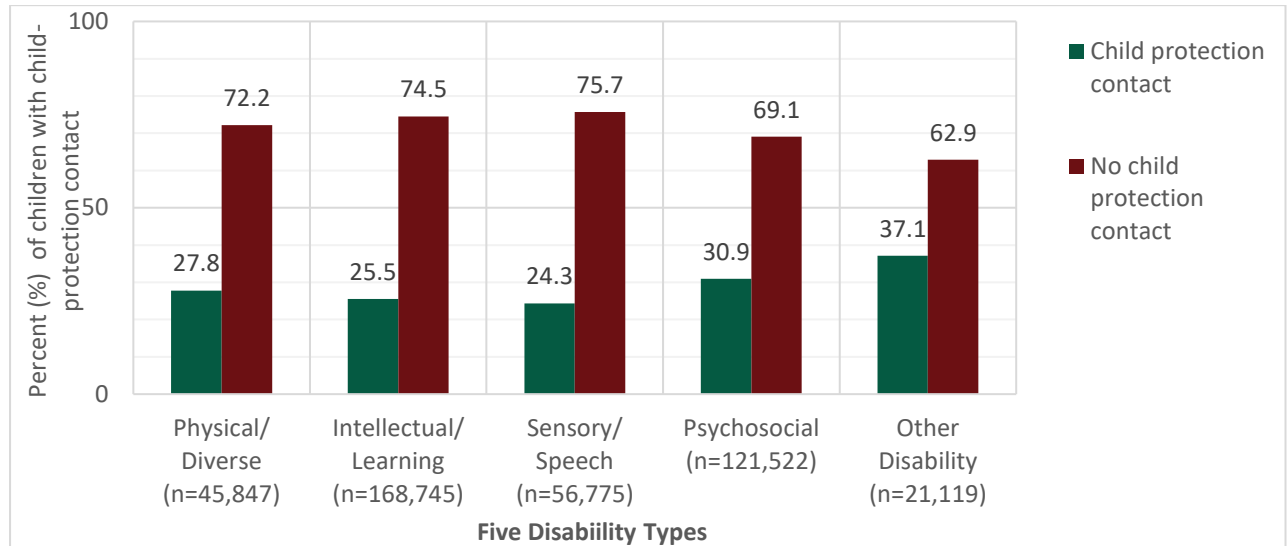
Children who were the subject of different levels of child protection services are presented as a proportion of the number of children with each disability type in Figure 35. There was a common pattern of the distribution of child protection service levels for all disability types.

Figure 35. Proportion of children within each disability type who were subject to different levels of child protection contact.
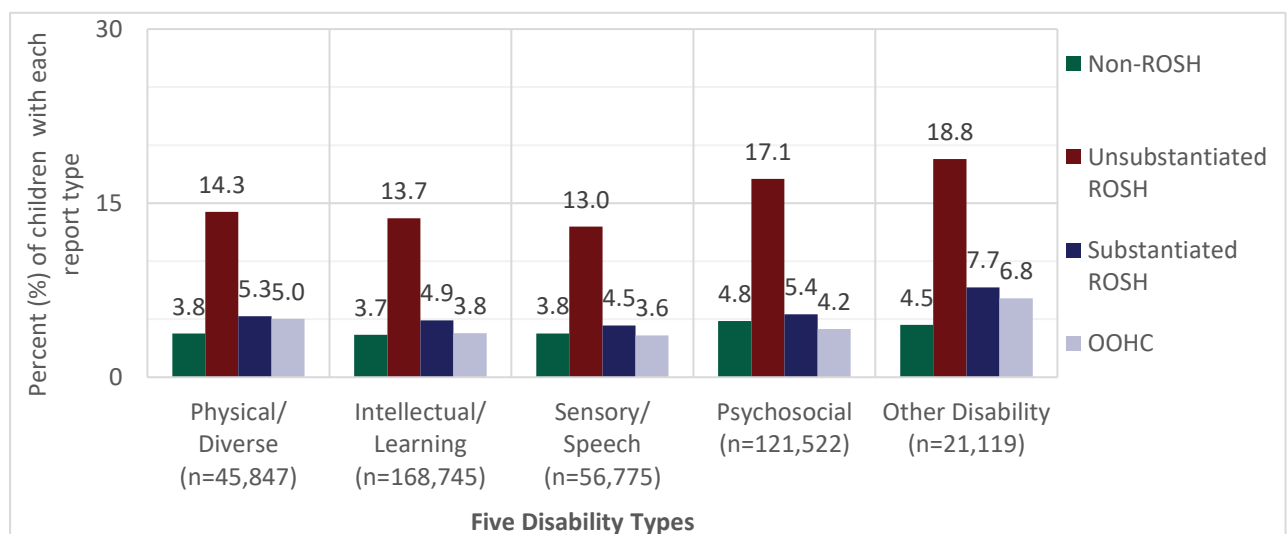
Note: a child could have received more than one type of child-protection service and could have more than one disability type.

Conversely, the proportion of children with each disability subtype among those with different levels of child protection contacts are presented in Figure 36. Among children who had been placed in OOHC, almost 21.8% had an intellectual/learning disability and 17.2% had a Psychosocial disability.

Figure 36. Proportion of children with different levels of child protection services who were identified with each disability type.

Note: a child could have received more than one type of child-protection service and could have more than one disability type.
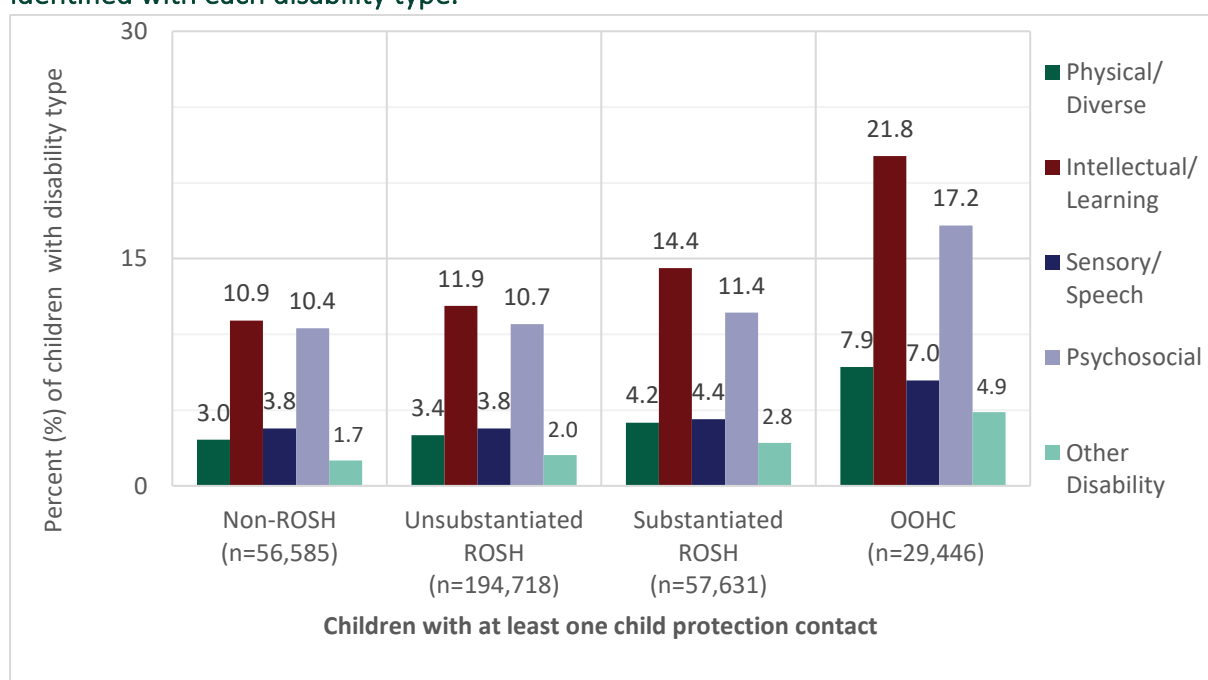
7.4.3   Childcare services

The CCS/CCB record set includes ECE/childcare services subsided under the current CCS scheme and former CCB scheme. The ECE/childcare services include Centre-based day care, family day care, out of school hours care and in-home care, with Centre-based day care captured within the Early Childhood Education services section of this report, and the remaining childcare combined as an overarching "Other CCS/CCB".

Of the children 142,612 (46.5%) with Any Disability who used Other CCS/CCB childcare services:

- 26.4% (n=37,647) accessed other CCS/CCB services between ages 0 to <3 years
- 78.8% (n=112,422) accessed other CCS/CCB services between ages 3 to <7 years
- 61.0% (n=86,988) accessed other CCS/CCB services between ages 7 to <18 years

Conversely, when examining access to these services as a proportion of all those accessing "Other CCS/CCB" in each age band, the following proportions reflect those children with disability who accessed these services:

- 12.3% (n=37,647) of children who accessed other CCS/CCB services had a disability, among those receiving services between ages 0 to <3 years (N=306,982)
- 37.7% (n=112,422) of children who accessed other CCS/CCB services had a disability, among those receiving services between ages 3 to <7 years (N=298,155)
- 43.1% (n=86,988) of children who accessed other CCS/CCB services had a disability, among those receiving services between ages 7 to <18 years (N=201,906)

7.4.4   Geographical access to supports and services

The population distribution of children living in major cities, rural and remote areas according to the Accessibility/Remoteness Index of Australia (ARIA; Figure 37) were similar among the subgroups of children identified with Any Disability, No Disability, and Developmental Vulnerability. This suggests no geographical bias in access to support services among these subgroups. Nevertheless, children in all three groups living in outer/inner regional and remote/very remote areas may lack access to some services and supports.

Figure 37. Distribution of remoteness index among the three sub-cohorts of children.
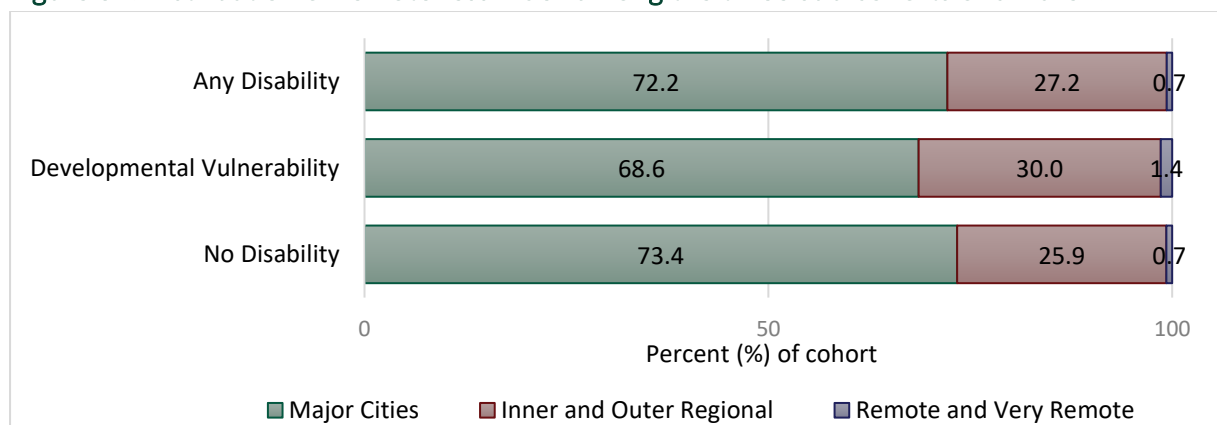
8 Developmental and Educational Outcomes

The childhood outcomes examined in this Test Case include early childhood developmental vulnerability (Section 8.1), school attendance (absences and suspensions; Section 8.2), and academic achievement (Section 8.3).

8.1 Early childhood developmental vulnerability

Early childhood development was assessed using the Australian Early Development Census (AEDC), a measure of school readiness on five domains of functioning (Physical Health and Wellbeing, Social Competence, Emotional Maturity, Language and Cognitive Skills (school-based), and Communication Skills and General knowledge) that is completed nationally by teachers in the child's first year of formal schooling (kindergarten in NSW), every three years.

A child's level of functioning on the 5 key domains of the AEDC are rated according to cut-off points established in the 2009 national census[7]. Children are considered "*developmentally vulnerable*" on a particular AEDC domain if they score in the lowest 10 percentiles (according to the 2009 national distribution); *"at risk"* if they score between the 11th and 25th percentile, and *"On track"* if they score above the 25th percentile. In this section we used data from the 2009, 2012, 2015, and 2018 census years to examine associations between disability and AEDC vulnerability with consideration of several other risk and protective factors (Section 8.1.1), as well as the effect of Early Childhood Education on AEDC developmental vulnerability (Section 8.1.2). Appendix A provides further details of these analyses.

Key insights

- Children with disability were more than twice as likely than their peers with No Disability to show developmental vulnerability on each AEDC domain.
- Children with disability were more likely to be developmentally vulnerable on multiple AEDC domains, compared with peers with No Disability.
- Children with 'Physical/Diverse' and 'Other disability' types were over three times as likely to be developmentally vulnerable on each AEDC domain.
- Children who were enrolled in Centre-based Day Care, NSW Community and NSW Government Preschools in the year before school were less likely to be developmentally vulnerable on the AEDC than peers with no Early Childhood Education, regardless of disability status.

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[7] We note that the AEDC does not provide domain-level categories for children identified at school as having "special needs" via medically verified information known to school-teachers. Children with AEDC-identified special needs are not included within domain indicators/categories because of the already identified substantial developmental needs of this group. However, some children identified with "Any Disability" in other records did have AEDC data available (i.e., they were not recorded as having Special Needs on the AEDC).

8.1.1 Disability, disability type and early childhood development at age ~5 years.

The following analyses are for a sub-cohort of 434,892 children with valid domain-level AEDC data and complete data on covariates. We excluded 26,349 children who had AEDC data but were classified as *Special Needs*[8], and 883 children who had incomplete covariate data on sex, remoteness, language background and socioeconomic status[9].

Among these 434,892 children:

- 50.6% (n=219,820) were male
- 15.1% (n=65,856) were identified with Any Disability, of which 79.0% (n=52,058) were identified with Medically Verified Disability
- 24.4% (n=106,308) were from a non-English speaking background
- 27.4% (n=119,081) were from a regional or remote area (i.e., not major cities) in NSW
- 21.4% (n=92,934) were from areas in the lowest quintile of socioeconomic disadvantage

In these analyses, dichotomous outcome variables of 'developmentally vulnerable' or 'at risk' or 'on track' were determined for each domain, for comparison among children identified with Any Disability and no disability. Covariates included dichotomous variables representing the child's sex, LBOTE and socioeconomic disadvantage and an ordinal (categorical) variable of remoteness.

A series of unadjusted and adjusted logistic regressions were employed to model the associations between disability status (and disability types) on these indices for the five AEDC domains, as well as for developmental vulnerability on multiple (non-specific) AEDC domains; adjusted logistic models were used to account for the effects of four covariates of sex, LBOTE, remoteness (ARIA), and socioeconomic disadvantage (SEIFA).

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[8] Children who require additional assistance due to a chronic medical, physical, or intellectually disabling condition for which the school has been provided with evidence of a medical diagnosis or diagnoses are categorised on the AEDC as having 'Special Needs'; these children are excluded from these analyses because there are no available domain-level vulnerability scores on the AEDC for these children.

[9] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials (see Appendix A).

Figure 38 shows the percentage of children with Any Disability and No Disability who were classed as 'developmentally vulnerable' (i.e., lowest 10 percentiles) on each AEDC domain.

Figure 38. Proportion of children 'vulnerable' on AEDC domains according to disability status.
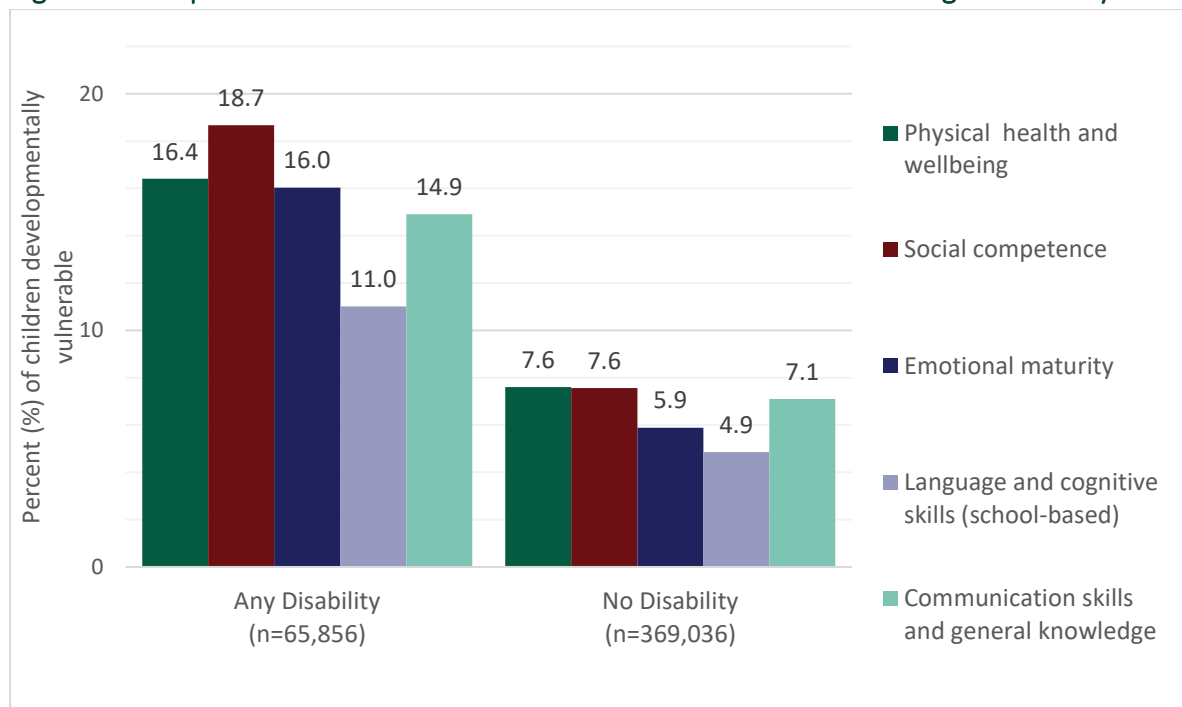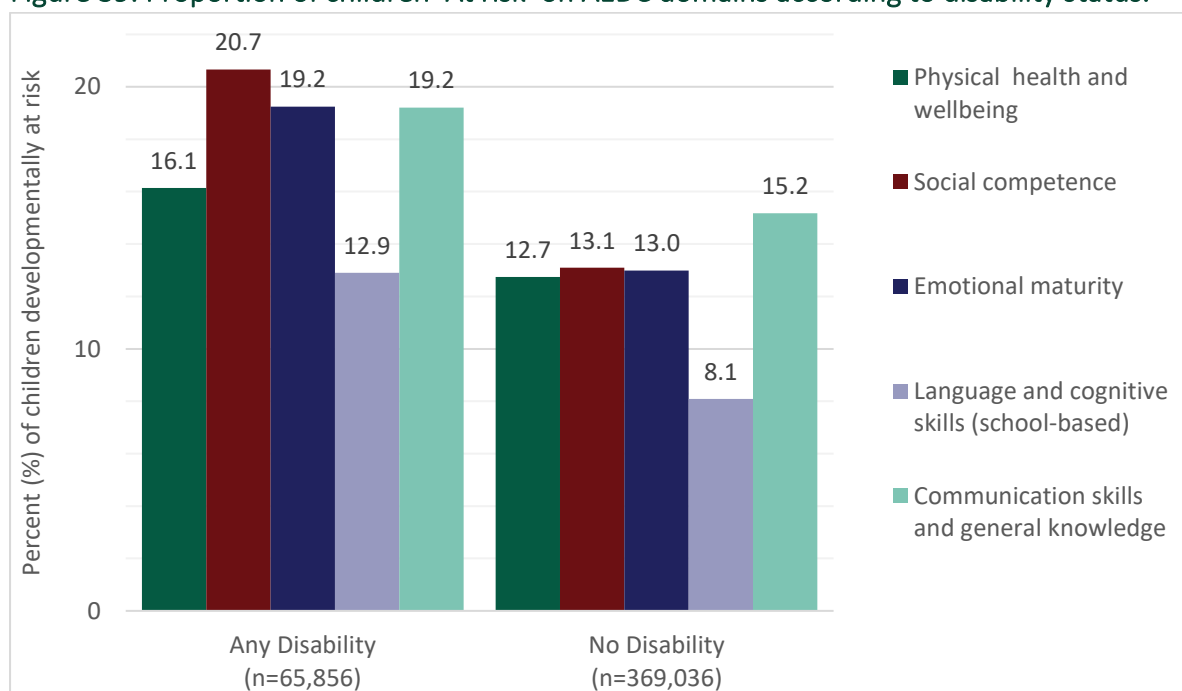

Figure 39 shows the percentage of children with Any Disability and No Disability who were classed as 'at risk' (i.e., 11th–25th percentiles) on each of the AEDC domains.

Figure 39. Proportion of children 'At risk' on AEDC domains according to disability status.

The likelihood of scoring in the lowest 10 percentiles (Developmentally vulnerable) and 11th to 25th percentiles (At risk) on each domain of the AEDC, and on multiple domains for developmentally vulnerable, are presented in Figure 40. Children with Any Disability were more than twice as likely to be developmentally vulnerable on each of the AEDC domains, and nearly three times as likely to be developmentally vulnerable on ≥2 AEDC domains, than children with no disability, after accounting for other covariates. These associations were less pronounced with being at risk on each of the AEDC domains, with children with Any Disability only showing small increased likelihoods of being at risk on each domain.

Figure 40. Adjusted Odds Ratios (and 95% CIs) for Developmentally Vulnerable and At Risk status on AEDC indices for children with disabilities.
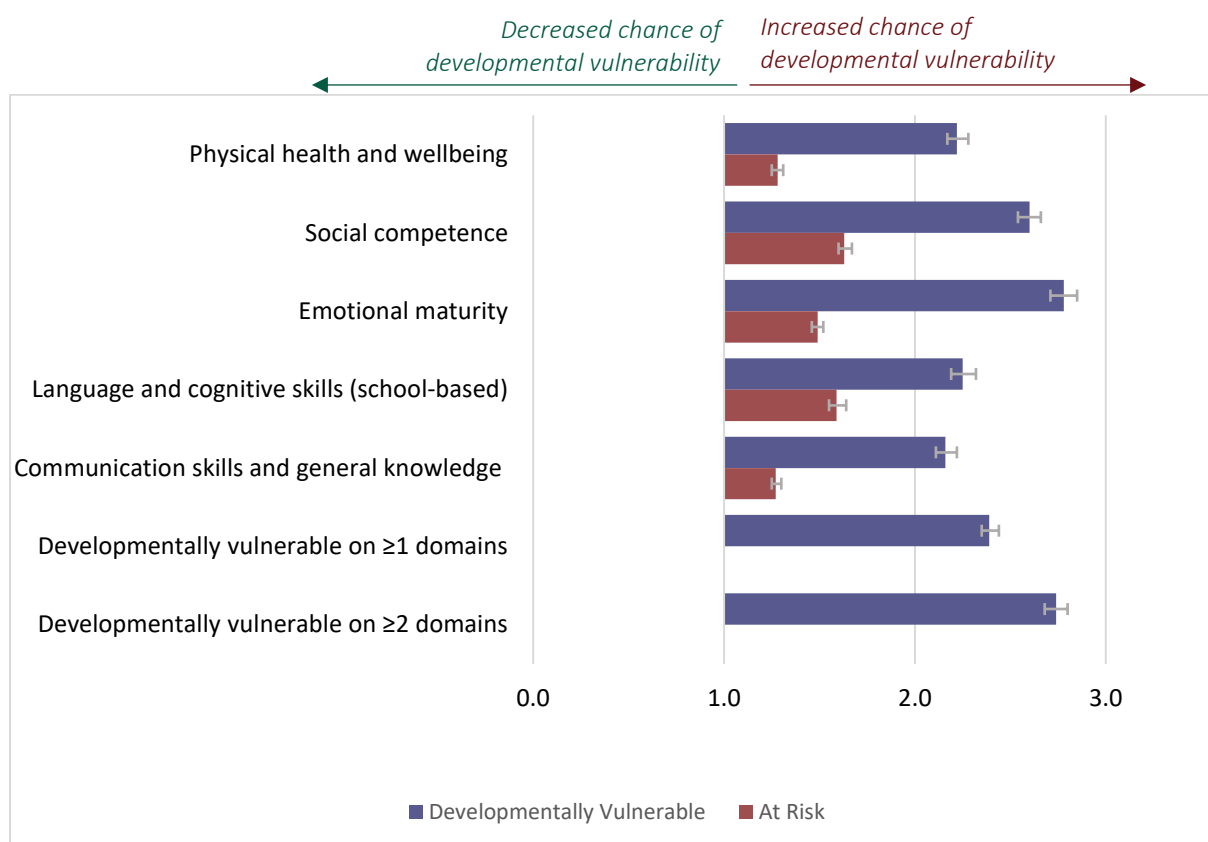
Note: Adjusted models included the covariates: male sex, remoteness, Language Background other than English, and socioeconomic disadvantage. Developmental vulnerability on ≥1 domains and ≥2 domains are established AEDC indicators provided to researchers as DV1 and DV2 respectively, however, to facilitate ease in reading this figure we have referred to these as ≥1 domains and ≥2 domains respectively.

Figure 41 presents the percentage of children with each disability type who were developmentally vulnerable on at least one AEDC domain.

Figure 41. Proportion of children with each disability type showing developmental vulnerability (lowest 10 percentiles) on at least one AEDC domain.
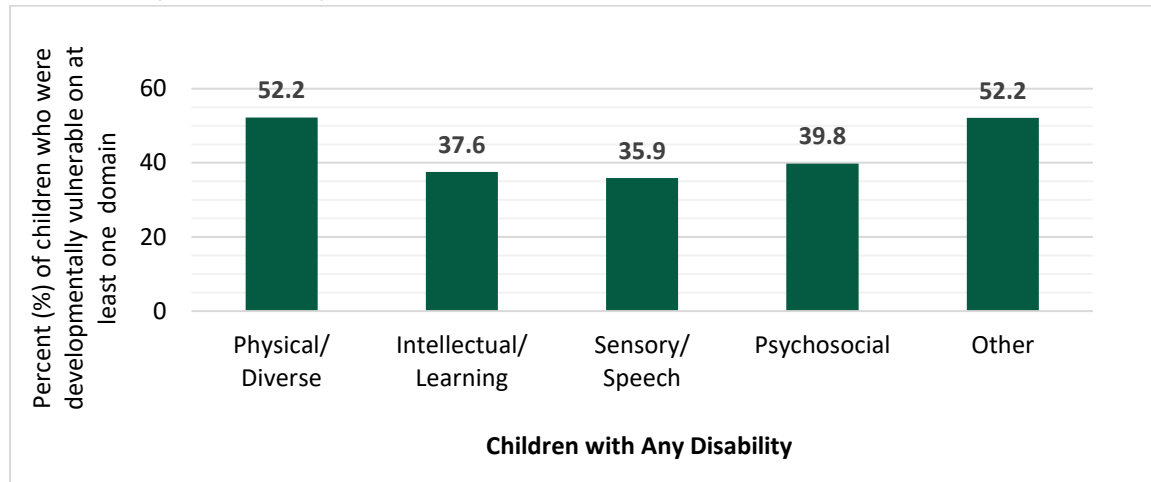
The likelihood of being vulnerable on each AEDC domain was consistently significant for all disability types (Figure 42), after accounting for other factors. Developmental vulnerability on each of the five AEDC domains was more likely among all disability types, relative to children with No Disability.

Figure 42. Adjusted Odds Ratios (95% Confidence Intervals) for developmental vulnerability (lowest 10 percentiles) on each AEDC domain according to disability type.
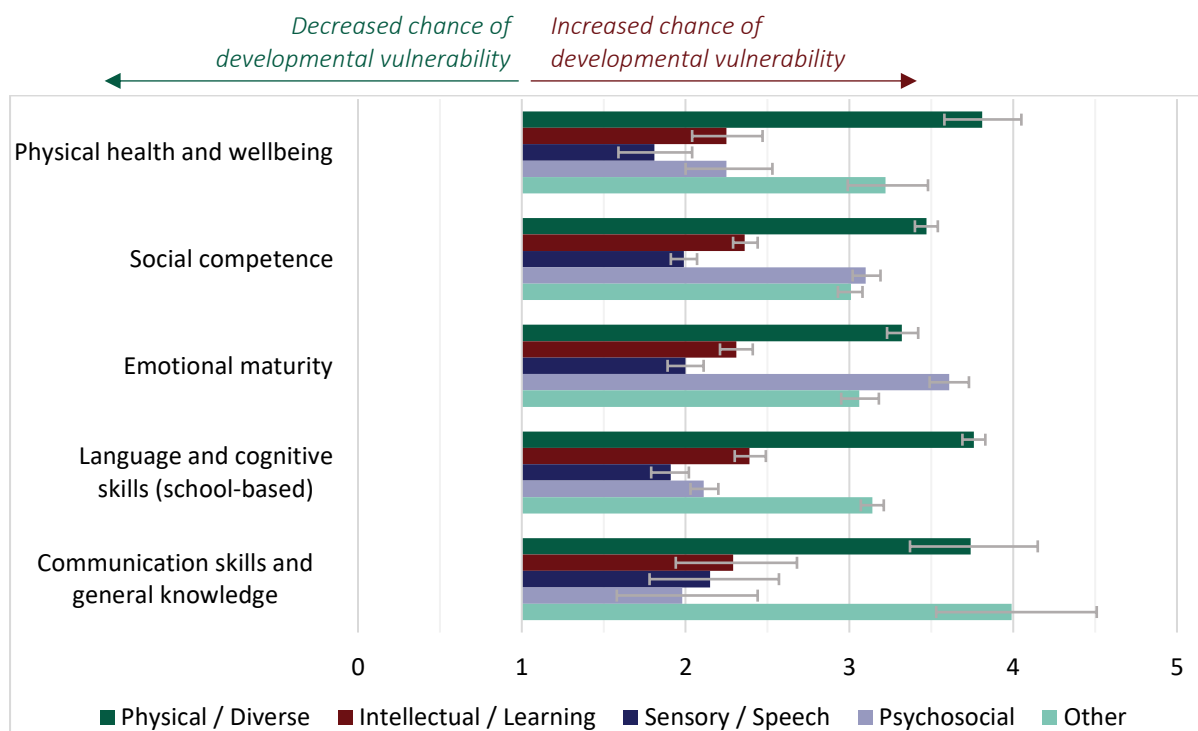
8.1.2 Early Childhood Education and early childhood development at age ~5 years.

The following analyses are for a sub-cohort of 407,780 children with a valid AEDC record and enrolment records for a single type of Early Childhood Education service in the year before school (i.e., excluding children enrolled in multiple Early Childhood Education services).[10] The year before full-time schooling was defined as one less than the child's age in the AEDC dataset. We examined the effect of Early Childhood Education enrolment, including hours of enrolment, on early childhood developmental functioning as measured by the AEDC domains in children's first year of formal schooling, including the contributory effect of disability. In general, the demographic information for these 407,780 children was very similar to the cohort described in the section above (at 8.1.1).

Figure 43 presents the percentage of children with early childhood developmental vulnerability on ≥1 and ≥2 AEDC domains, according to Early Childhood Education enrolment in each service type (limited to the year before school). This shows that there were less children with developmental vulnerability in Community Preschools and Centre-based Day Care, compared to other service types, in the year before school.

Figure 43. Developmental vulnerability on ≥1 and ≥2 domains for each Early Childhood Education type.

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[10] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials (see Appendix A).

Figure 44 presents the associations between developmental vulnerability on ≥1 and ≥2 AEDC domains among children in enrolled in each Early Childhood Education type, while controlling for other factors.

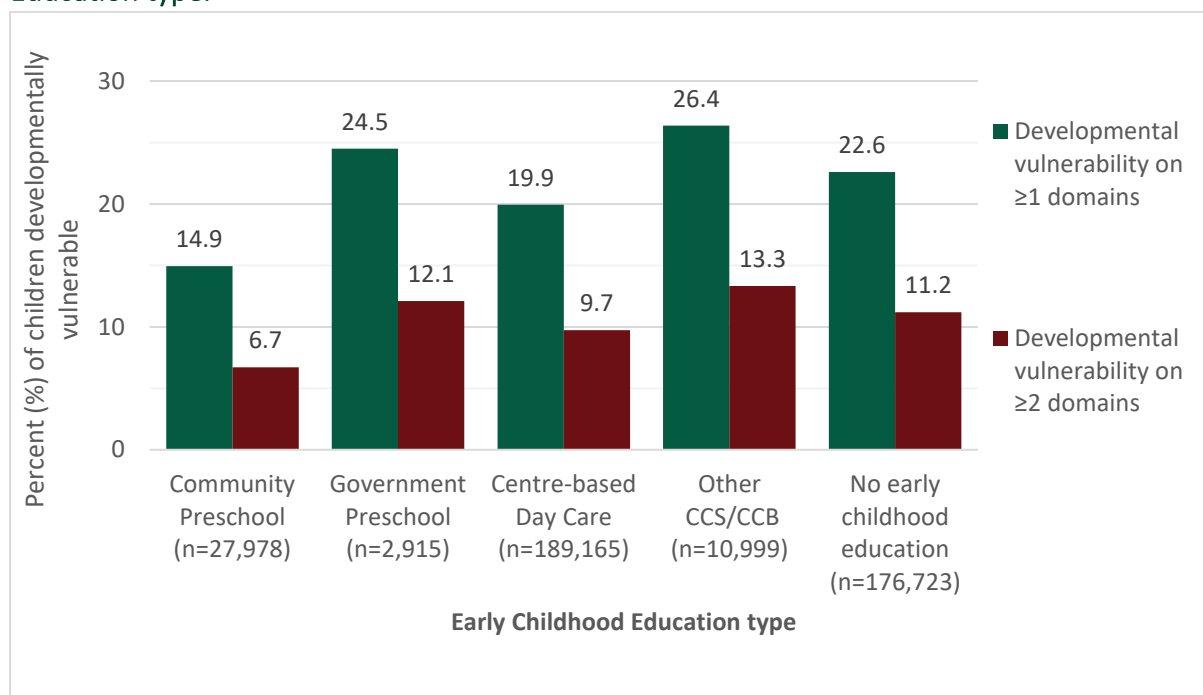**Figure 44. Adjusted Odds (Odds Ratios; 95% CIs) of developmental vulnerability on ≥1 and ≥2 AEDC domains among children in enrolled in each Early Childhood Education type, while controlling for other factors**
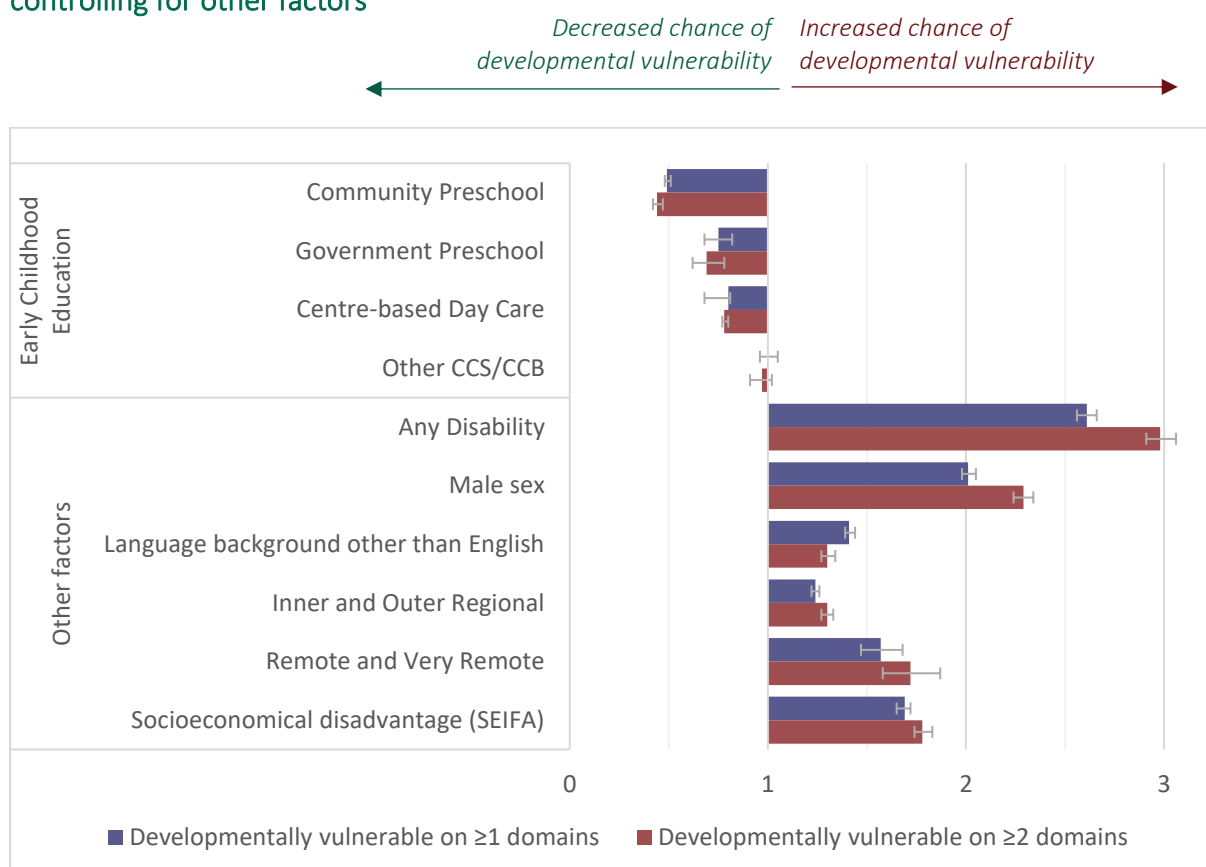
Adjusted associations (odds ratio and 95% confidence intervals) for developmental vulnerability on ≥1 and ≥2 AEDC domains for each Early Childhood Education type in the same model, adjusted for covariates.

Enrolment at a Centre-based Day Care, NSW Community and NSW Government Preschools in the year before school was associated with *decreased likelihood of being developmentally vulnerable* on ≥1 and ≥2 AEDC domains, after controlling for the effect of Any Disability and other factors (Figure 44).

However, there was no significant association between other childcare (excluding Centre-based Day Care) subsidised under the CCS/CCB and being developmentally vulnerable on ≥1 and ≥2 AEDC domains.

The majority of children who were enrolled in ECE in the year before school were enrolled for more than 600 hours in all ECE settings. Figure 45 presents the percentage of children with <600 and ≥600 hours enrolled in Early Childhood Education type in the year before school.

Figure 45. Proportion of children receiving <600 hours, or ≥600 hours of early education services according to Early Childhood Education type in the year before school.
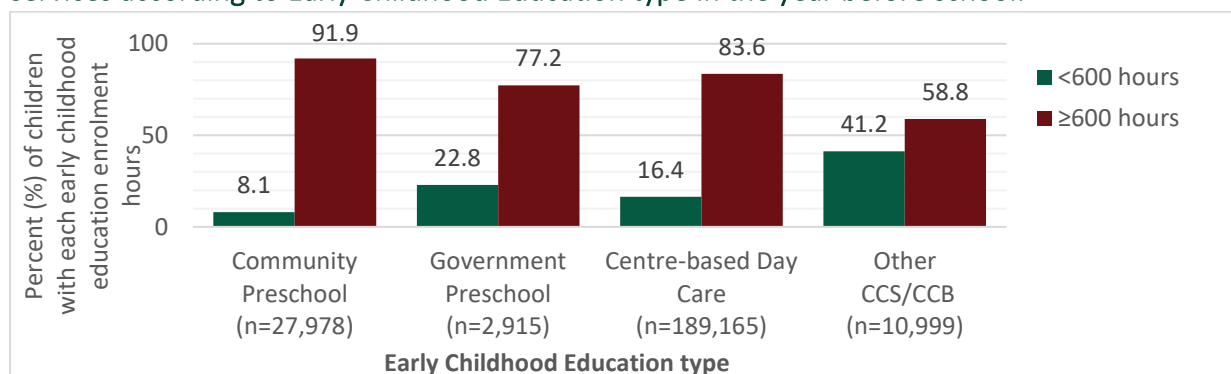
We also examined whether the number of hours enrolled in ECE was associated with the likelihood of being developmentally vulnerable. Figure 46 presents the estimated associations (adjusted Odds Ratios) between hours enrolled in each ECE type, and developmental vulnerability on at least one domain of the AEDC.

Figure 46. Adjusted Odds Ratios (ORs, 95% CIs) of developmental vulnerability on at least one AEDC domain according to enrolment hours in each Early Childhood Education type*.
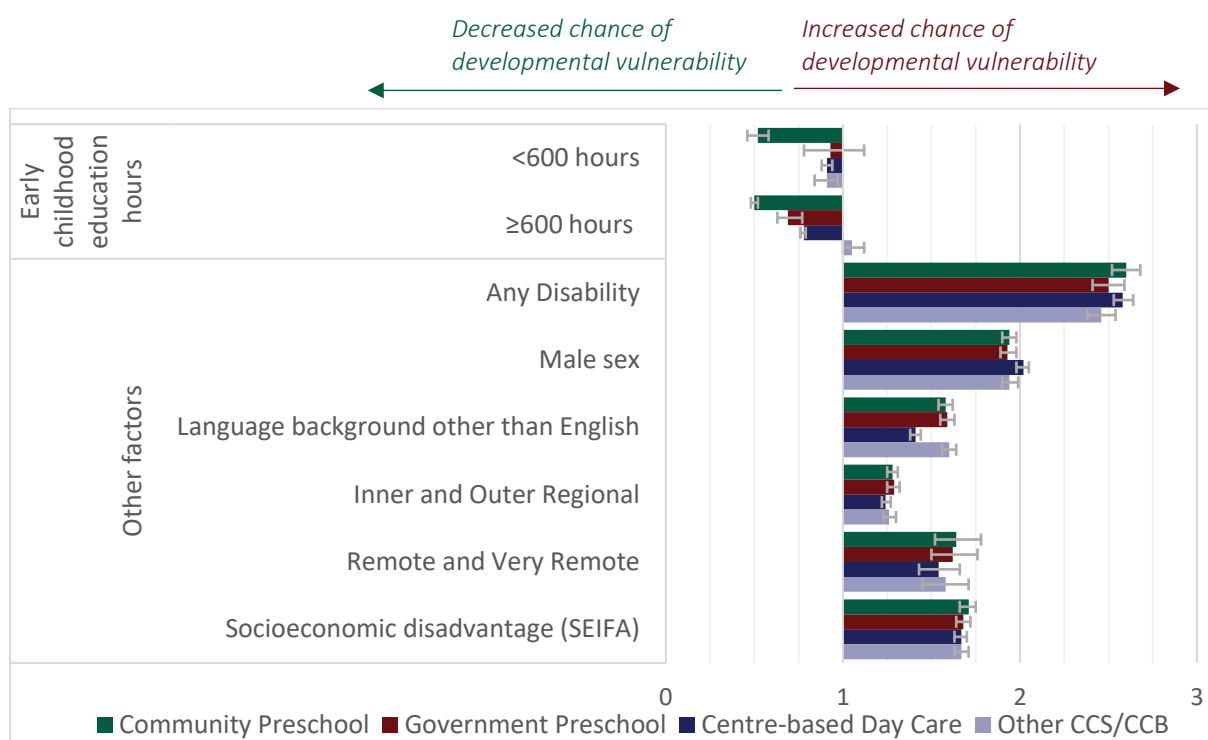
*Each Early Childhood Education type was examined in a separate model. Note: Adjusted associations (odds ratio and 95% confidence intervals) for the effect of Early Childhood Education enrolment hours on developmental vulnerability on at least one AEDC domains, adjusted for covariates.

Early developmental vulnerability on one or more domain of the AEDC was significantly less likely among all children enrolled in Early Childhood Education services, except for children enrolled in less than 600 hours of Government Preschool, and those enrolled in 600 or more hours of Other CCS/CCB which both had no significant effects on AEDC outcome (Figure 50).

The differences in ORs observable between the groups of children enrolled in the two categories of hours within each Early Childhood Education type have not been statistically tested for significance. The specific Odds Ratios for the unadjusted and adjusted associations between early childhood enrolment hours and developmental vulnerability on the AEDC are presented in detail in Supplementary Tables in the associated section 8.1.2 of Appendix A.

8.2 School Attendance

School attendance data for children attending government schools was sourced from the NSW Department of Education[11]. These data were used to derive indices of:

> (a) **school absences** (captured only between 2018-19), referring to an absence from school due to sickness, leave, exemption, unexplained reason, or suspension; and

> (b) **suspensions** (as a subcategory of 'absences', captured between 2012-2019), referring to a child's removal from school for a designated period of time, for unacceptable behaviour.

A total of 786,805 children had NSW Government School records of attendance (i.e., either absence or suspension)[12]. Of these 786,805 children, school absences were recorded for 774,082 (98.4%) children and suspensions were recorded for 62,238 (7.9%) children.

Of the 786,805 children with attendance records, 542,568 (69.0%) children had attendance records for primary school, and 308,435 (39.2%) children had attendance records for secondary school. We examined differences in the number and rates of absences and suspensions among children with disability and developmental vulnerability (Section 8.2.1). We then determined the strength of associations between Any Disability and school attendance rates with consideration of several other risk and protective factors (Section 8.2.2) and explored associations between school absences according to disability type (Section 8.2.3) and Early Childhood Education type (Section 8.2.4). Finally, we examined the impact of Early Childhood Education on school attendance indices (Section 8.2.5).

Key insights

- Children with Any Disability and Developmental Vulnerability had more days absent from school, and more days suspended, than their peers with No Disability or Developmental Vulnerability
- Enrolment in Early Childhood Education services in the year before school was generally associated with fewer days absent from school, and a decreased likelihood of being suspended from school. Those enrolled in NSW Community Preschools showed the fewest absences
- Children with medium and high functional limitation had more days absent from school compared with children with disability of low functional limitation
- Children with medium and high functional limitation had an increased chance of suspensions in primary school compared to children with low functional limitation.

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[11] Attendance data was not collected from Schools for Specific Purpose until 2020, such that information about absences and suspensions of children with disability may be limited.

[12] Days absent and suspended from primary school were estimated as those occurring up to age 12 years (as a proxy for grades Kindergarten to Grade 6), and secondary school defined as between the ages of 12-18 years (as a proxy for Grades 7 to 12). All ages up to 18 years was used as a proxy for grades Kindergarten to Grade 12 (All school levels).

8.2.1 School attendance among children with Any Disability and Developmental Vulnerability.

Data presented in this section is drawn from a subsample of 786,805 children with NSW government school enrolment records (of which 774,083 had at least one recoded absence, and 65,238 had at least one recorded suspension)[13]. Of the 786,805 children with an attendance record, 153,124 (19.5%) were identified with Any Disability. Among the 254,379 children with both attendance data and a valid AEDC record, 26,140 (10.3%) were classified in our 'Developmental Vulnerability' sub-cohort (i.e., vulnerable on 2 or more AEDC domains).

Of 774,082 (98.4%) children with at least one recorded school absence:

- 68.8% (n=532,415) had at least one recorded school absence in primary school
- 39.1% (n=302,582) had at least one recorded school absence in secondary school

The lower estimation of absences in secondary school must be interpreted as a reflection of the age-range of this sample, where a large proportion of the child cohort have not yet reached secondary-school age to enable being recorded with secondary school absences.

Of 65,238 (8.3%) children with at least one suspension record:

- 26.8% (n=17,452) had at least one suspension in primary school
- 71.7% (n=46,778) had at least one suspension in secondary school

It is typically known that children are more likely to be suspended in secondary school; these statistics also likely reflect that suspension data is not available for all children from Kindergarten to Year 12.

Four indices of school attendance were examined in this section, with Primary school age cut off being less than age 12 years and secondary school age cut-off being greater than or equal to age 12 years:
- Mean days absent (per year) in primary or secondary school
- Any suspensions in primary or secondary school
- Total days suspended in primary or secondary school
- Mean days suspended (per year) in primary or secondary school

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[13] Data on school absences was available only between 2018-19, while suspension data was available from 2012-2019.

8.2.1.1 School attendance among Any Disability and Developmental Vulnerability sub-cohorts

The mean number of days absent from school per year, in Primary and Secondary School, is presented in Figure 47 according to Any Disability and Developmental Vulnerability status.

Figure 47. Mean days absent from primary school and secondary school among children identified with Any Disability and Developmental Vulnerability (<7 years) with recorded absences.
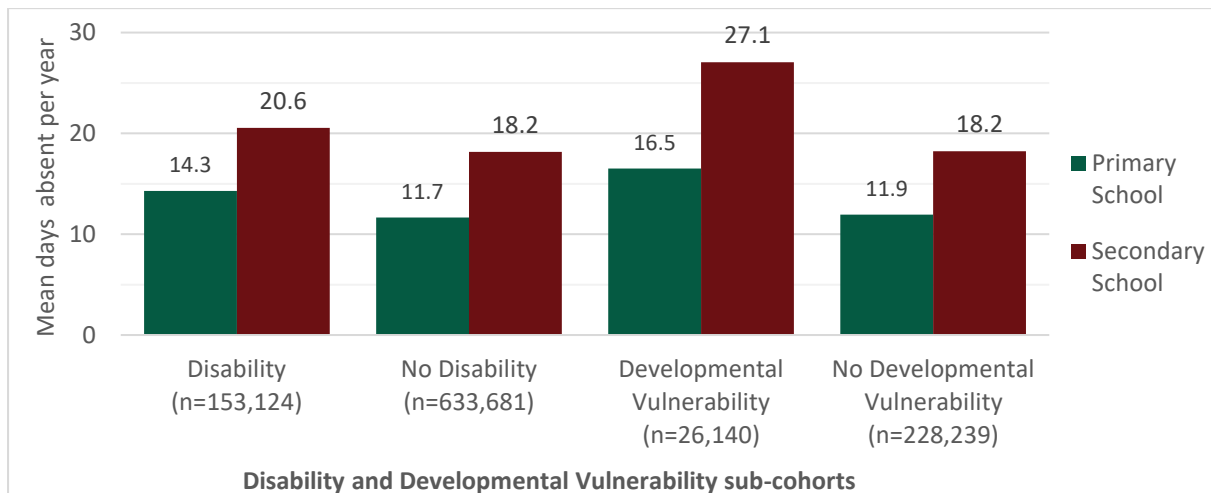
The proportion of children suspended from school according to Any Disability and 'Developmental Vulnerability' status is presented in Figure 48.

Figure 48. Proportion of children identified with Any Disability and Developmental Vulnerability (<7 years) suspended from school in primary school and secondary school.
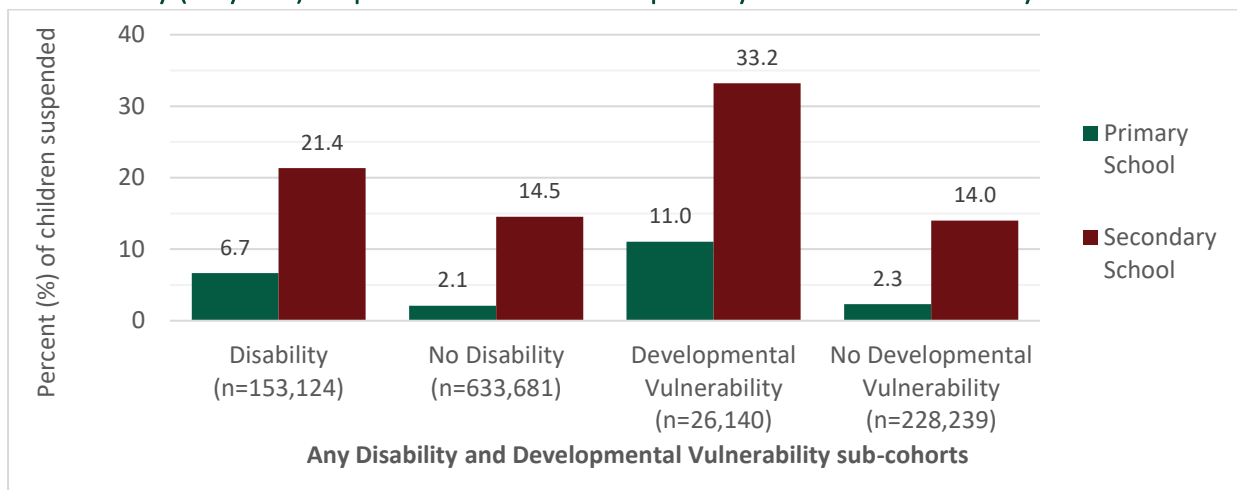
The mean number of days suspended from school per year, according to Any Disability and 'Developmental Vulnerability' status is presented in Figure 49.

Figure 49. Mean days suspended from primary school and secondary school among children identified with Any Disability and Developmental Vulnerability
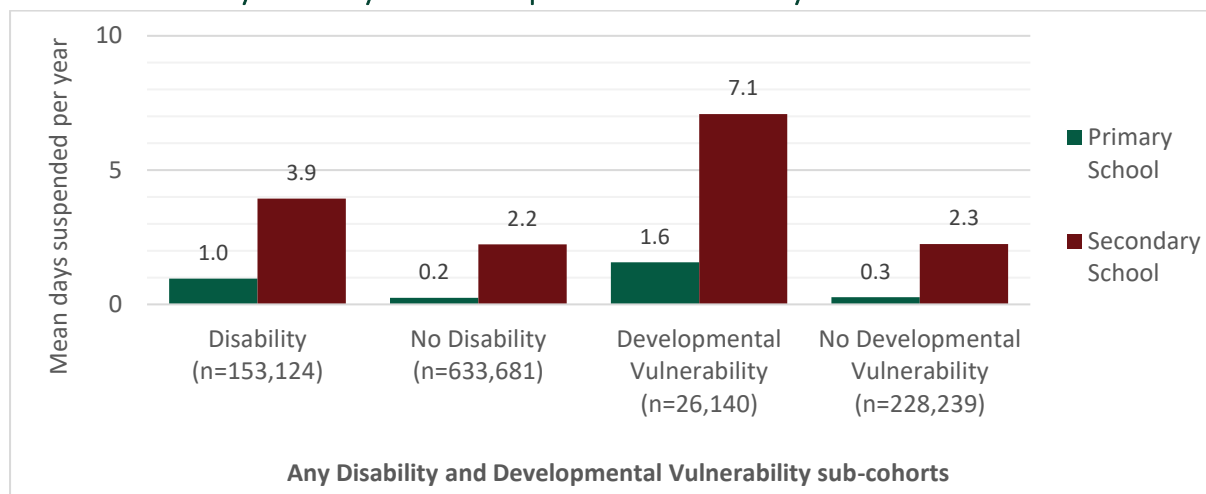

Figure 47-49 suggest that repeat suspensions may be over-represented among students with Disability and Developmental Vulnerability, with the latter being the more disadvantaged cohort with the highest number of mean days of suspended or absent.

8.2.2 Associations between disability and school attendance accounting for other factors

The following analyses estimate associations between disability and school attendance indices, while adjusting for other risk and protective factors (including the child's sex, language background other than English, remoteness, socioeconomic disadvantage, low birthweight, preterm birth and prenatal smoking exposure), among the sub-cohort of 293,224 children with at least one school absence or suspension and all available covariate data.

8.2.2.1 Number of days absent

Figure 50 summarises the results of regression analyses estimating the association between Any Disability and the mean number of school days absent in primary school and secondary school. This shows that there was a moderately positive relationship between disability status and mean days absent per year in primary school and secondary school, in the context of positive relationships also between prenatal smoking exposure, socioeconomic disadvantage and school absences. On the other hand, living in a major city and having language background other than English were associated with having fewer mean days absent.

Figure 50. Associations between the mean number of days absent per year and disability status when accounting for other risk and protective factors.
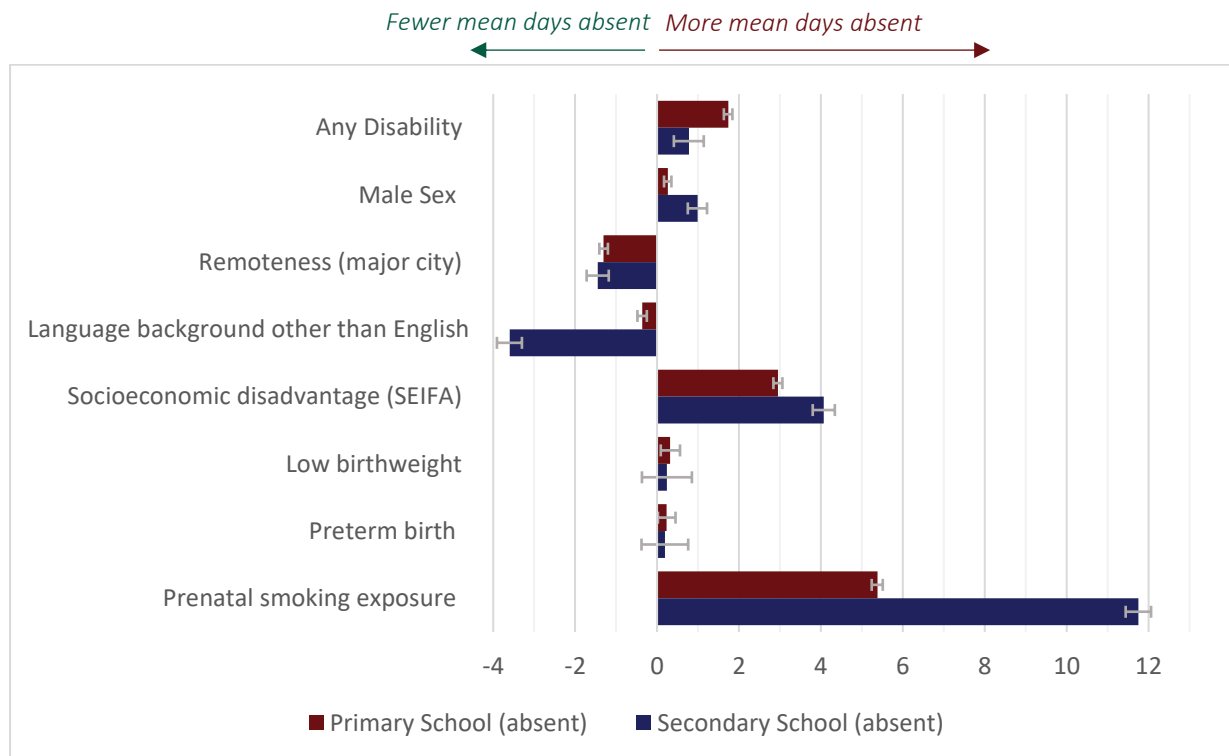
Adjusted parameter estimates (beta value, and 95% confidence intervals) from multiple regression analyses of the association between disability and mean days absent in primary and secondary school, adjusted for covariates.

8.2.2.1 Likelihood of at least one suspension

Figures 51 summarises the results of regression analyses estimating the association between disability and being suspended at least once in primary and secondary school.

Children with Any Disability were over twice as likely to have been suspended at least once, compared to children with no disability in primary school, while the likelihood of suspensions in secondary school was not statistically significant. In addition, exposure to prenatal smoking would make students at least three times as likely as those non-exposed to be suspended at least once from school.

Figure 51. Adjusted Odds between disability status and being suspended at least once in primary and secondary school when accounting for other risk and protective factors
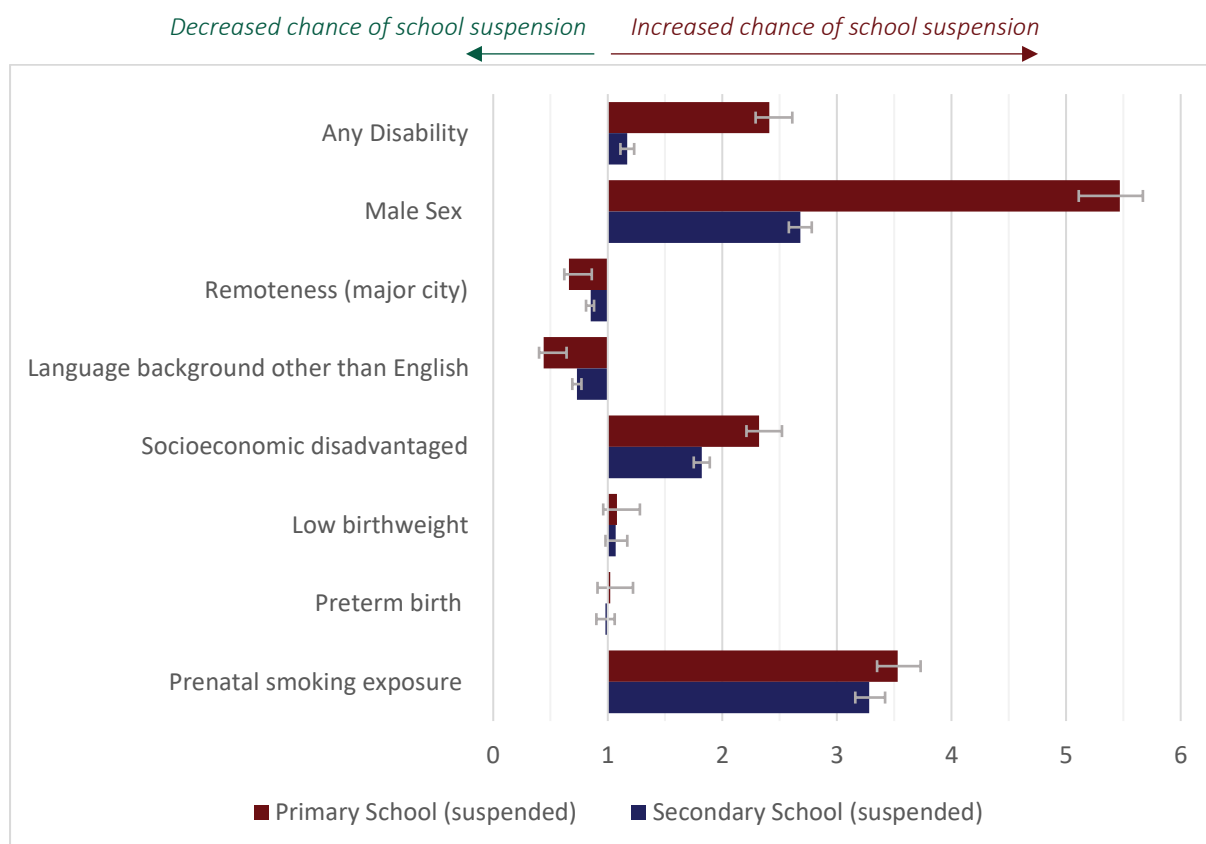
Adjusted associations (odds ratio and 95% confidence intervals) for the proportion of days suspended from primary and secondary school, adjusted for covariates.

8.2.2.1 Total number of days suspended

More days suspended often set students in a downward trajectory that has a profound impact on their educational outcome.

Figure 52 summarise the results of regression analyses estimating the association between disability and the total number of school days suspended in primary and secondary school.

There was a strong positive association between disability and suspensions in both primary and secondary school, in the context of other positive associations between male sex, socioeconomic disadvantage, preterm birth, prenatal smoking exposure and school suspensions. Again, living in a major city and having a language background other than English were associated with less days suspended from school.

Figure 52. Associations between the total number of days suspended in primary and secondary school and a range of risk and protective factors.
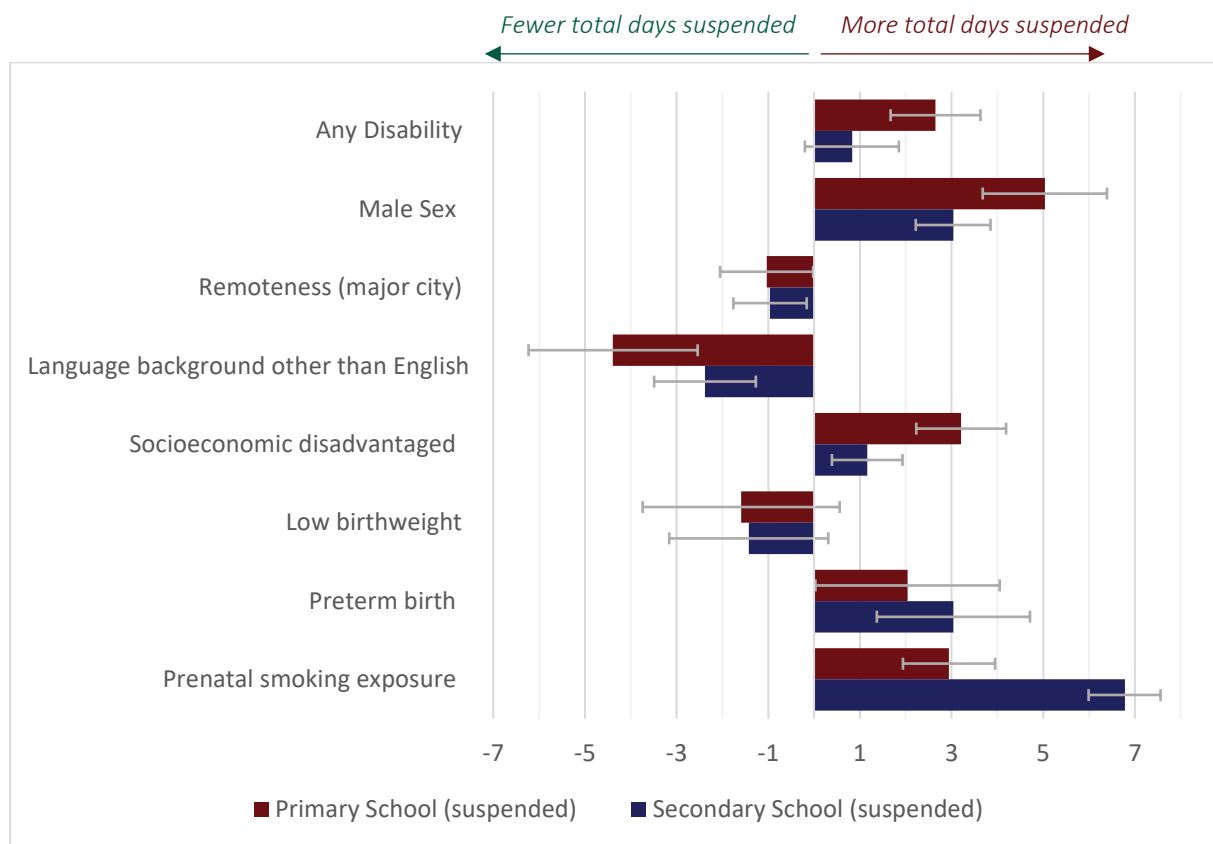
Adjusted regression parameter estimates (and 95% confidence intervals) of the association disability and total number of days suspended in primary and secondary school, adjusted for covariates.

8.2.3   School attendance according to disability type

The mean number of days absent from school (per year) is presented in Figure 53 for children with Any Disability, according to disability type.

Figure 53. Mean number of days absent (per year) from primary school and secondary school by disability types, among children with recorded absences.
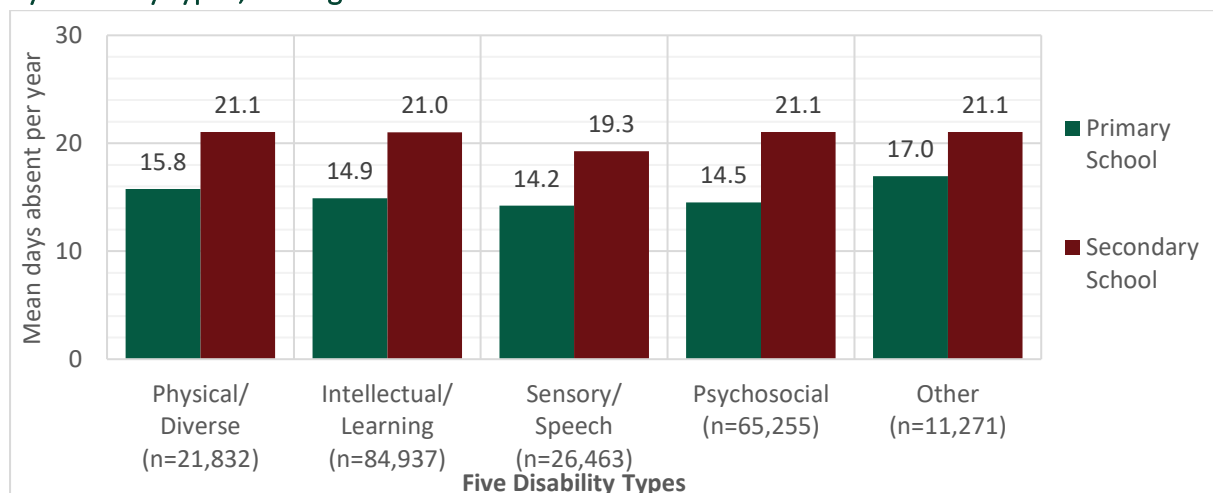
The mean number of days suspended from school for children with Any Disability is presented in Figure 54 according to disability type.

Figure 54. Mean number of days suspended (per year) from primary school and secondary school by disability types, among children with recorded suspensions.
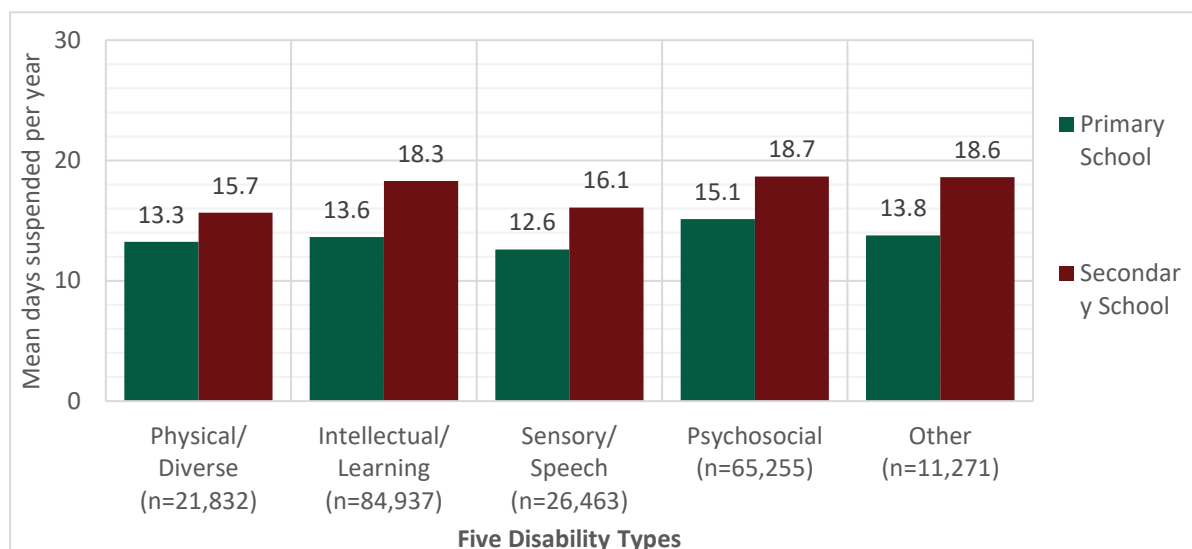
Figures 54 and 55 illustrate that among children with disability, the mean number of days absent or suspended from school (per year) is consistent across all types of disability.

Summary statistics from regression models to estimate the associations between each disability type and school absences and suspensions when accounting for other risk and protective factors (i.e., male sex, language background other than English, remoteness (major city), socioeconomic disadvantage, low birthweight, preterm birth and prenatal smoking exposure) are presented in Figures 55-57.

Figure 55 summarises the associations between each disability type and the mean number of days absent (per year) from primary and secondary school, when accounting for other risk factors. Children with Physical/Diverse and Other disability types were around 3 times as likely than children with no disability.

This shows strong associations between all disability types and *primary* school absences, but not secondary school absences (where the 95% confidence interval crosses 1 for all types of disability except for children with Psychosocial disability). This could be due to the smaller cohort reaching secondary school age in our record set.

Figure 55. Adjusted associations (β, and 95% CIs) for the mean number of days absent (per year) in primary and secondary school according to disability type.
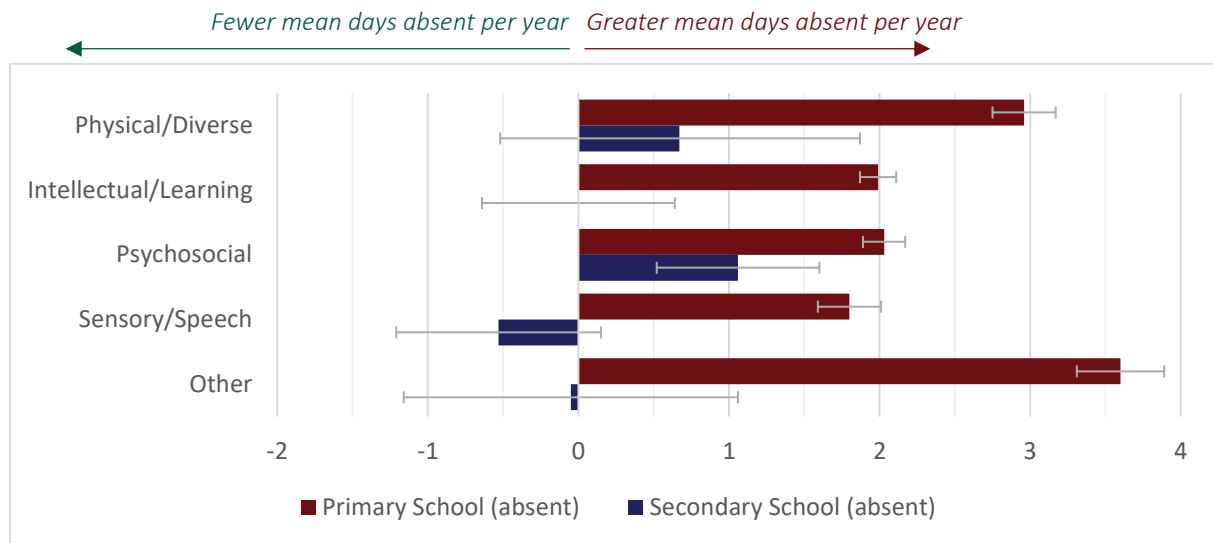

Adjusted regression parameter estimates (beta values and 95% confidence intervals) of the association disability type (examined in separate models) and mean days absent (per year) in primary and secondary school, adjusting for covariates.

Figure 56 summarises the associations between each disability type and the likelihood of having at least one suspension in primary and secondary school for each disability type, when accounting for other risk and protective factors.

Figure 56. Adjusted Odds Ratios (95% CIs) for the likelihood of having any suspension in primary and secondary school, according to disability type.
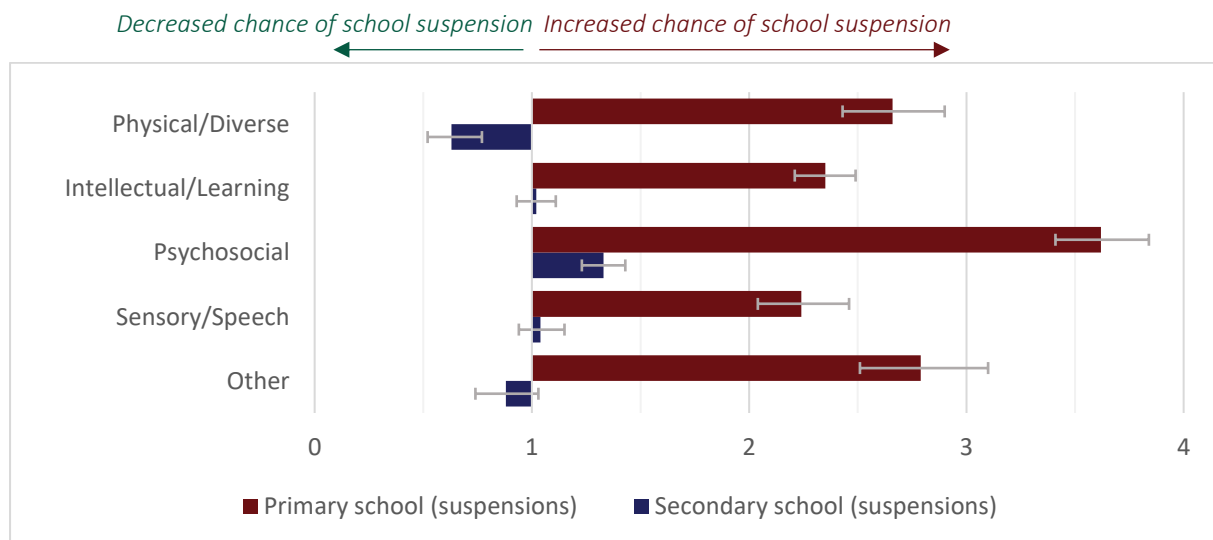
Adjusted associations (odds ratio and 95% confidence intervals) between disability type (separate models) and the proportion of days suspended from primary and secondary school, adjusted for covariates.

All disability types showed moderate to strong likelihood of at least one primary school suspension, with a less clear pattern for secondary school suspensions (as described already in terms of the associations with the number of days suspended, shown in Figure 56).

Figure 57 summarises the associations between each disability type and the total number of days suspended in primary and secondary school, when accounting for other risk and protective factors.

Again, children with all disability types had more total days suspended from primary school than children without disability, with the Psychosocial disability type showing the largest number of days suspended in Primary School.

In contrast, *fewer* days suspended in secondary school was associated with Physical/Diverse Disability, Sensory/Speech and Other Disability types, with only very small effects apparent for the latter two disability types. Conversely, children with Psychosocial disability showed a small increase in number of days suspended in secondary school, relative to children with no disability. This likely reflects current school suspension policy when dealing with students with behavioural issues, given that this type of disability captures children with conduct and behavioural disorders. Wide confidence intervals suggest much variability in these associations.
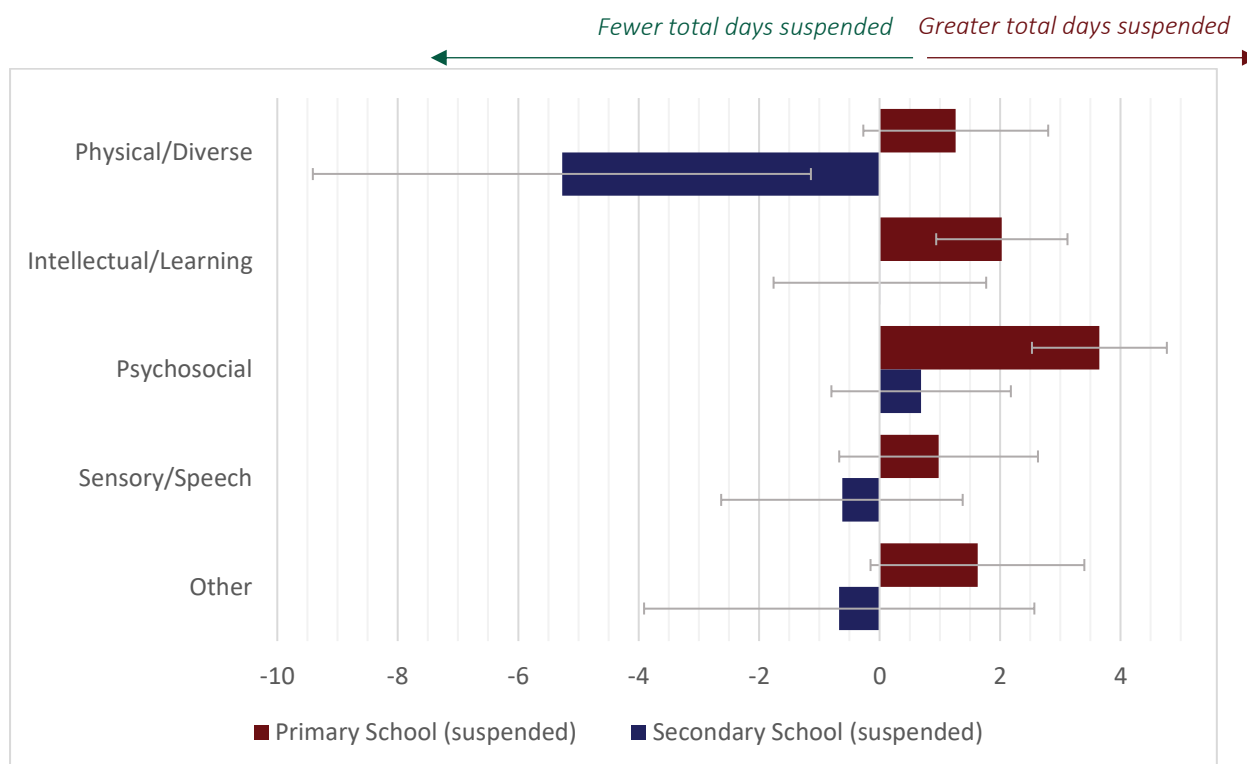
Figure 57. Adjusted associations (β, and 95% CIs) between disability type and the total number of days suspended in primary and secondary school.

Adjusted regression parameter estimates (beta values and 95% confidence intervals) of the association disability type and the total number of days suspended in primary and secondary school, adjusting for covariates: male sex, language background other than English, remoteness (major city), socioeconomic disadvantage, low birthweight, preterm birth and prenatal smoking exposure.

8.2.4 School attendance according to Early Childhood Education type

The following analyses are for a sub-cohort of 725,522[14] children with a Government school enrolment record and a single type of Early Childhood Education enrolment (or none; children with multiple types of Early Childhood Education enrolment were excluded).

Of the 725,522 children:
- 51.0% (n=372,790) were male [15]
- 18.7% (n=135,345) were identified with Any Disability
- 24.5% (n=177,723) were from a regional or remote area (i.e., not major cities) in NSW

8.2.4.1 Early Childhood Education and school attendance rates

Figure 58 presents the mean days absent from school for children with Any Disability, according to Early Childhood Education type in the year before school. Among children with disability, there was a significant difference in the mean number of days absent from primary and secondary school for children who were enrolled in each Early Childhood Education type versus those with no Early Childhood Education.

Figure 58. Mean days absent (per year) from primary school and secondary school according to disability status, and the type of Early Childhood Education enrolment.

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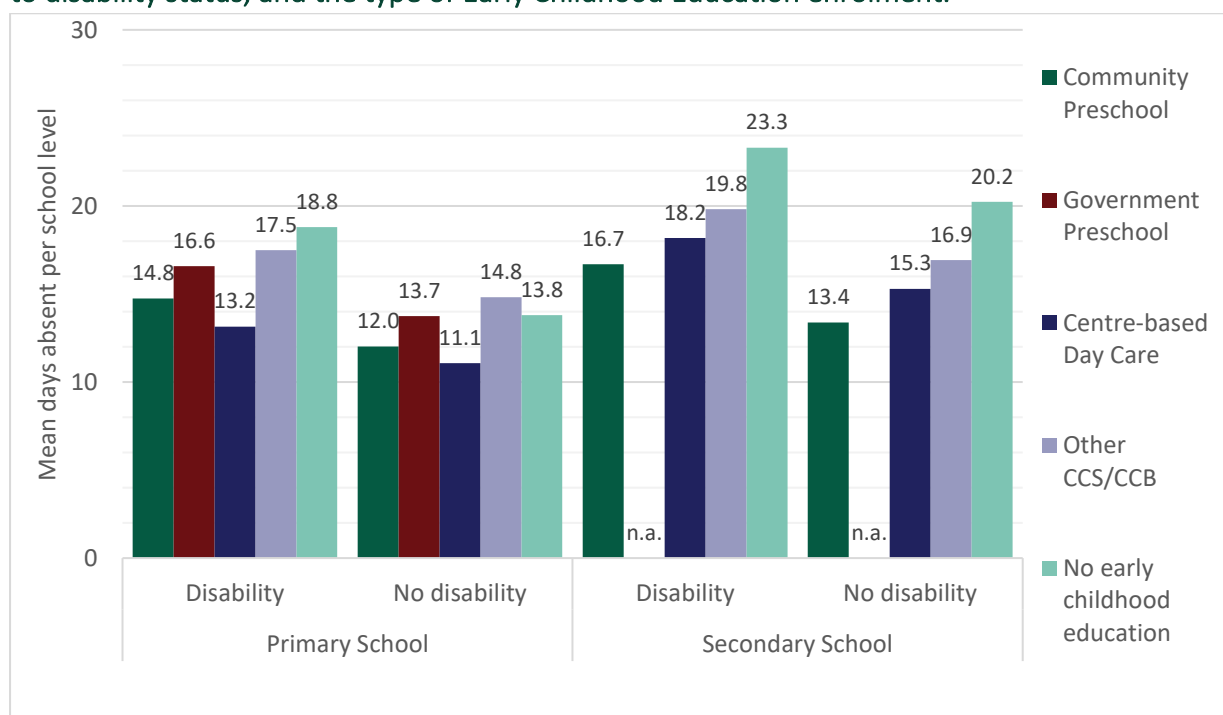
[14] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials in Section 8.2.4 of Appendix A.

[15] Sex in this analysis include male, female and other. As the minimum cell size rule was triggered for 'other' perturbation has been applied to the reporting of sex.

Figure 59 presents the mean days suspended from school for children with Any Disability, according to Early Childhood Education type in the year before school. For children with disability, there was no significant difference in the mean number of days suspended from primary school for children who were enrolled in each Early Childhood Education type and those with no Early Childhood Education (see details of difference tests in Appendix A).

Figure 59. Mean number of days suspended (per year) in primary school and secondary school according to disability status, and the type of Early Childhood Education enrolment.
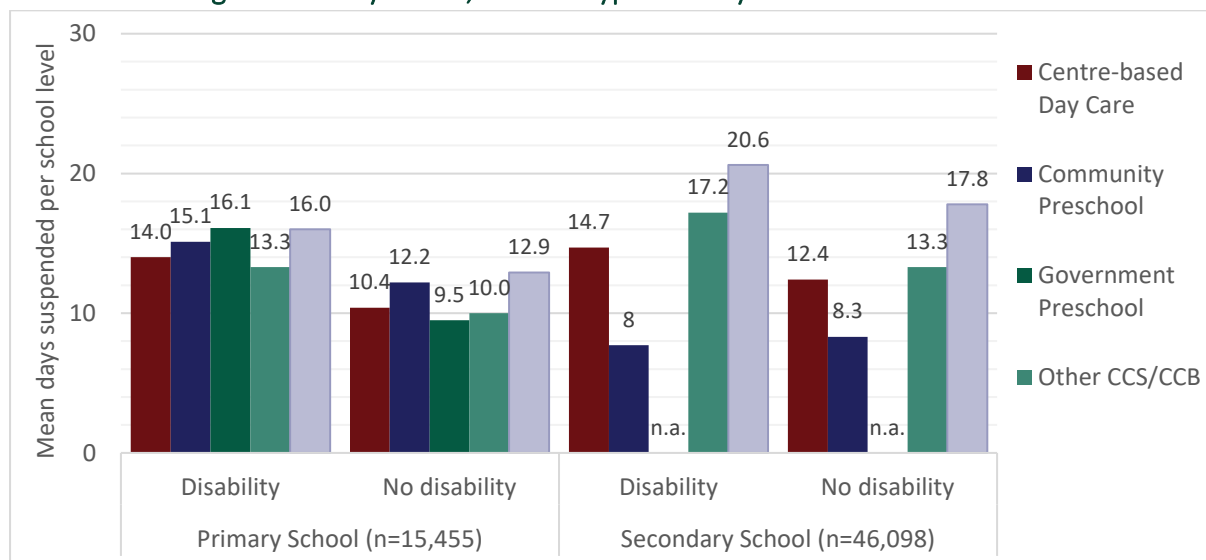

8.2.4.2 Association between Early Childhood Education type (and other factors) and school absences

Figure 60 presents a summary of estimated associations between Early Childhood Education and the mean number of days absent, among children with Any Disability and No Disability, separately. Across service types, enrolment in NSW Community Preschool was associated with the fewest days absent from both primary and secondary schools. In terms of differences between primary and secondary school, a stronger negative association was evident for absences (i.e., fewer days absent) in secondary school.

In general, children who were enrolled in some form of Early Childhood Education service had fewer days absent from both primary and secondary school, regardless of disability status and relative to their peers who were not enrolled in an Early Childhood Education service (Figure 60).

Figure 60. Associations between Early Childhood Education type* and mean days absent in primary and secondary school, according to disability status.
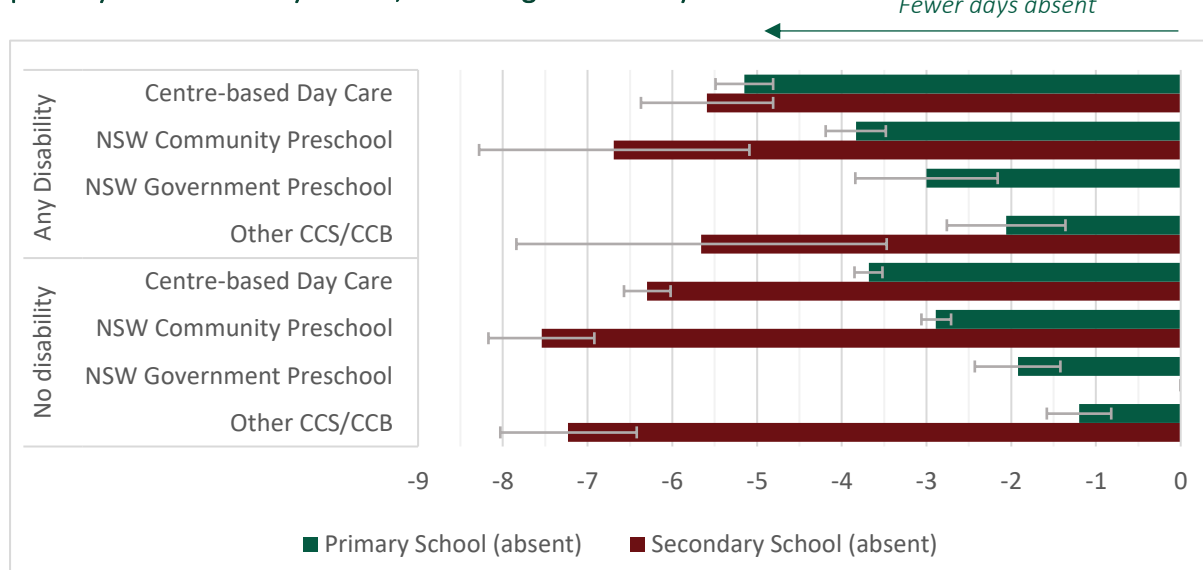
Adjusted regression parameter estimates (and 95% confidence intervals) of the association between Early Childhood Education enrolment and absences (mean days) in primary and secondary school, adjusted for covariates. *Each Early Childhood Education type was examined in a separate model. It was not possible to examine NSW Government Preschool and secondary school attendance owing to small sample sizes.

Figure 61 presents a summary of the associations between Early Childhood Education types and the total number of school days suspended in primary and secondary school. This shows that children who were enrolled in Centre-based Day Care and NSW Community Preschool had significantly fewer total days suspended in secondary school, regardless of disability status, relative to their peers who were note enrolled in an Early Childhood Education service.

Figure 61. Adjusted associations (β, and 95% CIs) between Early Childhood Education type* and the total number of days suspended in primary and secondary school, according to disability status.
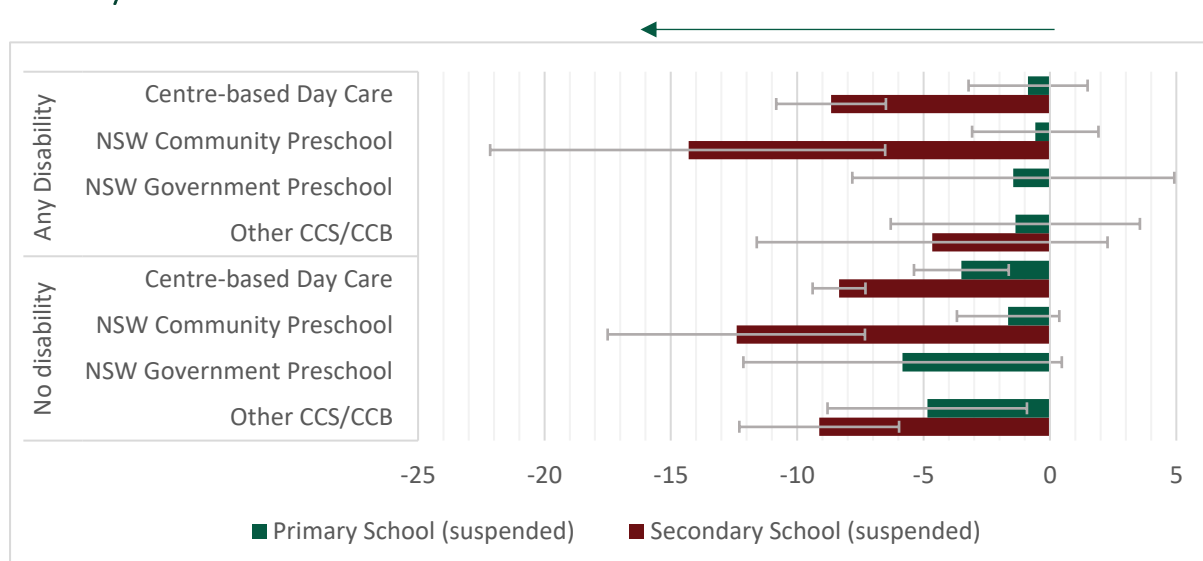
Adjusted regression parameter estimates (and 95% confidence intervals) of the association between Early Childhood Education enrolment and total days suspended in primary and secondary school, accounting for covariates. *Each Early Childhood Education type was examined in a separate model. It was not possible to examine NSW Government Preschool and secondary school attendance owing to small sample sizes.

Figure 62 presents a summary of the associations between Early Childhood Education types and the likelihood of any suspensions in primary and secondary school, when accounting for other factors including disability status. Children who were enrolled in Early Childhood Education generally had a decreased likelihood of school suspension than children who were not enrolled in any Early Childhood Education services (Figure 62). Enrolment at a NSW Community Preschool was associated with the largest decrease in the odds of being suspended in both primary and secondary school.

Figure 62. Adjusted Odds Ratios (ORs; 95% CIs) for at least one school suspension in primary or secondary school according to Early Childhood Education enrolment type* among those with Any Disability and No Disability.
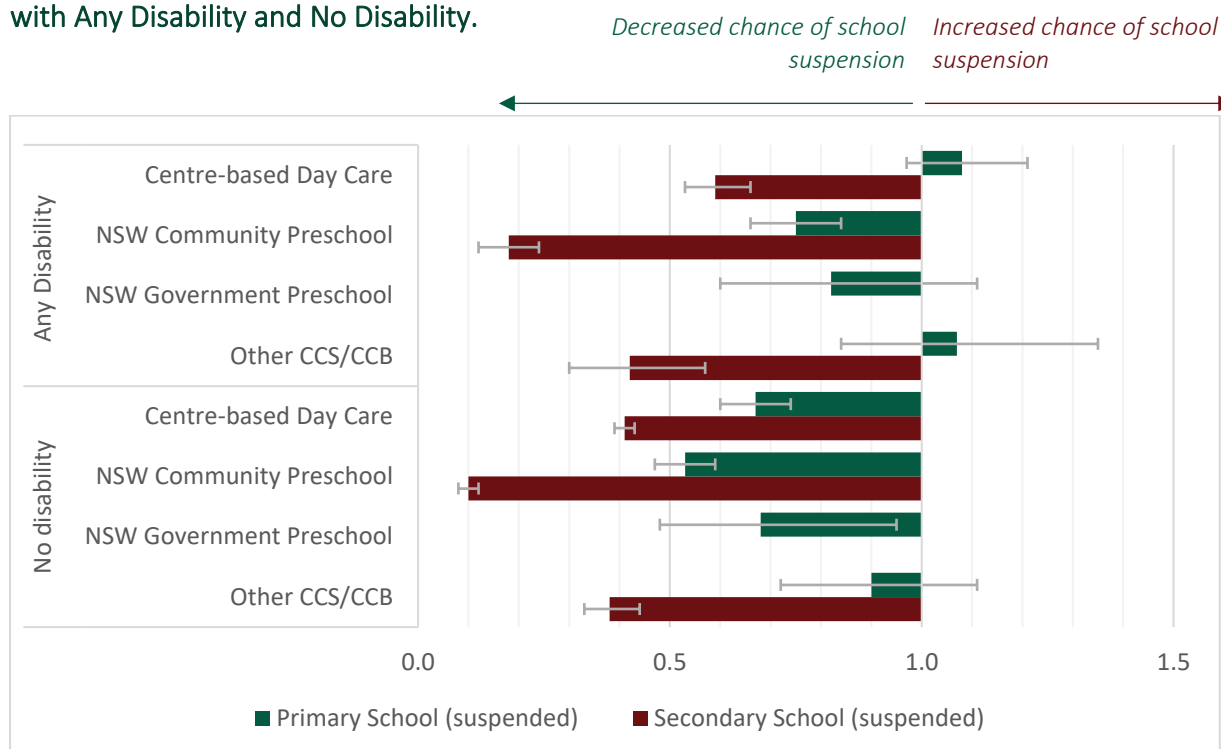
Adjusted associations (odds ratio and 95% confidence intervals) for the proportion of days suspended from primary and secondary school, adjusted for covariates. *Each Early Childhood Education type was examined in a separate model. It was not possible to examine NSW Government Preschool and secondary school attendance owing to small sample sizes.

8.2.5   Severity of disability and school attendance

The following analyses are for a sub-cohort of 26,821 children with a Government school enrolment record and a disability severity indicator on the NDIS[16]. We used these data to examine differences in the prevalence of school absences and suspensions according to the level of functional limitation associated with disability, and to estimate the associations between level of functional impairment and these school attendance indices in primary and secondary school, for children who had a registered NDIS plan.

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[16] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials in Section 8.2.5.1 of Appendix A.

The NDIS assessment process provides determination of the child's disability or impairment that affects their functional capacity in day-to-day activities (e.g., communication, learning, self-care, mobility, social interaction, and/or self-management). They are categorised into three hierarchical levels of functional limitation: low functional limitation; medium functional limitation; or, high functional limitation.

8.2.5.1 Disability functional limitation and school absences

Figure 63 presents the mean days absent from school for children with Any Disability, according to functional limitation level of the disability.

Figure 63. Mean number of days absent (per year) from primary school and secondary school according to the level of functional limitation for children with Any Disability.
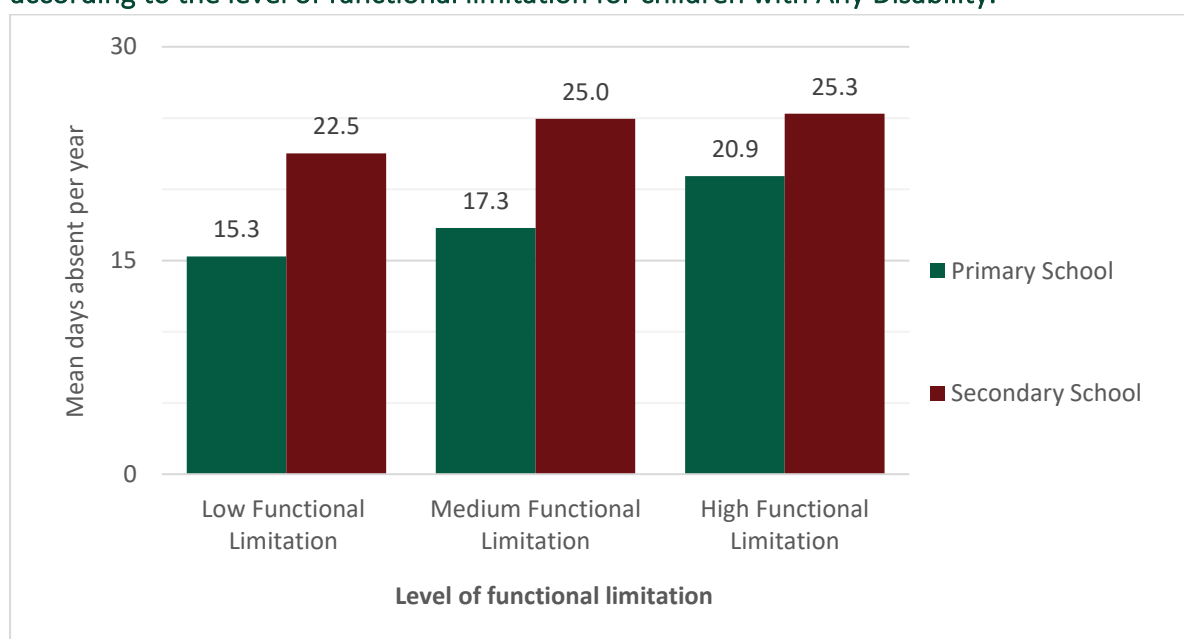
Of the 26,821 children with both a register NDIS plan and Government school enrolment records, 11,443 children had full covariate data for analyses in regression models presented below.

Figure 64 presents a summary of the associations between the level of functional limitation and the mean number of days absent (per year) for primary and secondary school. Children with medium and high functional limitation had significantly more days absent from primary and secondary school than children with low functional limitation (Figure 64). This association was more pronounced for the group of children with high functional limitation.

Figure 64. Adjusted associations (β, and 95% CIs) between the mean number of days absent (per year) in primary and secondary school and the level of functional limitation ("high" or "medium" relative to "low") among those with disability.
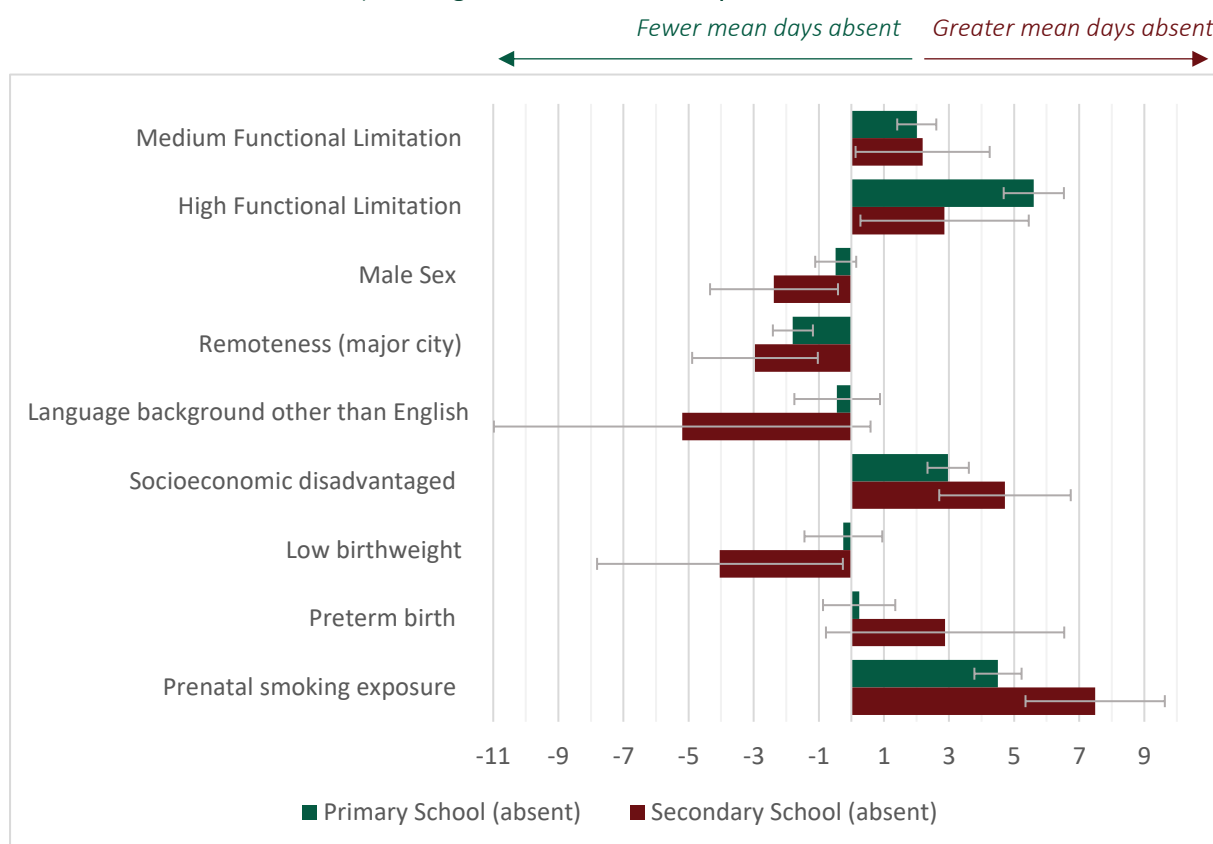
Adjusted regression parameter estimates (and 95% confidence intervals) of the association between disability functional limitation and absences (mean days) in primary and secondary school, adjusted for covariates.

Level of functional limitation and school suspensions

Figure 65 presents the mean number of days suspended from school for children with Any Disability, according to the level of functional limitation associated with their disability.

Figure 65. Mean number of days suspended (per year) from primary school and secondary school by disability functional limitation.
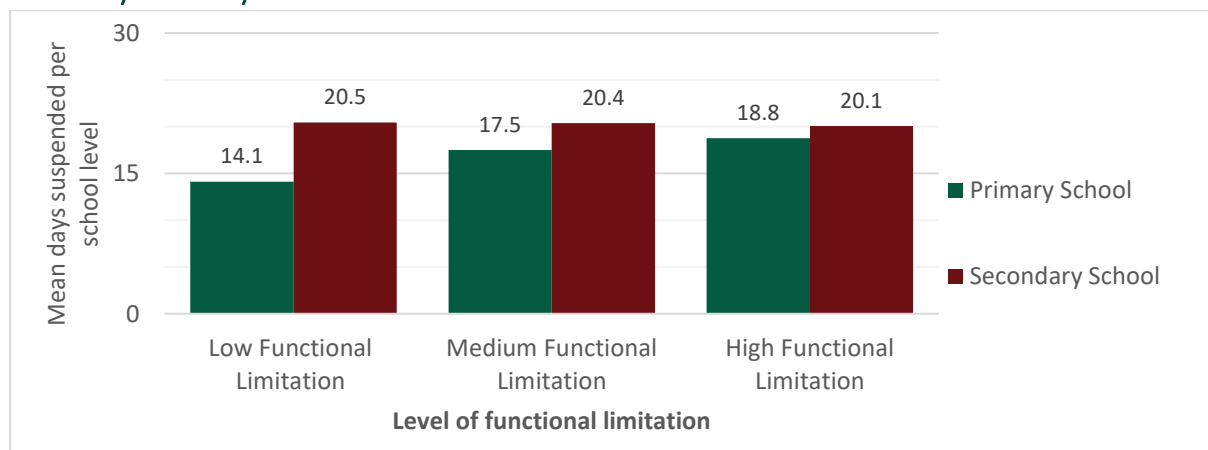
Figure 66 presents a summary of associations between the level of functional limitation and the total number of days suspended while also accounting for the effects of covariates. Children with medium and high functional limitation had more days suspended from primary school than children with low functional limitation (Figure 66).

Figure 66. Adjusted associations (β, and 95% CIs) between the total number of days suspended in primary and secondary school, and the level of functional limitation ("high" or "medium" relative to "low") among those with disability.

Adjusted regression parameter estimates (and 95% confidence intervals) of the association between disability functional limitation and suspensions (sum) in primary and secondary school, accounting for covariates.

Figure 67 presents a summary of associations between the level of functional limitation and the likelihood of at least one suspension among those with disability, when accounting for other covariates.

Children with medium and high functional limitation had a slightly increased likelihood of school suspensions in primary school than children with low functional limitation. However, there were no significant associations between functional limitation and the reduced likelihood of being suspended in secondary school.

Other factors such as being male, being socioeconomic disadvantaged, being exposed to prenatal smoking, were all risk factors that increased the likelihood of being suspended. In contrast, children from a non-English language background had a decreased likelihood of being suspended in primary school, but the likelihood of not being suspended became statistically not significant by the time they reached secondary school.

Figure 67. Adjusted Odds Ratios (95% CIs) for any school suspensions in primary and secondary school, according to functional limitation ("high" or "medium" relative to "low")
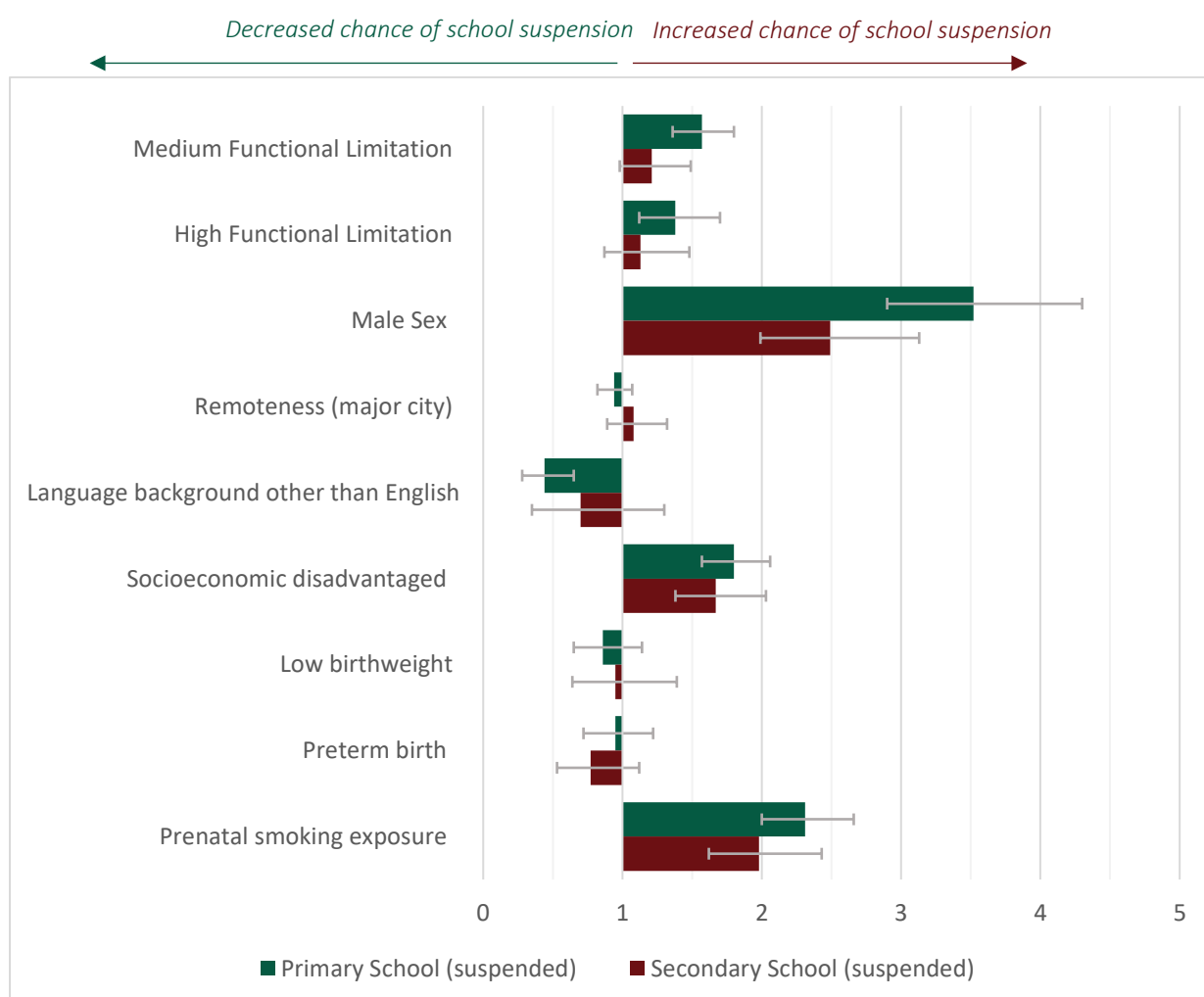
Adjusted associations (odds ratio and 95% confidence intervals) for the proportion of days suspended from primary and secondary school. Adjusted models examined disability functional limitation and each of the covariates.

8.3 Academic Achievement (National Assessment Program – Literacy and Numeracy)

This section reports on Grade 3 NAPLAN achievement for children with and without Disability and Developmental Vulnerability (section 8.3.1), the effect Early Childhood Education types, and hours of enrolment, on Grade 3 NAPLAN achievement (section 8.3.2), and the trajectory of NAPLAN achievement across Grades 3, 5, 7, and 9 (section 8.3.3).

The National Assessment Program – Literacy and Numeracy (NAPLAN) is the yearly assessment administered to school children in Grades 3, 5, 7, and 9 to assess achievement in five domains: Reading; Writing; Spelling; Grammar and Punctuation; and Numeracy[17]. In this Test Case, NAPLAN data was available for 609,740 children attending Government schools (26.2% of the NSW Test Case population).

We used these data to examine NAPLAN achievement (scoring below National Minimum Standard) on **Any domain** (among all five domains), and for the individual domains of **Numeracy** and **Reading**. Achieving below National Minimum Standard (NMS) refers to scoring a Band 1 for Grade 3, Band 3 for Grade 5, Band 4 for Grade 7, or Band 5 for Grade 9.

Key insights

- Children with Any Disability were over 2.5 times as likely to achieve below NMS on any domain of the Grade 3 NAPLAN
- Children with Developmental Vulnerability were over 4 times as likely to achieve below NMS on any domain of the Grade 3 NAPLAN
- Community Preschool enrolment was associated with decreased odds of achieving below NMS on any domain of the Grade 3 NAPLAN, for both children with and without disability
- Children with Any Disability were 2-3 times as likely to achieve below NMS at each NAPLAN year, compared children with No Disability
- 23.1% of children with disability achieved below NMS on any domain of the Grade 3 NAPLAN compared to 10.0% of children with No Disability
- Children with Any Disability who achieved below NMS on the Grade 3 NAPLAN assessment were significantly more likely to achieve below NMS in subsequent NAPLAN assessments.

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[17] See Appendix A for more detail on the NAPLAN and the specific variables used for the Test Case in the NAPLAN record set, including covariate details.

8.3.1   Grade 3 NAPLAN achievement

A sub-cohort of 518,310 children had complete data for each of the five Grade 3 NAPLAN domains[18]. Of these children:
- 11.7% (n=60,500) achieved below the National Minimum Standard (NMS) on at least one domain in Grade 3;
- 3.9% (n=20,375) achieved below the National Minimum Standard (NMS) on the Numeracy domain in Grade 3
- 4.5% (n=23,080) achieved below the National Minimum Standard (NMS) on the Reading domain in Grade 3, and;
- 13.1% (n=67,831) were identified with Any Disability, of which 48.8% (n=33,106) had a Psychosocial disability, and 37.3% (n=25,324) had an Intellectual/Learning disability.

There were 175,838 of children with complete Grade 3 NAPLAN data and available AEDC records (from the 2009 [including additional 2010 assessments], 2012, 2015, or 2018 data collections), of which 9.4% (n=16,573) were identified with Developmental Vulnerability (on ≥2 AEDC domains).

Figure 68 presents the proportion of each sub-cohort achieving below the NMS on Grade 3 NAPLAN indices according to disability status and developmental vulnerability.

Figure 68. Proportion of children in specific sub-cohorts who achieved below National Minimum Standard (NMS) for selected indices on the Grade 3 NAPLAN.

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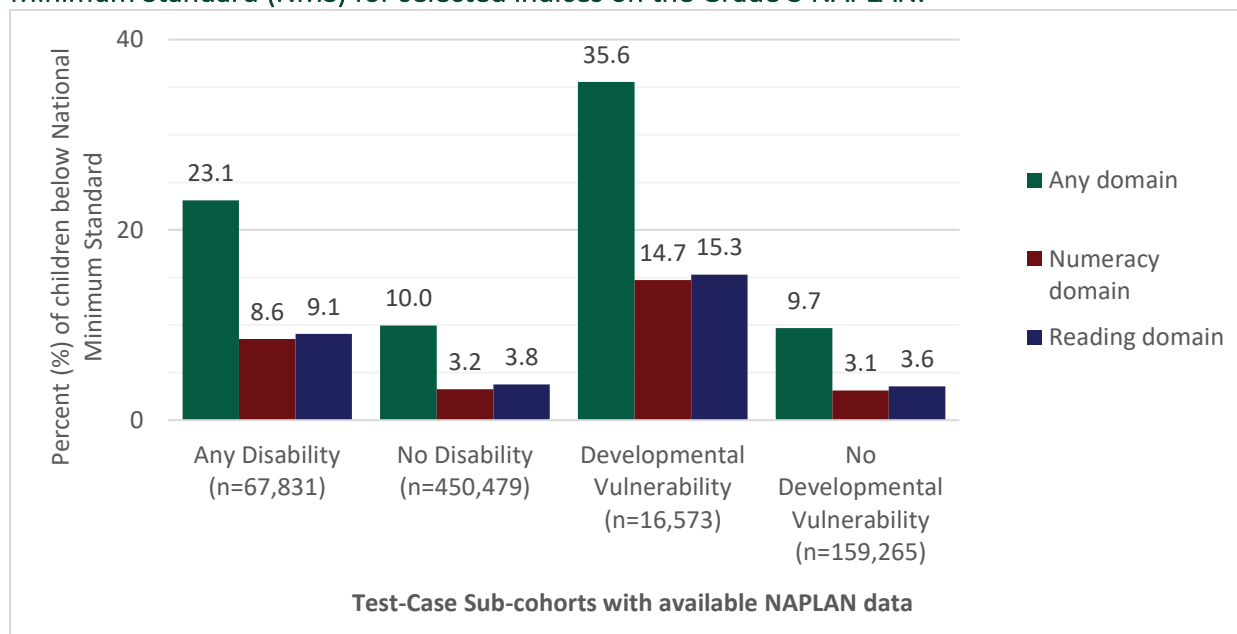
[18] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials in Section 8.3.1 of Appendix A.

Figure 69 presents the unadjusted odds ratios for achieving below NMS on selected NAPLAN indices, for children identified in the Any Disability or Developmental Vulnerability sub-cohorts.

Children with Any Disability were more than two and a half times as likely to achieve below NMS on these Grade 3 NAPLAN indices, than their peers without disability. Whereas children with Developmental Vulnerability (on ≥2 domains of the AEDC) were around five times as likely to achieve below NMS on these Grade 3 NAPLAN indices, relative to their peers without Developmental Vulnerability.

The fact that children with Developmental Vulnerability performed more poorly than children with disabilities suggests that children with Developmental Vulnerability are not receiving adequate supports to perform well in NAPLAN.

It is therefore crucial that we identify these children with Developmental Vulnerability before they start school so that they can get the right support they need, as early and quickly as possible.

Figure 69. Unadjusted Odds Ratios (ORs, and 95% confidence intervals) of achieving below NMS on selected indices on the Grade 3 NAPLAN for sub-cohorts of Any Disability or Developmental Vulnerability.
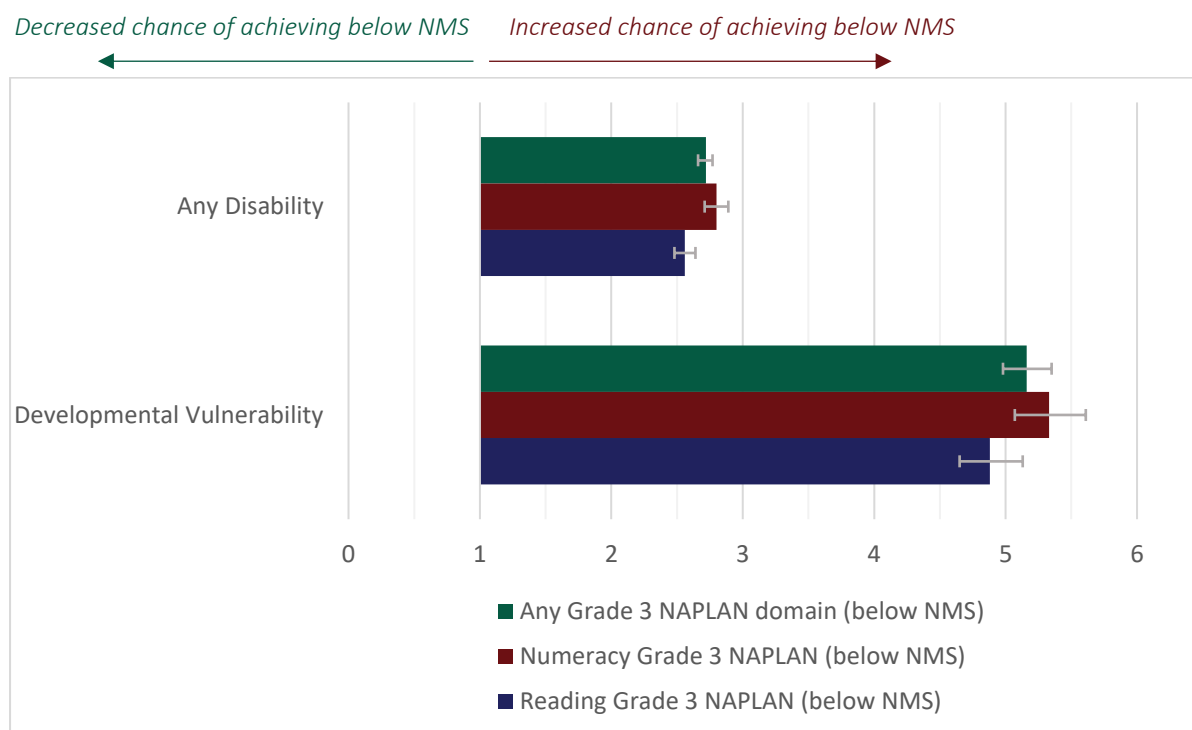
Figure 70 presents the proportion of children with each disability type achieving below the NMS on Grade 3 NAPLAN indices according to disability type. The pattern of achieving below the NMS was consistent across disability types.

Figure 70. Proportion of children with each disability type who achieved below National Minimum Standard (NMS) for selected indices on the Grade 3 NAPLAN.

Figure 71 presents the unadjusted odds ratios for achieving below NMS on selected NAPLAN indices, according to disability type.

Figure 71. Unadjusted Odds Ratios (95% confidence intervals) for achieving below NMS on selected indices on the Grade 3 NAPLAN, for each disability type.
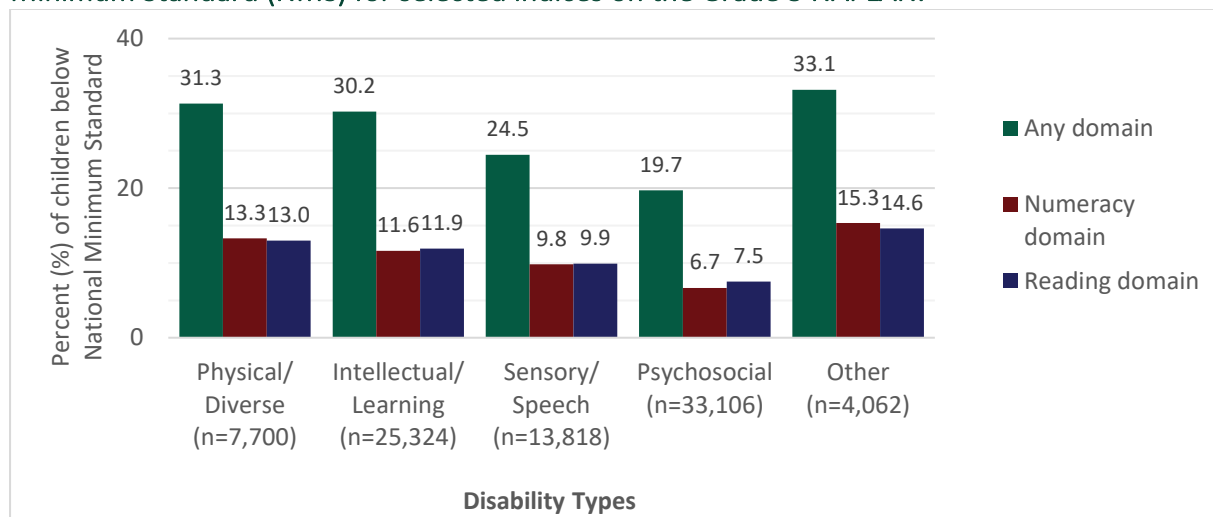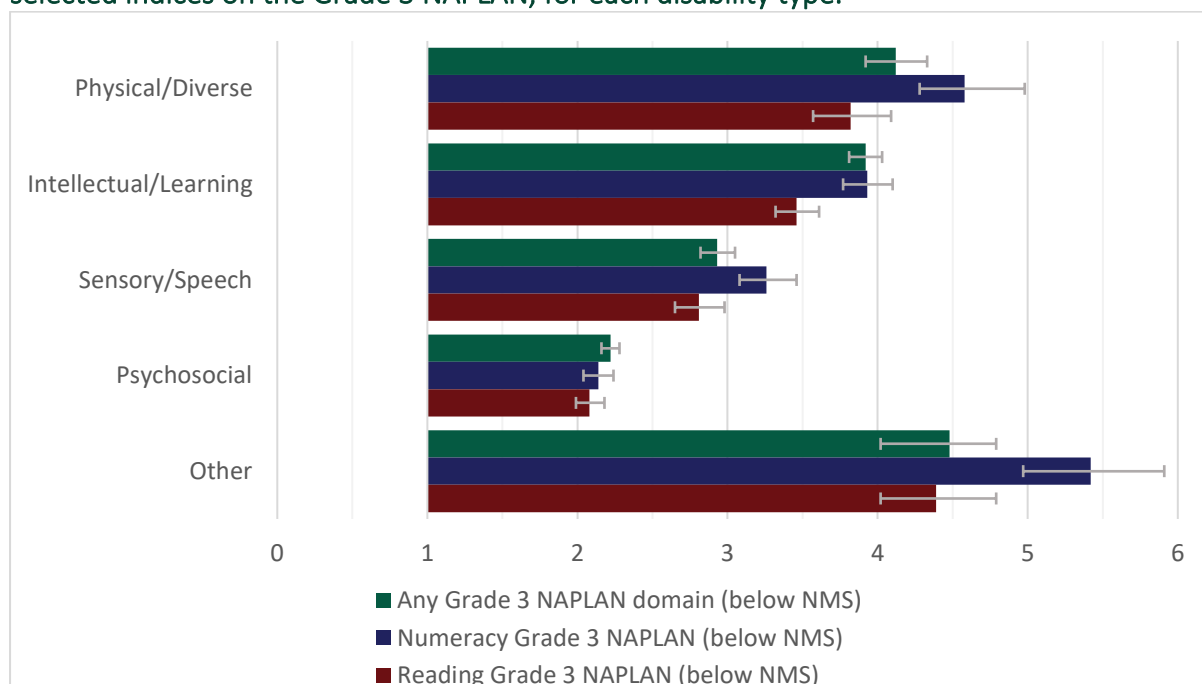
8.3.1.1 Associations between Any Disability and Grade 3 NAPLAN achievement

Among the 518,310 children in the section above, a sub-cohort of 192,910 children had complete covariate data required for analyses of associations between disability and NAPLAN outcomes, when adjusting for other risk and protective factors (covariates, including binary indicators of the child's *sex*, *remoteness*, *socioeconomic disadvantage*, *language background other than English*, *low birthweight*, *preterm birth*, and *prenatal smoking exposure*).[19]

Of the 192,910 children:

- 50.1% (n=98,318) were male
- 16.0% (n=30,808) were identified with Any Disability
- 21.3% (n=41,043) were from a non-English speaking background
- 28.2% (n=54,361) were from a regional or remote area (i.e., not major cities) in NSW
- 22.4% (n=43,137) were from areas in the lowest quintile of socioeconomic disadvantage

Figure 72 presents the likelihood of achieving below NMS on any Grade 3 NAPLAN domain for children with Any Disability relative to their peers without disability, when adjusting for the covariates.

Figure 72. Odds Ratios for achieving below National Minimum Standard on the Grade 3 NAPLAN for children with Any Disability (and other factors).
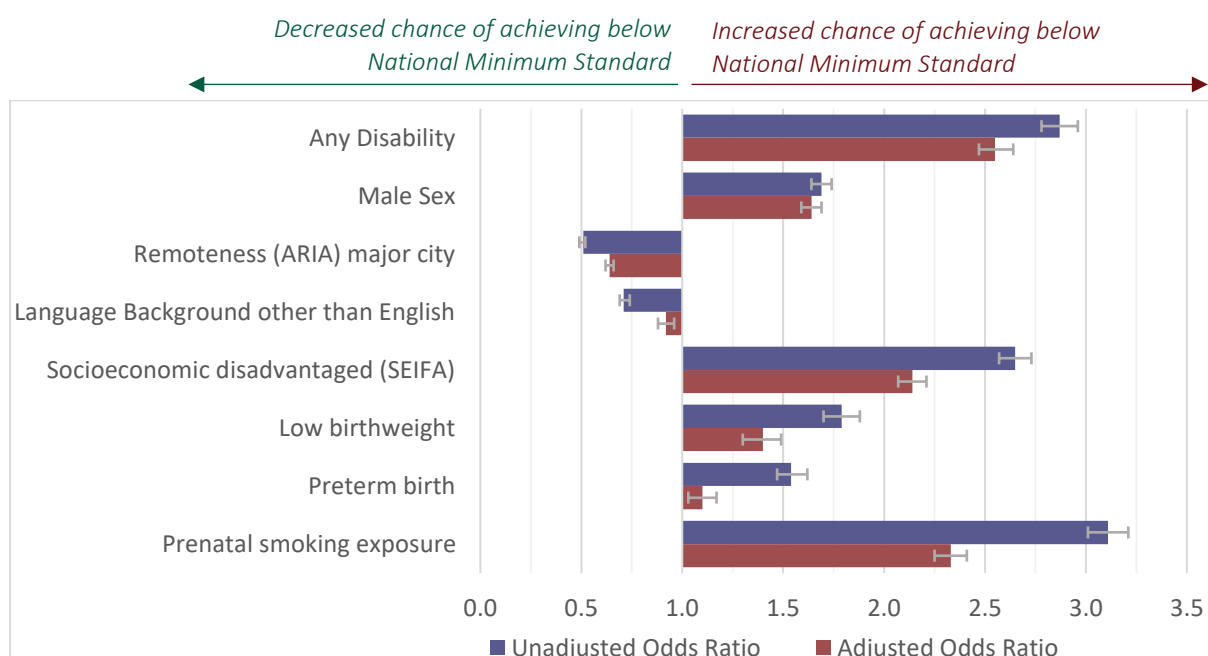
Adjusted associations (odds ratio and 95% confidence intervals) for below NMS achievement on any domain of the Grade 3 NAPLAN and Any Disability (relative to No Disability, when adjusting for covariates).

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[19] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials in Section 8.3.1.1 of Appendix A.

Figure 72 shows that children with a disability were over 2.5 times as likely to achieve below NMS on at least one domain of the Grade 3 NAPLAN, relative to children without disability, when accounting for other factors.

Living in a major city and having a language background other than English decreased the odds of achieving below NMS on at least one Grade 3 NAPLAN domain. Whereas being male, living in a socio-economically disadvantaged area, being of low birthweight and exposed to prenatal smoking were all associated with increased odds of achieving below NMS on at least one Grade 3 NAPLAN domain.

Figure 73 presents the likelihood of achieving below NMS on the Grade 3 NAPLAN reading or numeracy domains for children with Any Disability relative to their peers without disability, when adjusting for the covariates.

Figure 73. Odds Ratios for achieving below National Minimum Standard on the Grade 3 NAPLAN Reading and Numeracy domains for children with Any Disability (and other factors).

Adjusted associations (odds ratio and 95% confidence intervals) for below NMS achievement on the reading and numeracy domains of the Grade 3 NAPLAN and Any Disability (relative to No Disability, when adjusting for covariates).

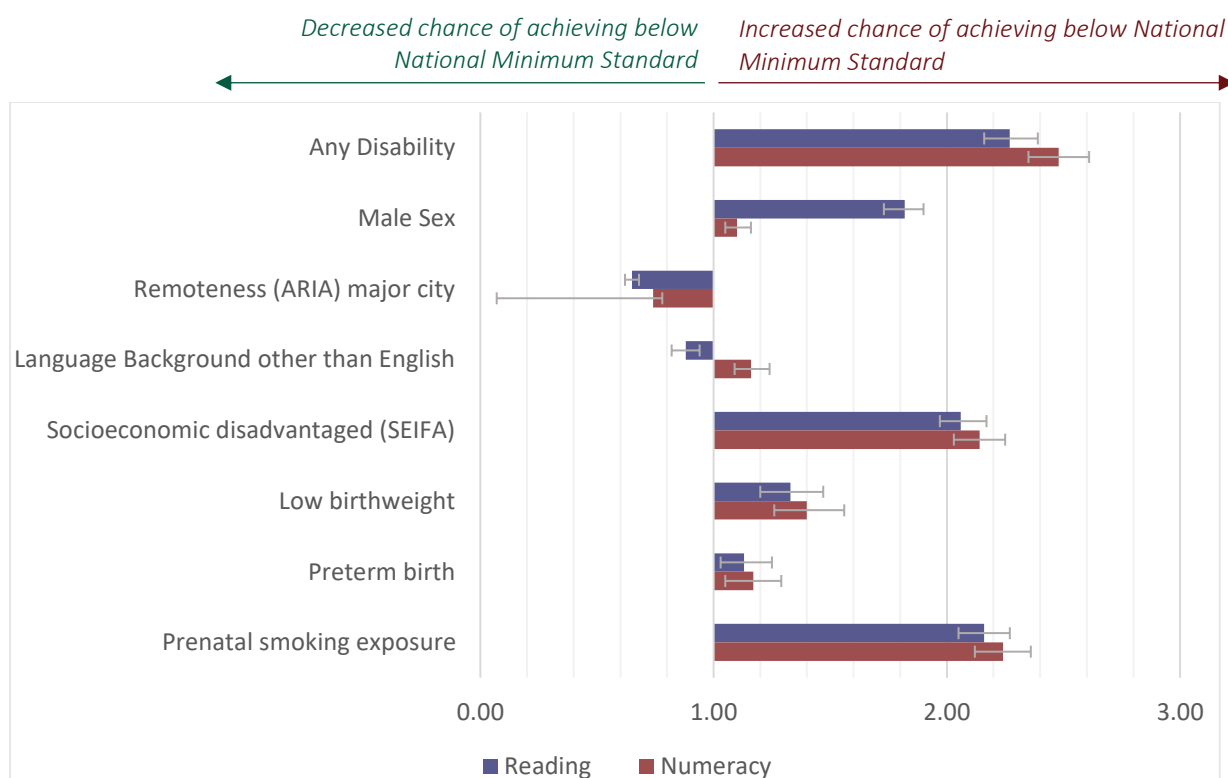Figure 73 shows that children with a disability were over 2 times as likely to achieve below NMS on the reading and numeracy domains of the Grade 3 NAPLAN, relative to children without disability, when accounting for other factors.

With the exception of male sex, children with Any Disability and all covariates examined were associated with slightly higher increased odds of achieving below NMS on numeracy than reading, with the highest increased odds of achieving below NMS on the Grade 3 numeracy domain for children with disability, living in a socio-economically disadvantaged area and being exposed to prenatal smoking. In contrast being male showed higher increased offs of achieving below NMS on the reading domain of the Grade 3 NAPLAN. Living in a major city decreased the odds of achieving below NMS on the reading and numeracy domains of the Grade 3 NAPLAN domain, and having a language background other than English decreased the odds of achieving below NMS on only the reading domain of the Grade 3 NAPLAN.

8.3.1.2 Associations between Type of Disability and Grade 3 NAPLAN achievement

A smaller sample of children had information available on Disability Type, among the 192,910 children with all covariate data referred to in the analysis above. Among those with available information on Disability Type, we conducted separate analyses for each Disability Type, to estimate associations between Disability Type and NAPLAN outcomes in the context of other risk and protective factors (covariates).

Figure 74 presents a summary of associations between the five disability types and achieving below NMS on any Grade 3 NAPLAN domain, accounting for other covariates. Children with Physical/Diverse or Intellectual/Learning disability were over three times as likely to achieve below the NMS than peers with No Disability.

Figure 74. Unadjusted and Adjusted Odds Ratios (ORs; 95% CIs) of achieving below National Minimum Standard on the Grade 3 NAPLAN for children with each Disability Type.
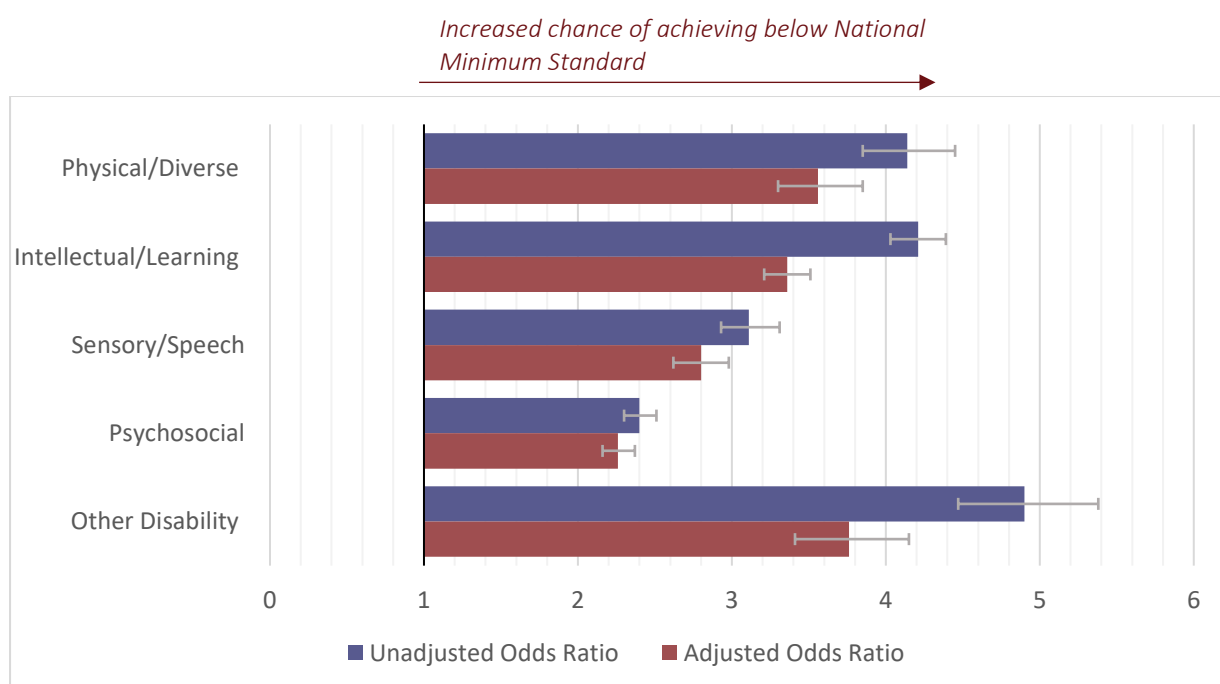
Note: Separate models were run for each disability type relative to No Disability.

8.3.1.3 Associations between Developmental Vulnerability and Grade 3 NAPLAN achievement

Among the 503,610 children with complete data for each of the five Grade 3 NAPLAN domains, a sub-cohort of 151,394 children had complete AEDC record and full covariate information, allowing the estimation of the effects of 'Developmental Vulnerability' (on ≥2 AEDC domains) on Grade 3 NAPLAN achievement, in the context of the other contributing factors.

Figure 75 shows the likelihood of achieving below the NMS on any Grade 3 NAPLAN domain for children with Developmental Vulnerability relative to their peers. Children with Developmental Vulnerability were over four times as likely to achieve below the NMS, than their peers without developmental vulnerability.

Figure 75. Unadjusted and Adjusted Odds Ratios (95% CIs) for achieving below National Minimum Standard on the Grade 3 NAPLAN among children in the Developmental Vulnerability sub-cohort.
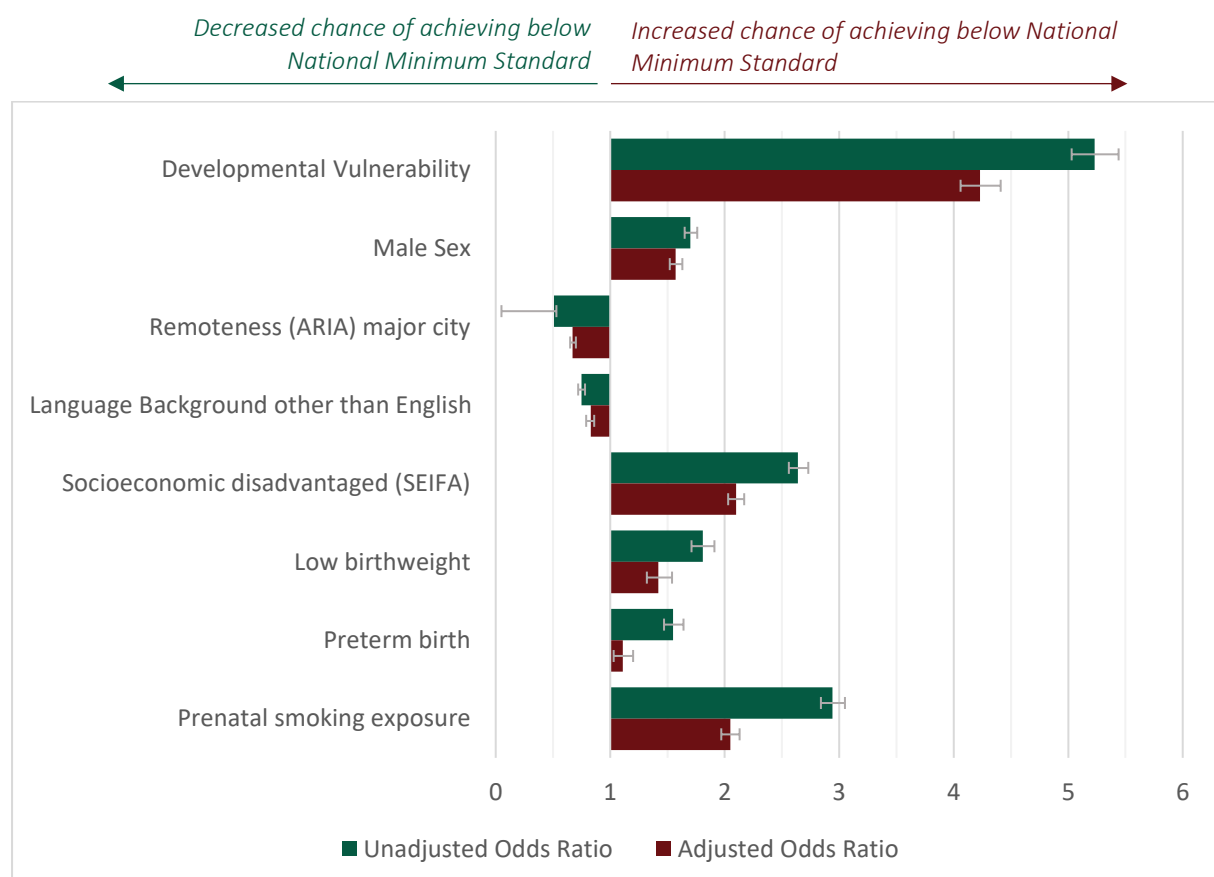
Adjusted associations (odds ratio and 95% confidence intervals) for below National Minimum Standard achievement on any domain of the Grade 3 NAPLAN and Developmental Vulnerability (relative to no Developmental Vulnerability), when adjusting for covariates.

8.3.2 Early Childhood Education and Grade 3 NAPLAN achievement

A subsample of 488,354 children had full data for their Grade 3 NAPLAN record, and evidence of enrolment in a single type of Early Childhood Education in the year before school, in one of the following datasets: NSW Community Preschool, NSW Government Preschool, Centre-based Day Care or Other Childcare Subsidy/Benefit enrolment; these children were compared to those with no Early Childhood Education enrolment (children with multiple types of enrolment were excluded).

Table 4 shows the number of children achieving below the NMS on the Grade 3 NAPLAN for each early education type, and presents the unadjusted Odds Ratios children with Any Disability, according to each of the types of Early Childhood Education.

Children with disability were around 3 times as likely to achieve below NMS, relative to children without disability, regardless of the type of Early Childhood Education enrolment (ORs for each type ranged from 2.66 to 3.05).

Table 4. Descriptive statistics and unadjusted Odds Ratios (OR; 95% CIs) for achieving below National Minimum Standard on the Grade 3 NAPLAN according to Early Childhood Education enrolment type, for children with Any Disability (relative to No Disability).

NAPLAN Grade 3	Total n	% (row)	Any Disability n	% (col)	No Disability n	% (col)	Disability OR (95%CI)
Community preschool (n=36,103)			n=7,609		n= 28,494		
Achieving below NMS	3,448	9.55	1,433	18.8	2,015	7.1	3.05 (2.83,3.28)
Government preschool (n=2,430)			n=621		n=1,809		
Achieving below NMS	353	14.53	165	26.6	188	10.4	3.12 (2.47,3.94)
Centre-based Day Care (n=204,945)			n=32,034		n=172,911		
Achieving below NMS	22,081	10.77	7,088	22.1	14,993	8.7	2.99 (2.90,3.09)
Other CCS/CCB (n=11,262)			n= 1,812		n= 9,450		
Achieving below NMS	1,780	15.81	556	30.7	1,224	13.0	2.98 (2.65,3.34)
No childcare (n=233,614)			n=19,381		n=214,233		
Achieving below NMS	29,427	12.60	4,951	25.6	24,476	11.4	2.66 (2.57,2.75)

Of the 488,354 children contributing data to the analyses presented above, a subsample of 174,334 children had all covariate data available for analyses in adjusted regression models (alongside data on the Grade 3 NAPLAN assessment and Early Childhood Education enrolment data in the year before school). [20]

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[20] Further information on the subsamples, variables, analysis approach and detailed results are presented in the associated supplementary materials (see Appendix A).

Figure 76 shows the likelihood of achieving below NMS on the Grade 3 NAPLAN according to Early Childhood Education enrolment type (relative to no enrolment in Early Childhood Education), for children with and without disability separately, when adjusting for all covariates.

Children who were enrolled in Community Preschool were the only group with a significantly decreased likelihood of achieving below NMS on at least one domain of the Grade 3 NAPLAN, regardless of their disability status. There were no significant effects for other types of ECE (all 95% confidence intervals crossing 1), with the exception of Centre-based Day Care, where children with No Disability had a small decreased likelihood of achieving below NMS.

Figure 76. Adjusted Odds Ratios (and 95% CIs) for achieving below National Minimum Standard (NMS) on the Grade 3 NAPLAN according to Early Childhood Education enrolment type, for children with Any Disability and No Disability.
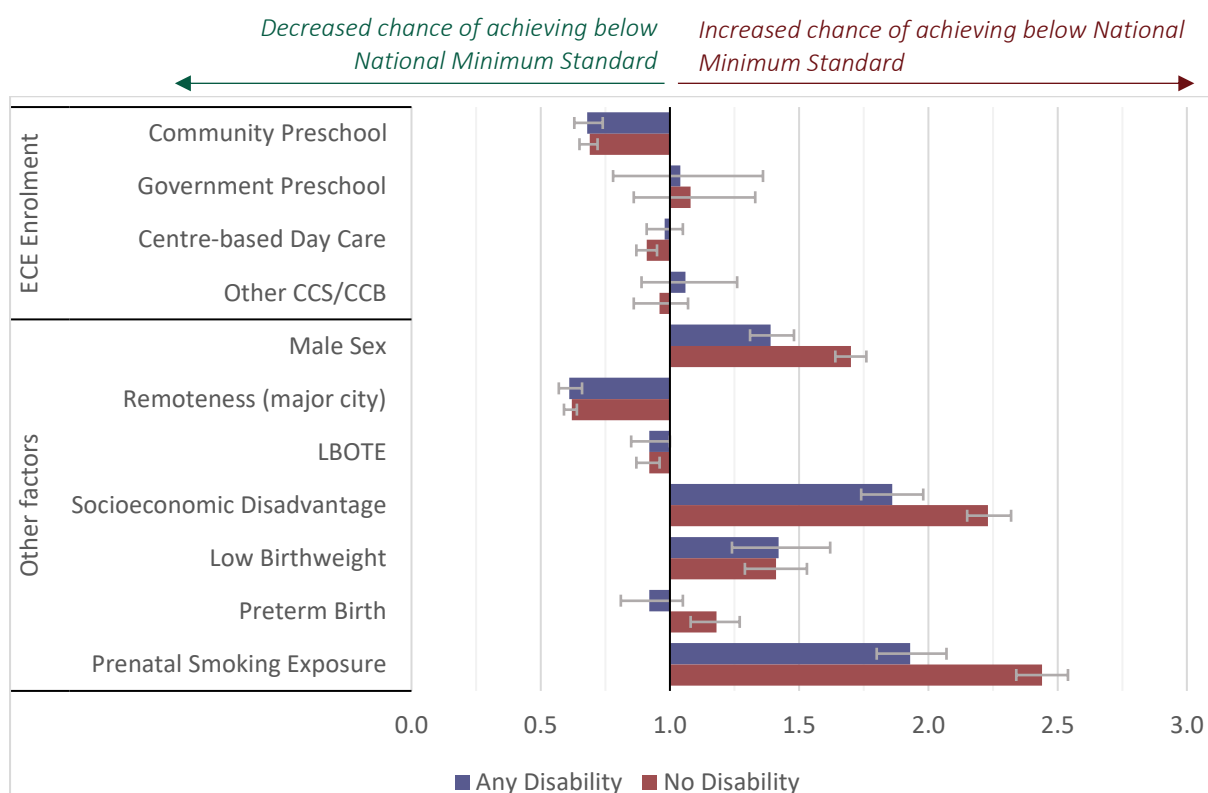
Adjusted associations (odds ratio and 95% confidence intervals) between below NMS achievement on any domain of the Grade 3 NAPLAN and ECE type (relative to no ECE enrolment), for children with and without disability, including covariates.

Figure 76 also indicates that living in a major city and having a language background other than English decreased the odds of achieving below NMS on at least one domain in the Grade 3 NAPLAN assessment. Whereas being male, living in a socio-economically disadvantaged area, being born with low birthweight, and exposed to prenatal smoking were associated with a significantly increased likelihood of achieving below the NMS. Additionally, children without disability and born preterm were a significantly increased likelihood of achieving below NMS, while there was no significant association for children with disability.

8.3.3 Early Childhood Education enrolment hours and Grade 3 NAPLAN achievement

The following analyses are for a sub-cohort of 100,228 children that had complete data for each of the five Grade 3 NAPLAN domains, information about the hours enrolled in a single type of Early Childhood Education or no enrolment in Early Childhood Education (i.e., children with multiple types of early childhood enrolments were excluded), as well as full covariate information.[21]

Figure 77 shows associations between hours enrolled in Early Childhood Education (for each type separately) and achieving below NMS on any domain of the Grade 3 NAPLAN, for relative to peers who were enrolled in less than 600 hours.

Figure 77. Unadjusted and Adjusted Odds Ratios (ORs; 95% CIs) of achieving below National Minimum Standard on at least one domain of the Grade 3 NAPLAN for children who were enrolled in ≥600 hours of Early Childhood Education in the year before school.
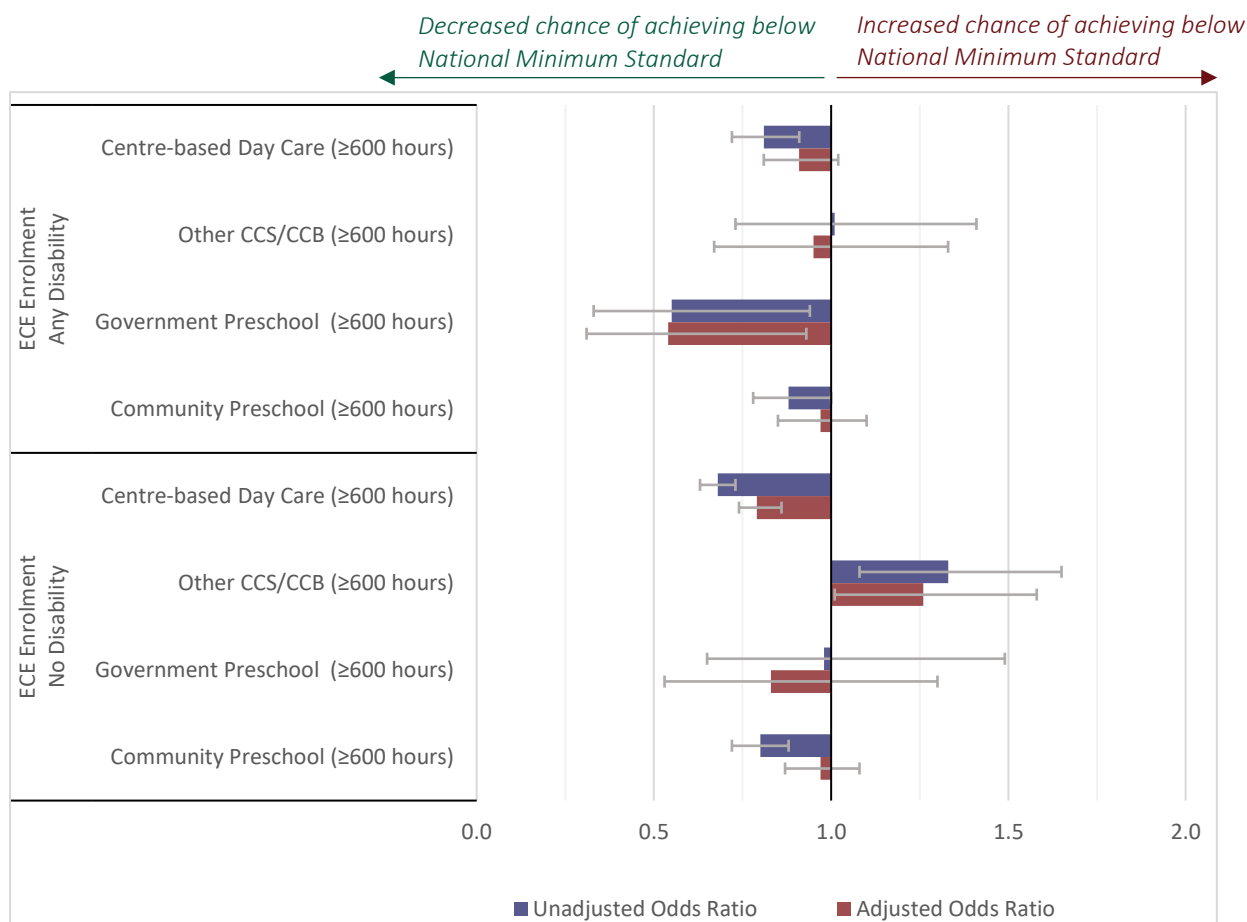
Separate modes were run for children with and without disability, including the covariates: child's sex (male/female); remoteness (major cities/regional and remote); socioeconomic disadvantage (yes/no); language background other than English (yes/no); low birthweight (yes/no); preterm birth (yes/no); prenatal smoking exposure (yes/no).

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[21] Further information on the subsample, variables, analysis approach and results for these analyses are presented in the associated supplementary materials (see Appendix A).

Children with disability who were enrolled for ≥600 hours in Government Preschool showed a decrease in the likelihood of achieving below NMS on Grade 3 NAPLAN when accounting for the contribution of the covariates. In contrast, there were no significant associations between the hours enrolled in the other types of Early Childhood Education for children with disability on achieving below NMS on at least one domain of the Grade 3 NAPLAN.

Similarly, children with No Disability who were enrolled in Government Preschool, also showed a decrease in the likelihood of achieving below NMS on Grade 3 NAPLAN when accounting for the covariates, while the effect of Early Childhood Education enrolment hours was not significant for other Early Childhood Education types.

8.3.4   Grades 3, 5, 7, and 9 NAPLAN achievement

In this section, we examined the associations between disability status and achieving below NMS on at least one domain of the NAPLAN in Grades 3, 5, 7, and 9, as well as the relationship between NAPLAN achievement in Grade 3, and subsequent achievement in Grades 5, 7, and 9, according to disability status.

These analyses were conducted in four sub-cohorts of children[22]:
  i.   518,315 children with complete data for the Grade 3 NAPLAN
  ii.   385,075 children with complete data for the Grades 3 and 5 NAPLAN
  iii. 211,653 children with complete data for the Grades 3, 5 and 7 NAPLAN
  iv.   104,344 children with complete data for the Grades 3, 5, 7, and 9 NAPLAN

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[22] Further information on the subsample, variables, analysis approach and detailed results for these analyses are presented in the associated supplementary materials (see Appendix A)

Table 5 presents descriptive information for sub-cohorts of children with and without Any Disability, and with and without Developmental Vulnerability, with regard to achieving below NMS for each index of NAPLAN assessment, in Years 3, 5, 7, and 9.
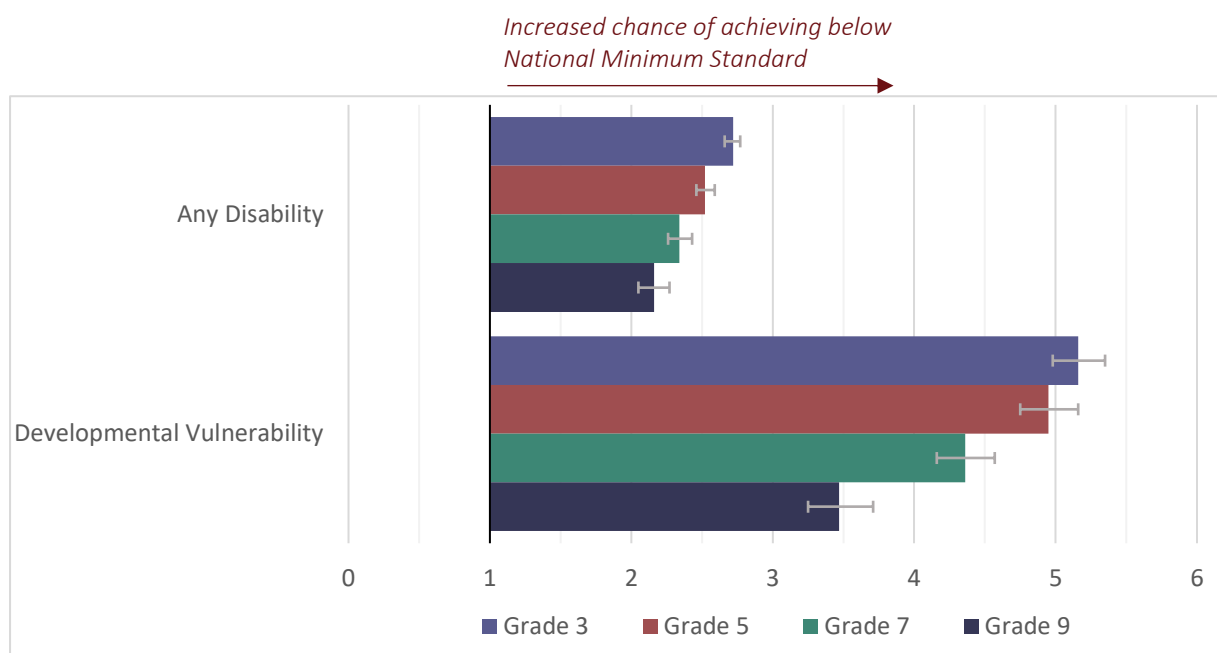
Table 5. Descriptive information for achieving below National Minimum Standard (NMS) on at least one domain of the NAPLAN Grades 3, 5, 7, 9, for children in the Any Disability and Developmental Vulnerability sub-cohorts, and their unaffected peers.

Sub-cohort		Sample Sizes	Below NMS (Any)		Below NMS (Numeracy)		Below NMS (Reading)	
			N	%(row)	N	%(row)	N	%(row)
Any Disability								
Yes	Grade 3	67,831	15,660	23.9	5,799	8.6	6,156	9.1
	Grade 5	36,767	11,140	30.3	3,850	10.5	4,670	12.7
	Grade 7	15,961	5,510	34.5	1,595	9.9	2,203	13.8
	Grade 9	6,309	2,702	42.8	385	6.1	1,036	16.4
No	Grade 3	450,479	44,840	9.9	14,576	3.2	16,924	3.8
	Grade 5	348,304	51,175	14.7	13,582	3.9	19,171	5.5
	Grade 7	195,690	35,931	18.4	7,138	3.7	11,922	6.1
	Grade 9	98,034	25,254	25.8	2,423	2.5	7,931	8.1
Developmental Vulnerability								
Yes	Grade 3	16,573	5,894	35.6	2,438	14.7	2,536	15.3
	Grade 5	10,870	4,839	44.5	1,811	16.7	2,095	19.3
	Grade 7	8,562	3,840	44.9	1,301	15.2	1,611	18.8
	Grade 9	4,022	2,189	54.4	372	9.3	821	20.4
No	Grade 3	159,265	15,397	9.7	4,989	3.1	5,682	3.6
	Grade 5	101,520	14,152	13.9	3,746	3.7	4,781	4.7
	Grade 7	79,934	12,565	15.7	3,041	3.8	3,958	4.9
	Grade 9	36,584	9,362	25.6	1,075	2.9	2,385	6.5

Figure 78 shows the unadjusted odds of achieving below NMS for Grades 3, 5, 7, and 9, (any domain and numeracy and reading domains) for children with and without Any Disability and Developmental Vulnerability.

Children with Any Disability were 2-3 times as likely to achieve below NMS on the reported domains for each NAPLAN year, relative to children with No Disability. Children with Developmental Vulnerability were 3-5 times as likely to achieve below NMS on the reported domains for each NAPLAN years, compared to children with no Developmental Vulnerability.

Figure 78. Odds Ratios (95% CI) for achieving below NMS on any one NAPLAN domain in Grades 3, 5, 7, and 9, for children with Any Disability and Developmental Vulnerability.

Reference groups - corresponding Grade 3, 5, 7, 9 No Disability/Developmental Vulnerability.

Table 6 presents the descriptive information in relation to achieving below NMS for each index of NAPLAN assessment in Years 5, 7, and 9, following achievement below NMS in Grade 3, for sub-cohorts of children with Any Disability, and with Developmental Vulnerability, and their non-affected peers.[23]

Table 6. Proportion of children achieving below National Minimum Standard (NMS) for NAPLAN Grades 5, 7 and 9, for children who achieved below NMS on Grade 3 NAPLAN assessment for children with and without Any Disability and Developmental Vulnerability before age 7 years.

			Below NMS (Any)		Below NMS (Numeracy)		Below NMS (Reading)	
		Sample Sizes	N	%(row)	N	%(row)	N	%(row)
Any Disability								
Yes	Grade 5	6,979	5,201	74.5	2,066	29.6	2,595	37.2
	Grade 7	2,831	2,115	74.7	712	25.2	998	35.3
	Grade 9	938	774	82.5	133	14.2	387	41.3
No	Grade 5	31,746	20,586	64.9	6,861	21.6	9,445	29.8
	Grade 7	18,128	12,254	67.6	3,251	17.9	5,219	28.8
	Grade 9	7,566	5,734	75.8	798	10.6	2,627	34.7
Developmental Vulnerability								
Yes	Grade 5	3,272	2,639	80.7	1,122	34.3	1,329	40.6
	Grade 7	2,404	1,869	77.8	730	30.4	915	38.1
	Grade 9	999	850	85.1	182	18.2	426	42.6
No	Grade 5	8,575	5,729	66.8	1,938	22.6	2,532	29.5
	Grade 7	6,677	4,368	65.4	1,379	20.6	1,771	26.5
	Grade 9	2,578	2,031	78.8	320	12.4	879	34.1

Unadjusted Odds Ratios (OR; 95% CIs) of achieving below the NMS on at least one domain of the NAPLAN in Grades 5, 7, and 9, following achievement below NMS on at least one domain of Grade 3, is presented in Figure 79, for separate sub-cohorts of children with Any Disability, and with Developmental Vulnerability (on ≥2 domains of the AEDC).

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[23] See the associated section (8.3.4) of Appendix A for the proportion of children achieving below NMS for NAPLAN Grades 5, 7 and 9 for children who *achieved NMS* on Grade 3 NAPLAN.

Figure 79. Unadjusted Odds Ratios (95% CI) for achieving below National Minimum Standard (NMS) on at least one domain of the Grade 5, 7 and 9 NAPLAN assessment among children who achieved below NMS on Grade 3 assessment, for Any Disability and Development Vulnerability sub-cohorts.
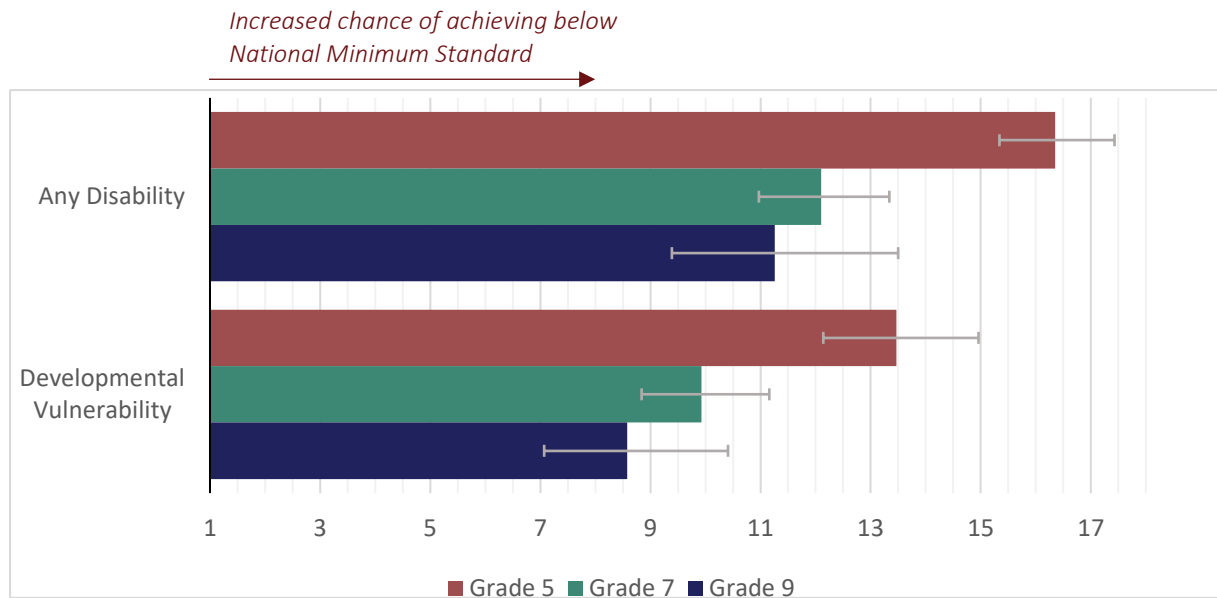
*Reference groups were children who achieved NMS on all NAPLAN domains in the corresponding Grades.

Children with Any Disability and Developmental Vulnerability who achieved below NMS on at least one domain of the Grade 3 NAPLAN assessment were significantly more likely to achieve below NMS on at least one domain in subsequent NAPLAN assessments, compared to their non-affected peers.

For example, children with Any Disability were more than 16 times as likely to achieve NMS on the Grade 5 NAPLAN assessment if they had achieved below NMS on at least one domain of the Grade 3 NAPLAN assessment. This analysis did not consider other factors which may be associated with achieving below NMS (e.g., socio-economic disadvantage, sex).

9 Benefits and Limitations

Representativeness of the cohort

- While most data were available for the NSW child population, MBS data for the NSW EC Test Case was provided for a sub-cohort of the NSW population who met one of 15 criteria for increased risk of Developmental Vulnerability. This meant that there was limited capacity to compare mainstream health care use with that for the population at risk of developmental vulnerability.
- The time frame for analyses precluded investigation of all research questions that may be of interest to the data custodians.

Advantage of having linked data

- Education data sets do not capture all children with disability; by including linked data sets from other jurisdictions identified more than double the number of children with disability that is typically identified by Education department records.

10 Recommendations

Additional data selection

- Whole-of-population samples would ensure a robust platform to inform policy.
- The inclusion of diagnostic codes in hospital admissions is likely to improve health service use patterns, and potentially the identification of disability.
- Information on health and social services and supports could be expanded to include community-controlled and child health services, community mental health, outpatient, Pharmaceutical Benefits Scheme data (for indicative medication), and additional information on medical services to delineate mainstream and targeted services. Additional information on social services, particularly child protection.
- The selection of variables could be expanded to provide more comprehensive information about familial risk and protective factors (e.g., mother's age at birth of child and targeted family intervention services, disability family support services, and Child Wellbeing Unit data).

Longer term data improvement

- Greater information on family, home and community environments would assist to understand the impact of services and supports in context, and to design more impactful wrap-around services.
- Additional factors derived via interview, such as community connections, culturally and linguistically diverse characteristics, should be considered for linkage with administrative data in future studies.
- There is a need for better quality metadata and data dictionaries to be maintained by data custodians for provision to data linkage analysts.

Improving services for vulnerable children and families

- Receiving support early in life can potentially reduce the impacts of disability or developmental vulnerability, build skills and independence, as well as reduce the extent of supports needed later in life.
- Additional supports are required to boost literacy and numeracy particularly among developmentally vulnerable children.
- Early identification of developmentally vulnerable children can ensure that adequate support is provided to those in need before school age.
- Access to NDIS is lower in children with a language background other than English. Further work is required to understand the barriers to access for these children.