



2021 AEDC indicators of development for children with disability

Department of Education, Skills and
Employment

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30 August 2022

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Dear Kay,

[AEDC indicators of development for children with disability, 2021 AEDC update](#)

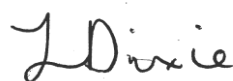
We are pleased to provide this report on the development of potential indicators of development for children with disability using the Australian Early Development Census (AEDC) for children with disability. The update to 2021 AEDC results means that the findings are up to date and relevant to stakeholders. This should provide a good basis for future monitoring and policy work for children with disability.

We look forward to discussing this report further with you.

Kind regards,



Hugh Miller



Laura Dixie

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Glossary

Acronym/term	Name
Aboriginal people	Aboriginal, when used in this report, is inclusive of Aboriginal and/or Torres Strait Islander people(s)
ADHD	Attention deficit hyperactivity disorder
AEDC	Australian Early Development Census
AHDN	Additional Health and Development Needs Children with additional health and developmental needs (AHDN) have, or are at increased risk of having, a chronic physical, developmental, behavioural, or emotional condition which requires more medical, allied health, education or related services than their peers. ¹
AvEDI	Australian version of the Early Development Instrument
Communication domain	Communication skills and general knowledge domain
Critical difference	The AEDC critical difference is the minimum level of change required between two cycles to be statistically significant. The critical difference varies depending on the number of children in a community, and the AEDC indicator of interest. It reflects the variation expected in results given different teachers completing the survey for the same group of children. Details on the calculation are available from Gregory, T., & Brinkman, S. (2016). Exploring change in the Australian version of the Early Development Instrument: The estimation of a critical difference for the “developmentally vulnerable”, “developmentally at risk” and “developmentally on track” categories. Telethon Kids Institute, Adelaide, Australia.
CALD	Culturally and Linguistically Diverse, used interchangeably with English as a Second Language as this is recorded on the AEDC
DD	Developmental Difficulty
DESE	Department of Education, Skills and Employment
DSS	Department of Social Services
DV1	Developmentally vulnerable on one or more domains
DV2	Developmentally vulnerable on two or more domains
Emotional domain	Emotional maturity domain
ESL	English as a Second Language
GDD	Global Development Delay
LBOTE	Language Background Other Than English
Language domain	Language and cognitive skills (school-based) domain
MoE	Margin of Error
NCCD	Nationally Consistent Collection of Data An annual collection of information about Australian school students who are receiving adjustments due to disability. The NCCD enables schools, education authorities and governments to better understand the needs of students with disability and how they can be best supported at school.
NDIS	National Disability Insurance Scheme Australia’s national Scheme for people with disability. It provides funding directly to eligible people based on their individual needs.

¹ Definition taken from: Chapter 5, Children on the Edge: Starting School with Additional Health and Developmental Needs. Meredith O’Connor, Jon Quach, and Sharon Goldfeld

Acronym/term	Name
Physical domain	Physical health and wellbeing domain
SHCN	Special Health Care Need Used in some work in the same way as AHDN.
Social domain	Social competence domain
Special needs	A child requiring special assistance because of chronic medical, physical, or intellectually disabling conditions (e.g. Autism, Cerebral palsy, Down syndrome) based on a medical diagnosis or diagnoses
TKI	Telethon Kids Institute

Executive Summary

Introduction

Monitoring developmental outcomes for children with disability is important. Australia's Disability Strategy 2021-31 makes clear there remain significant gaps for children with disability, including the opportunity to improve school readiness through high-quality early childhood education and care.

One challenge is how best to track developmental improvements. Defining a disability cohort at very young ages can be difficult since many children have not had a formal diagnosis, and significant effort is needed to achieve substantive sample sizes.

In this context, the Australian Early Development Census (AEDC) represents a valuable data source that focuses on the development of children early in their time at school. The census occurs every three years, tracking progress against five developmental domains for all children in their first year of school. To date, the AEDC has not been used to regularly report on the development of children with special needs or the broader group of children with a disability. Indeed, the main reporting of the AEDC explicitly excludes children with a diagnosed special need because of the already identified substantial developmental needs of this group.

Taylor Fry ('We') have been asked by the Department of Education, Skills and Employment ('The Department') to

- Provide an analysis of AEDC data related to children with special needs, and those children with an identified disability or health condition
- Construct an index of development for children with a disability, suitable for inclusion in the National Disability Strategy Outcomes Framework
- Examine results of the index and changes over the past few AEDC cycles.

Suitability of the data

We have compared AEDC unit record data for children with recorded special needs against the data for students more broadly. The rate of missing or non-definitive responses is very similar for children with special needs and other students. Developmental vulnerability scores are similarly calculated for virtually all students, including those with special needs.

Overall, the underlying AEDC responses are as complete (or even more so) for children with special needs as for the broader population. This means that AEDC data can be used to track developmental improvements for this group.

Defining disability and health needs in the AEDC

There are a few different definitions of children with disability within the AEDC dataset. We have used the broader term AHDN to provide natural alignment with the focus of the AEDC on children's potential need for additional health, education or related supports. There are four different main subgroups, as shown in Table 1.

Table 1 – Definitions of Additional Health and Development Needs (AHDN) within the AEDC dataset and reported prevalence

Definition	Number of children in 2021 AEDC	Proportion of children in 2021 AEDC
Having special needs (based on a medical diagnosis or diagnoses)	15,797	5.2%
Having at least one developmental difficulty that affects their ability to do schoolwork in a regular classroom	54,684	18.0%
Having at least one developmental difficulty that does not affect their ability to do schoolwork in a regular classroom	43,120	14.2%
Requiring further assessment to determine if they have a developmental difficulty that affects their ability to do schoolwork in a regular classroom.	47,873	15.8%
In at least one of the AHDN groups	99,647	32.8%

Children can fall into more than one of these groups. Combining these groups, children with AHDN represent nearly a third of all children. There are substantial overlaps between groups, and we have used a hierarchy (based on the ordering shown in the table) to define mutually exclusive reporting groups.

Considerations for defining an index

We ran a series of consultation sessions with key stakeholders, including all States and Territories, to understand how an index might be used and design considerations. While some opinions varied, the main design conclusions were:

- A broad definition of AHDN (with the ability to explore subgroups) was most consistent with aims of development support and other collections such as the Nationally Consistent Collection of Data on School Students with Disability (NCCD). This means reporting on all four groups in Table 1. This also meant including health conditions that could affect learning (e.g. anxiety, diabetes), rather than a narrower disability definition based on diagnosis.
- That comparability of the index with the broader student population was important. While it might be possible to reweight AEDC responses to obtain an index tailored to children with AHDN, it would then be hard to compare outcomes to the broader student population. We have applied consistent definitions of domains, developmentally on track and developmentally vulnerable.
- Both absolute changes (i.e. how scores for children with AHDN have moved between censuses) and relative changes (i.e. the gap in development between children with AHDN and other students) are important.
- The existence of compositional changes over time (e.g. a growing fraction of children with an autism diagnosis) meant that recognition of these changes is important for understanding changes over time.
- Statistical testing should be used to understand when changes are significant.

Further detail of the consultations and design decisions are available in Section 3 of the report main body.

Proposed Index and results

In our reporting we have reported results for three potential indices:

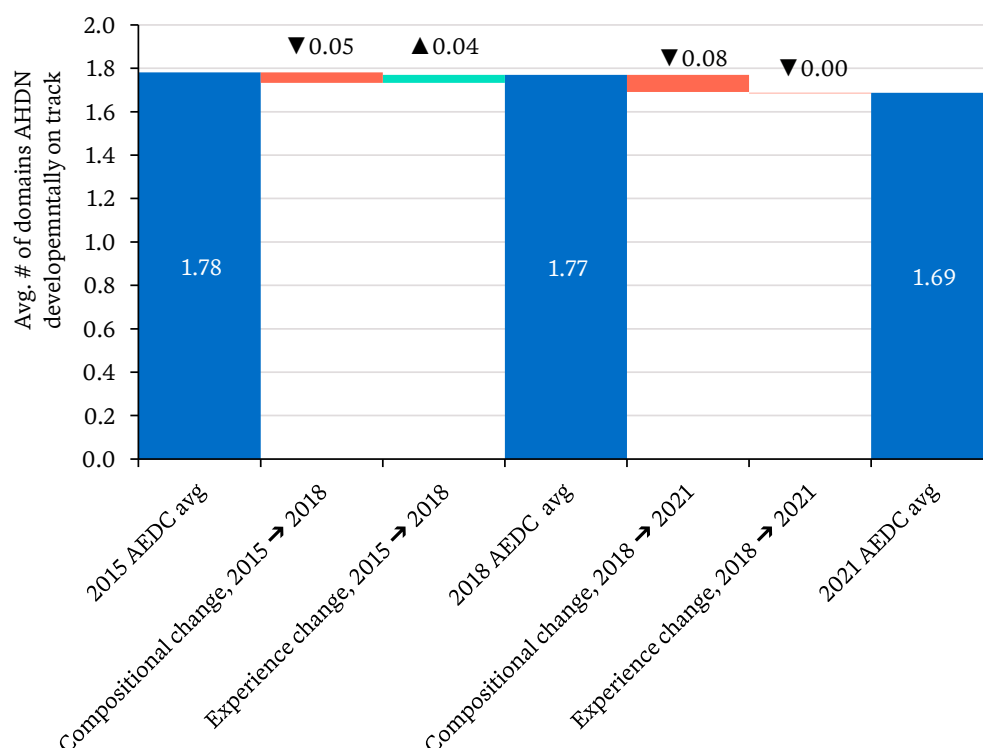
1. The proportion of children with AHDN which are developmentally vulnerable on three or more domains
2. The average number of domains on which children with AHDN are developmentally vulnerable
3. The average number of domains on which children with AHDN are developmentally on track.

All give good insight across key subgroups and would be suitable as an index to track progress. We show results for the third option here – it is most consistent with strength-based reporting and the current wording of the Outcomes Framework for Australia’s Disability Strategy.

We believe the three proposed indicators are better suited to children with AHDN than existing measures used in AEDC reporting such as DV1, DV2 and ‘On Track on 5’. This is because of the high rates of developmental vulnerability for the subgroup with special needs. For example, three quarters of children with special needs are developmentally vulnerable on at least one domain, and sub-cohorts would be higher still; such high rates reduce the robustness of the indicator and may also lead to AEDC reportability constraints.

Figure 1 shows the evolution of this index for children with identified special needs across the last three censuses. We have fit a model to enable compositional changes to be isolated. The results show the average number of ‘AHDN developmentally On track’ domains was stable between 2015 and 2018, with expected decreases due to compositional effects offset by observed improvements. The average fell between 2018 and 2021, but the cause was primarily compositional; driven (in part) by a higher proportion of students with an intellectual disability or learning condition.

Figure 1 – Decomposition of change in average number of domains AHDN developmentally on track across Cycles 3 (2015 AEDC) through 5 (2021 AEDC), for children with special needs



Equivalent results for all four AHDN groups are given in Table 2. Unsurprisingly, the average number of domains AHDN developmentally on track is higher for those with developmental difficulty compared to those with special needs. In fact, the average for those with a developmental difficulty that does **not** affect learning is 3.75 in the 2021 AEDC, quite close to the broader average of 3.92 across all children without special needs (as used in mainstream AEDC reporting). Notably, the average for those with Further Assessment flagged was 2.73, close to the average for those with a developmental difficulty that affects learning. This suggests that the requires further assessment flag is an effective way for teachers to highlight genuine difficulties.

Table 2 – Change in the average number of domains AHDN developmentally on track by AHDN group and breakdown into compositional mix change, 2015 (Cycle 3) through to 2021 (Cycle 5)

AHDN group	2015 AEDC, average # domains AHDN developmentally on track	Compositional change, 2015 → 2018	Experience change, 2015 → 2018	2018 AEDC, average # domains AHDN developmentally on track	Compositional change, 2018 → 2021	Experience change, 2018 → 2021	2021 AEDC, average # domains AHDN developmentally on track
Special needs	1.78	-0.05	+0.04	1.77	-0.08	-0.00	1.69
Developmental difficulty, affects learning	2.49	-0.03	+0.05	2.51	-0.04	+0.02	2.49
Developmental difficulty, does not affect learning	3.67	-0.02	+0.13	3.78	-0.02	-0.00	3.75
Further assessment	2.46	+0.01	+0.03	2.50	+0.02	+0.06	2.58
All children with AHDNs	2.77	-0.06	+0.08	2.79	-0.07	+0.01	2.73
All children, excluding those with known Special Needs	3.91	+0.00	+0.03	3.94	-0.00	-0.02	3.92

Note: When a child is in more than one AHDN group they are placed in the category highest in the table. AHDN developmentally on track is consistent with general AEDC definitions but recognises we're applying the thresholds to a group for which results are not generally reported.

Conclusions and future work

We have found the AEDC data to be good quality and have demonstrated that robust indices can be defined to track development over time for children with disability. We believe the indices are appropriate for use in reporting such as the Outcomes Framework for Australia's Disability Strategy.

The comprehensive nature of the AEDC means that it gives more robust results (in terms of size and coverage) than survey-based alternatives. It also leverages an existing collection, rather than requiring additional surveys and provides rich detail on both condition type and specific developmental aspects. These advantages mean that the AEDC carries many advantages over alternative sources.

There are some limitations associated with the AEDC that should be noted:

- The underlying questionnaire was not designed specifically for children with disability. Our impressions are favourable - most of the questions have a functional emphasis and teachers are able to select 'not applicable' where needed. But validation of the tool for different types of disability and health conditions is a worthwhile exercise to better establish the robustness of the indicator.
- The AEDC does not record the severity of a disability (the degree of functional limitation). Given specific disability diagnoses often have a range of severities, this can reduce the ability to judge how severities are affecting the results.
- Index interpretation is made more complex by changing rates of disability diagnosis. The AEDC and other disability services have seen a marked increase over time in some diagnoses, particularly around global developmental delay, autism and intellectual disability.
- Census non-response rates can be higher in vulnerable groups. The overall high response rate should offer reasonable protection against non-response bias.

If an index is to be pursued, the next steps involve finalising the selection on indicator and adopting a reporting approach. An interactive tool that enables people to explore different subgroups is likely to be valuable.



Introduction

1 Background

1.1 Introduction and scope

Taylor Fry ('We') have been asked by the Department of Education, Skills and Employment ('The Department') to provide:

1. An **in-depth data analysis** of children identified as Special Needs in the AEDC, and those children with an identified disability or health condition, including analysis of differences between those cohorts.
2. The **construction of an index of development for children with a disability** that could be used as measure in the National Disability Strategy Outcomes Framework, including evidence that it is a reasonably robust measure and supplies reliable and meaningful results.
3. **Updated results for the most recent AEDC results (2021)** and discussion of key changes observed between 2018 and 2021.

We provided the first item in an interim report 'Analysis of the AEDC for children with disability'. In that report we:

- Concluded that:
 - The AEDC provides a strong measurement tool for children with additional health and development needs (AHDN).
 - There appears little issue with completeness of data for this subgroup, compared to the broader population.
- Raised a number of questions for stakeholder discussions around how to form a meaningful metric of development for children with disability.

We provided the second item in a report 'AEDC indicators of development for children with disability' (final version date 29 March 2022). In that report we:

- Summarised discussions with stakeholders on the construction of an index of development for children with a disability
- Provided options for a measure of development for children with special needs and other groups with additional health or disability needs. We also explored topics such as reporting granularity and how progress can be tracked robustly over time.

This report reproduces key content from the first two reports and also covers the third item – updated analysis and results based on the 2021 AEDC results. The report is therefore intended to be stand-alone and does not assume readers are familiar with any of the previous reports. Content on stakeholder discussions has been reproduced from the previous report.

1.2 Context

The Australian Early Development Census (AEDC) is a valuable resource to understand the wellbeing of young children and how this has been changing over time. It identifies children who are developmentally on track, developmentally at risk or developmentally vulnerable. There have been five completed cycles of the three-yearly census (most recently 2021, the fifth). The census covers a wide range of questions that allow assessment and categorisation over five domains:

- Physical health and wellbeing
- Social competence
- Emotional maturity

- Language and cognitive skills (school-based)
- Communication skills and general knowledge.

For each of the five AEDC domains, children receive a score between 0 and 10 where 0 denote the least amount of development and 10 the most. In the first data collection cycle a series of cut-off scores was established for each of the five domains:

- Children falling below the 10th percentile were categorised as ‘developmentally vulnerable’
- Children falling between the 10th and 25th percentile were categorised as ‘developmentally at risk’
- All other children were categorised as ‘developmentally on track’.

These cut-off scores set in 2009 have remained the same across all collection cycles and provide a reference point against which later AEDC results can be compared.

A material subset of children are identified in the census as having special needs². Children identified as having special needs are **not** included within domain indicators/categories in regular AEDC reporting because of the already identified substantial developmental needs of this group. Further, the underlying data for children with special needs has not been extensively analysed to understand these children. There is potential for AEDC to be used to inform policy for children with special needs or a health condition or disability.

Another activity relevant to our work is the latest National Disability Strategy, 2021-2031, which was released in December 2021. The new Strategy³ builds on the previous one, retaining a similar vision and outcome areas, while improving other aspects. The desire to strengthen accountability is particularly relevant and will include:

- Enhanced measurement and reporting of outcomes
- Commitment to the collection of relevant data
- A coordinated approach to evaluation.

The strategy is supported by an outcomes framework as the mechanism by which governments and service providers can be held accountable for the outcomes being achieved by programs and services they are delivering to people with disability⁴. While the outcomes set in the Strategy have been set, other evidence will be needed to understand its effectiveness. AEDC findings are relevant to tracking the Learning and skills domain, as improvements in pre-school supports can be tied to better developmental progress in the AEDC.

1.3 Terminology

Throughout this report we refer to children with Additional Health and Development Needs (AHDN).

Children with AHDN are those who have, or are at increased risk of chronic physical, developmental, behavioural, or emotional conditions, and need more supports than their peers⁵. This is a diverse group and does not require children to have a diagnosed condition.

² A child requiring special assistance because of chronic medical, physical, or intellectually disabling conditions (e.g. Autism, Cerebral palsy, Down syndrome) based on a medical diagnosis or diagnoses.

³ National Disability Strategy, Position Paper, July 2020

⁴ <https://www.disabilitygateway.gov.au/sites/default/files/documents/2021-11/1816-outcomes-framework.pdf>

⁵ Learning Trajectories of Children With Special Health Care Needs Across the Severity Spectrum. Goldfeld et al. (2015)

Other terminology often used includes ‘Children with Special Educational Needs and Disabilities’, ‘Children with Special Health Care Needs’, ‘Children with Disability’ and ‘Children with health and developmental concerns’.⁶

1.4 Structure of this report

The remainder of this report is structured into the following sections:

- *Section 2 Data* provides a brief description of the data used for this analysis
- *Section 3 Key considerations for an index of development for children with a disability* steps through some important design decisions for an index, beginning with a summary of stakeholder discussions
- *Section 4 Results* looks at the proposed index based on Cycle 5 (2021) and changes between 2018 and 2021
- *Section 5 Conclusions* notes the key limitations to this analysis.

1.5 Status of this report

This report is the final version and supersedes all draft versions.

This report should be considered and used in its entirety. Sections of the report could be misinterpreted if they were considered in isolation. No reliance should be placed on this report for any other purpose without first confirming with us that such a purpose is appropriate.

⁶ Health and Education Interdependence, Thriving from Birth to Adulthood. Chapter 5 Children on the Edge: Starting School with Additional Health and Developmental Needs Meredith O’Connor, Jon Quach, and Sharon Goldfeld (2020)

2 Data

2.1 The Australian Early Development Census and data provided

The Australian Early Development Census (AEDC) is a national data collection of early childhood development at the time children commence their first year of full-time school. The AEDC is held every three years. The census involves teachers of children in their first year of full-time school (most aged 5 or 6) completing a research tool, the Australian version of the Early Development Instrument (AvEDI). The Instrument collects responses to over 100 questions relating to five key areas of early childhood development referred to as ‘domains’. Table 3 shows the domains. These domains have been shown to predict later health, wellbeing and academic success.

Table 3 – Domains of the AEDC⁷

Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge
Measures children’s physical readiness for the school day, physical independence and gross and fine motor skills	Measures children’s overall social competence, responsibility and respect, approaches to learning and readiness to explore new things	Measures children’s pro-social and helping behaviour, anxious and fearful behaviour, aggressive behaviour and hyperactivity and inattention	Measures children’s basic literacy, interest in literacy, numeracy and memory, advanced literacy and basic numeracy	Measures children’s communication skills and general knowledge

For each of the five AEDC domains, children receive a score between 0 and 10 where 0 is most developmentally vulnerable. In the first data collection cycle a series of cut-off scores was established for each of the five domains:

- Children falling below the 10th percentile were categorised as ‘developmentally vulnerable’
- Children falling between the 10th and 25th percentile were categorised as ‘developmentally at risk’
- All other children were categorised as ‘developmentally on track’.

These cut-off scores set in 2009 have remained the same across all collection cycles and provide a reference point against which later AEDC results can be compared. The AEDC also collects demographic information including age, gender, cultural background and geographics of the school.

The AEDC provides important information to communities, governments and schools to support their planning and service provision. Data from the AEDC can help identify the types of services, resources or support to meet the needs of communities. The early environments and experiences children are exposed to shape their development. The AEDC results are considered to measure how well children and families are supported from conception through to school age.

The AEDC highlights what is working well and what needs to be improved or developed to support children and their families by providing evidence to support health, education and community policy and planning.

Following certification, we were provided with a full copy of the (de-identified) unit-record level AEDC microdata in line with the AEDC guidelines (available [here](#)). This covered the results from five cycles, Cycle 1 (2009/10) through to Cycle 5 (2021). This data formed the basis for all analysis in this report.

Cycle 1 was largely collected in 2009 (97.6% of children in Cycle 1) with a small follow-up collection in 2010 to allow reporting on more geographical areas. The rates of children with AHDN in the 2009 and

⁷ For further background information, refer to the AEDC website: <http://www.aedc.gov.au/>

2010 subcomponents of Cycle 1 are comparable and we have included both components as Cycle 1. Results are not materially altered by excluding 2010 results.

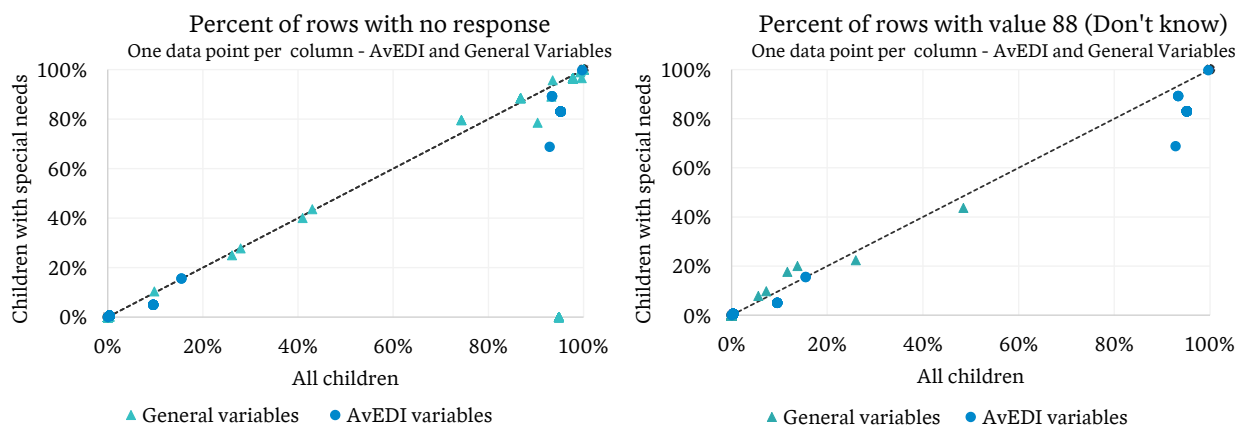
The use of the microdata for this report is subject to the AEDC Data Guidelines, including privacy protections.

2.2 Completeness of data

This project considers the use of the AEDC to report on children with additional health and development needs (AHDN). Children with special needs are an important subgroup which are specifically recorded on the AEDC. As children with special needs are excluded from some reporting, it was important to determine that similar data is actually recorded for these children as for children without special needs.

To do this we compared the rate of ‘missing’ responses across all questions for children with special needs and the full population. Figure 2 shows this comparison for the 2021 AEDC for both the variables which contribute to the developmental scores (‘AvEDI variables’) and ‘general variables’ (including demographics). The results are similar for each cycle.

Figure 2 – Rate of missing values for all children compared to children with special needs, 2021 (Cycle 5)



From Figure 2:

- The rate of missing values (left panel) is similar, but generally slightly lower, for children with special needs as for all children. There are values which are only populated for a small subset of children (for example relating to Aboriginal consultation). Variables relating to diagnosis(es) are only populated for children with special needs.
- The rate of ‘Don’t know’ responses (right panel) is similar for both groups albeit slightly lower again for children with special needs.

Developmental vulnerability scores are calculated for virtually all children with AHDN, with a reasonable-looking distribution of responses. This means we can allocate these children to the three developmental groups above, using the same age-standardised thresholds as for all children. We have used the terms ‘AHDN developmentally vulnerable’, ‘AHDN developmentally at risk’ and ‘AHDN developmentally on track’ to distinguish from the established categories which are not reported for children with special needs. But the basis for calculating these (weights and thresholds) is unchanged from the broader population.

Overall, the underlying AEDC responses are as complete (or even more so) for children with special needs as for the broader population.

We confirmed we were able to reproduce statistics published in the Australian Early Development Census National Reports for 2018 and 2021 including both demographic splits and rates of developmental vulnerability by domain.

Overall, we have found that the AEDC data is relatively complete and appears of high quality for children with special needs and children with AHDN more broadly. Therefore, AEDC data is suitable for reporting developmental outcomes for this group.

B

Analysis

3 Key considerations for an index of development for children with a disability

This section begins with a summary of stakeholder discussions on key considerations. The subsequent sections then step through our design decisions in the development of an index, based on these discussions as well as analysis. The topics covered are:

- 3.1 Summary of stakeholder discussions
- 3.2 Cohort selection
- 3.3 Inclusion of disability
- 3.4 What measure to use
- 3.5 Reporting on gaps
- 3.6 Compositional effects
- 3.7 Grouping disability and health conditions
- 3.8 Granularity

3.1 Summary of stakeholder discussions

We ran a series of consultation sessions with key stakeholders, focussed on a set of questions raised in the first report. The questions are provided in Table 4. These cover a range of topics, including which children should be included in the index, appropriate metrics, and granularity of results.

We held consultation sessions with representatives from the following organisations, with relevant attendees arranged by State AEDC coordinators:

- Department of Social Services (DSS)
- Telethon Kids Institute (TKI)
- Department of Education and Training Victoria
- Department of Education New South Wales
- Department of Education Tasmania
- Department of Education Northern Territory
- ACT Community Services Directorate
- Department of Education Western Australia
- Queensland Department of Education
- Department for Education South Australia.

Sections 3.1.1 to 3.1.5 provide a summary of responses and common themes from the discussions in the consultation sessions. These are grouped according by question topics posed.

The AEDC National Committee also reviewed this report with the opportunity to provide feedback.

Table 4 – Consultation discussion questions

Topic	Questions
Cohort selection	- Should all children in the special needs and developmental difficulty groups be included, or a subset selected to better align with disability? - Should we aim to align with another definition of disability? - Should children recorded as requiring further assessment be included? - The developmental difficulty cohort is split into ‘Has difficulty and affects learning’, and ‘Has difficulty but does not affect learning’. - Are we interested in the smaller group for which their learning is affected, or the larger group?
Use of AEDC domain scores	- Assuming we use the AEDC weighted scores, should the weighted scores be used directly (e.g. average of 7.5) versus the proportion of people above or below a threshold (e.g. AEDC has thresholds for ‘developmentally on track’). - Should we be aiming to have indicators in both the Health & wellbeing and the Skills & development NDS domains? - To what extent are the AEDC domain scores appropriate, or should we explore the appropriateness of underlying questions (e.g. ‘Can a child listen in English?’ for a deaf child). Is consistency with existing AEDC reporting important?
Tracking change over time	- Are we interested in improvements for the population with disability, or looking for improvements relative to the broader population. e.g. if wellbeing for children with disability improves over time, but by less than the broader group, is this good or bad? - Is it reasonable to accept that under the index, there will always be a wellbeing gap between children with and without disability, by virtue of some of the questions embedded in the survey (e.g. ‘Can the child use stairs’)? Or do we need an index where a target of zero gap is plausible? - Should we control for potential compositional changes over time (e.g. if average age is increasing over time, or socio-economic background)? - Should we adjust for potential changes in the mix of disability or developmental difficulty types?
Granularity	Are results split by state and/or disability type important?
Other potential indices	- To what extent are we interested in the number of children with disabilities over time, rather than estimates of AHDN developmental vulnerability? This is potentially an indicator of early diagnosis and intervention? - Are there specific questions we could/should be looking at rather than aggregated scores?

3.1.1 Consultation topic: Cohort selection

Table 5 – Consultation summary – Cohort selection

Questions	Themes
- Should all children in the special needs and developmental difficulty groups be included, or a subset selected to better align with disability? - Should we aim to align with another definition of disability? - Should children recorded as requiring further assessment be included? - The developmental difficulty cohort is split into ‘Has difficulty and affects learning’, and ‘Has difficulty but does not affect learning’. Are we interested in the smaller group for which their learning is affected, or the larger group?	DSS and TKI noted a preference for focussing reporting on the group of children with diagnosed special needs. Contrastingly, feedback from state government stakeholders was consistently in favour of including the ability to monitor outcomes for a broader group of children with AHDN. In most cases, this included a preference for the ability to report separately on: - Children with diagnosed special needs - Children with a development difficulty, which does affect their learning - Children with a development difficulty, which does not affect their learning - Children identified as requiring further assessment. It was noted that despite a preference for the ability to monitor a broader group, children with diagnosed special needs may still be a useful focus for top-level reporting. The primary reasons noted for favouring a broad definition of disability were: - A focus solely on diagnosed special needs may miss issues around delayed diagnosis. Specific observations included: - Children with delayed diagnosis are of interest in program and service development. - Children with a delayed diagnosis are likely to be unevenly spread across geographies, which may influence comparisons of results. - Rates of early diagnosis have been observed to change with policy changes. - Adopting a broader definition of disability is more closely aligned with NCCD definitions, which would be desirable when using results. - A developmental difficulty that does not currently affect a child’s learning may begin to affect them in the future. With this in mind, the “does not affect learning” group is still interesting from a program perspective. Some stakeholders expressed less interest in this group. - Alternatively, intervention and support may move children to the group where learning is not affected. It is important to include the group where learning is not affected in reporting, to ensure that these improvements are not missed by the index.

3.1.2 Consultation topic: Tracking change over time

Table 6 – Consultation summary – Tracking change over time

Questions	Themes
Are we interested in improvements for the population with disability, or looking for improvements relative to the broader population. e.g. if wellbeing for children with disability improves over time, but by less than the broader group, is this good or bad?	All stakeholders noted that it is important to be able to report on the population of children with a disability independently, and that this would form a key component of reporting. Several observed that progress in outcomes may look different for children with disability relative to the broader population, and that as a result, it is important to be able to measure their outcomes without reference to the broader population. Stakeholders broadly noted that it would be useful to have a comparable metric for the broader population of children, to allow comparisons over time, and tracking of the ‘gap’. Stakeholders expressed different views on how heavily these comparisons should be emphasised in reporting. Some noted that it would be useful to report both absolute and relative (gap) metrics. Others preferred a reporting focus on the cohort of children with disability, noting that their measures of success may be different to the broader population. Stakeholders also noted an interest in cross-sectional as well as over time reporting. That is, they noted that it would be useful to compare across regions or demographic groups within the same AEDC collection year. Some stakeholders noted metrics were more useful when related to policy levers, for example considering differences between children who did and did not attend playgroups.
- Is it reasonable to accept that under the index, there will always be a wellbeing gap between children with and without disability, by virtue of some of the questions embedded in the survey? e.g. ‘Can the child use stairs’? - Do we need an index where a target of zero gap is plausible?	Stakeholders were generally comfortable with the idea that a gap of zero between children with a disability and the broader population is not likely to be feasible. They were generally comfortable with an index that did not target a gap of zero. Despite a non-zero target gap, several stakeholders expressed that it would still be useful to report on the gap between children with a disability and the broader population. Some stakeholders noted concerns that this may simply highlight children with disability are already at a disadvantage, rather than provide actionable insight. Stakeholders noted the importance of careful language in reporting on the gap between groups. They noted that it is important not to pathologize children with disability, particularly when they may be developmentally on track after considering their disability.
- Should we control for potential compositional changes over time (e.g. if average age is increasing over time, or socio-economic background)? - Should we adjust for potential changes in the mix of disability or developmental difficulty types?	Stakeholders expressed a range of opinions regarding the importance of controlling for compositional changes over time. Stakeholders generally recognised the potential benefits of controlling for compositional changes over time, although some expressed concerns about adjustment approaches impacting the explainability of results. Controlling for demographic factors It was noted that existing AEDC reporting controls for differences in age, but not other demographic variables. Most expressed that a similar approach is reasonable for reporting on children with disability. A few stakeholders noted that controlling for additional demographic factors could be useful.

Questions	Themes
	Controlling for the mix of disability/developmental difficulty types Most stakeholders noted a preference for controlling for differences in the mix of disability types. It was noted that this could assist with comparisons across both regions and time. One stakeholder noted a high prevalence of hearing disorders in regional areas as an example motivation for controlling for disability type mix. It was identified that this is important due to the significant difference in outcomes across disability types, which may have a material effect on comparisons, particularly between small groups of children. Stakeholders broadly agreed that it would be important to report on both raw figures, alongside any controlled version of the index. Several noted that their key interest in an adjusted metric is to assist with explaining changes in the index over time. That is, identifying areas where changes in the index can be partially explained due to changes in the mix of disability types in an area. In line with this, several stakeholders were interested in reporting numbers of children by disability type, to assist with explaining changes over time.

3.1.3 Consultation topic: Use of AEDC domain scores

Table 7 – Consultation summary – Use of AEDC domain scores

Questions	Themes
Assuming we use the AEDC weighted scores, should the weighted scores be used directly (e.g. average of 7.5) versus the proportion of people above or below a threshold (e.g. AEDC has thresholds for 'developmentally on track' – so 60% of group is developmentally on track).	Stakeholders were consistently in favour of maintaining threshold-based reporting metrics, rather than reporting domain scores directly. This was primarily motivated by the preference for aligning with existing AEDC reporting metrics. Some stakeholders also noted that threshold-based scores may be easier to understand and communicate. Further, when considering metrics over time, it's useful to align with what has been done previously. Some stakeholders also noted that for children with disability, it is particularly important to be able to track outcomes on individual domains, rather than always aggregating domains into combined indicators. Other stakeholders expressed preference for focussing on combined indicators across multiple domains as: - They encourage holistic thinking. - A focus on domain level indicators may be less helpful for children with a disability which means they are likely to have relatively low scores in certain domains. - Higher levels of granularity require higher levels of data literacy from end users.
Should we be aiming to have indicators in both the Health & wellbeing and the Skills & development NDS domains?	Stakeholders consistently noted that all five AEDC domains most closely map to the Skills and Development domain from the NDS. Some stakeholders observed that some sub-domains within the AEDC Physical health and wellbeing domain could be mapped to the Health and Wellbeing domain from the NDS. However, these stakeholders still expressed a preference for mapping the <i>full</i> AEDC Health and Wellbeing domain to the Skills and Development domain from the NDS. In line with this, it was noted that several of the Health and Wellbeing questions in the AEDC relate to motor skills, which is more closely aligned with skills and development under the NDS.

Questions	Themes
To what extent are the AEDC domain scores appropriate, or should we explore the appropriateness of underlying questions (e.g. 'Can a child listen in English?' for a deaf child). Is consistency with existing AEDC reporting important?	There was a lot of interesting discussion on this topic, with several stakeholders having previously considered the issue. Generally, stakeholders were comfortable reporting on existing AEDC domain scores, without attempting to modify underlying questions. Observations from stakeholders included: - A preference for using existing domain scores is appealing, due to their alignment with existing AEDC reporting. The AEDC is well known and regarded. - If adjustments to questions were made, they would need to be adjusted separately for different disability and developmental difficulty types. Even within a diagnosis, a question may be relevant for some children, but not others. Designing a process to appropriately reweight questions would be highly challenging. - Concerns about the relevance of specific questions are not limited to children with disability. For example, a teacher may find it hard to assess competency of interacting with other children of a child who does not speak English. Teachers have the option of selecting not applicable in these cases. Several state government stakeholders also noted a preference for aligning outcomes metrics with NCCD definitions, which they use regularly in their work. It was noted that a perfect alignment may not be possible. TKI recommended using existing AEDC domain definitions, but noted the possibility of using different domain thresholds when flagging children with different disability types as AHDN developmentally at risk. Stakeholders also noted that they felt all AEDC domains are equally valuable, and that none should be weighted over others in reporting. One stakeholder expressed interest in the multiple strengths indicator for children with disability.

3.1.4 Consultation topic: Granularity of reporting

Table 8 – Consultation summary – Granularity of reporting

Questions	Themes
Are results split by state/territory and/or disability type important?	Splitting by state Almost all stakeholders expressed that splitting results by state would be an important feature of any prospective index. The ability to calculate splits of interest from the unit record data was noted by some. Splitting by disability type Several stakeholders noted that it would be useful to be able to report separately by disability type, particularly as programs may be designed for specific disability types. It was noted that while these splits may not be published publicly (in some cases due to data volumes), the ability to drill down is useful for Department monitoring. Some stakeholders noted the increased chance of statistical noise or privacy issues if drilling down to individual diagnoses, and proposed splitting by broader disability type groups. One stakeholder identified the autism sub-group as of particular interest for internal monitoring. DSS noted that while a split by state is desirable for their purposes, splitting by disability type is less important. As in previous questions, several stakeholders noted that it would be useful for disability type splits to align with NCCD definitions, to improve usability of results. Splitting by other variables Stakeholders were generally interested in reporting with as much granularity as possible. Representatives from some smaller jurisdictions identified that splits below the state level are unlikely to be feasible, due to low data volumes. Variables identified as possibly useful splits included: - Remoteness (e.g. metro/ inner regional/outer regional) - Gender - Children with Culturally and Linguistically Diverse (CALD) backgrounds - Aboriginal and/or Torres Strait Islander identification It was generally noted that each additional split reduced data volumes when reporting, increasing volatility of the metrics.

3.1.5 Consultation topic: Other potential indices

Table 9 – Consultation summary – Other potential indices

Questions	Themes
To what extent are we interested in the number of children with disabilities over time, rather than estimates of AHDN developmental vulnerability? This is potentially an indicator of early diagnosis and intervention?	Some stakeholders noted an interest in reporting raw numbers of children by disability type. This was not proposed as a replacement for measures of AHDN developmental vulnerability, but rather as a supplementary metric to assist with explaining changes in AHDN developmental vulnerability over time. It was also identified that raw numbers provide a useful lens when interpreting proportions of AHDN developmentally vulnerable children – a high rate for a small population can give fewer AHDN developmentally vulnerable children than a low rate for a large population.
Are there specific questions we could/should be looking at rather than aggregated scores?	The stakeholders that addressed this question were broadly in favour of using existing AEDC aggregate domain scores, to remain consistent with current reporting.

3.1.6 Other discussions from consultation that are out of scope for this project

The consultations included discussion of possible uses of AEDC data that would be interesting but are outside the scope of this project. We include some brief bullets here as a way of collating ideas for further research. Most would require data linkage studies which follow children over time. Questions to explore included:

- Do children in the developmental difficulty group or further assessment group later receive diagnoses that would classify them as having special needs?
- For children with a developmental difficulty that does not affect their learning currently, is their learning affected in the future? how do their later schooling outcomes compare?
- How do children in the AHDN groups fare in later schooling years? are there differences for those with earlier or later diagnoses which classify them as having Special Needs?
- Exploring AEDC results for students in the NCCD, as well as the overlap between the two groups.
- Can AEDC data be used to evaluate the success of children's transition into school, and understand the relationship between successful transition and developmental outcomes?

3.1.7 Stakeholder concerns for consideration

In discussing the new indicator, some questions and potential concerns were raised. The main concerns or queries raised by stakeholders were:

- Would this information be used as a performance metric? (We note that the AEDC is only collected every three years, so it is not well suited to this hypothetical purpose).
- How widely available would AEDC results for children with disability be? Interpreting results requires care and understanding of children with disability. As a result, careful consideration would be required around which outputs are published publicly.
- The potential expansion of reporting – suggest that children with disability (including special needs) could be incorporated into existing AEDC reporting rather than creating new reporting systems.
- Potential misalignment with the NCCD – The NCCD is used by all states and territories. Some stakeholders expressed concerns about the potential for the NCCD and AEDC data to report different figures for similar metrics, due to their separate collection processes and definitions of disability.

However, they identified that NCCD does not provide the metrics of development the AEDC does. Stakeholders generally noted a preference for aligning AEDC reporting with NCCD definitions where possible.

- While much AEDC reporting focuses on rates of developmental vulnerability, looking instead at the number of domains where children are doing well might be better aligned to a strengths-based approach.
- There is the potential to consult even more widely to ensure reporting is consistent with cultural norms and values, including for Aboriginal and Torres Strait Islander children.

3.2 Cohort selection

There are a few different definitions of children with disability within the AEDC dataset. We have used the term AHDN to provide natural alignment with the focus of the AEDC on children's potential need for additional health, education or related supports. Table 10 describes the four key groups of children with AHDN as well as the number and proportion of children in each group at Cycle 5 (2021).

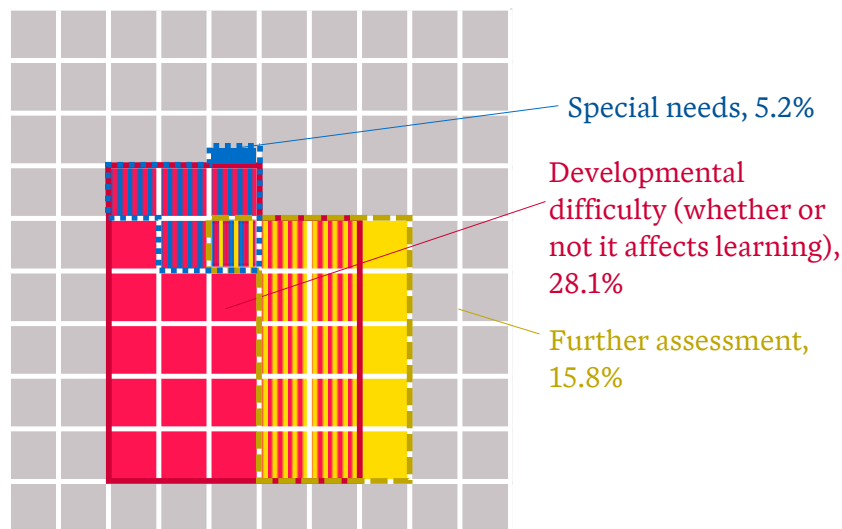
Table 10 – Definitions of Additional Health and Development Needs (AHDN) within the AEDC dataset and reported prevalence

Definition	Number of children in 2021 AEDC	Proportion of children in 2021
Having special needs (based on a medical diagnosis or diagnoses)	15,797	5.2%
Having at least one developmental difficulty that affects their ability to do schoolwork in a regular classroom	54,684	18.0%
Having at least one developmental difficulty that does not affect their ability to do schoolwork in a regular classroom	43,120	14.2%
Requiring further assessment to determine if they have a developmental difficulty that affects their ability to do schoolwork in a regular classroom.	47,873	15.8%
In at least one of the AHDN groups	99,647	32.8%

Children can fall into more than one of these groups. Combining these groups, children with AHDN represent nearly a third of all children.

There are also overlaps between the respective groups. The figure below shows the overlap between the groups (with the two developmental difficulty groups combined for clarity). For instance, 80% of children in the special needs group all have a flagged developmental difficulty that affects their learning.

Figure 3 – Overlap of AHDN indicators for the 2021 AEDC (Cycle 5). Each box represents 1% of the total census responses. Labels provide proportion of the total census responses.



In deciding which subgroups to report on stakeholders expressed a range of views. Key considerations are:

- Using a narrow definition (e.g. only those in the special needs group, who have a formal diagnosis) has the attraction of reduced reliance on teacher judgement. However, it creates equity risks if not all children have had equal access to diagnostic assessment by that age. Further, while only speculation, we believe that it is reasonable to assume that many of those flagged as requiring further assessment will eventually receive a diagnosis⁸.
- Excluding those with developmental difficulties that do not affect their ability to do schoolwork in a regular classroom allows a focus on those with greater developmental challenges. However, if over time early interventions mean that children are effectively ‘moved’ across categories (e.g. with the provision of appropriate supports) to those where learning in a regular classroom is not affected, then this improvement will be invisible.
- Since AHDN developmental vulnerability rates vary markedly across the different cohorts, the ability to subdivide results was important for potential users of the indicator.

Given the range of opinions, it appears reasonable to report in a way that is **broad and flexible**. A headline indicator could report the results for children with special needs, but analysis of the broader groups will be core to understanding trends over time.

Design decision 1: It makes sense to have results for both the special needs group and the broader groups available. While splitting into component groups will aid interpretation and enable a fuller picture, a single indicator should focus on children with special needs.

3.3 Inclusion of disability and health condition types

The AEDC records a wide range of disabilities and health conditions in separate diagnosis and condition flags. Some are disability categories that would be recognised by disability schemes that make use of disability diagnoses (e.g. Down syndrome, Cerebral Palsy). Others are health conditions that may not be recognised as a disability elsewhere but may represent a barrier to learning (e.g. anxiety, celiac disease,

⁸ The ABS Survey of Disability, Ageing and Carers shows that autism rates are highest in the 10-14 age group, implying that a large number of diagnoses are made later than age 7, say. See <https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/latest-release/key-statistics>

diabetes). A full table is included in Appendix A for interested readers, including an allocation as to those disabilities that would generally be recognised for NDIS eligibility.

Alternative approaches as to which groups to include in the indicator are possible:

- **A narrow definition** could be used, which would limit the results to a smaller set of disabilities. This would potentially improve consistency with other disability measures or programs (e.g. the NDIS).
- **A broader definition**, retaining the other health conditions being flagged. This would be recognising that many of these additional health conditions would be recognised under the NCCD, which places less emphasis on diagnosis and more on functional impacts and level of supports required.

Our stakeholder discussions pointed to a preference for greater consistency with the NCCD, and the risks of tying the indicators too closely to specific conditions. A broader definition also potentially allows users to drill into granular results to find results relating to specific classes of disability. Essentially this is similar to having multiple definitions and separate indicators for each.

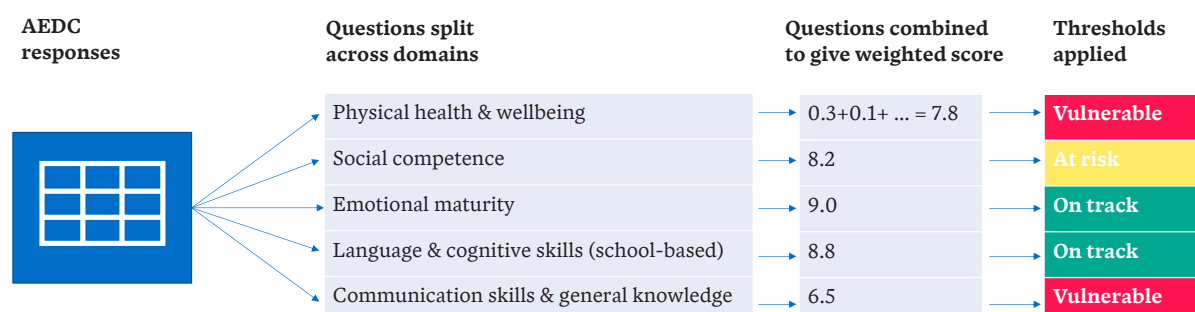
We also note that even for health conditions that may not seem as severe based on the description, teachers are often flagging this as a developmental difficulty which ‘affects their learning’. Therefore development outcomes for these children with a recognised barrier are of significant interest.

Design decision 2: Retain the broader definition of disability and health conditions, as recorded in the AEDC. Retain the flexibility to report results for specific disability groups that may be of interest to users.

3.4 What measure to use for an indicator?

The schematic in Figure 4 gives an overview of the approximate process for converting AvEDI survey responses to reporting metrics of development categories in existing AEDC reporting.

Figure 4 – Current process of converting AvEDI responses to development categories.



Note: Numbers shown are illustrative, and do not correspond to actual thresholds

A significant number of questions (about 100) are collected for each student. Roughly, these questions are categorised into five broad domains and then combined into scaled scores in each domain using a weighting formula.

In the first data collection cycle a series of cut-off scores was established for each of the five domains:

- Children falling below the 10th percentile were categorised as ‘developmentally vulnerable’
- Children falling between the 10th and 25th percentile were categorised as ‘developmentally at risk’
- All other children were categorised as ‘developmentally on track’.

Common reporting metrics include the numbers of children developmentally vulnerable, at risk or on track across one or more domains.

In principle, changes could be made at any stage of this process to tailor it to children with AHDN. For example:

- **Questions for inclusion.** Specific questions could be removed or reweighted in the scoring process. The existing weights are a secret (under the questionnaire licence), so any changes might involve a substantial change to weights and approach.
- **Scores and thresholds.** Thresholds could be changed, or scores reported directly.
- **How domains are combined.** While individual domains can be reported and will be of interest to many users, an overall combined score can be created in multiple ways and will be useful for high-level tracking of progress.

Questions for inclusion

There may be specific questions that are not appropriate for some children. For instance, the question on the ability to climb stairs is inappropriate for a child in a wheelchair. Similarly '*Would you say this child is able to write simple words*' could be interpreted as inappropriate for children with a vision impairment. However, isolating such examples in the actual data is not easy; most questions see higher rates of poor assessments for children with AHDN, but these elevated rates are not close to 100%. This means identifying a question as inappropriate is not clear-cut statistically; rather it will still tell you something about the development of those children with special needs. The questions appear to be giving useful information.

Table 11 – Example of proportion ‘poor’ responses for AEDC questions for children without special needs, and for different groups of special needs. Depending on the question a ‘poor’ response may be ‘Yes’, ‘No’ or ‘Poor/Very poor’. Based on 2015 onwards.

Domain	Question	No Special Needs	Special Needs: Intellectual / Learning (a)	Special Needs: Physical/ Neurological (b)	Special Needs: Sensory/ Communication (c)	Special Needs: Other – specified (d)	Special Needs: Other - not specified
Physical health and wellbeing	How would you rate this child’s ability to climb stairs?	1%	12%	51%	10%	5%	18%
Communication skills and general knowledge	How would you rate this child’s ability to tell a story?	7%	47%	41%	30%	17%	46%
Language and cognitive skills (school-based)	Would you say this child is aware of writing directions in English (left to right, top to bottom)?	4%	31%	34%	12%	8%	26%
Social competence	Would you say that this child demonstrated self-control?	2%	27%	16%	6%	6%	16%
Emotional maturity	Would you say that this child will invite others to join in a game?	11%	57%	39%	22%	21%	37%

(a) Includes Asperger syndrome, Attention Deficit Hyperactive Disorder (ADHD), Autism, Autism spectrum disorder (ASD), Down syndrome, Foetal Alcohol Spectrum Disorder (FASD), Global Developmental Delay.

(b) Includes Cerebral palsy, Epilepsy, Spina bifida, Cleft Palate, Cystic Fibrosis, Fragile X, Hydrocephalus, Muscular Dystrophy, Neurofibromatosis.

(c) Includes Blind, Deaf.

(d) Includes Asthma, Diabetes, Dyslexia, Dyspraxia, Anxiety, Oppositional Defiance Disorder / Oppositional Defiant Disorder / ODD, Selective Mutism, Coeliac / Celiac, Eczema / Dermatitis, Leukaemia, Otitis Media, Perthes Disease.

Examples of this are shown in Table 11 above and we have also included the full question list in a table in Appendix Table A.5.

Given the benefits of consistency and the challenges of coming up with agreed adjustments, we recommend not removing specific questions from the index. This makes indicator more comparable across the broader population.

A formal validation of the questions for children with special needs could generate recommendations for the removal or modification of specific questions.

While we have not been provided with the weights applied to the questions within each domain, the same comments apply to the weights.

Scores and thresholds

One natural question is whether to report the change in scores within domains, rather than the percentage falling below a threshold. There are a few considerations:

- A score naturally carries more information. For instance, it is possible that average scores improve even if the proportion below a threshold does not. If a threshold sits towards the fringe of a distribution, then overall movements will be harder to gauge.
- Current AEDC measures are based on thresholds. Users of the census results will be more familiar categories based on thresholds.
- A measure that reports a percentage of students is more intuitive than a score on an arbitrary scale.

On balance, threshold-based measures are more likely to suit an indicator.

A secondary question is whether **existing or new** thresholds should be defined. The developmentally vulnerable thresholds used in current AEDC reporting were set based on the 10th percentile of the broader student population in Cycle 1 (excluding children with special needs) in 2009.

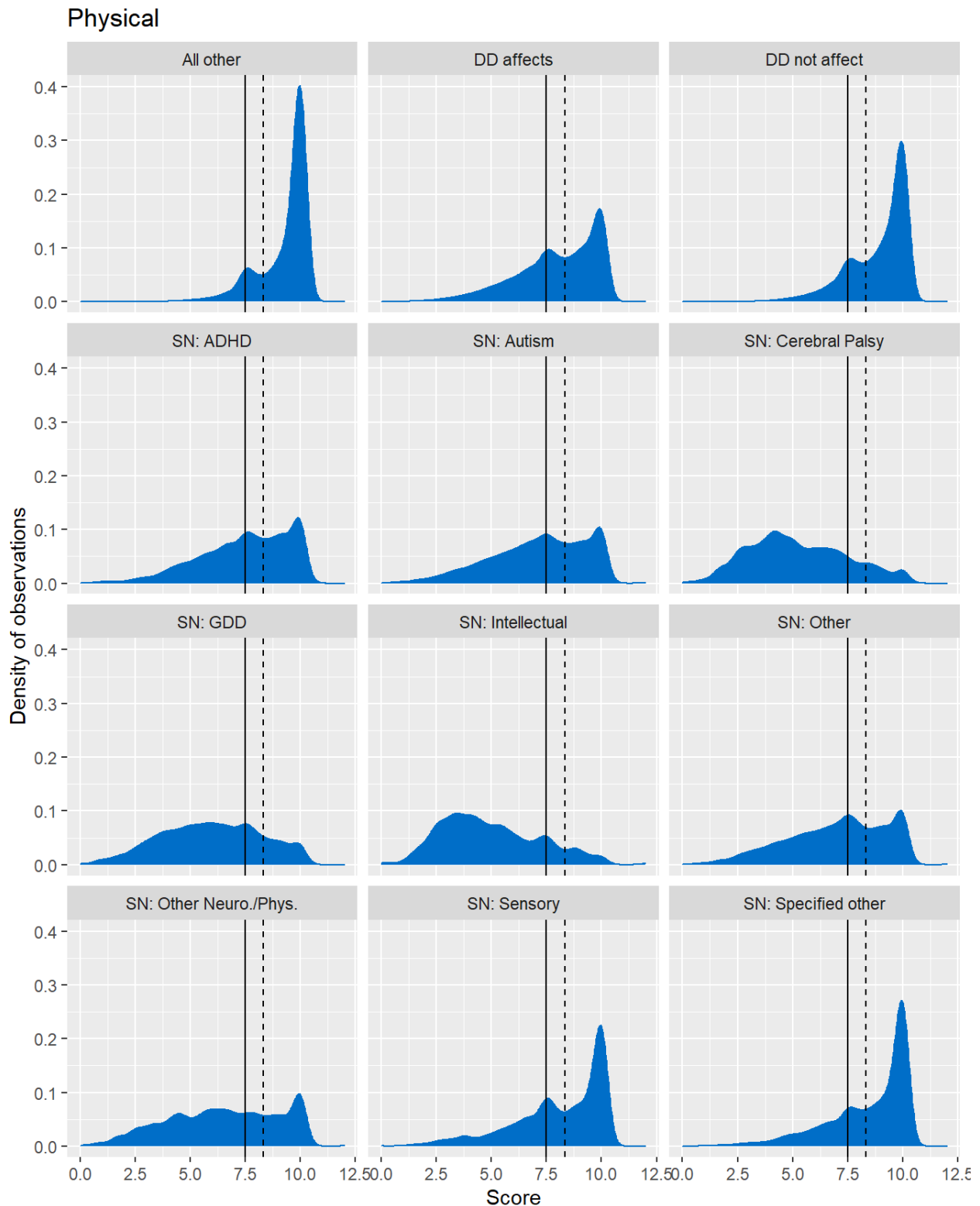
Figure 5 shows the distribution of scores in the Physical health and wellbeing domain for children split by AHDN group. Children with special needs are also split by diagnosis group. Figure 6 shows the same information for the Social competence domain. Results for other domains and splits by recorded diagnosis (for children with special needs) can be found in Appendix A.

The figures indicate how the existing thresholds apply for the special needs cohort. We observe that:

- Typically, 30%-70% of students with special needs or at least one developmental difficulty fall below the 'developmentally vulnerable' threshold. This means that the thresholds may be reasonably effective for reporting, with significant numbers of students on either side. The 'developmentally vulnerable' threshold is probably more relevant than the 'developmentally at risk' threshold, since a large proportion of children with some diagnoses fall below the 'developmentally at risk' threshold.
- Using the same thresholds improves comparability to the broader student population. This consistency is likely to be an advantage when reporting, particularly if comparing changes against those for the broader population.
- A disadvantage of using the same threshold is that it creates a 'gap' between students with AHDNs and other students, which could lead to improper interpretations. For students with significant barriers to learning, setting up a direct comparison may be less helpful than attempting to establish what good developmental progress represents for them.
- Any new threshold (in the absence of further validation work) would likely be based on selections drawn from historical distributions; so there is no 'right' threshold that can be defined that represents good progress for children with AHDN. This is particularly true for this group, where the variation in disability severity means that progress measurement would ideally be highly tailored.

Stakeholder views were mixed on this particular topic. Given that the existing thresholds are at levels that should see meaningful changes over time, and that there's no inherent reasons why an alternative threshold is more suitable, the existing developmentally vulnerable threshold appears reasonable.

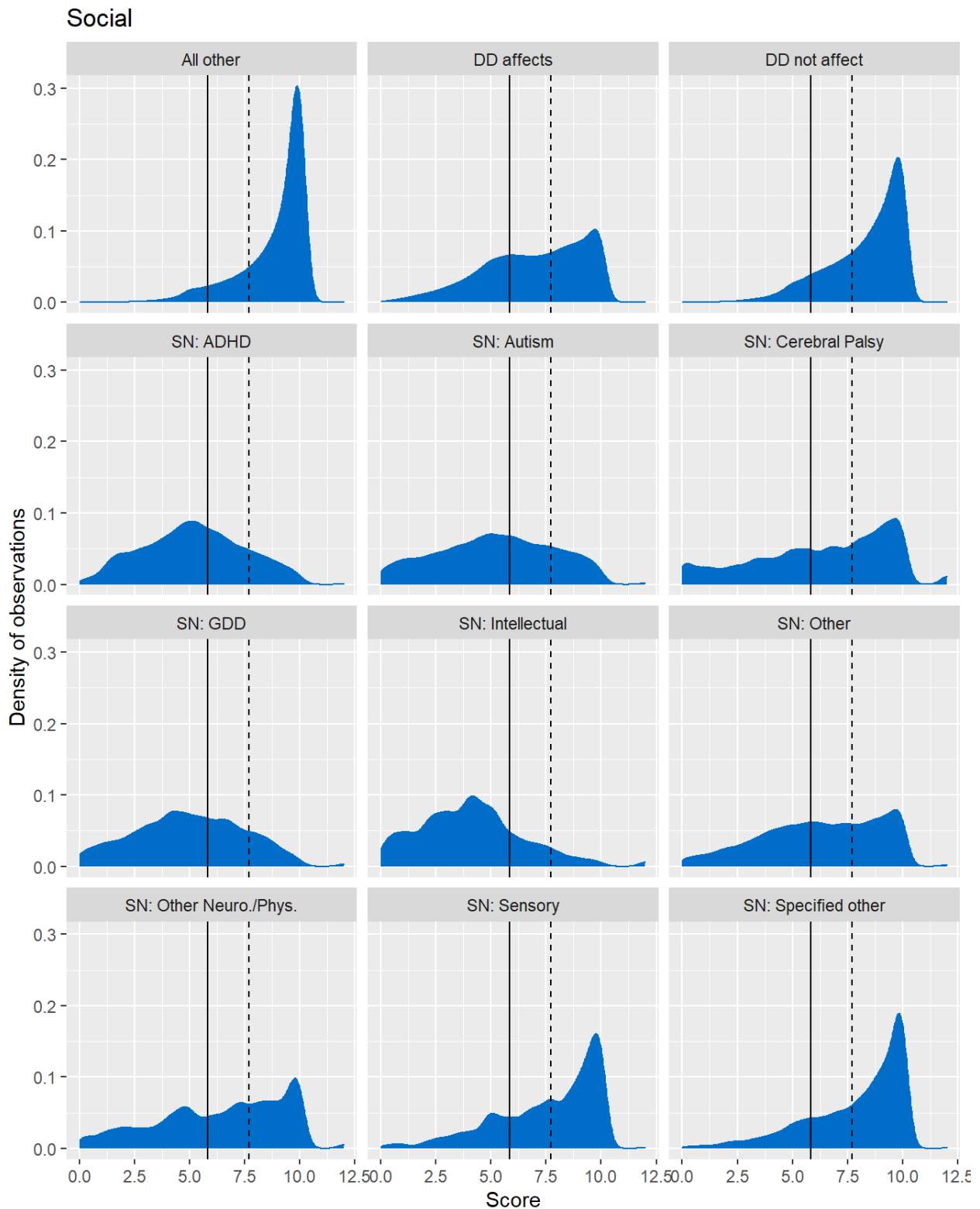
Figure 5 – Distribution of Physical health and wellbeing domain scores for children split by AHDN group, Children with special needs are also split by diagnosis group, 2015 (Cycle 3) onwards.



Notes:

- (a) Missing values coded as 12
- (b) Solid line shows the approximate 'Developmentally Vulnerable' threshold, and the dashed line shows the approximate 'Developmentally At Risk' threshold for five-year-old children
- (c) The allocation from diagnoses to diagnosis group is given in Appendix A.

Figure 6 – Distribution of Social competence domain scores for children split by AHDN group, Children with special needs are also split by diagnosis group, 2015 (Cycle 3) onwards.



Notes:

- (a) Missing values coded as 12
- (b) Solid line shows the approximate 'Developmentally Vulnerable' threshold, and the dashed line shows the approximate 'Developmentally At Risk' threshold for five-year-old children
- (c) The allocation from diagnoses to diagnosis group is given in Appendix A.

Combining domains

AEDC measures include two Vulnerability Summary Indicators, which measure children's developmental vulnerability across the five AEDC domains: developmentally vulnerable on one or more domain(s) (DV1) and developmentally vulnerable on two or more domains (DV2).

Table 12 shows the proportion of children in AHDN groups who are AHDN developmentally vulnerable (using the existing thresholds). Strikingly, 47% of children in the special needs group are AHDN developmentally vulnerable in at least three domains.

Table 13 goes further by looking at the overlaps for children in the special needs cohort. Some domains have relatively high overlaps; 87% of children with an AHDN Developmental Vulnerability in the emotional domain are also AHDN Developmentally Vulnerable in the social competence domain.

The equivalent tables considering the proportion AHDN developmentally on track and number of domains in which children are AHDN developmentally on track are provided in Appendix A.

Table 12 – Indicators of AHDN developmental vulnerability by AHDN groups, 2021 (Cycle 5)

AHDN group	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally vulnerable in 1+ domains	AHDN developmentally vulnerable in 2+ domains	AHDN developmentally vulnerable in 3+ domains	AHDN developmentally vulnerable in 4+ domains	AHDN developmentally vulnerable in 5 domains	Avg # domains AHDN developmentally vulnerable
Special Needs	48%	52%	49%	39%	47%	74%	60%	47%	35%	20%	2.4
Developmental Difficulty affects learning in regular classroom	30%	31%	29%	24%	29%	59%	40%	25%	14%	6%	1.4
Developmental Difficulty which does not affect learning in regular classroom	11%	9%	9%	6%	7%	25%	11%	5%	2%	1%	0.4
Requires further assessment	26%	27%	24%	22%	22%	57%	34%	19%	9%	3%	1.2
All children with AHDN	27%	28%	26%	21%	25%	51%	34%	22%	13%	6%	1.3
All children, excluding those with known Special Needs	10%	10%	8%	7%	8%	22%	11%	6%	3%	1%	0.4

Note: The average number of domains calculation is based on children with at least one domain score available.

Table 13 – Proportion AHDN developmentally vulnerable in one domain who are AHDN developmentally vulnerable in another, special needs cohort, 2021 (Cycle 5)

Proportion of children who are AHDN developmentally vulnerable in the domain...	...who also have a AHDN developmental vulnerability in the ____ domain				
	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge
Physical health and wellbeing	100%	75%	67%	60%	70%
Social competence	70%	100%	81%	61%	72%
Emotional maturity	66%	87%	100%	57%	67%
Language and cognitive skills (school-based)	75%	83%	73%	100%	82%
Communication skills and general knowledge	72%	81%	70%	68%	100%

Stakeholders noted that domain level results are important, particularly for children with disability where different domains may be more or less impacted. While retaining the ability to report at a domain level, a single headline indicator is of interest. It is not clear-cut what the most useful form of indicator is in terms of the best way to combine domains:

- ‘Number of children AHDN developmentally vulnerable in X or more domains’ ties to existing reporting practices. Currently X=1 or 2 are used, however 3 might be a better choice for these cohorts, given high AHDN developmentally vulnerable rates and the heavily overlaps.
- An alternative is the ‘average number of domains the cohort is AHDN developmentally vulnerable’. This effectively sums the domain percentages shown in Table 12 to get the numbers in the far right of the table. We believe this has some intuitive appeal and might reduce the need for another threshold decision and be more flexible for different sub-cohorts of the AHDN groups. This measure has a natural twin – the average number of domains on track – see Section 4.6.

Design decision 3: For calculating indicators:

- Retain the current question set and weightings.
- Use the current ‘developmentally vulnerable’ threshold to monitor the proportion of students with AHDN below a certain point. This improves comparability, although care is needed in the presentation of any comparison.
- Use average number of domains a child is AHDN developmentally vulnerable or on track as a way to combine domain scores.

A related question is whether the term developmentally vulnerable remains appropriate. Retaining the language encourages comparability but may be unhelpful for describing for children that are largely AHDN developmentally on track conditional on their known disabilities. While we have used AHDN developmentally vulnerable in our reporting, we flag this as a topic for further consideration.

3.5 Reporting on differences to the broader student population

There are two types of progress that could be monitored:

- **Absolute** progress over time. That is, monitoring progress in outcomes metrics for children in the AHDN cohort, without reference to the broader student population.
- **Relative** progress compared to the overall student population. This would involve comparisons, and potentially tracking of the 'gap' between the two groups.

Often both measures will align. But there can be circumstances where the absolute improvement might be smaller than that of the broader group, which means that the relative measure deteriorates.

Another important point is that a relative measure will create a gap, but there is no 'right' level of the gap (beyond observing that a shrinking gap is probably desirable).

Stakeholder discussions suggested that both views had some relevance.

Our recommended approach is to focus on the absolute levels as the primary indicator, but have broader rates available so that relative comparisons can be made.

Design decision 4: Report both the rate for the AHDN cohorts and the broader cohort of children so that absolute and relative results can be tracked. Treat the absolute measure as the primary indicator.

3.6 Compositional effects

3.6.1 Whether to include compositional adjustments

One challenge in tracking changes over time is the underlying variability in the cohort. There are two sources of variability:

- **Demographic composition.** This includes factors such as gender, age, region (remoteness and socioeconomic status of location), Aboriginal and/or Torres Strait Islander identification and English as a Second Language (ESL). We have previously found that AHDN developmental vulnerability rates differ across these dimensions; Figure 7 gives examples for remoteness and socioeconomic status.
- **Disability and health condition variability.** AHDN developmental vulnerability varies markedly on disability type. Further, relative rates have shifted over time; Figure 8 shows, among other things, the significant increase in autism as a fraction of the group with special needs. Such a movement will change reported rates of AHDN developmental vulnerability, all else being constant.

Figure 7 – Rates of AHDN developmental vulnerability by AHDN group and SEIFA quintile (top) and AHDN and Remoteness group (lower) both, 2021

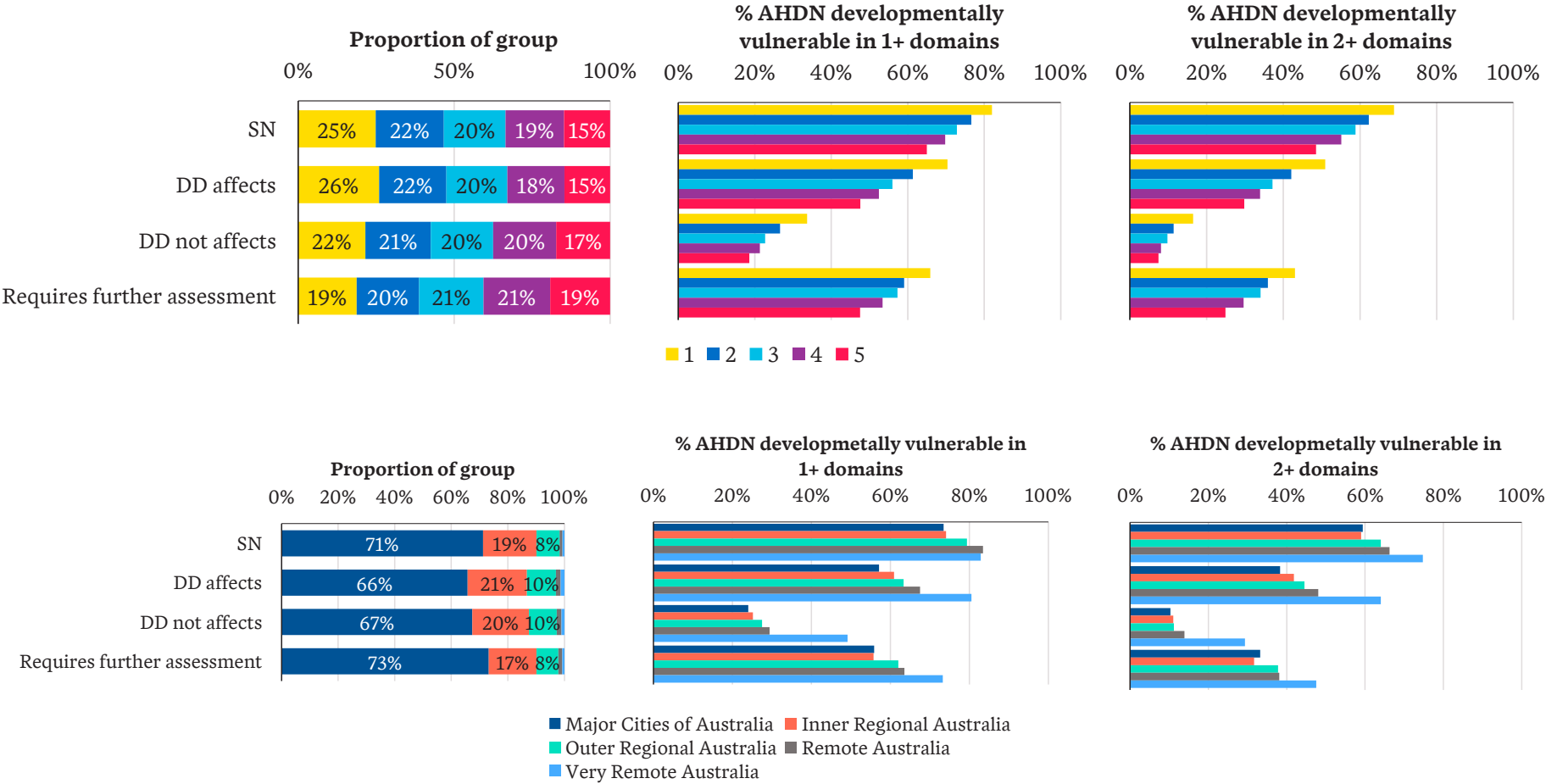
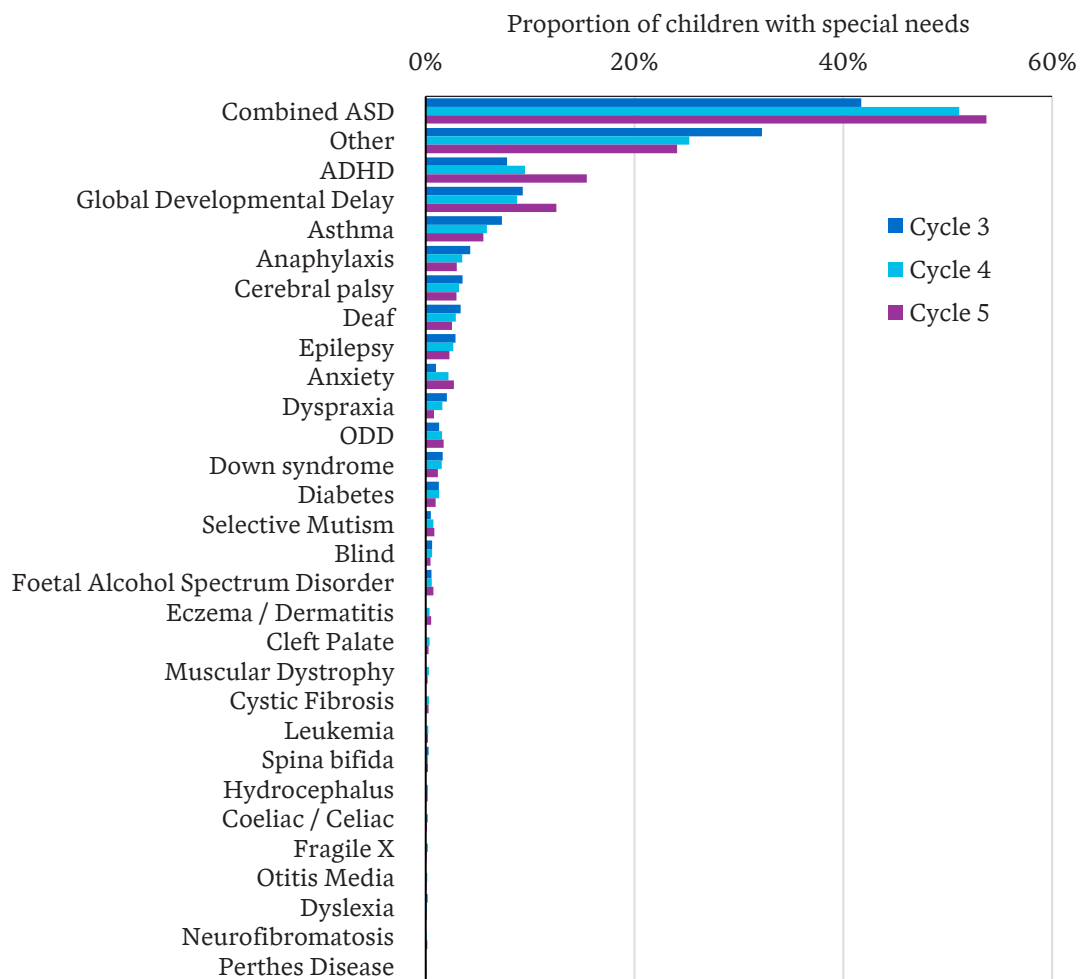


Figure 8 – Proportion of children with special needs with recorded diagnoses



- (a) Combined ASD refers to the combined group of Autism spectrum disorder, Autism and Asperger Syndrome indicators which are collected separately and combined in the figure. The breakdown is available in Appendix A.
- (b) ADHD: Attention Deficit Hyperactive Disorder.
- (c) ODD: Oppositional Defiance Disorder/Oppositional Defiant Disorder.

A natural question is then whether to control for this variation when updating the indicator each census. At one extreme, raw unadjusted results are the most accessible for many users. At the other end of the spectrum, an index could be created which controls for this compositional change, which might then diverge from the raw results over time.

Ultimately, we take the view that the **raw indicator with attribution** is the most transparent way of presenting results. This means reporting the vulnerability rates as they are recorded in the AEDC (without any adjustment) so the proportions can be tracked. As well as calculating a controlled estimate in the background so that the degree of compositional impact can be quantified and reported.

Relatedly, some of the compositional change may be driven by changes to the number of people being allocated to various groups. While the attribution process will control for this, reporting numbers may be a useful aid to help explain how shifts have been driven by factors like increased identification of certain conditions.

Design decision 5: Calculate both the raw indicator and a version that controls for compositional change for demographics and AHDN mix. Report the raw indicator along with an estimate of compositional change.

Reporting should also highlight the number of students in a group, so large shifts can be observed and considered.

3.6.2 Technical options for compositional adjustments

While a more technical topic, there are various options for how the compositional adjustment is made. Three common approaches:

- **Simple (disjoint subset) reweighting** – This approach works best if there are a small number of subgroups or effects to control for. The old weights (or numbers) for each group can be applied to the new outcome rates to obtain a controlled estimate. We illustrate this in the schematic below (Figure 9); the reduction to 25% in the total outcome rate is partly due to an increasing fraction of the lower-rate cohort A. Controlling gives a smaller impact in line with cohort-level changes.
- **Propensity model reweighting** – This approach has the same intuition as the simple reweighting, but is applied at an individual level. A propensity model is fit to the data from the new and prior AEDC cycles, to estimate the change in distribution of disability type and demographic factors between the current and previous collection. The results of this model can be converted to weights, which are used to re-weight individual observations when calculating outcomes. These re-weighted outcomes control for compositional mix changes between cycles. The advantage of this over simple weighting is that more dimensions of change can be allowed for. However, it does require a model refit and review every cycle.
- **Regression model adjustment** – A model is fit to data from the previous cycle, to predict average outcomes based on demographic, disability type, and other control variables. This model is then applied to data from both the previous and latest collection. A change in average predictions between the previous and latest data reflects a change in outcome due to compositional change. This compositional change can be subtracted off the actual change, to create mix-adjusted outcome measure. This approach requires a separate model for each outcome of interest (e.g. different vulnerability domains).

Simple reweighting is not feasible given the number of dimensions of interest (gender, age, state, disability or health condition type, AHDN cohort, etc.). There are several other considerations when deciding between the remaining two options, but on balance we prefer the reweighting approach. It is intuitive and a single set of weights can be used for every indicator calculation.

Design decision 6: Use propensity reweighting for measuring compositional change.

Figure 9 – Illustration of simple reweighting

2018

Cohort	Number in group	Outcome Rate
A	100	20%
B	200	30%
C	300	40%
Total	600	33.3%

2021

Cohort	Number in group	Outcome Rate
A	200	15%
B	200	25%
C	200	35%
Total	600	25%

2021, reweighted

Cohort	Number in group	Outcome Rate
A	100	15%
B	200	25%
C	300	35%
Total	600	28.3%

We demonstrate this approach for comparing 2015, 2018 and 2021 AEDC results in Section 4.4 (*Reweighting to estimate the impact of compositional mix changes*). More technical details are provided in Appendix C. Future AEDC cycles would require a similar reweighting model to be fit.

3.7 Grouping disabilities and health conditions

The different AHDN groups form a high-level grouping of children with disability. This is summarised in Table 14. While children can fall into multiple groups, we have applied the natural hierarchy from the information collected. Mutually exclusive groups means results can more easily be aggregated or disaggregated. The hierarchy is applied in the following order:

1. Having special needs
2. Having a developmental difficulty that affects learning in a regular classroom
3. Having a developmental difficulty that does not affect learning in a regular classroom
4. Requiring further assessment.

Table 14 – AHDN groups and number of children, 2021 (Cycle 5)

AHDN group	Number of children in 2021 AEDC	Proportion of all children in 2021 AEDC
Special needs	15,797	5.2%
Developmental difficulty that affects learning	42,085	13.9%
Developmental difficulty that does not affect learning	28,445	9.4%
Requiring further assessment	13,320	4.4%
Total	99,647	32.8%

Within each of these AHDN groups further splitting by disability and health condition types is of interest based on stakeholder discussions. The best grouping is not immediately clear as definitions of disability can vary. Also, the level of detail collected varies by AHDN group.

Table A.1 in Appendix A summarises the range of diagnosis and developmental delay flags in the dataset. Some conditions are very low incidence; less than 100 across the whole of Australia. This means that some form of grouping is needed to meaningfully enable reporting of subgroups.

In proposing a grouping, we have considered:

- Comments and feedback from stakeholders
- The groupings and classifications used by the NCCD. These are functional grouping, rather than disability specific. Stakeholders also viewed comparability with the NCCD useful if possible, since it is highly relevant to funding and program considerations.
- The groupings used by other disability programs, particularly the NDIS.

Table 15 shows our proposed grouping for children with special needs based on diagnoses recorded. Children with special needs can have multiple diagnoses. Depending on the reporting purpose, a hierarchy could be applied to diagnoses to capture each child only once. Alternatively, children could be allowed to contribute to the sub-results for multiple groups. Applying a hierarchy means sub-results can naturally be aggregated into results for broader groups. This comes at the cost of losing some information about overlapping diagnoses. For children with special needs the overlap is fairly small, particularly at the higher grouping level. We therefore prefer to use the hierarchy for this group.

Table 15 – Proposed groupings and number of children with special needs, 2021

Group		Total number of children with diagnosis	Number of children, hierarchy applied
Intellectual / learning	Autism	8,468	8,468
	ADHD	2,436	1,223
	GDD	1,977	1,321
	Intellectual disability	305	215
Neurological / physical	Cerebral Palsy	467	378
	Other neurological / physical	584	339
Sensory		462	462
Other – specified		2,326	2,326
Other – not specified		4,218	4,218
Total number of children			15,797

Our inspections of the distributions of domain scores by diagnosis suggests that in most cases the grouping makes sense from a developmental view too. Grouped disabilities and conditions tend to have similar patterns of scores across different domains. For example, this can be seen in Figure 5 (p31) and Figure 6 (p32).

For children with a developmental difficulty (but not special needs) an indicator is recorded for a series of types of conditions or impairments – the type or category of developmental difficulty. The categories are listed in Table 16. A teacher may also record specific diagnoses, consistent with those for children with special needs. This can be based on observations, diagnoses or information provided to them. For the Developmental Difficulty group 19% have such a diagnosis recorded. The primary diagnoses recorded are asthma (7%), anaphylaxis (3%) and Attention Deficit Hyperactive Disorder (ADHD) (3%).

Given that children in this group do not have special needs, that diagnoses are recorded for only a subset, and that the distribution of these does not align well to children with special needs, we think reporting is better based on the categories of developmental difficulty, rather than aligning to the special needs subgroups above in Table 15.

Table 16 shows the number of children in each of the two developmental difficulty groups by difficulty category. The counts are shown on two basis, first where children with difficulties spanning multiple categories are counted in each category. Then where a hierarchy has been applied working down the table.

Table 16 – Number of children with various types of developmental difficulties, 2021

Developmental difficulty category	Total number of children in DD affects learning group	DD affects learning, hierarchy applied	Total number of children in DD which does not affect learning group	DD does not affect learning, hierarchy applied
Physical disability	736	736	664	664
Visual impairment	1,488	1,413	5,108	5,013
Hearing impairment	1,213	1,080	835	700
Speech impairment	18,970	17,682	12,963	12,206
Learning disability	5,909	2,289	574	289
Emotional problem	8,357	4,872	5,334	4,278
Behavioural problem	9,315	3,350	2,910	1,575
Problems at home	8,127	3,099	5,323	3,617
Trauma, isolation or difficulties associated with resettlement	176	40	162	103
Other - Chronic illness	4,974	4,072		
Other - Neurodevelopmental disorder	3,257	1,076		
Other - Any other enduring problems	4,614	2,376		
Total number of children		42,085		28,445

Note: We have only included results where the AvEDI is recorded as a valid instrument, or the child has special needs and meets some of the approximate criteria for a valid instrument. This is discussed further in Section 4.

We noted in the previous report that there are substantial overlaps, children have developmental difficulties in multiple areas. This is again visible in Table 16 as the reduction in the group size on the hierarchical basis – for example the number in the learning disability and behavioural problems categories are reduced substantially. There is also no clear way to order a hierarchical assignment – AvEDI scores could be used, but we would expect vast differences by domains.

We suggest:

- Main reporting split based on the number of different developmental difficulties recorded. This provides subsets which naturally aggregates to higher level results as well as some reflection as to the degree of difficulties a child faces.
- Retaining the flags for each category so that results can be summarised by developmental difficulty type, noting that these results will not aggregate to higher level results as children will be counted multiple times.

Table 17 – Number of children by count of developmental difficulties, 2021

Count	DD affects learning	DD does not affect learning
1	26,888	24,323
2	8,906	3,303
3	3,898	619
>3	2,393	200
Total	42,085	28,445

For children requiring further assessment no further information is available for categorising the type of disability or health condition.

Design decision 7: Group children into the mutually exclusive categories shown to enable more detailed reporting while retaining simple aggregation. For children with special needs this reflects categorisation of diagnosis. For children with developmental difficulties this reflects the number of difficulties. Retain indicators of difficulty types so that results at this level are producible noting double counting of children.

3.8 Granularity of results

Stakeholders have universally recognised that being able to subdivide results is important. Partly this recognises that to drive improvements in a top-level indicator, estimates are needed of state level results to understand what is potentially working well.

Competing with this desire, there is also awareness that if cohort sizes are too small then both:

- This is potentially too identifying, with results unable to be published
- Outcome rates will be subject to too much variability, so that tracking over time is very difficult.

We also recognise there are two potential purposes of granularity:

- Understanding differences between groups
- Understanding changes over time.

Differences between groups

In exploring differences between groups, there is the potential for greater granularity; even groups of about 200 may be enough to see meaningful differences between them within the same census cycle. Critical difference⁹ research suggests that domain differences of a 3-4 percentage points for a group of size 200+ will generally be meaningful.

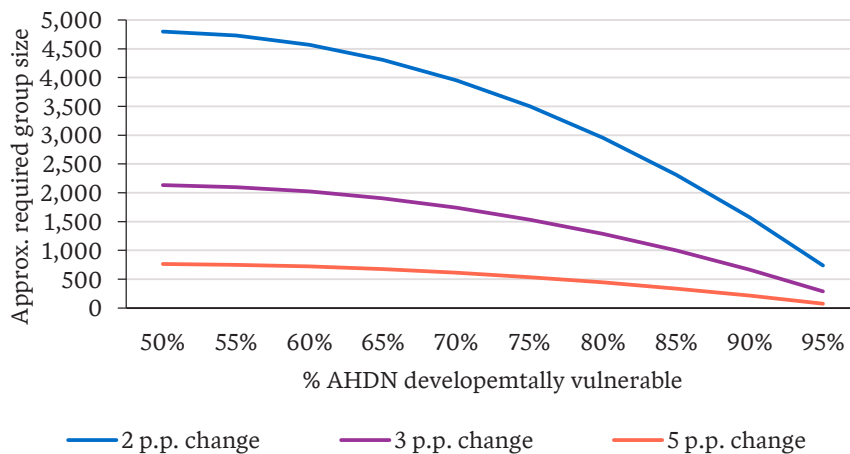
Differences over time

We reproduce commentary from our previous report on tracking differences over time. Figure 10 provides an illustration of the group sizes required to be confident of measuring a significant change year on year. The calculation assumes the normal approximation to the Bernoulli (0-1 response) distribution, at the 95% confidence level¹⁰.

⁹ Gregory, T., & Brinkman, S. (2016). Exploring change in the Australian version of the Early Development Instrument: The estimation of a critical difference for the “vulnerable”, “at risk” and “on track” categories. Telethon Kids Institute, Adelaide, Australia.

¹⁰ Based on a two-sided hypothesis test. The level of confidence means that if there is no underlying change apart from statistical noise, we would identify this correctly 95% of the time.

Figure 10 – Illustrative group sizes required to measure a statistically significant change in outcomes from one cycle to the next, at 95% confidence



For example, if the base rate of AHDN developmental vulnerability is 50%, then to be confident of a two-percentage point change at the 95% confidence level (regardless of whether this is an increase or decrease), requires a group size of 4,800 in each year. This varies by the baseline rates (e.g. the starting level of vulnerability). If the baseline rate of AHDN developmental vulnerability is closer to 75%, the confidence interval is narrower and only 3,500 in each year are required. For reliable detection of a three-percentage point change, around 1,500 children would be sufficient to achieve that level of confidence.

There is obviously a trade-off between group size and the size of change that can be detected robustly. As an example, for a group of ~2,000 people a movement of two to three percentage points will be statistically significant. Given that genuine movements larger than this are infrequent, it means that care is needed in reporting of groups of less than 2,000 people.

Design decision 8: Enable results to be split across key variables such that:

- Comparisons of subgroups within a census are reasonably granular, down to size of about 200.
- Comparisons across time need larger numbers to be robust. Any group reported with less than 2,000 students would need clear warnings and uncertainty estimates.

This flexibility of specifying cohorts could be delivered via an interactive tool.

4 Results

Given the design decisions in Section 3, we are able to generate and discuss results for a potential index. This section presents the proposed indicators over Cycle 3 (2015) to Cycle 5 (2021).

Throughout this Section we report results by AHDN group. This refers to the hierarchical grouping which allocates children to only one group. The hierarchy is applied in the following order:

1. Having special needs (Special Needs)
2. Having at least one developmental difficulty that affects learning in a regular classroom (DD does affect learning)
3. Having at least one developmental difficulty that does not affect learning in a regular classroom (DD does not affect learning)
4. Requiring further assessment (Requires further assessment).

We have only included results where:

- The AvEDI is recorded as a valid instrument, or
- The child has special needs and is aged over 3 and has been at school for at least a month (or the teacher feels they can provide an accurate assessment). For children with special needs the instrument is always recorded as invalid as these children are excluded from usual reporting, so we have approximated the other criteria for a valid instrument.

This means removes <0.4% of responses and means some numbers may differ to statistics reported or calculated elsewhere.

4.1 Descriptive statistics

4.1.1 The 2021 AEDC (Cycle 5)

Table 18 shows the number of children in each AHDN group for the 2021 AEDC. The proportion of female and Aboriginal and/or Torres Strait Islander children are shown. Compared to 2018, the number of children with special needs is 13% higher, while the number of children who are Aboriginal and/or Torres Strait Islander and have special needs is 42% higher.

Table 18 – Number of children by AHDN group and selected demographics, 2021 AEDC (Cycle 5)

AHDN group	Total # of children	# female	% female	# Aboriginal and/or Torres Strait Islander	% Aboriginal and/or Torres Strait Islander
Special Needs	15,797	4,562	29%	1,724	11%
DD affects learning	42,085	16,119	38%	5,459	13%
DD does not affect learning	28,445	12,758	45%	2,365	8%
Requires further assessment	13,320	4,920	37%	1,036	8%
Total, all children with AHDN	99,647	38,359	38%	10,584	11%
All children, excluding those with known Special Needs	287,935	143,098	50%	18,523	6%

Notes:

(a) We have only included results where the AvEDI is recorded as a valid instrument, or the child has special needs and meets the approximate criteria for a valid instrument. This is discussed further in Section 4.

(b) All children, excluding those with known Special Needs includes many of the children with AHDN (those with developmental difficulties and requiring further assessment)

Table 19 shows the number of children in each AHDN group for the 2021 AEDC by State.

Table 19 – Number of children by AHDN group and State, 2021 AEDC (Cycle 5)

AHDN group	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special Needs	256	5,079	217	3,232	1,223	340	3,965	1,485
DD affects learning	819	12,438	660	9,341	3,108	1,014	9,262	5,443
DD does not affect learning	478	8,277	394	5,360	2,008	746	7,063	4,119
Requires further assessment	306	4,289	136	3,258	803	238	2,684	1,606
Total, all children with AHDN	1,859	30,083	1,407	21,191	7,142	2,338	22,974	12,653
All children, excluding those with known Special Needs	5,534	90,399	2,974	61,433	18,937	5,595	69,264	33,799

Table 20 summarises for convenience the information from Table 15 and Table 17, showing the number of children in each AHDN group split by further disability category for Cycle 5.

Table 20 – Number of children by AHDN group and further disability category groups, 2021 AEDC

AHDN group	Total	Special needs					Count of developmental difficulties		
		Intellectual / learning	Neurological / physical	Sensory	Other - specified	Other	1	2	≥3
Special Needs	15,797	11,227	717	381	1,369	2,103			
DD affects learning	42,085						26,888	8,906	6,291
DD does not affect learning	28,445						24,323	3,303	819
Requires further assessment	13,320								
Total	99,647	11,227	717	381	1,369	2,103	51,211	12,209	7,110

4.1.2 Time trends

Table 21 shows the number and proportion of children in each AHDN group split by further disability category for 2015, 2018 and 2021 AEDC results. Table 22 shows the split by further disability category.

Table 21 – Number of children by AHDN group, 2015 (Cycle 3) through to 2021 (Cycle 5)

AHDN group	Total # of children			Proportion of all children		
	2015	2018	2021	2015	2018	2021
Special Needs	13,998	13,990	15,797	4.7%	4.5%	5.2%
DD affects learning	37,874	40,617	42,085	12.6%	13.2%	13.9%
DD does not affect learning	30,162	28,949	28,445	10.0%	9.4%	9.4%
Requires further assessment	9,122	11,061	13,320	3.0%	3.6%	4.4%
Total, all children with AHDN	91,156	94,617	99,647	30.3%	30.8%	32.8%
All children, excluding those with known Special Needs	286,820	293,820	287,935	95.3%	95.5%	94.8%

Table 22 – Number of children by AHDN group and further disability category groups, 2015 to 2021

AHDN subgroup		Total # of children			Proportion of all children		
		2015	2018	2021	2015	2018	2021
Special Needs	Intellectual / learning	7,898	9,094	11,227	2.6%	3.0%	3.7%
	Neurological / physical	680	734	717	0.2%	0.2%	0.2%
	Sensory	464	373	381	0.2%	0.1%	0.1%
	Other - specified	1,733	1,517	1,369	0.6%	0.5%	0.5%
	Other	3,223	2,272	2,103	1.1%	0.7%	0.7%
DD affects learning	1 type	24,972	26,932	26,888	8.3%	8.7%	8.9%
	2 types	7,676	8,202	8,906	2.6%	2.7%	2.9%
	3+ types	5,226	5,483	6,291	1.7%	1.8%	2.1%
DD does not affect learning	1 type	25,404	24,945	24,323	8.4%	8.1%	8.0%
	2 types	3,716	3,279	3,303	1.2%	1.1%	1.1%
	3+ types	1,042	725	819	0.3%	0.2%	0.3%
Requires further assessment		9,122	11,061	13,320	3.0%	3.6%	4.4%

From Table 21 and Table 22:

- Overall the proportion of children with AHDN has increased over time, particularly between 2018 and 2021 (from 30.8% to 32.8%). This is driven by increases in the groups of children with special needs (+1,807 children) and requiring further assessment (+2,259).
- The proportion of children with special needs increased about 0.5 percentage points to 5.2% in 2021 after being flat at under 5% in previous Cycles. This is due to an increase in the number of children with diagnosed special needs, it may reflect movement between groups (e.g. children who would previously been in the DD affects learning group having had an earlier diagnosis), although the proportion of children in the other groups has been constant or also increased.
- The increase in the number of children with special needs is largely driven by an increase in the number of children in the Intellectual/ learning AHDN subgroup. Figure 8 showed large increases in the number of children with diagnoses relating to Autism, Attention Deficit Hyperactivity Disorder and Global Developmental Delay.
- The proportion of children in the requires further assessment AHDN group increased 0.8 percentage points from 3.6% to 4.4% in 2021. This proportion also increased between 2015 and 2018. With the hierarchical AHDN group, this represents an increase in the total group of children with recorded AHDN.

Table 23 shows the number and proportion of children by broad AHDN group and State/Territory for 2015, 2018 and 2021 (Cycles 3, 4, and 5). Generally increases are seen in both groups in each State/Territory, of note:

- The Northern Territory has seen particularly large increases in the proportion of children with special needs and other AHDN.
- South Australia has seen an increase in the proportion of children with special needs, but not for other AHDN groups.
- In Victoria the proportion of children with AHDN has remained constant in contrast to other States/Territories.

The presence of differences is not unexpected, different jurisdictions have different diagnostic processes and policy contexts. It does highlight the need for consideration of compositional change when considering aggregate results.

Table 23 – Number of children by broad AHDN group and State/Territory, 2015 to 2021

State/Territory	Broad AHDN group	Total # of children			Proportion of all children		
		2015	2018	2021	2015	2018	2021
ACT	Special needs	232	229	256	4.3%	4.0%	4.4%
	AHDN, not special needs	1,452	1,696	1,859	27%	30%	32%
NSW	Special needs	4,667	4,215	5,079	4.9%	4.3%	5.3%
	AHDN, not special needs	28,345	27,799	30,083	30%	29%	32%
NT	Special needs	164	145	217	4.8%	4.4%	6.8%
	AHDN, not special needs	1,148	1,189	1,407	34%	36%	44%
QLD	Special needs	2,743	2,672	3,232	4.2%	4.2%	5.0%
	AHDN, not special needs	19,164	19,971	21,191	30%	31%	33%
SA	Special needs	1,068	1,030	1,223	5.5%	5.1%	6.1%
	AHDN, not special needs	6,598	7,035	7,142	34%	35%	36%
TAS	Special needs	253	284	340	3.9%	4.6%	5.7%
	AHDN, not special needs	2,134	2,216	2,338	33%	36%	39%
VIC	Special needs	3,709	4,137	3,965	5.2%	5.5%	5.4%
	AHDN, not special needs	21,442	23,626	22,974	30%	31%	31%
WA	Special needs	1,162	1,278	1,485	3.5%	3.8%	4.2%
	AHDN, not special needs	10,873	11,085	12,653	32%	33%	36%

Note: The 'AHDN, not special needs' group combines 'DD affects learning', 'DD does not affect learning' and 'Requires further assessment'.

4.2 Headline indicators

Table 24 shows the rates of AHDN developmental vulnerability indicators by AHDN group for the 2021 AEDC (repeated from Table 12 above). Most importantly, the special needs group sees very high rates of vulnerability across all domains and on average are AHDN developmentally vulnerable in 2.4 domains. This is five times higher than the broader student population. Students with developmental difficulties or flagged for further investigation have vulnerability rates between children with special needs and the broader school population. The results suggest that the requires further assessment flag is highlighting genuine difficulties that affect learning, given the high rates of vulnerability visible in the AEDC.

Table 24 – Rates of AHDN developmental vulnerability indicators by AHDN group, 2021 AEDC

AHDN group	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally vulnerable in 1+ domains	AHDN developmentally vulnerable in 2+ domains	AHDN developmentally vulnerable in 3+ domains	AHDN developmentally vulnerable in 4+ domains	AHDN developmentally vulnerable in 5 domains	Avg # domains AHDN developmentally vulnerable
Special Needs	48%	52%	49%	39%	47%	74%	60%	47%	35%	20%	2.4
Developmental Difficulty affects learning in regular classroom	30%	31%	29%	24%	29%	59%	40%	25%	14%	6%	1.4
Developmental Difficulty which does not affect learning in regular classroom	11%	9%	9%	6%	7%	25%	11%	5%	2%	1%	0.4
Requires further assessment	26%	27%	24%	22%	22%	57%	34%	19%	9%	3%	1.2
All children with AHDN	27%	28%	26%	21%	25%	51%	34%	22%	13%	6%	1.3
All children, excluding those with known Special Needs	10%	10%	8%	7%	8%	22%	11%	6%	3%	1%	0.4

Note: The average number of domains calculation is based on children with at least one domain score available.

Table 25 shows the movement from 2018 to 2021 for these same indicators and AHDN groups. Changes which are significant are coloured according to the direction of the change – green for improvement and orange for deterioration. Significance is based on a two-sided test and a 95% confidence level.¹¹

We observe:

- (Statistically) significant deteriorations across all indicators for the Special needs group.
- Significant deteriorations for the developmental difficulty, affects learning group in the Language and cognitive skills (school-based) domain and the proportion of children vulnerable in 2 or more domains.
- Significant improvement in the social competence domain and deterioration in the Language and cognitive skills (school-based) for the Developmental difficulty, does not affect learning group.

¹¹ The AEDC critical difference is often used to test whether changes are significant. The critical difference allows for expected variation in results if different teachers were to complete the survey for the same group of children. It assumes the children are fairly representative of the population (i.e. domain vulnerability rates are approximately 10%).

We are considering results for subgroups which are not representative of the population. We compare the results across cycles where the cohort changes. Therefore, we expect some level of variability between cycles. We have tested the null hypothesis that this underlying variability is constant between cycles. To do this we have used a two a two-sided test and a 95% confidence level.

The size of change required for significance we report are about 30% larger than the critical difference values for a community of the same size.

- Significant improvements across almost all indicators for the Further assessment group. The exceptions are the Emotional maturity domain and proportion of children vulnerable in all 5 domains (which both also showed improvements but not significantly).
- Significant deteriorations across all indicators for the overall group of children with AHDN. This is in the context of deteriorations for the broader population of all students with not known special needs¹².

Table 25 – Change in AHDN developmental vulnerability indicators by AHDN group, 2018 to 2021

AHDN group	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally vulnerable in 1+ domains	AHDN developmentally vulnerable in 2+ domain	AHDN developmentally vulnerable in 3+ domains	AHDN developmentally vulnerable in 4+ domains	AHDN developmentally vulnerable in 5 domains	Avg # domains AHDN developmentally vulnerable
Special needs	1.4%	1.9%	2.1%	2.1%	1.7%	1.2%	1.9%	2.1%	2.1%	1.8%	0.09
Developmental difficulty, affects learning	-0.3%	0.1%	0.3%	1.1%	-0.3%	0.6%	0.8%	0.0%	-0.4%	-0.2%	0.01
Developmental difficulty, does not affect learning	0.1%	-0.6%	-0.4%	0.6%	0.1%	-0.2%	-0.2%	0.0%	0.1%	0.0%	-0.00
Further assessment	-1.5%	-1.3%	-0.9%	-2.8%	-1.4%	-2.1%	-2.7%	-1.7%	-1.1%	-0.3%	-0.08
All children with AHDN	0.4%	0.6%	0.8%	1.1%	0.5%	1.0%	1.0%	0.7%	0.4%	0.4%	0.03
All children, excluding those with known Special Needs	0.2%	-0.1%	0.0%	0.7%	0.1%	0.4%	0.3%	0.2%	0.1%	0.0%	0.01

Statistically significant movements shaded – green for improvements and orange for deterioration

The magnitude of the change required to be significant depends on both the group size and the level/proportion. Roughly, in the results reported here, to be significant:

- Around a 1 percentage point change is significant for the group of about 10,000 (e.g. children with special needs)
- Around a 0.5 percentage point change is significant for a group of 30,000-40,000 (developmental difficulty groups)
- Around a movement of 0.04 is needed in the average number domains AHDN developmentally vulnerable for a group of 10,000 and 0.2 for a group of 30,000-40,000.

4.3 Splits and granularity

In this section we report both in the proportion of children vulnerable in three or more domains these and the average number of domains in which children are vulnerable for various demographic, geographic and disability type splits. Consistent with Table 25, the tables show changes which are significant are coloured according to the direction of the change, – green for improvement and orange for deterioration.

¹² Readers interested in results and discussion for the group of ‘All children, excluding those with known Special Needs’ should refer to the Australian Early Development Census National Report 2021, available from: <https://www.aedc.gov.au/resources/detail/2021-aedc-national-report>. Results for this group are provided here only for context and are estimated, they may vary slightly from official statistics.

Significance is based on a two-sided test and a 95% confidence level. This uses standard errors and a normal approximation for the confidence interval.

4.3.1 Time trends

Table 26 and Statistically significant movements shaded – green for improvements and orange for deterioration

Table 27 show the headline indicator levels over Cycles 3, 4 and 5 (2015 to 2021) split by AHDN group and subgroup respectively. A version of Table 26 which includes the standard errors can be found at the beginning of Appendix B.

Table 26 – Levels of key AHDN developmental vulnerability indicators by AHDN group, 2-15 to 2021

AHDN group	AHDN developmentally vulnerable in 3+ domains			Avg # domains AHDN developmentally vulnerable		
	2015	2018	2021	2015	2018	2021
Special Needs	44.5%	45.1%	47.2%	2.24	2.26	2.35
DD affects learning	24.4%	24.7%	24.7%	1.41	1.43	1.43
DD does not affect learning	5.5%	4.8%	4.8%	0.48	0.43	0.43
Requires further assessment	20.6%	20.4%	18.6%	1.29	1.29	1.21
Total, all children with AHDN	20.9%	21.1%	21.8%	1.22	1.23	1.26

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 27 – Levels of key AHDN developmental vulnerability indicators by AHDN subgroup, 2015 to 2021

AHDN subgroup		AHDN developmentally vulnerable in 3+ domains			Avg # domains AHDN developmentally vulnerable		
		2015	2018	2021	2015	2018	2021
Special Needs	Intellectual / learning	53.1%	51.4%	53.8%	2.61	2.53	2.64
	Neurological / physical	48.6%	44.0%	39.6%	2.45	2.25	2.05
	Sensory	22.1%	20.4%	20.6%	1.34	1.25	1.20
	Other - specified	13.7%	15.8%	15.1%	0.84	0.95	0.87
	Other	42.1%	43.5%	40.0%	2.18	2.23	2.08
DD affects learning	1 type	15.3%	15.2%	14.4%	1.02	1.01	0.99
	2 types	33.4%	33.4%	32.4%	1.83	1.84	1.80
	3+ types	55.1%	58.0%	57.7%	2.70	2.85	2.81
DD does not affect learning	1 type	4.3%	3.7%	3.7%	0.41	0.37	0.36
	2 types	10.4%	9.7%	9.0%	0.79	0.75	0.74
	3+ types	17.0%	21.9%	21.7%	1.16	1.30	1.37
Requires further assessment		20.6%	20.4%	18.6%	1.29	1.29	1.21

Statistically significant movements shaded – green for improvements and orange for deterioration

We observe that:

- The deterioration for the Special needs group in both indicators for 2021 follows stable results over the previous two cycles. For the Intellectual/learning disability subgroup the deterioration reverses an improvement between 2015 and 2018.
- Similarly, the improvement for the Requires further assessment group in both indicators for 2021 follows stable results over between 2015 and 2018.

- Improvements in the indicators between 2015 and 2018 for the 'DD affects learning' group have been sustained in 2021.

4.3.2 Demographic splits

In this Section we discuss the indicator levels for 2021 across various splits as well as changes since 2018. Tables showing the actual differences between 2018 and 2021 are provided in Appendix B.

Table 28 though to Table 31 show the indicators for Cycle 5 for both the proportion of children vulnerable in three or more domains these and the average number of domains in which children are vulnerable.

The main statistically significant effect observed is the deterioration for children with special needs and improvement for children in the further assessment group, both of which were observed at an aggregate level in Table 25 above.

This affects some of the demographic subgroups more.

The deterioration for children with special needs is particularly visible for children that are:

- Male
- Non-Indigenous
- Non-Language Background Other Than English (Non-LBOTE)
- Among higher SEIFA quintile groups

The improvement for children in the further assessment group is particularly visible for children that are:

- Male
- Non-Indigenous
- Among higher SEIFA quintile groups.

Table 28 – Levels of key AHDN developmental vulnerability indicators by AHDN group and gender, 2021.

AHDN group	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
	Male	Female	Male	Female
Special needs	50%	39%	2.50	2.00
Developmental difficulty, affects learning	29%	18%	1.63	1.13
Developmental difficulty, does not affect learning	6%	3%	0.52	0.32
Further assessment	21%	15%	1.34	0.99
All children, excluding those with known Special Needs	9%	4%	0.59	0.29

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 29 – Levels of key AHDN developmental vulnerability indicators by AHDN group and Aboriginal and/or Torres Strait Islander identification, 2021.

AHDN group	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
	Not Indigenous	Aboriginal and/or Torres Strait Islander	Not Indigenous	Aboriginal and/or Torres Strait Islander
Special needs	46%	58%	2.29	2.83
Developmental difficulty, affects learning	23%	37%	1.35	1.97
Developmental difficulty, does not affect learning	4%	9%	0.41	0.71
Further assessment	18%	31%	1.17	1.72
All children, excluding those with known Special Needs	5%	16%	0.40	0.98

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 30 – Levels of key AHDN developmental vulnerability indicators by AHDN group and Language Background Other Than English (LBOTE) indicator, 2021.

AHDN group	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
	Not LBOTE	LBOTE	Not LBOTE	LBOTE
Special needs	44%	57%	2.24	2.74
Developmental difficulty, affects learning	23%	30%	1.37	1.68
Developmental difficulty, does not affect learning	4%	8%	0.39	0.60
Further assessment	16%	25%	1.12	1.48
All children, excluding those with known Special Needs	6%	7%	0.41	0.51

Statistically significant movements shaded – green for improvements and orange for deterioration.

Table 31 – Levels of key AHDN developmental vulnerability indicators by AHDN group and SEIFA quintile category, 2021.

AHDN group	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
	Lower 2 quintiles	Upper 3 quintiles	Lower 2 quintiles	Upper 3 quintiles
Special needs	52%	43%	2.60	2.13
Developmental difficulty, affects learning	30%	20%	1.69	1.20
Developmental difficulty, does not affect learning	7%	3%	0.55	0.35
Further assessment	23%	16%	1.42	1.08
All children, excluding those with known Special Needs	9%	4%	0.61	0.33

Statistically significant movements shaded – green for improvements and orange for deterioration

4.3.3 Geographic splits

Table 32 shows the movement from 2018 to 2021 in the proportion of children vulnerable in three or more domains by State/Territory. Table 33 shows the movement in average number of domains in which children are vulnerable by State/Territory. The deteriorations for the special needs group are again visible, but limited to New South Wales, Victoria and Western Australia. The improvements for the further assessment group appear limited to Queensland.

Table 32 – The proportion of children AHDN developmentally vulnerable in three or more domains by AHDN group and State, 2021 (Cycle 5).

AHDN group	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special needs	55%	44%	55%	48%	52%	57%	46%	50%
Developmental difficulty, affects learning	27%	23%	43%	27%	27%	24%	24%	23%
Developmental difficulty, does not affect learning	5%	5%	12%	5%	5%	5%	5%	3%
Further assessment	20%	17%	25%	21%	20%	20%	19%	14%
All children with AHDN	24%	21%	35%	24%	25%	22%	21%	19%
All children, excluding those with known Special Needs	7%	5%	17%	7%	7%	7%	6%	6%

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 33 – The average number of domains children are AHDN developmentally vulnerable by AHDN group and State, 2021.

AHDN group	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special needs	2.66	2.22	2.79	2.41	2.57	2.69	2.29	2.47
Developmental difficulty, affects learning	1.53	1.34	2.20	1.56	1.56	1.36	1.38	1.36
Developmental difficulty, does not affect learning	0.53	0.41	0.85	0.50	0.47	0.41	0.41	0.35
Further assessment	1.33	1.15	1.59	1.34	1.25	1.28	1.23	0.98
All children with AHDN	1.40	1.21	1.85	1.39	1.39	1.24	1.22	1.11
All children, excluding those with known Special Needs	0.51	0.41	0.96	0.50	0.49	0.47	0.39	0.40

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 34 and Statistically significant movements shaded – green for improvements and orange for deterioration

Table 35 show the same information split by remoteness category. We observe that the overall effects are more prominent in the least remote areas (Major cities of Australia).

Table 34 – The proportion of children AHDN developmentally vulnerable in three or more domains by AHDN group and Remoteness, 2021.

AHDN group	Major Cities of Australia	Inner Regional Australia	Outer Regional Australia	Remote Australia	Very Remote Australia
Special needs	44%	44%	52%	57%	74%
Developmental difficulty, affects learning	23%	26%	29%	33%	50%
Developmental difficulty, does not affect learning	5%	5%	6%	7%	13%
Further assessment	20%	20%	24%	26%	38%
All children, excluding those with known Special Needs	5%	7%	8%	9%	21%

Statistically significant movements shaded – green for improvements and orange for deterioration

Table 35 – The average number of domains children are AHDN developmentally vulnerable by AHDN group and Remoteness, 2021.

AHDN group	Major Cities of Australia	Inner Regional Australia	Outer Regional Australia	Remote Australia	Very Remote Australia
Special needs	2.32	2.29	2.61	2.80	3.19
Developmental difficulty, affects learning	1.36	1.49	1.58	1.81	2.41
Developmental difficulty, does not affect learning	0.41	0.43	0.47	0.55	1.11
Further assessment	1.19	1.17	1.37	1.40	1.76
All children, excluding those with known Special Needs	0.40	0.48	0.54	0.59	1.14

Statistically significant movements shaded – green for improvements and orange for deterioration

Table B.9 and B.10 in Appendix B also show the same information split by both state and grouped remoteness category (Major City and Inner Regional versus Outer Regional, Remote and Very Remote).

4.3.4 Disability and health condition grouping

Table 36 shows the rate of AHDN developmental vulnerability for subgroups of the AHDN cohorts for the 2021 AEDC. Within special needs groups AHDN developmental vulnerability rates are highest for the Intellectual/learning and Neurological/physical subgroups; domain-level differences are clearly visible, as would be expected. For the Developmental Difficulty cohorts, AHDN developmental vulnerability rates are significantly elevated where multiple types of difficulty are flagged.

Table 36 – AHDN developmental vulnerability indicators by AHDN subgroup, 2021

AHDN subgroup		Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally vulnerable in 1+ domains	AHDN developmentally vulnerable in 2+ domains	AHDN developmentally vulnerable in 3+ domains	AHDN developmentally vulnerable in 4+ domains	AHDN developmentally vulnerable in 5 domains	Avg # domains AHDN developmentally vulnerable
Special Needs	Intellectual / learning	51.2%	60.9%	59.1%	42.4%	51.0%	80%	67%	54%	40%	24%	2.6
	Neurological / physical	64.0%	36.5%	26.6%	38.9%	39.7%	71%	50%	40%	30%	16%	2.1
	Sensory	27.8%	21.3%	14.7%	22.3%	33.7%	48%	32%	21%	13%	6%	1.2
	Other - specified	21.3%	18.1%	15.9%	12.9%	18.3%	38%	23%	15%	8%	3%	0.9
	Other	48.7%	39.6%	33.4%	38.9%	48.0%	72%	53%	40%	28%	15%	2.1
DD affects learning	1 type	21.9%	19.2%	17.6%	17.7%	22.3%	48%	28%	14%	7%	2%	1.0
	2 types	36.6%	40.5%	39.2%	29.4%	34.5%	72%	53%	32%	17%	6%	1.8
	3+ types	55.5%	66.9%	66.1%	44.1%	48.1%	89%	76%	58%	38%	20%	2.8
DD does not affect learning	1 type	9.6%	7.4%	7.0%	5.3%	6.5%	22%	9%	4%	2%	0%	0.4
	2 types	18.1%	16.7%	20.1%	8.9%	10.0%	41%	20%	9%	3%	1%	0.7
	3+ types	27.4%	36.9%	40.7%	14.7%	17.5%	62%	38%	22%	11%	5%	1.4
Requires further assessment		26.1%	26.8%	23.8%	22.1%	22.1%	57%	34%	19%	9%	3%	1.2
All children, excluding those with known Special Needs		9.8%	9.6%	8.4%	7.3%	8.3%	22%	11%	8%	4%	2%	0.4

Table 37 shows the change in rates of AHDN developmental vulnerability indicators by AHDN subgroup between Cycle 4 and Cycle 5. We observe:

- Significant deterioration for the Intellectual/ Learning subgroups of children with special needs across all domains.
- Significant Improvements in some of the indicators for the Neurological/ physical and Sensory subgroups of children with special needs.

The requires further assessment group does not have a natural further breakdown of AHDN type so these results are unchanged from above (Table 25).

Table 37 – Change in AHDN developmental vulnerability indicators by AHDN subgroup, 2018 to 2021. Statistically significant changes from 2018 are shaded.

AHDN subgroup		Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally vulnerable in 1+ domains	AHDN developmentally vulnerable in 2+ domains	AHDN developmentally vulnerable in 3+ domains	AHDN developmentally vulnerable in 4+ domains	AHDN developmentally vulnerable in 5 domains	Avg # domains AHDN developmentally vulnerable
Special Needs	Intellectual / learning	2.2%	2.1%	1.6%	3.0%	2.3%	1.3%	1.9%	2.3%	2.8%	2.8%	0.11
	Neurological / physical	-6.9%	-4.9%	-3.3%	-4.1%	-1.8%	-7.1%	-3.8%	-4.4%	-2.7%	-2.8%	-0.20
	Sensory	-0.1%	-3.1%	-4.9%	1.9%	1.2%	-1.6%	0.5%	0.2%	-2.0%	-1.9%	-0.05
	Other - specified	-2.8%	-1.7%	-1.4%	-1.2%	-0.6%	-1.2%	-2.0%	-0.7%	-2.3%	-1.8%	-0.08
	Other	-0.4%	-4.7%	-3.5%	-2.4%	-3.6%	-2.1%	-3.1%	-3.5%	-3.2%	-2.5%	-0.15
DD affects learning	1 type	-1.0%	-1.0%	-0.9%	1.1%	-0.3%	-0.3%	0.0%	-0.8%	-0.7%	-0.3%	-0.02
	2 types	-1.1%	-0.7%	0.0%	-0.4%	-1.2%	-0.1%	0.0%	-1.1%	-1.4%	-0.8%	-0.03
	3+ types	-0.2%	-0.5%	0.0%	-0.5%	-2.6%	0.1%	-1.1%	-0.3%	-1.5%	-1.0%	-0.04
DD does not affect learning	1 type	-0.1%	-0.7%	-0.6%	0.5%	0.1%	-0.5%	-0.4%	0.0%	0.1%	0.0%	-0.01
	2 types	0.2%	-1.6%	-0.5%	1.2%	-0.4%	0.0%	-0.1%	-0.8%	-0.4%	0.0%	-0.01
	3+ types	2.1%	1.8%	1.8%	0.3%	1.2%	4.2%	1.2%	-0.2%	0.7%	1.4%	0.07
Requires further assessment		-1.5%	-1.3%	-0.9%	-2.8%	-1.4%	-2.1%	-2.7%	-1.7%	-1.1%	-0.3%	-0.08
All children, excluding those with known Special Needs		0.2%	-0.1%	0.0%	0.7%	0.1%	0.4%	0.3%	0.2%	0.1%	0.0%	0.01

Statistically significant movements shaded – green for improvements and orange for deterioration

4.3.5 Discussion of multi-way splits

Often splits will be required across multiple dimensions; for example disability type and state. Ultimately much is possible and reporting is a balance between the time required to set up the different views, the need to follow suppression guidelines and the desire to have as much flexibility as possible.

Table 32 shows the **change** in key AHDN developmental vulnerability indicators by AHDN subgroup and State between 2018 and 2021. There are large movements and while some of these are passing the confidence interval test significance test that is not unexpected for random variation across close to 100 results.

Table 38 – Change in key AHDN developmental vulnerability indicators by AHDN subgroup and State, 2018 to 2021

AHDN subgroup		AHDN developmentally vulnerable in 3+ domains								Avg. # domains AHDN developmentally vulnerable							
		ACT	NSW	NT	QLD	SA	TAS	VIC	WA	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special Needs	Intellectual/learning	-2.8%	2.3%	4.6%	1.6%	-4.6%	3.4%	3.3%	4.0%	-0.08	0.13	0.28	0.08	-0.13	0.05	0.11	0.20
	Neurological/physical	*	-10.8%	*	-9.7%	*	*	7.6%	-4.0%	*	-0.44	*	-0.37	-0.37	*	0.31	-0.39
	Sensory	*	-4.1%	*	0.7%	*	*	10.3%	*	*	-0.30	*	0.08	0.17	*	0.26	-0.26
	Other-specified	*	0.4%	*	-1.0%	*	*	-0.7%	*	-0.03	-0.01	*	-0.09	-0.19	-0.27	-0.11	-0.06
	Other	*	-1.0%	-2.8%	-6.0%	-0.3%	*	-1.9%	-2.0%	-0.10	-0.06	0.14	-0.20	-0.21	-0.81	-0.05	-0.16
DD affects learning	1type	0.4%	0.1%	-4.9%	-2.9%	-0.3%	-2.9%	0.4%	-1.2%	0.08	0.02	-0.30	-0.11	-0.01	-0.13	0.02	-0.01
	2types	-6.8%	-0.6%	-4.7%	-4.7%	-0.5%	6.5%	2.8%	-3.1%	-0.18	0.02	-0.15	-0.14	-0.04	0.22	0.05	-0.13
	3+types	-0.1%	1.6%	-13.1%	-3.8%	1.2%	5.4%	-0.8%	2.1%	-0.19	-0.02	-0.22	-0.17	0.02	0.03	0.02	-0.00
DD does not affect learning	1type	-0.2%	0.2%	-3.5%	-0.5%	0.4%	0.4%	0.1%	0.2%	0.02	0.00	-0.18	-0.03	0.02	-0.02	-0.00	-0.01
	2types	*	-0.3%	*	-2.3%	-5.5%	*	1.8%	-2.1%	0.04	-0.03	-0.29	-0.11	-0.03	0.24	0.07	-0.01
	3+types	*	-0.7%	*	3.0%	6.2%	*	-2.3%	-4.5%	*	0.08	0.79	0.24	0.19	0.59	-0.10	-0.10
Requires further assessment		-1.9%	-0.8%	-9.9%	-3.5%	-1.9%	2.1%	0.4%	-1.8%	-0.07	-0.02	-0.24	-0.17	-0.07	0.03	-0.00	-0.09
All children, excluding those with known Special Needs		0.0%	0.5%	2.0%	-0.6%	0.0%	1.3%	0.3%	0.4%	0.03	0.03	0.09	-0.03	-0.00	0.05	0.01	0.02

Notes: * Suppression of cells that contain less than 15 children for AEDC indicators

Statistically significant movements shaded – green for improvements and orange for deterioration

4.4 Re-weighting to estimate the impact of compositional mix changes

One aspect of change over time is adjusting for what we term ‘compositional effects’. Within AHDN groups, different cohorts have significantly different outcomes - for example the condition groups of Table 36. If the composition of a group changes (e.g. a higher fraction of children with an autism diagnosis) then we would expect any index to change, even if the index levels of individual cohorts remain the same. Once composition is allowed for, the residual change we label the ‘experience’, which is the more meaningful movement.

We have applied a re-weighting to estimate the change in results due to change in compositional mix. This is based on the propensity model approach discussed in Section 3.6 (*Compositional effects*). This means in moving from 2018 to 2021 we compare the following:

- 2018. The unadjusted results for the previous Cycle.
- 2021 reweighted. The model weights have been applied to the Cycle 5 scores to make these cohorts ‘look’ more similar in aggregate to the Cycle 4 cohorts.
- 2021. The unadjusted results shown in the previous subsection.

This allows us to estimate the:

- Compositional mix change (= 2021 minus 2021 reweighted). The estimated change due to compositional mix changes (e.g. more or less children with autism in the special needs group, etc.).
- Experience change (= 2021 reweighted minus 2018). This is the estimated change as if holding the composition constant between Cycles; the change due to non-compositional effects. This shows the change from the 2021 results to the 2018 results **after** the 2021 results have been reweighted to be more similar in composition to 2018.

Table 39 and Table 40 show the detailed results of this decomposition over 2015, 2018 and 2021 by AHDN group and subgroup. From Table 39 and Table 40 we observe that the estimated compositional and non-compositional impacts are of similar sizes. The compositional changes are often a large part of the changes in the vulnerability indicators. For the special needs group, in aggregate, the deterioration between Cycles 4 and 5 is entirely compositional.

Table 39 – Change in the average number of domains AHDN developmentally vulnerable by AHDN group and breakdown into compositional mix change, 2015 through to 2021

AHDN group	2015 AEDC average	Compositional change, 2015 → 2018	Experience change, 2015 → 2018	2018 AEDC average	Compositional change, 2018 → 2021	Experience change, 2018 → 2021	2021 AEDC average
Special needs	2.24	+0.04	-0.02	2.26	+0.09	+0.00	2.35
Developmental difficulty, affects learning	1.41	+0.05	-0.04	1.43	+0.04	-0.03	1.43
Developmental difficulty, does not affect learning	0.48	-0.02	-0.03	0.43	+0.01	-0.01	0.43
Further assessment	1.29	+0.01	-0.01	1.29	-0.01	-0.07	1.21
All children with AHDN	1.22	+0.04	-0.03	1.23	+0.06	-0.03	1.26
All children, excluding those with known Special Needs	0.43	+0.03	-0.03	0.43	+0.01	+0.00	0.44

Table 40 – Change in the average number of domains AHDN developmentally vulnerable by AHDN subgroup and breakdown into compositional mix change, 2015 through to 2021

AHDN subgroup		2015 AEDC average	Compositional change, 2015→2018	Experience change, 2015→2018	2018 AEDC average	Compositional change, 2018→2021	Experience change, 2018→2021	2021 AEDC average
Special Needs	Intellectual / learning	2.61	-0.04	-0.04	2.53	+0.03	+0.08	2.64
	Neurological / physical	2.45	-0.01	-0.18	2.25	+0.05	-0.25	2.05
	Sensory	1.34	+0.04	-0.13	1.25	+0.02	-0.07	1.20
	Other – specified	0.84	+0.02	+0.09	0.95	+0.02	-0.10	0.87
	Other	2.18	+0.01	+0.04	2.23	-0.03	-0.11	2.08
DD affects learning	1 type	1.02	+0.01	-0.02	1.01	+0.00	-0.02	0.99
	2 types	1.83	+0.01	-0.00	1.84	+0.01	-0.04	1.80
	3+ types	2.70	+0.01	+0.13	2.85	+0.01	-0.05	2.81
DD does not affect learning	1 type	0.41	-0.01	-0.03	0.37	+0.00	-0.01	0.36
	2 types	0.79	-0.02	-0.02	0.75	+0.03	-0.04	0.74
	3+ types	1.16	-0.04	+0.18	1.30	+0.09	-0.02	1.37
Requires further assessment		1.29	+0.01	-0.01	1.29	-0.01	-0.07	1.21
All children, excluding those with known Special Needs		0.43	+0.03	-0.03	0.43	+0.01	-0.00	0.44

4.5 Presenting results to end users

4.5.1 Decomposing changes in raw metrics

The reweighting approach implemented in Section 4.4 allows changes in raw outcomes for each group of children to be decomposed into:

1. Changes in the outcome metric due to a change in the underlying mix of children with disability
2. Changes in the outcome metric, after controlling for changes in mix.

This decomposition allows reporting of simple and explainable raw metrics, while retaining the ability to identify situations where results are influenced by a change in the composition of the cohort.

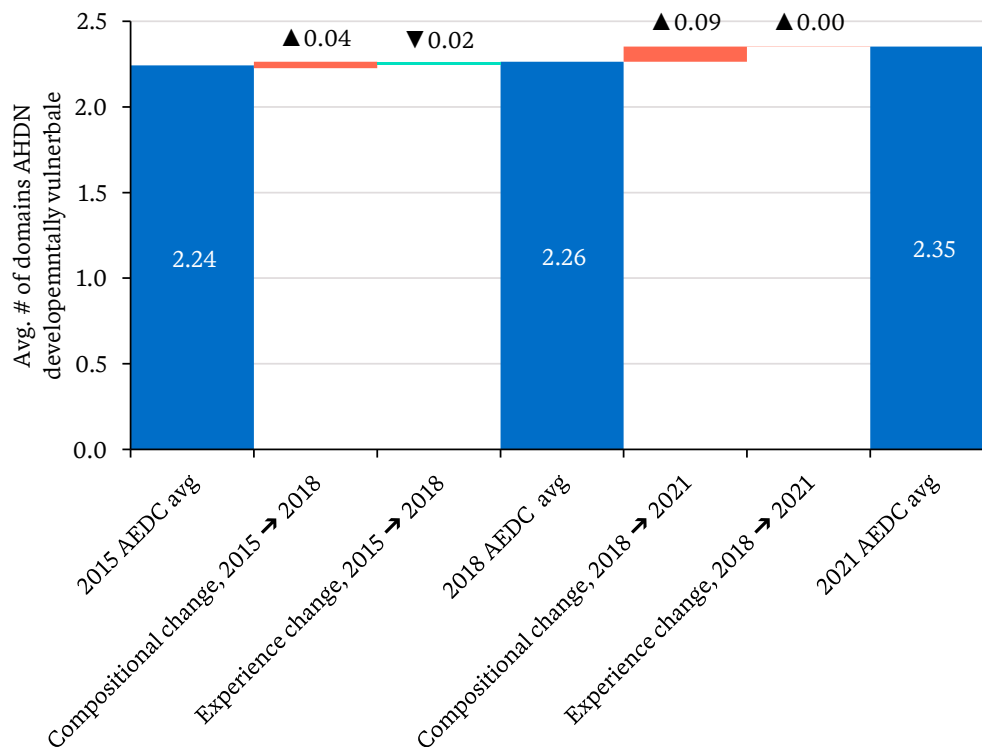
Explanation of changes can be further supported by summaries of the number of children and average scores in key cohorts contributing to the overall change figure.

We provide an example of how year on year changes could be illustrated for reporting below. The example focusses on the special needs cohort of children, and presents the change average number of AHDN developmentally vulnerable domains between collection Cycles 3 through 5.

Figure 11 provides an example of how year on year changes in metrics could be illustrated for reporting.

Table 41 provides an example of the types of supplementary summary data that could help experienced users drill into results.

Figure 11 – Decomposition of change in average number of domains AHDN developmentally vulnerable across 2015 through 2021 (Cycles 3, 4 and 5), for children with special needs



The raw change between 2018 and 2021 was an **increase** of 0.09 in the average number of domains of AHDN developmental vulnerability.

However, Figure 11 shows that between 2018 and 2021:

- We would expect the average number of domains of AHDN developmental vulnerability to have increased by 0.09, due to changes in the composition of children.
- After controlling for this compositional change, there is no change observed for children with special needs in the average number of domains of AHDN developmental vulnerability.

In this example, controlling for the change in composition explains the deterioration observed for the group. Between 2015 and 2018 change in composition fully explained the deterioration observed, and the experience change was actually an improvement of +0.02.

Summary tables like the one shown provide an experienced user with further tools to help to understand the effects of compositional change. This is in line with feedback from stakeholders, several of whom noted that it would be useful to have access to raw compositional data, to support their analysis.

While Table 41 showed a summary split by special needs group, summaries could also be split by demographic or geographic variables. Table 41 shows that between 2018 and 2021:

- The percentage of children in the intellectual/learning group increased from 65.0% to 71.1%. This is the sub-group with the highest average number of domains AHDN developmentally vulnerable.
- The percentage of children in the Other group decreased from 16.2% to 13.3%. This is the sub-group has lower than average number of domains AHDN developmentally vulnerable, relative to other children with special needs.

Table 41 – Change in number of children and average # number of domains AHDN developmentally vulnerable by special needs subgroup, 2018 to 2021

AHDN group		2018			2021			Change, 2018 to 2021		
		Number of children	% of total children in Special needs group	Average # domains AHDN developmentally vulnerable	Number of children	% of total children in Special needs group	Average # domains AHDN developmentally vulnerable	Change in % of total children in Special needs group	Change in average # domains AHDN developmentally vulnerable	Change after allowing for compositional effects
Special Needs	Intellectual/learning	9,094	65.0%	2.53	11,227	71.1%	2.64	6.1%	+0.11	+0.08
	Neurological/physical	734	5.2%	2.25	717	4.5%	2.05	-0.7%	-0.20	-0.25
	Sensory	373	2.7%	1.25	381	2.4%	1.20	-0.3%	-0.05	-0.07
	Other-specified	1,517	10.8%	0.95	1,369	8.7%	0.87	-2.2%	-0.08	-0.10
	Other	2,272	16.2%	2.23	2,103	13.3%	2.08	-2.9%	-0.15	-0.11
Total		13,990	100.0%	2.26	15,797	100%	2.35		+0.09	+0.00

These changes would be expected to result in an increased average number of domains AHDN developmentally vulnerable, due to compositional changes alone. This partially explains the increase due to composition changes seen in Figure 11.

In practice, there are many reasons why the composition of children with special needs might change between cycles. For example, there could be genuine changes in rates of occurrence or diagnosis of different special needs types. Alternatively, reporting practices may change such that fewer children are specified as Other. While the analysis alone cannot unpick these effects, it can give end users the tools to more easily apply their expertise and domain knowledge to understand underlying trends.

4.5.2 Communicating results to stakeholders

Section 4.5.1 provide an example of illustrating between cycle changes in a single metric for the special needs cohort of children.

As identified in Section 3.7, while you may choose a small number of headline indicators, in full there could be as many as 11 indicators across 5 AHDN groups. Further to this, stakeholders expressed their preference for more granular results, split by key geographic or demographic variables.

This large number of potential metric and splits lends itself well to an interactive visualisation of the indicators along with supporting summary information.

Such a visualisation would allow users to drill into segment level data and select metrics of interest. Measures of statistical significance could be dynamically constructed at the specific level of granularity selected by the end user.

4.6 Strength-based reporting using the average number of domains AHDN developmentally on track

When introduced AEDC national reporting focused on identifying and reporting rates of developmental vulnerability. Since then, there have been shifts towards including reporting focused on developmental strengths. The 2021 AEDC has seen the introduction of the new summary indicator to AEDC national reporting – ‘On track on five domains’. Similarly, the indicators discussed in this report can be recast to focus on developmental strengths.

The two most obvious types of indicators for on track reporting could ‘proportion of children AHDN developmentally on track in N domains’ and ‘average number of domains AHDN developmentally on track’. We believe that the second option is most practical for reporting on children with AHDN, given limitations with the first:

- The ‘On track on five domains’ is used for other AEDC reporting, but leads to low rates for some AHDN subgroups. Children with special needs are on track on all 5 domains in 12% of cases, with the rate below 10% for many diagnosis groups. Using this metric would risk breaching suppression thresholds under disclosure guidelines. High rates of suppression would make the measure less meaningful.
- ‘On track on four domains’ is more ad hoc and is also quite sensitive to small changes in patterns across domains (and the definitions of individual domains). For instance, children with an ADHD diagnosis (but not autism) have a similar average number of domains AHDN developmentally on track to the broader special needs group, but only 15% of them are AHDN developmentally on track on 4 domains, compared to 20% of the broader special needs group.

Therefore in this section we provide the compositional breakdown of change as in Section 4.4, but focussing on the **average number of domains AHDN developmentally on track**.

Figure 12, Table 42, Table 43 and Table 44 show the detailed results of this decomposition over 2015, 2018 and 2021 AEDCs by AHDN group and subgroup. These are equivalent to Figure 11, Table 41, Table 39 and Table 40 respectively but for the average number of domains AHDN developmentally on track.

The observed changes between cycles for the average number of domains AHDN developmentally on track and AHDN developmentally vulnerable tell very similar stories. For example, between 2018 and 2021, the special needs group saw a change in the average number of domains:

- AHDN developmentally at risk of +0.09 which was largely attributed to compositional change
- AHDN developmentally on track -0.08 which was largely attributed to compositional change.

This suggests a strong correlation between the average number of domains AHDN developmentally on track and AHDN developmentally at risk. This is natural, and we would only expect to see differences if there were significant patterns (growth or shrinkage) in the intermediate ‘AHDN developmentally at risk’ group.

Figure 12 – Decomposition of change in average number of domains AHDN developmentally on track across 2015, 2018 and 2021 AEDCs, for children with special needs

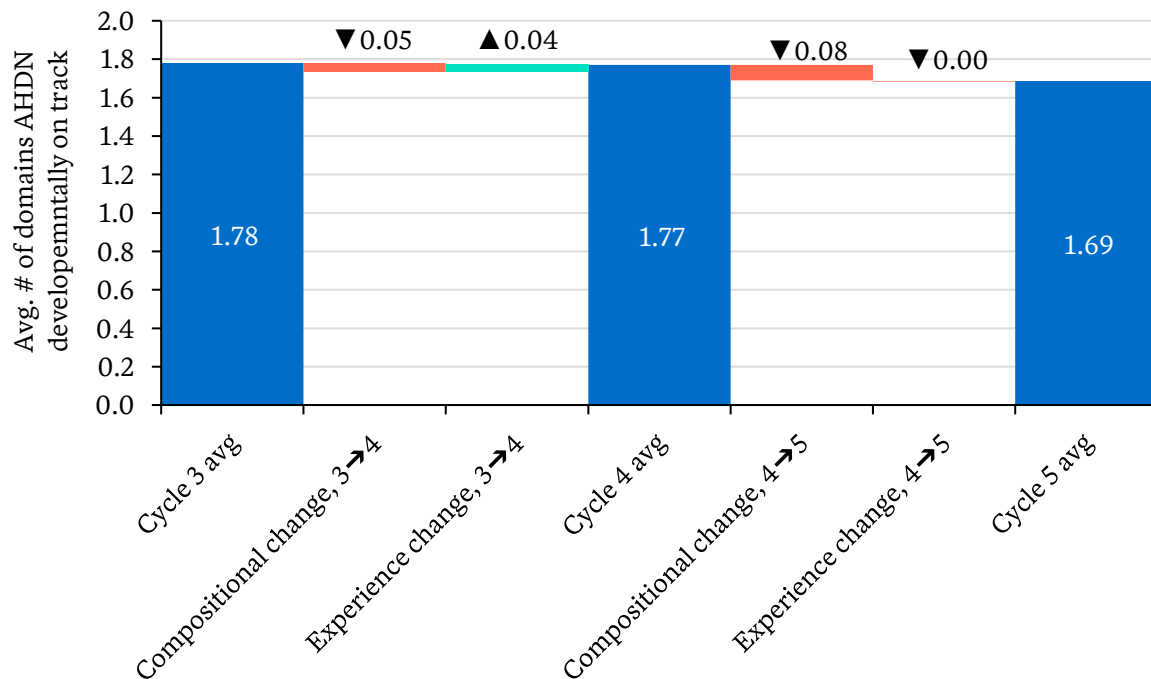


Table 42 – Change in number of children and average # number of domains AHDN developmentally on track by special needs subgroup, 2018 to 2021

AHDN group		2018			2021			Change, 2018 to 2021		
		Number of children	% of total children in Special needs group	Average # domains AHDN developmentally on track	Number of children	% of total children in Special needs group	Average # domains AHDN developmentally on track	Change in % of total children in Special needs group	Change in average # domains AHDN developmentally on track	Change after allowing for compositional effects
Special Needs	Intellectual/learning	9,094	65.0%	1.47	11,227	71.1%	1.39	6.1%	-0.08	-0.06
	Neurological/physical	734	5.2%	1.83	717	4.5%	2.04	-0.7%	+0.21	+0.26
	Sensory	373	2.7%	2.85	381	2.4%	2.86	-0.3%	+0.00	+0.02
	Other-specified	1,517	10.8%	3.29	1,369	8.7%	3.30	-2.2%	+0.01	+0.02
	Other	2,272	16.2%	1.75	2,103	13.3%	1.88	-2.9%	+0.13	+0.10
Total		13,990	100.0%	1.77	15,797	100.0%	1.69		-0.08	-0.00

Table 43 – Change in the average number of domains AHDN developmentally on track by AHDN group and breakdown into compositional mix change, 2015 through to 2021

AHDN group	2015 AEDC, average # domains AHDN developmentally on track	Compositional change, 2015→2018	Experience change, 2015→2018	2018 AEDC, average # domains AHDN developmentally on track	Compositional change, 2018→2021	Experience change, 2018→2021	2021 AEDC, average # domains AHDN developmentally on track
Special needs	1.78	-0.05	+0.04	1.77	-0.08	-0.00	1.69
Developmental difficulty, affects learning	2.49	-0.03	+0.05	2.51	-0.04	+0.02	2.49
Developmental difficulty, does not affect learning	3.67	-0.02	+0.13	3.78	-0.02	-0.00	3.75
Further assessment	2.46	+0.01	+0.03	2.50	+0.02	+0.06	2.58
All children with AHDN	2.77	-0.06	+0.08	2.79	-0.07	+0.01	2.73
All children, excluding those with known Special Needs	3.91	+0.00	+0.03	3.94	-0.00	-0.02	3.92

Table 44 – Change in the average number of domains AHDN developmentally on track by AHDN subgroup and breakdown into compositional mix change, 2015 through to 2021

AHDN subgroup		2015 AEDC, average # domains AHDN developmentally on track	Compositional change, 2015→2018	Experience change, 2015→2018	2018 AEDC, average # domains AHDN developmentally on track	Compositional change, 2018→2021	Experience change, 2018→2021	2021 AEDC, average # domains AHDN developmentally on track
Special Needs	Intellectual / learning	1.37	+0.00	+0.10	1.47	-0.02	-0.06	1.39
	Neurological / physical	1.66	-0.00	+0.17	1.83	-0.05	+0.26	2.04
	Sensory	2.72	-0.02	+0.16	2.85	-0.02	+0.02	2.86
	Other – specified	3.37	+0.04	-0.11	3.29	-0.01	+0.02	3.30
	Other	1.83	+0.03	-0.11	1.75	+0.04	+0.10	1.88
DD affects learning	1 type	2.92	-0.00	+0.03	2.94	+0.00	+0.01	2.96
	2 types	1.97	-0.00	+0.02	1.98	-0.00	+0.02	2.00
	3+ types	1.25	-0.01	-0.07	1.17	-0.00	+0.02	1.19
DD does not affect learning	1 type	3.79	-0.01	+0.10	3.89	-0.00	-0.01	3.88
	2 types	3.10	-0.04	+0.14	3.20	-0.06	+0.02	3.16
	3+ types	2.61	-0.09	-0.03	2.49	-0.11	+0.05	2.42
Requires further assessment		2.46	+0.01	+0.03	2.50	+0.02	+0.06	2.58
All children, excluding those with known Special Needs		3.91	+0.00	+0.03	3.94	-0.00	-0.02	3.92

5 Conclusions

5.1 Overall suitability of the AEDC for tracking development for children with AHDN

Overall, we believe the AEDC represents a valuable source for tracking development for children with disability or AHDNs. Its key advantages are:

- **Comprehensiveness** – since number of children with disability or other AHDNs is small in many communities, a census approach is important in giving a complete picture. Surveys will be subject to a much higher degree of statistical variability. The AEDC is more likely to detect unmet need in the support of AHDNs compared to other sources such as the NCCD.
- **Availability** – The AEDC is an existing and well-known resource that does not require additional time and expense to manage, compared to a new disability-focused survey.
- **Quality** – We have found the results for children with special needs to be of high quality, commensurate with the broader AEDC.
- **Detail** – Responses to a large number of detailed assessment, diagnosis and demographic questions provides a rich picture of development.

These advantages make it attractive relative to alternative data sources. They also mean results are likely to be robust, and so appropriate for use in reporting such as the Outcomes Framework for Australia's Disability Strategy.

5.2 Recommended index and overall historical findings

In Section 3 we recommended a series of design decisions for an AEDC-based index:

- Results should be made available for both special needs and broader AHDN groups. A single headline indicator could focus on children with special needs.
- Retain a broader definition of disability and health conditions, as recorded in the AEDC, with some subdivisions available for interested users.
- Use the current weights and thresholds for domain ratings, to ensure comparability with broader AEDC results.
- Track both absolute (results for AHDN groups over time) and relative (gap to broader AEDC results) movements.
- Calculate compositional change over time, to help understand changes in the index. Also monitor numbers in each group so large shifts can be observed. Use propensity weighting to measure this compositional change.
- Group children into mutually exclusive subcategories to enable more detailed reporting while retaining intuitive aggregation (e.g. for children with special needs define diagnosis subcategories).
- Enable results to be split across key variables such as diagnosis, region, socioeconomic status, language background, Indigenous identification and gender. Appropriately warn about statistical uncertainty for small cohort sizes.

In Section 4 we have focused on three alternative indices that satisfy the design recommendations:

1. The proportion of children with AHDN which are developmentally vulnerable on three or more domains
2. The average number of domains on which children with AHDN are developmentally vulnerable
3. The average number of domains on which children with AHDN are developmentally on track.

All measures are robust and can be used to show meaningful changes in outcome rates for a variety of subgroups of children with AHDN.

Of the three options, the third option listed is most consistent with strength-based reporting and the current wording of the Outcomes Framework for Australia's Disability Strategy. Section 4.6 gives the detail of the results, but we summarise our historical findings here.

The average number of domains on which children with AHDN are developmentally on track is our preferred index selection. We also recommend reporting on all subgroups of children with AHDN, even if headline indicators focus on those with special needs.

Key results in the historical data are:

- Tracking results since 2009 (Cycle 1) is difficult due to changes in how developmental difficulties are recorded. Results are consistent (and meaningful) since 2015 (Cycle 3).
- Children with Special Needs are those with a medical diagnosis, generally a disability. In 2021 they were AHDN developmentally on track on an average of 1.69 domains, compared to 3.92 for children excluding those with special needs (the group generally included in AEDC reporting).
 - Since 2015, the average has fallen 0.09 from 1.78. We believe that the 'experience' component is actually slightly positive (+0.04) over this time - the decrease is driven by compositional factors such as a higher number of children with an intellectual or learning condition.
- The other AHDN groups have similarly seen positive improvements in the experience component over time:
 - The 'Developmental difficulty, affects learning' group has remained steady with an average of 2.49 domains AHDN developmentally on track since 2015. Improvements related to experience have been offset by compositional effects.
 - The average number of domains on which the 'Developmental difficulty, does not affect learning' group is AHDN developmentally on track on has increased from 3.67 to 3.75 over the six years to 2021. This is driven by experience changes.
 - The average number of domains on which the 'Further assessment' group is AHDN developmentally on track on increased from 2.46 to 2.58 over the six years to 2021. This is driven by experience changes.
 - Among all children with AHDN, the average number of domains on which the group is AHDN developmentally on track decreased from 2.77 to 2.73 over the six years to 2021. Compositional factors dominated the decrease (i.e. the improvements for the subgroups are masked by an increase in the proportion of children with special needs).
- These results have occurred in the context of increasing numbers of children identified with AHDNs. The combined group has increased in size by 9% in the six years to 2021 (from 91,156 children to 99,647) and the group with special needs has increased by 13% (from 13,998 children to 15,797). By comparison, the main AEDC reporting cohort (children without special needs) has remained stable in size.
- The measure is relatively robust in detecting changes in moderately sized groups (e.g. a 0.04 point movement is significant for a group of 10,000 students).

5.3 Limitations to the AEDC for tracking development for children with AHDN

Any potential index will have limitations or nuances. We highlight a few important ones in the remainder of this section.

5.3.1 Appropriateness of the questionnaire for children with AHDN

The questionnaire underlying the AEDC and used to form the indicators of vulnerability is the AvEDI. This was not developed for children with AHDN, rather for the broader population of all children. The results should be interpreted with care for children with AHDN.

Specifically, the AvEDI has been validated and shown to predict the later literacy, numeracy and other cognitive and behavioural outcomes of children without special needs¹³. We are not aware of equivalent work focusing on children with special needs or the broader group of children with AHDN.

Validation of the AvEDI for different types of disability and health conditions is a worthwhile exercise to better establish the robustness of the indicator. Several questions are ambiguous for some conditions. This relates to comment in our previous report of the potential to do further analysis, specifically more detailed question-level analysis. For instance:

- ‘How would you rate this child’s ability to climb stairs’ will be inappropriate for certain types of physical disability
- Some communication questions (e.g. *How would you rate this child’s ability to use language effectively in English*) will not be appropriate for children speech impairments
- Some reading questions (e.g. ‘Would you say this child is able to participate in group reading activities’) would be ambiguous for children with vision impairments. If teachers interpret the question broadly (e.g. children with blindness reading braille) then responses could be meaningful.
- Down syndrome specifically sees some very high rates of negative answers to some questions (e.g. ‘Would you say this child is showing awareness of rhyming words’ is answered ‘No’ more than 90% of the time for children with a Down syndrome diagnosis). For this cohort questions could potentially be better targeted.

That said, our overall impressions are favourable; the questions generally have a functional emphasis that are appropriate in a wide range of circumstances. Teachers can select ‘not applicable’ for questions and valid overall scores are still calculated¹⁴. There is a reasonable spread of responses for most disability types so they represent a meaningful checkpoint.

There will also be variation between teachers in their judgement of whether a question is applicable, particularly for children with special needs. Further consideration could be given as to whether any additional resources or guiding materials are required to support teachers to come to this determination and enhance consistency in judgement (this could take the form of case studies).

5.3.2 Variability in the severity of disability and health conditions

The AEDC does not attempt to assess the severity of AHDNs, except to ask whether it impedes learning and to the extent that severity is reflected in the developmental questions themselves.

This represents a challenge, since the variation of functional ability within a disability type can be very large. For instance, the range of abilities on the autism spectrum is well documented; but this range is true for many (perhaps even most) other AHDNs too. While viewing results for broad disability types will be of interest, there are limits to interpretation without understanding this range.

¹³ The predictive validity of the AEDC: Predicting later cognitive and behavioural outcomes, Available from:

<https://www.aedc.gov.au/resources/detail/the-predictive-validity-of-the-aedc-predicting-later-cognitive-and-behavioural-outcomes>

¹⁴ Provided a sufficient number of questions within the domain have responses other than ‘not applicable’

From the perspective of the index, one risk is compositional change in the severity of disabilities and health conditions. This could cause drift in the index related to composition, rather than actual experience changes on a like-for-like basis.

5.3.3 Changing rates of recognition and diagnosis of disability

The AEDC and other disability services have seen a marked increase over time in the prevalence of diagnosed disability, particularly around global developmental delay, autism and intellectual disability. In many cases this is a welcome development as children are more likely to get early supports that will improve development and learning. From the perspective of an index, this shifting denominator can make some interpretations difficult. An increase in numbers may be accompanied by a decrease in average severity, so that measured improvements can be partly compositional. This means that even upon separating compositional and experience components, some care is needed in interpreting changes over time if there are large changes in AHDN group numbers.

The main protection is to look at results for different AHDN cohorts, as well as tracking both the prevalence (numbers) and the rate of AHDN developmental vulnerability.

Rates of reported disabilities may also be influenced by funding implications and diagnostic processes, both of which can vary across Australia (e.g. different States/Territories, or regional/metro locations). This could potentially lead to less robust comparisons regarding specific disability rates in the reporting. To protect against this:

- We have proposed including reporting on broader groups of children, not just those with an existing diagnosis
- Care should be taken in interpreting making regional comparisons where local context and funding rates might contribute to some of the observed differences.

Early results of the index should be monitored, to try and identify any systemic biases or inconsistencies in interpretation or application of the instrument across States/Territories to be identified and addressed.

A related limitation is that there is no straightforward way to reconcile disability numbers and types to other sources. Alignment of disability definitions is challenging, particularly in early childhood where there can be differing speeds of diagnosis.

5.3.4 Response bias

The AEDC has a high response rate, with 95.7% of schools participating and 95.5% of children in the 2021 AEDC (Cycle 5)¹⁵. The national school participation rate is very high for Government schools (99.4% in 2018 – we have not seen 2021 rates at the time of writing) followed by Catholic schools (97.2%) with fewer independent schools participating (81.5%)¹⁶. Children who are home schooled are not included in the AEDC. ‘Special schools’ that cater 100 per cent to special needs children are included in the AEDC. For The 2015 census (Cycle 3) it was estimated 90.5% of special schools participated.¹⁷ The following groups are estimated to be over-represented among non-respondents (so under-represented in the AEDC results)¹⁸:

- Aboriginal and/or Torres Strait Islander children
- Children with a language background other than English
- Children born overseas

¹⁵ AEDC 2021 National Report

¹⁶ 2018 AEDC Data Collection Technical Report, Social Research Centre

¹⁷ *ibid*

¹⁸ *ibid*

- Children whose first parent did not complete Year 12
- Younger children in their first year of school.

These high overall response rates mean that the aggregated results are unlikely to be significantly impacted by these response biases and are reflective of the population. However, when considering subgroups such as children with special needs (less than 5% of all responses) the results could be more skewed. The Australian Bureau of Statistics (ABS) reports indicate that in 2018¹⁹:

- The prevalence of Autism was 0.7% for children aged 0-4 and 3.1% for children aged 5 to 9. This is consistent with the AEDC results indicating 2% of children with Autism in their first year of school (largely aged 5 or 6); we would expect the AEDC estimate to sit between the two rates as diagnosis rates accumulate with age.
- The prevalence of disability was 4.8% for males and 2.7% for females aged 0-4, 11.9% for males and 7.1% for females aged 5-14. While definitions of disability differ, the relativities between males and females are broadly consistent with those observed in the AEDC for children with AHDN.

This indicates the results should be a reasonable representation of children with AHDN.

We are restricted to reporting only on children that participate in the AEDC, and only the domains in which they participate. Some children with special needs are exempt from participating in the AEDC. Those with exemption may be more likely to be developmentally vulnerable across domains, affecting average scores. However, we note both that this should be a relatively fixed effect over time and overall AEDC coverage is reasonably high.

5.3.5 Use of microdata

The use of the microdata for this report is subject to the AEDC Data Guidelines²⁰.

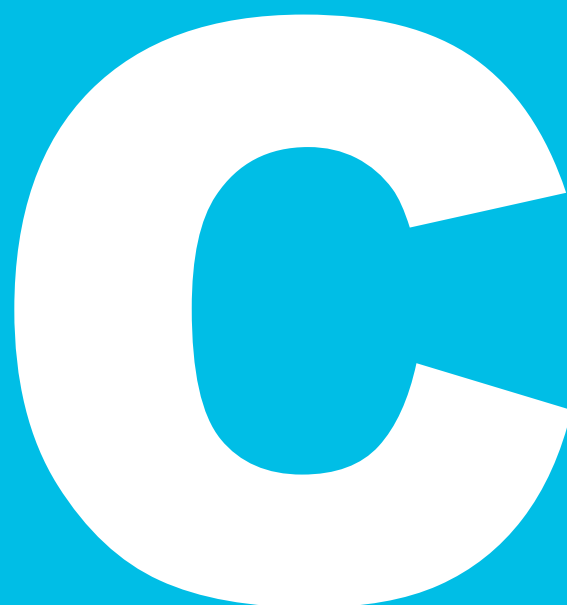
5.4 Future work

If an index is to be pursued, the next steps involve:

- **Finalising the selection on indicator.** This will likely involve endorsing the design decisions of Section 3 and selection of the specific indicator (e.g. The average number of domains on which children with AHDN are developmentally on track).
- **Adopting a reporting approach.** A headline indicator will need to be selected for the Outcomes Framework – this could be the index just for the special needs group, as it is likely to align best with other parts of the disability strategy. For more general reporting, there are quite a few dimensions to the index – different AHDN subgroups, condition types, demographic features, locations and domains. An interactive tool that enables people to explore these different dimensions. It would also be consistent with stakeholders' desire to access some of the underlying detail.
- **Formal knowledge transfer of the compositional adjustment process.** We use a reweighting process to understand compositional changes between censuses. We describe the setup in the Appendices, but there is related code that could be provided, with explanations. This would be needed for performing the reweighting for future censuses.

¹⁹ ABS Disability, Ageing and Carers, Australia 2019. Available from: <https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/latest-release#autism-in-australia>

²⁰ <https://www.aedc.gov.au/researchers/resources-for-data-users/aedc-data-guidelines>



Appendices

Appendix A Further figure and tables

A.1 Headline indicators using AHDN developmentally on track assessments

Table A.1 – Indicators of being AHDN developmentally on track by AHDN groups, 2021

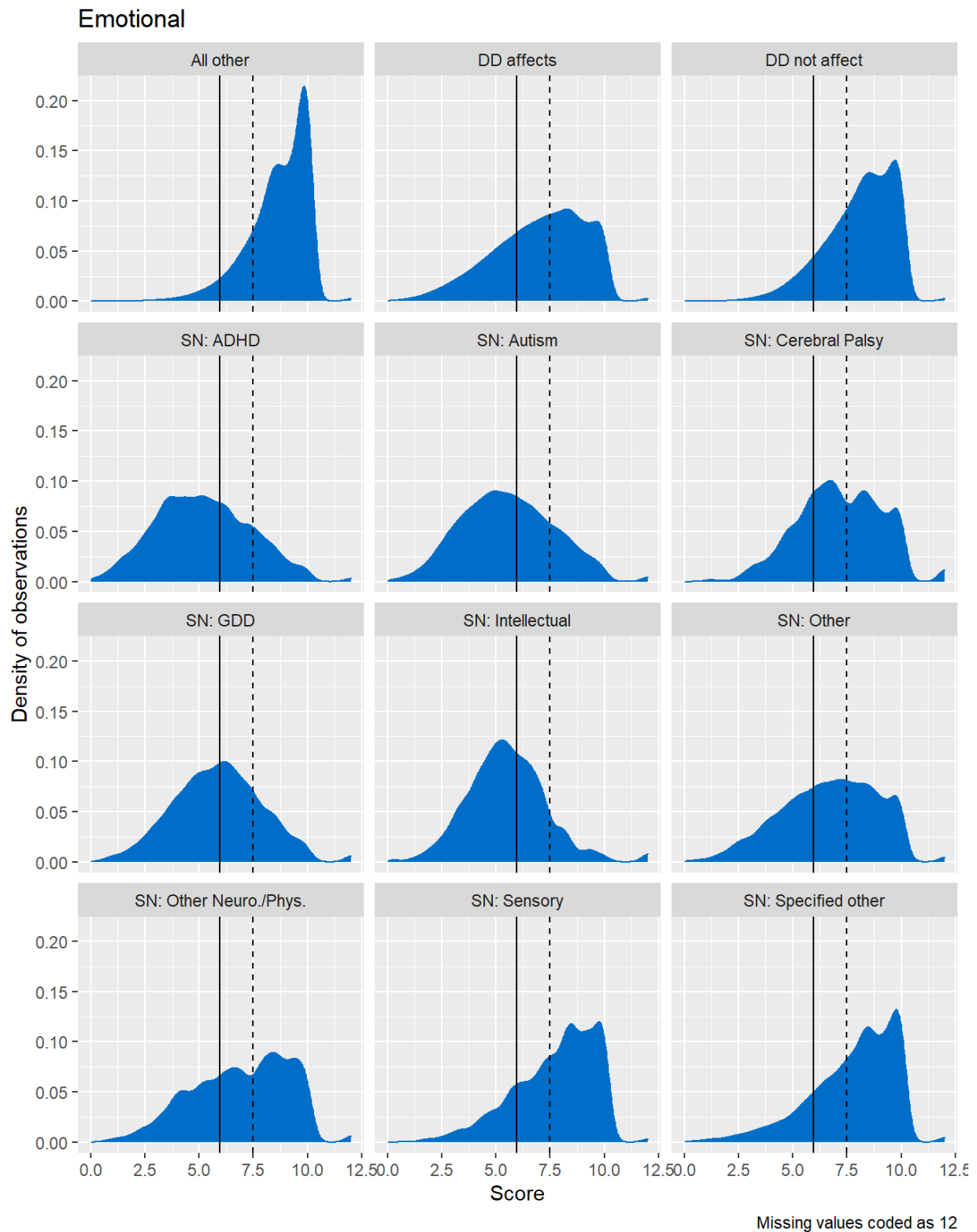
Cohort	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge	AHDN developmentally on track in 1+ domain	AHDN developmentally on track in 2+ domains	AHDN developmentally on track in 3+ domains	AHDN developmentally on track in 4+ domains	AHDN developmentally on track in 5 domains	Avg # domains AHDN developmentally on track
Special needs	36%	27%	28%	44%	34%	62%	44%	31%	20%	12%	1.7
Developmental difficulty, affects learning	53%	45%	47%	56%	49%	82%	65%	50%	33%	20%	2.5
Developmental difficulty, does not affect learning	75%	71%	71%	83%	75%	96%	89%	80%	64%	45%	3.8
Further assessment	56%	44%	48%	56%	54%	86%	70%	53%	33%	17%	2.6
All children, excluding those with known Special Needs	78%	76%	77%	83%	77%	96%	90%	82%	70%	55%	3.9

Table A.2 – Proportion AHDN developmentally on track in one domain who are AHDN developmentally on track in another, special needs cohort, 2021

Proportion of children who are AHDN developmentally on track in this domain...	...who are also AHDN developmentally on track in ---- domain				
	Physical health and wellbeing	Social competence	Emotional maturity	Language and cognitive skills (school-based)	Communication skills and general knowledge
Physical health and wellbeing	100%	64%	61%	72%	69%
Social competence	75%	100%	84%	75%	68%
Emotional maturity	69%	80%	100%	69%	62%
Language and cognitive skills (school-based)	68%	60%	58%	100%	67%
Communication skills and general knowledge	75%	63%	59%	77%	100%

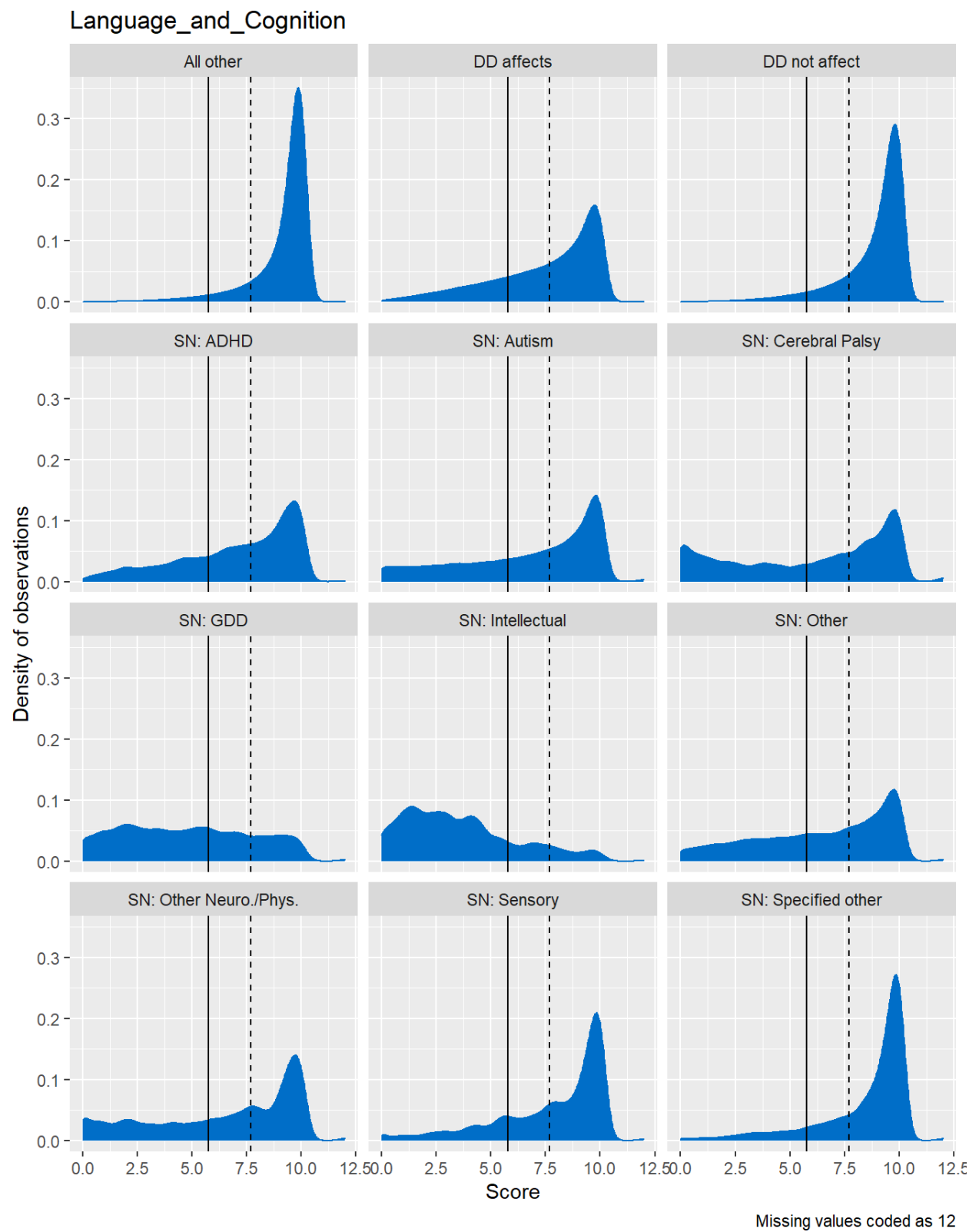
A.2 Distributions of scores across AEDC domains for AHDN cohorts

Figure A.1 – Distribution of Emotional maturity domain scores for children split by AHDN group, Children with special needs are also split by diagnosis group, 2015 onwards.



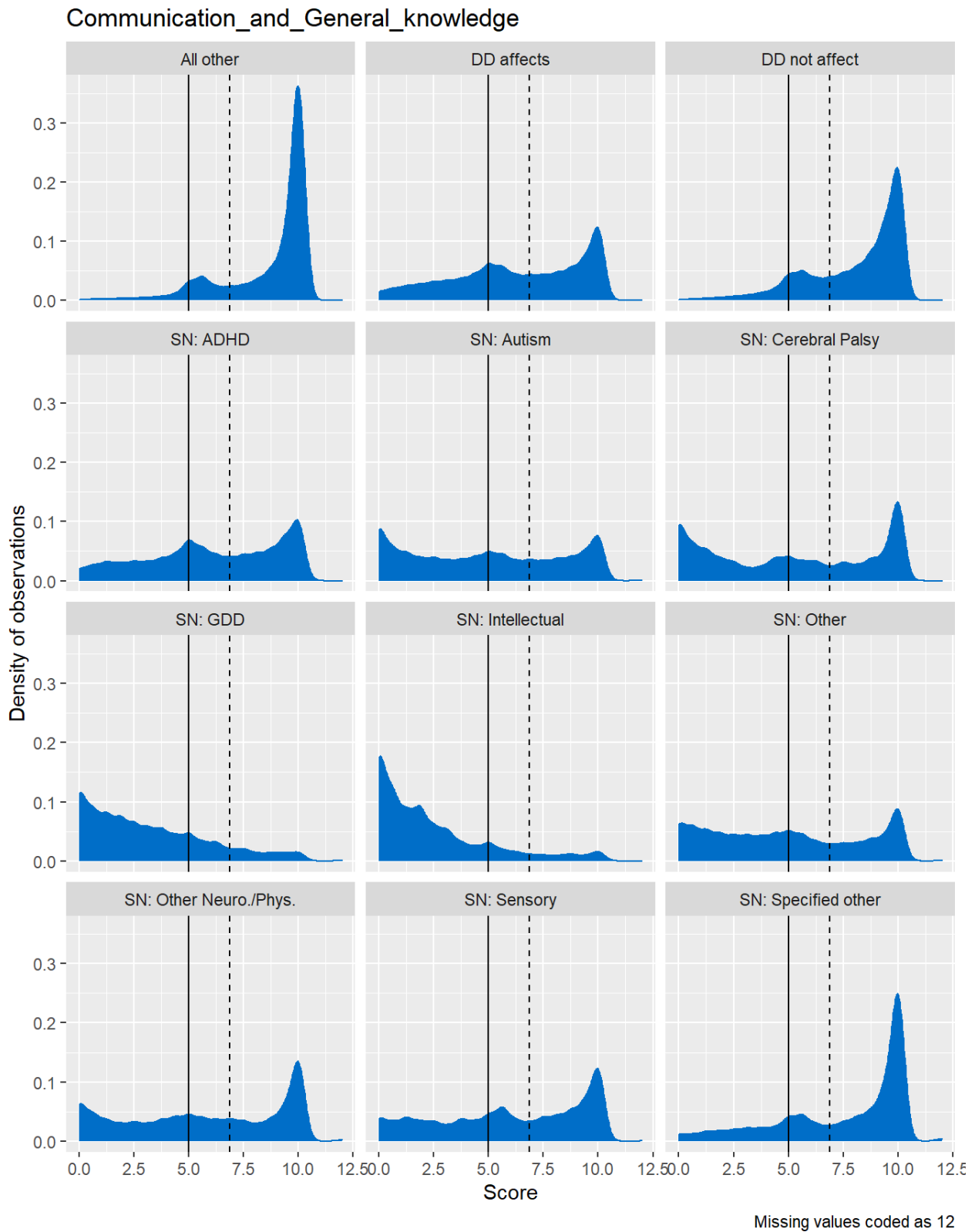
Note: Solid line shows the approximate 'Developmentally Vulnerable' threshold, and the dashed line shows the approximate 'Developmentally At Risk' threshold for five-year-old children.

Figure A.2 – Distribution of Language and cognitive skills (school-based) domain scores for children split by AHDN group, Children with special needs are also split by diagnosis group, 2015 onwards.



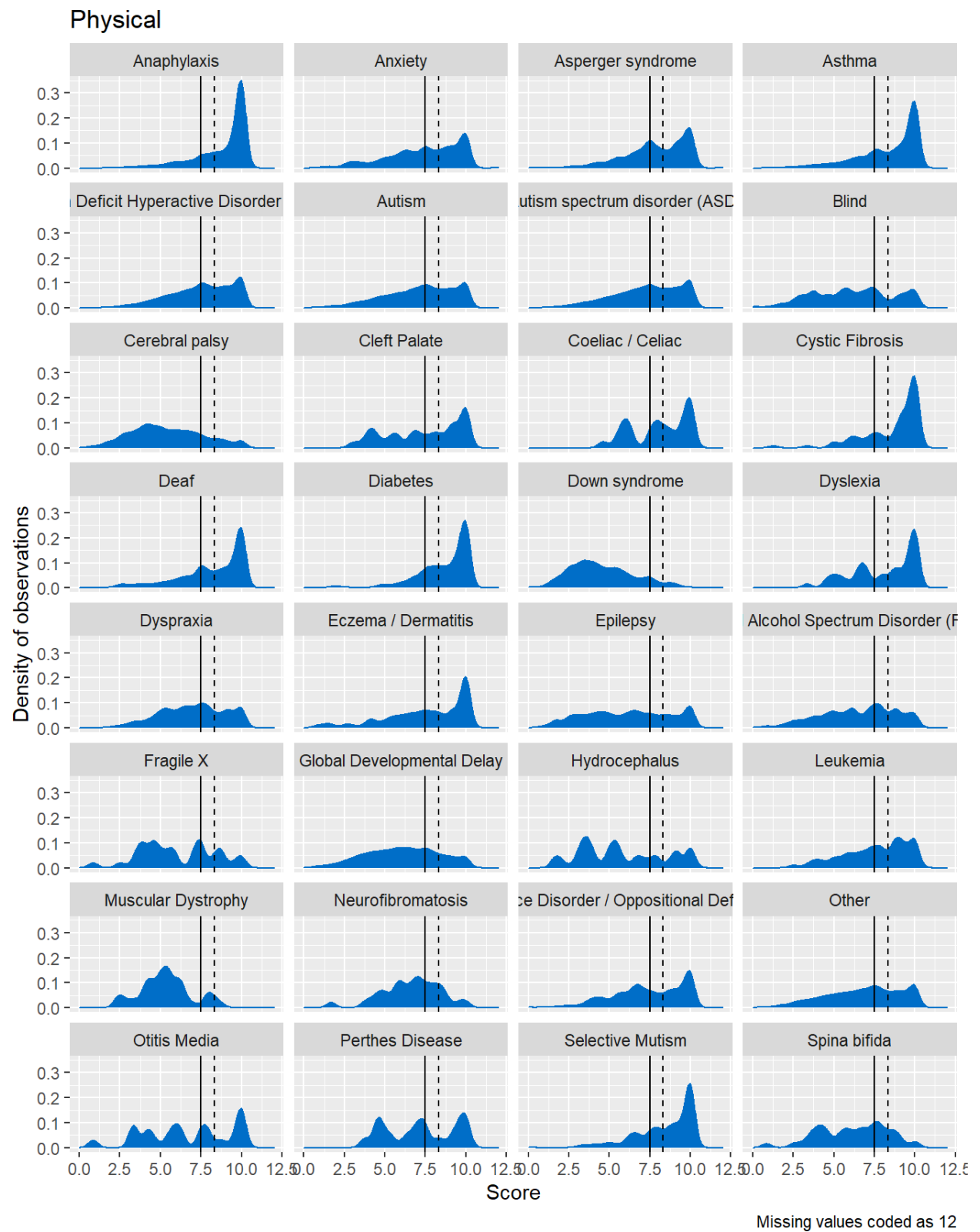
Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.3 – Distribution of Communication skills and general knowledge domain scores for children split by AHDN group, Children with special needs are also split by diagnosis group, 2015 onwards.



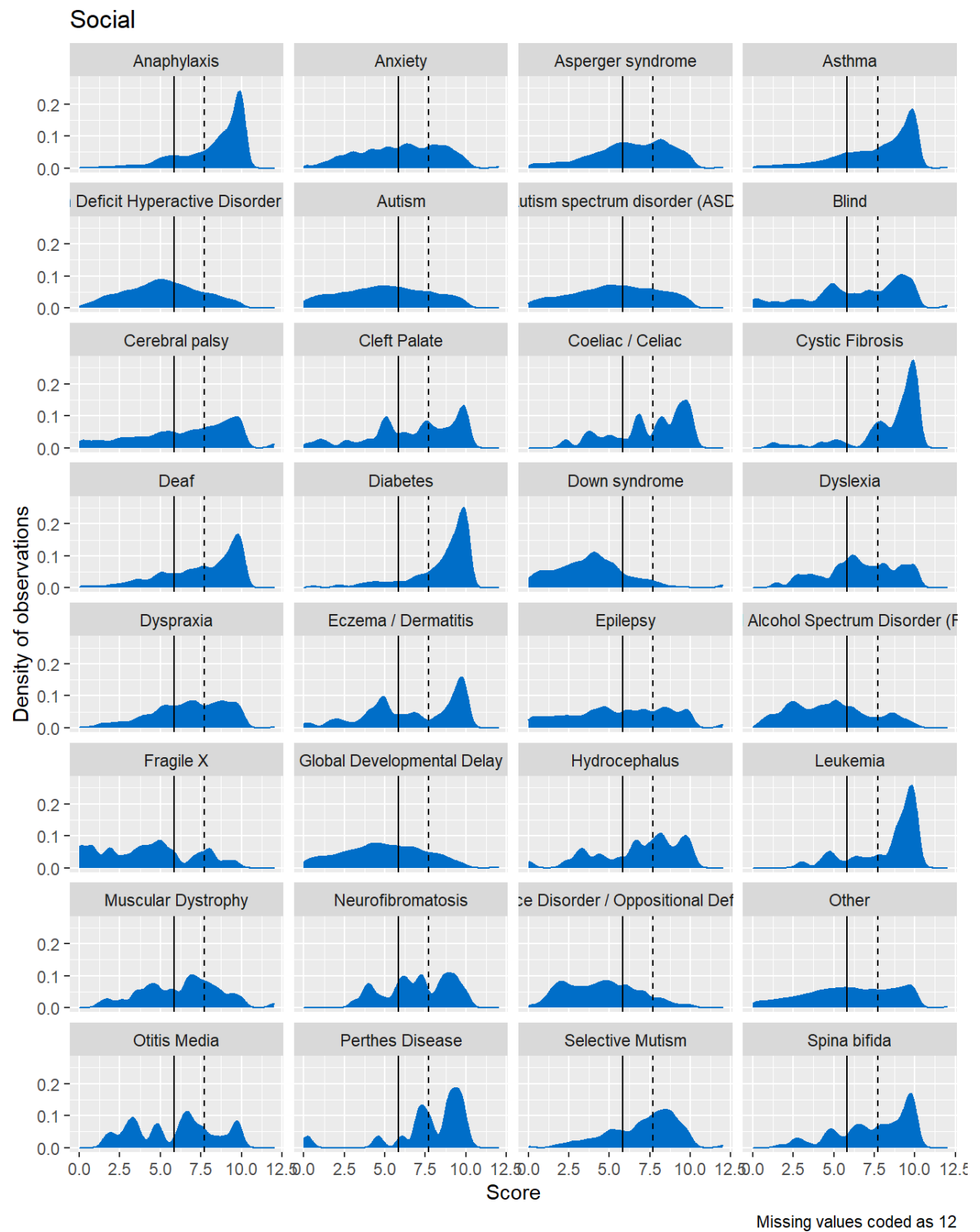
Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.4 – Distribution of Physical health and wellbeing domain scores for children with special needs by recorded diagnosis, 2015 onwards.



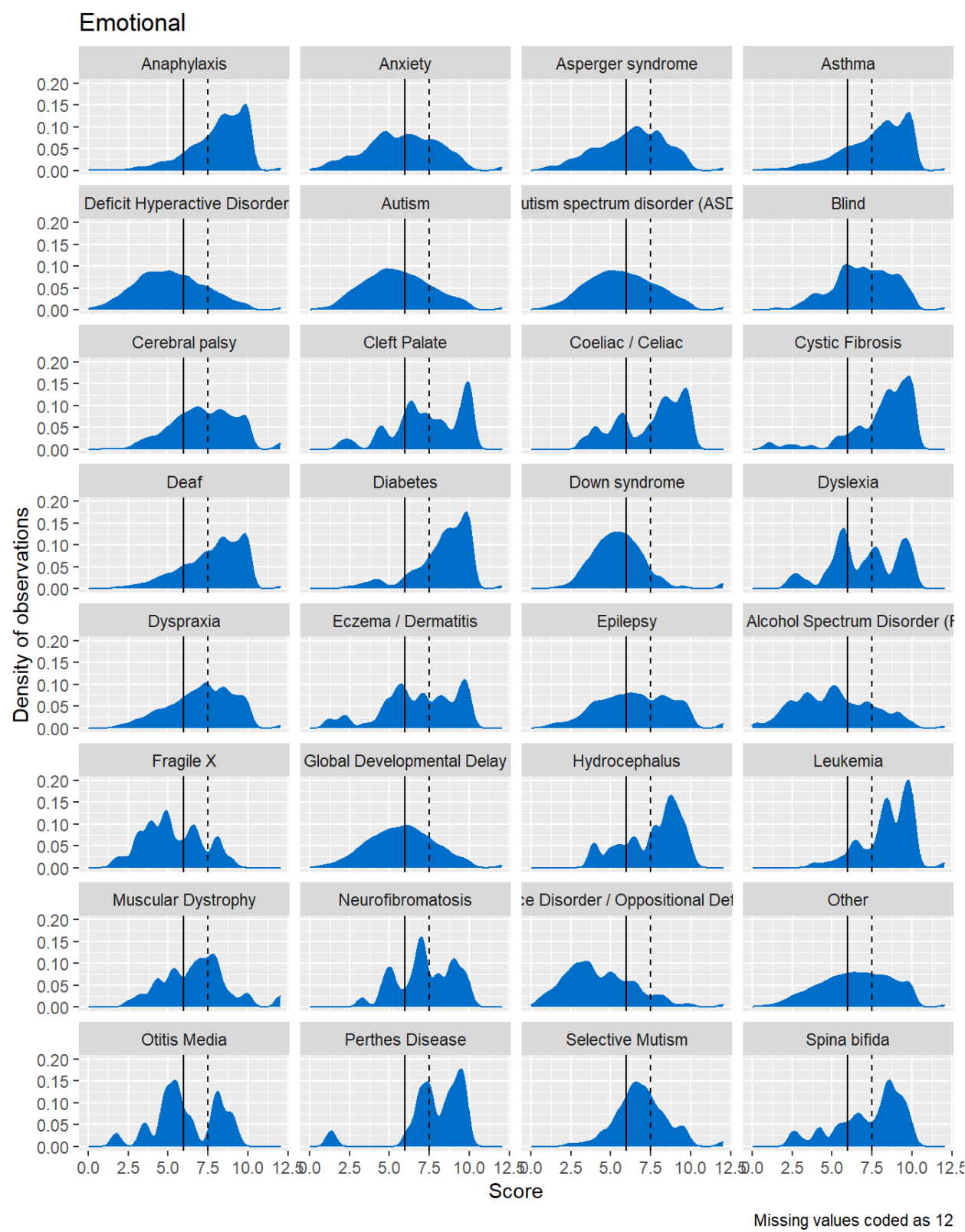
Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.5 – Distribution of Social competence domain scores for children with special needs by recorded diagnosis, 2015 onwards.



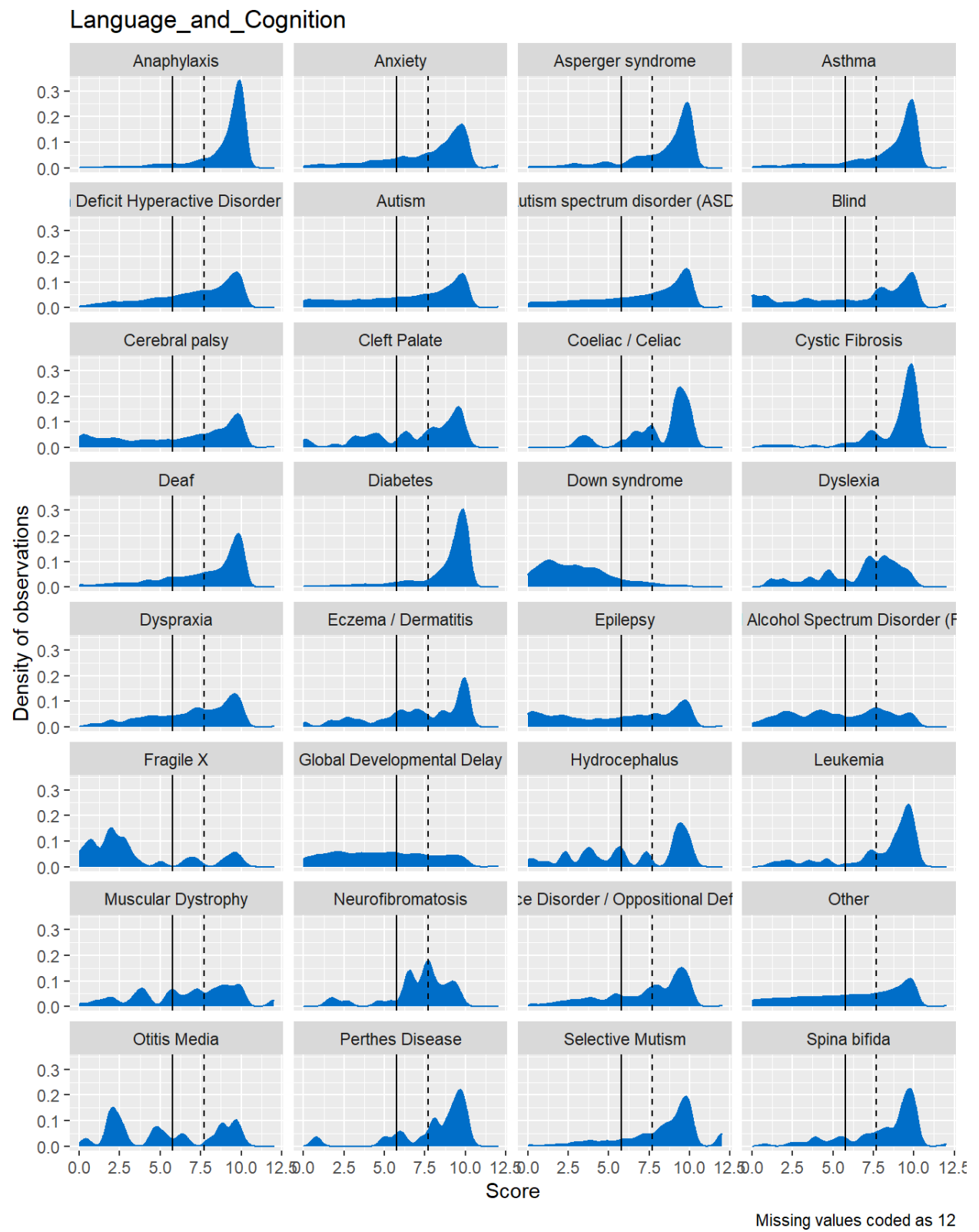
Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.6 – Distribution of Emotional maturity domain scores for children with special needs by recorded diagnosis, 2015 onwards.



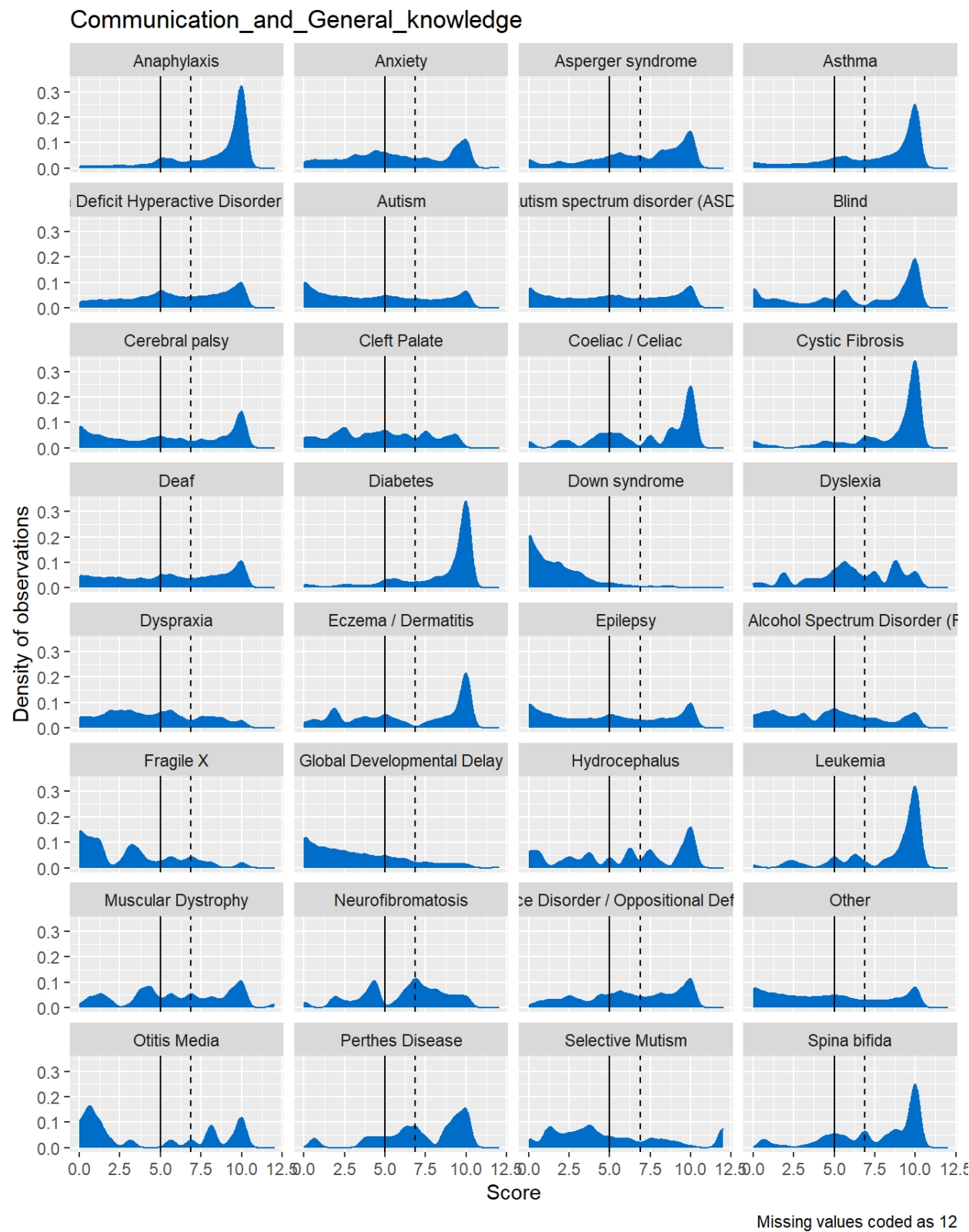
Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.7 – Distribution of Language and cognitive skills (school-based) domain scores for children with special needs by recorded diagnosis, 2015 onwards.



Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

Figure A.8 – Distribution of Communication skills and general knowledge domain scores for children with special needs by recorded diagnosis, 2015 onwards.



Note: Solid line shows the approximate ‘Developmentally Vulnerable’ threshold, and the dashed line shows the approximate ‘Developmentally At Risk’ threshold for five-year-old children.

A.3 Tables related to grouping of diagnosis and other health conditions

Table A.3 – Allocation of diagnoses to diagnosis group for children with special needs. For children with multiple diagnoses the allocation is hierarchical from top of the table to bottom.

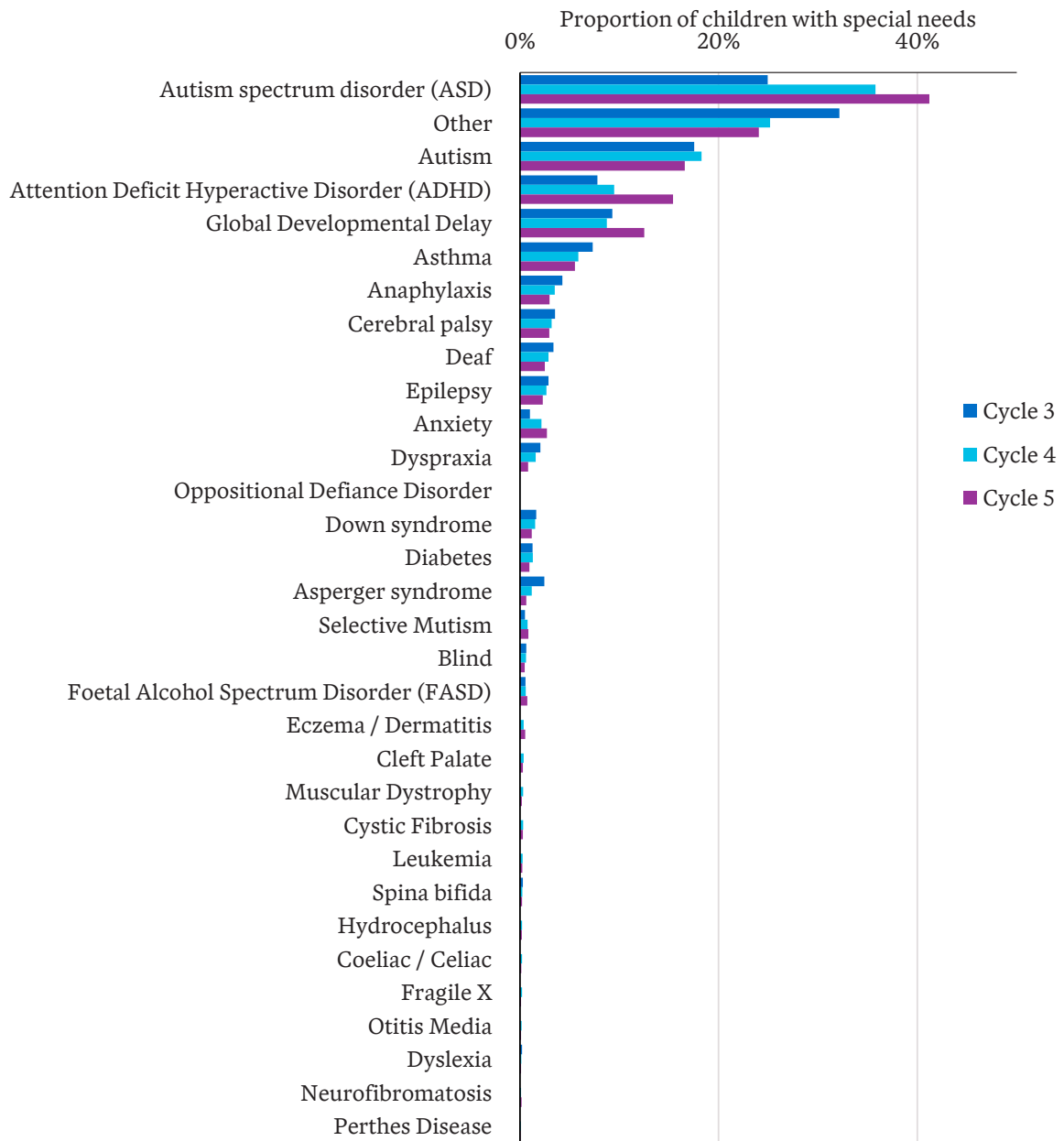
Diagnosis	SN diagnosis subgroup	SN diagnosis group
Asperger syndrome	Autism	Intellectual / learning
Autism	Autism	Intellectual / learning
Autism spectrum disorder (ASD)	Autism	Intellectual / learning
Attention Deficit Hyperactive Disorder (ADHD)	ADHA	Intellectual / learning
Global Developmental Delay	GDD	Intellectual / learning
Down syndrome	Intellectual	Intellectual / learning
Foetal Alcohol Spectrum Disorder (FASD)	Intellectual	Intellectual / learning
Cerebral palsy	Cerebral Palsy	Neurological / physical
Blind	Sensory	Sensory
Deaf	Sensory	Sensory
Epilepsy	Other Neuro./Phys	Neurological / physical
Spina bifida	Other Neuro./Phys	Neurological / physical
Cleft Palate	Other Neuro./Phys	Neurological / physical
Cystic Fibrosis	Other Neuro./Phys	Neurological / physical
Fragile X	Other Neuro./Phys	Neurological / physical
Hydrocephalus	Other Neuro./Phys	Neurological / physical
Muscular Dystrophy	Other Neuro./Phys	Neurological / physical
Neurofibromatosis	Other Neuro./Phys	Neurological / physical
Anaphylaxis	Specified other	Other - specified
Asthma	Specified other	Other - specified
Diabetes	Specified other	Other - specified
Dyslexia	Specified other	Other - specified
Dyspraxia	Specified other	Other - specified
Anxiety	Specified other	Other - specified
Oppositional Defiance Disorder / Oppositional Defiant Disorder / ODD	Specified other	Other - specified
Selective Mutism	Specified other	Other - specified
Coeliac / Celiac	Specified other	Other - specified
Eczema / Dermatitis	Specified other	Other - specified
Leukaemia	Specified other	Other - specified
Otitis Media	Specified other	Other - specified
Perthes Disease	Specified other	Other - specified
Other	Other	Other – not specified

Table A.4 – Summary of AEDC reported conditions for those with special needs and/or a developmental difficulty, 2018

Special needs			Developmental difficulty		
Condition	Number	NDIS?	Condition	Number	NDIS?
Autism	2,565	Y	OS: Autism	942	Y
Autism spectrum disorder (ASD)	5,026	Y	OS: Autism spectrum disorder (ASD)	1,175	Y
Asperger syndrome	168	Y	OS: Asperger syndrome	153	Y
Attention Deficit Hyperactive Disorder (ADHD)	1,337	Y	OS: Attention Deficit Hyperactive Disorder (ADHD)	1,024	Y
Global Developmental Delay	1,230	Y	OS: Global Developmental Delay	451	Y
Down syndrome	217	Y	OS: Down syndrome	<100	Y
Foetal Alcohol Spectrum Disorder (FASD)	<100	Y	OS: Foetal Alcohol Spectrum Disorder (FASD)	<100	Y
Cerebral palsy	449	Y	OS: Cerebral palsy	<100	Y
Cystic Fibrosis	<100	Y	Cystic Fibrosis	<100	Y
Fragile X	<100	Y	Fragile X	<100	Y
Epilepsy	372	Y	OS: Epilepsy	290	Y
Muscular Dystrophy	<100	Y	Muscular Dystrophy	<100	Y
Spina bifida	<100	Y	OS: Spina bifida	<100	Y
Hydrocephalus	<100	Y	Hydrocephalus	<100	Y
Cleft Palate	<100	Y	Cleft palate	<100	Y
Neurofibromatosis	<100	Y	Neurofibromatosis	<100	Y
Deaf	408	Y	Hearing impairment	2,084	Y
Blind	<100	Y	Visual impairment	2,374	Y
Anxiety	308		OS: Anxiety	793	
Oppositional Defiance Disorder	224		OS: Oppositional Defiance Disorder	198	
Selective Mutism	106		OS: Selective Mutism	213	
Coeliac / Celiac	<100		OS: Coeliac / Celiac	137	
Asthma	824		OS: Asthma	3,351	
Eczema / Dermatitis	<100		OS: Eczema / Dermatitis	600	
Anaphylaxis	494		OS: Anaphylaxis	1,286	
Diabetes	182		OS: Diabetes	<100	
Leukemia	<100		OS: Leukaemia	<100	
Otitis Media	<100		OS: Otitis media	<100	
Perthes Disease	<100		Perthes Disease	<100	

Special needs			Developmental difficulty		
Condition	Number	NDIS?	Condition	Number	NDIS?
Dyslexia	<100		OS: Dyslexia	<100	
Dyspraxia	223		OS: Dyspraxia	173	
Other	3,546				
			Physical disability	2358	Y
			Speech/language impairment	25,219	Y
			Learning disability	12,091	Y
			Emotional problem	11,178	
			Behavioural problem	12,270	
			Home environment/problems at home	9,895	
			Trauma, isolation or difficulties associated with resettlement	265	
			Other specific condition	14,691	
			Other enduring problems - Chronic Illness	5,597	
			Other enduring problems - Neurodevelopmental disorder	4,584	
			Other enduring problems	5665	

Figure A.9 – Proportion of children with special needs with recorded diagnoses, with different breakdown into different autism spectrum disorder indicators



- (a) ADHD: Attention Deficit Hyperactive Disorder.
 (b) ODD: Oppositional Defiance Disorder/Oppositional Defiant Disorder.

A.4 Summary of question response rates by AHDN group

Table A.5 – Proportion ‘poor’ responses for AEDC questions for children without special needs, and for different groups of special needs. Depending on the question a ‘poor’ response may be ‘Yes’, ‘No’ or ‘Poor/Very poor’. Based on 2015 onwards.

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Physical	Since the start of the year, has the child sometimes (more than once) arrived over or under-dressed for school related activities	3%	7%	4%	5%	4%	8%
Physical	Since the start of the year, has the child sometimes (more than once) arrived too tired and/or too sick to do schoolwork	9%	28%	30%	18%	17%	26%
Physical	Since the start of the year, has the child sometimes (more than once) arrived hungry	3%	8%	5%	6%	4%	7%
Physical	Would you say this child is independent in toileting habits most of the time	2%	22%	40%	7%	5%	16%
Physical	Would you say this child shows an established hand preference (right vs. left or vice versa)	2%	16%	21%	6%	4%	12%
Physical	Would you say this child is well co-ordinated (i.e. moves without running into or tripping over things)?	6%	37%	69%	25%	17%	40%
Physical	How would you rate this child’s proficiency at holding a pen, crayon or brush	6%	38%	49%	16%	14%	33%
Physical	How would you rate this child’s ability to manipulate objects	3%	26%	47%	12%	10%	26%
Physical	How would you rate this child’s ability to climb stairs	1%	12%	51%	10%	5%	18%
Physical	How would you rate this child’s level of energy throughout the school day	3%	15%	27%	8%	7%	17%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Physical	How would you rate this child's overall physical development	2%	18%	49%	11%	8%	23%
Physical	How would you rate this child's daily personal hygiene	1%	11%	13%	5%	3%	10%
Communication	How would you rate this child's ability to use language effectively in English	5%	37%	35%	26%	13%	38%
Communication	How would you rate this child's ability to listen in English	3%	25%	20%	22%	6%	24%
Communication	How would you rate this child's ability to tell a story	7%	47%	41%	30%	17%	46%
Communication	How would you rate this child's ability to take part in imaginative play	3%	35%	28%	12%	8%	24%
Communication	How would you rate this child's ability to communicate their own needs in a way understandable to adults and peers	5%	36%	33%	21%	14%	34%
Communication	How would you rate this child's ability to understand on first try what is being said to him/her	5%	34%	28%	24%	10%	34%
Communication	How would you rate this child's ability to articulate clearly without sound substitutions	8%	44%	43%	37%	19%	46%
Communication	Would you say that this child answers questions showing knowledge about the world (e.g. leaves fall in autumn, apple is fruit, dogs bark etc.)	3%	32%	29%	15%	8%	26%
Language	Would you say this child knows how to handle a book (e.g. turn a page)	1%	7%	15%	3%	1%	6%
Language	Would you say this child is generally interested in books (pictures and print)	3%	16%	13%	8%	5%	13%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Language	Would you say this child is interested in reading (inquisitive/curious about the meaning of printed material)?	7%	30%	25%	14%	11%	26%
Language	Would you say this child is able to identify some letters of the alphabet	6%	23%	30%	13%	10%	25%
Language	Would you say this child is able to attach sounds to letters	10%	35%	39%	24%	16%	36%
Language	Would you say this child is showing awareness of rhyming words	19%	54%	52%	41%	26%	54%
Language	Would you say this child is able to participate in group reading activities	4%	34%	27%	15%	9%	27%
Language	Would you say this child is able to read simple words	12%	41%	44%	27%	17%	44%
Language	Would you say this child is able to read complex words	59%	77%	82%	72%	62%	83%
Language	Would you say this child is able to read simple sentences	22%	52%	56%	40%	27%	56%
Language	Would you say this child is experimenting with writing tools	2%	14%	19%	5%	4%	11%
Language	Would you say this child is aware of writing directions in English (left to right, top to bottom)	4%	31%	34%	12%	8%	26%
Language	Would you say this child is interested in writing voluntarily (and not only under the teacher's direction)	24%	62%	56%	36%	32%	55%
Language	Would you say this child is able to write his/her own name in English	4%	30%	39%	13%	7%	26%
Language	Would you say this child is able to write simple words	12%	46%	50%	27%	17%	45%
Language	Would you say this child is able to write simple sentences	23%	59%	62%	41%	28%	60%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Language	Would you say this child is able to remember things easily	16%	49%	51%	28%	24%	53%
Language	Would you say this child is interested in mathematics	5%	26%	27%	12%	8%	24%
Language	Would you say this child is interested in games involving numbers	4%	26%	25%	10%	8%	22%
Language	Would you say this child is able to sort and classify objects by common characteristics (e.g. shape, colour, size)	4%	23%	30%	12%	7%	25%
Language	Would you say this child is able to use one-to-one correspondence	6%	30%	37%	16%	10%	31%
Language	Would you say this child is able to count to twenty	14%	39%	48%	33%	20%	45%
Language	Would you say this child is able to recognise numbers one to ten	9%	27%	36%	19%	12%	32%
Language	Would you say this child is able to recognise which number is bigger of the two	11%	43%	44%	28%	17%	44%
Language	Would you say this child is able to recognise geometric shapes (e.g. triangle, circle, square)	4%	20%	28%	11%	6%	21%
Language	Would you say this child is able to understand simple time concepts (e.g. today, summer, bedtime)	6%	33%	32%	21%	9%	31%
Social	How would you rate this child's overall social/emotional development	6%	52%	28%	15%	17%	34%
Social	How would you rate this child's ability to get along with peers	4%	37%	18%	10%	10%	22%
Social	Would you say that this child plays and works cooperatively with other children at the level appropriate for his/her age	2%	30%	19%	7%	6%	17%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Social	Would you say that this child is able to play with various children	3%	32%	19%	8%	8%	18%
Social	Would you say that this child follows rules and instructions	2%	19%	15%	5%	4%	12%
Social	Would you say that this child respects the property of others	1%	19%	14%	5%	3%	11%
Social	Would you say that this child demonstrated self-control	2%	27%	16%	6%	6%	16%
Social	Would you say that this child demonstrated respect for adults	1%	12%	9%	2%	2%	6%
Social	Would you say that this child demonstrates respect for other children	1%	15%	11%	3%	3%	8%
Social	Would you say that this child accepts responsibility for actions	3%	32%	21%	8%	6%	19%
Social	Would you say that this child listens attentively	4%	27%	17%	10%	7%	22%
Social	Would you say that this child completes work on time	6%	34%	31%	12%	11%	29%
Social	Would you say that this child works independently	6%	45%	42%	20%	13%	39%
Social	Would you say that this child takes care of school materials	1%	17%	15%	4%	3%	10%
Social	Would you say that this child works neatly and carefully	5%	38%	35%	14%	12%	30%
Social	Would you say that this child is curious about the world	2%	14%	11%	5%	4%	12%
Social	Would you say that this child is eager to play with a new toy	0%	7%	6%	1%	1%	4%
Social	Would you say that this child is eager to play a new game	1%	13%	10%	2%	2%	6%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Social	Would you say that this child is eager to play with/read a new book	2%	18%	13%	5%	4%	12%
Social	Would you say that this child is able to solve day-to-day problems by him/herself	6%	48%	39%	18%	15%	36%
Social	Would you say that this child is able to follow one-step instructions	1%	11%	14%	4%	3%	11%
Social	Would you say that this child is able to follow class routines without reminders	3%	31%	28%	11%	8%	23%
Social	Would you say that this child is able to adjust to changes in routines	2%	27%	12%	6%	7%	15%
Social	Would you say that this child shows tolerance to someone who made a mistake (e.g. when a child gives a wrong answer to a question posed by the teacher)	2%	27%	18%	7%	5%	15%
Emotional	Would you say that this child will try and help someone who is hurt	5%	36%	27%	10%	10%	20%
Emotional	Would you say that this child, if there is a quarrel or dispute, will try to stop it	22%	69%	55%	36%	33%	52%
Emotional	Would you say that this child offers to help other children who have difficulty with a task	18%	67%	53%	33%	29%	52%
Emotional	Would you say that this child comforts a child who is crying or upset	10%	48%	33%	16%	16%	28%
Emotional	Would you say that this child spontaneously helps to pick up objects which another child has dropped (e.g. pencils, books)	15%	57%	46%	25%	23%	39%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Emotional	Would you say that this child will invite others to join in a game	11%	57%	39%	22%	21%	37%
Emotional	Would you say that this child helps others who are feeling sick	11%	56%	40%	21%	19%	35%
Emotional	Would you say that this child gets into physical fights	1%	6%	2%	2%	2%	4%
Emotional	Would you say that this child bullies or is mean to others	1%	5%	1%	1%	2%	3%
Emotional	Would you say that this child kicks, bites, hits other children or adults	1%	11%	4%	3%	3%	6%
Emotional	Would you say that this child takes things that do not belong to him/her	1%	11%	4%	2%	2%	7%
Emotional	Would you say that this child laughs at other children's discomfort	1%	4%	1%	1%	2%	3%
Emotional	Would you say that this child can't sit still, is restless	7%	40%	19%	12%	12%	26%
Emotional	Would you say that this child is distractible, has trouble sticking to any activity	7%	42%	23%	13%	13%	30%
Emotional	Would you say that this child is disobedient	2%	14%	5%	4%	5%	9%
Emotional	Would you say that this child has temper tantrums	2%	18%	6%	4%	4%	9%
Emotional	Would you say that this child is impulsive, acts without thinking	5%	32%	13%	8%	9%	19%
Emotional	Would you say that this child has difficulty awaiting turn in games or groups	4%	34%	13%	9%	8%	19%
Emotional	Would you say that this child cannot settle to anything for more than a few moments	4%	29%	15%	7%	8%	20%

Category	Question	No special needs	Intellectual/ Learning (a)	Physical/ Neurological (b)	Sensory/ Communication (c)	Other – specified (d)	Other - not specified
Emotional	Would you say that this child is inattentive	6%	32%	19%	9%	10%	25%
Emotional	Would you say that this child seems to be unhappy, sad or depressed	1%	4%	2%	1%	3%	3%
Emotional	Would you say that this child appears worried	2%	6%	2%	1%	6%	4%
Emotional	Would you say that this child cries a lot	2%	6%	3%	2%	3%	5%
Emotional	Would you say that this child is nervous, highly strung or tense	2%	9%	3%	1%	7%	5%
Emotional	Would you say that this child is incapable of making decisions	2%	16%	11%	3%	5%	12%

- (a) Includes Asperger syndrome, Attention Deficit Hyperactive Disorder (ADHD), Autism, Autism spectrum disorder (ASD), Down syndrome, Foetal Alcohol Spectrum Disorder (FASD), Global Developmental Delay.
- (b) Includes Cerebral palsy, Epilepsy, Spina bifida, Cleft Palate, Cystic Fibrosis, Fragile X, Hydrocephalus, Muscular Dystrophy, Neurofibromatosis.
- (c) Includes Blind, Deaf.
- (d) Includes Asthma, Diabetes, Dyslexia, Dyspraxia, Anxiety, Oppositional Defiance Disorder / Oppositional Defiant Disorder / ODD, Selective Mutism, Coeliac / Celiac, Eczema / Dermatitis, Leukaemia, Otitis Media, Perthes Disease.

Appendix B Further summaries of change in indicators over time

B.1 Standard errors by AHDN group

We add detail to the results of Section 4.3 by including standard errors alongside point estimates.

Table B.1 – Levels and standard errors of proportion of children AHDN developmentally vulnerable in 3+ domains by AHDN group, 2015, 2018 and 2021. Statistically significant changes from prior Cycle shaded.

AHDN group	AHDN developmentally vulnerable in 3+ domains				
	2015		2018		2021
	%	<i>Std error of the difference between 2015 and 2018 estimates</i>	%	<i>Std error of the difference between 2018 and 2021 estimates</i>	%
Special Needs	44.5%	1.2%	45.1%	1.1%	47.2%
DD affects learning	24.4%	0.6%	24.7%	0.6%	24.7%
DD does not affect learning	5.5%	0.4%	4.8%	0.4%	4.8%
Requires further assessment	20.6%	1.1%	20.4%	1.0%	18.6%
Total, all children with AHDN	20.9%	0.4%	21.1%	0.4%	21.8%

Table B.2 – Levels and standard errors of average number of domains AHDN developmentally vulnerable by AHDN group, 2015, 2018 and 2021. Statistically significant changes from prior Cycle shaded.

AHDN group	Avg # domains AHDN developmentally vulnerable				
	2015		2018		2021
	#	<i>Std error of the difference between 2015 and 2018 estimates</i>	#	<i>Std error of the difference between 2018 and 2021 estimates</i>	#
Special Needs	2.24	0.04	2.26	0.04	2.35
DD affects learning	1.41	0.02	1.43	0.02	1.43
DD does not affect learning	0.48	0.02	0.43	0.01	0.43
Requires further assessment	1.29	0.04	1.29	0.04	1.21
Total, all children with AHDN	1.22	0.01	1.23	0.01	1.26

B.2 Demographic splits

Table B.3 – Change in key AHDN developmental vulnerability indicators by AHDN group and gender, 2018 to 2021

	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
AHDN group	Male	Female	Male	Female
Special needs	2.8%	0.3%	0.12	0.02
Developmental difficulty, affects learning	0.2%	0.1%	0.01	0.01
Developmental difficulty, does not affect learning	-0.1%	0.2%	-0.01	0.01
Further assessment	-2.2%	-0.8%	-0.08	-0.07
All children, excluding those with known Special Needs	0.2%	0.2%	0.01	0.01

Table B.4 – Change in key AHDN developmental vulnerability indicators by AHDN group and Aboriginal and/or Torres Strait Islander identification, 2018 to 2021

	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
AHDN group	Not Indigenous	Aboriginal and/or Torres Strait Islander	Not Indigenous	Aboriginal and/or Torres Strait Islander
Special needs	2.1%	-0.8%	0.09	-0.02
Developmental difficulty, affects learning	0.1%	-1.3%	0.01	-0.05
Developmental difficulty, does not affect learning	0.0%	0.0%	-0.00	-0.00
Further assessment	-1.9%	0.2%	-0.09	-0.01
All children, excluding those with known Special Needs	0.1%	0.0%	0.01	0.02

Table B.5 – Change in key AHDN developmental vulnerability indicators by AHDN group and Language Background Other Than English (LBOTE) indicator, 2018 to 2021

	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
AHDN group	Not LBOTE	LBOTE	Not LBOTE	LBOTE
Special needs	1.7%	2.0%	0.07	0.08
Developmental difficulty, affects learning	0.1%	-0.8%	0.01	-0.03
Developmental difficulty, does not affect learning	-0.2%	0.6%	-0.01	0.01
Further assessment	-1.5%	-2.3%	-0.07	-0.09
All children, excluding those with known Special Needs	0.2%	0.0%	0.01	-0.00

Table B.6 – Change in AHDN developmental vulnerability indicators by AHDN group and SEIFA quintile category, 2018 to 2021

AHDN group	AHDN developmentally vulnerable in 3+ domains		Avg # domains AHDN developmentally vulnerable	
	Lower 2 quintiles	Upper 3 quintiles	Lower 2 quintiles	Upper 3 quintiles
Special needs	0.4%	3.4%	0.05	0.12
Developmental difficulty, affects learning	0.1%	0.3%	0.01	0.02
Developmental difficulty, does not affect learning	0.1%	0.0%	0.00	-0.00
Further assessment	-1.4%	-1.6%	-0.08	-0.06
All children, excluding those with known Special Needs	0.4%	0.2%	0.02	0.01

B.3 Geographic splits

Table B.7 – Change in the proportion of children AHDN developmentally vulnerable in three or more domains by AHDN group and State, 2018 to 2021

AHDN group	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special needs	-0.7%	2.3%	1.6%	0.7%	-0.7%	1.2%	2.9%	4.0%
Developmental difficulty, affects learning	-0.9%	0.9%	-3.6%	-2.5%	0.5%	1.7%	1.1%	0.2%
Developmental difficulty, does not affect learning	-0.3%	0.2%	-2.6%	-0.5%	-0.1%	1.2%	0.3%	0.0%
Further assessment	-1.9%	-0.8%	-9.9%	-3.5%	-1.9%	2.1%	0.4%	-1.8%
All children with AHDN	-0.5%	1.5%	-2.2%	-1.0%	1.2%	2.6%	1.0%	0.6%
All children, excluding those with known Special Needs	0.0%	0.5%	2.0%	-0.6%	0.0%	1.3%	0.3%	0.4%

Table B.8 – Change in average number of domains children are AHDN developmentally vulnerable by AHDN group and State, 2018 to 2021

AHDN group	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Special needs	0.03	0.12	0.12	0.05	-0.04	-0.01	0.10	0.17
Developmental difficulty, affects learning	-0.01	0.04	-0.12	-0.09	0.01	0.03	0.05	0.02
Developmental difficulty, does not affect learning	0.03	0.01	-0.12	-0.03	0.02	0.01	0.01	-0.00
Further assessment	-0.07	-0.02	-0.24	-0.17	-0.07	0.03	-0.00	-0.09
All children with AHDN	0.02	0.08	-0.05	-0.03	0.06	0.08	0.03	0.0355
All children, excluding those with known Special Needs	0.03	0.03	0.09	-0.03	-0.00	0.05	0.01	0.0247

Table B.9 – Change in the proportion of children AHDN developmentally vulnerable in three or more domains by AHDN group and Remoteness, 2018 to 2021

AHDN group	Major Cities of Australia	Inner Regional Australia	Outer Regional Australia	Remote Australia	Very Remote Australia
Special needs	2.4%	1.7%	0.8%	-1.3%	-6.5%
Developmental difficulty, affects learning	0.5%	-0.6%	-1.1%	1.1%	-0.5%
Developmental difficulty, does not affect learning	0.0%	0.0%	-0.2%	0.0%	3.3%
Further assessment	-1.4%	-1.8%	-2.8%	-4.4%	-8.7%
All children, excluding those with known Special Needs	0.2%	0.2%	0.3%	0.5%	-0.6%

Table B.10 – Change in average number of domains children are AHDN developmentally vulnerable by AHDN group and Remoteness, 2018 to 2021

AHDN group	Major Cities of Australia	Inner Regional Australia	Outer Regional Australia	Remote Australia	Very Remote Australia
Special needs	0.10	0.07	0.09	-0.05	-0.27
Developmental difficulty, affects learning	0.02	-0.00	-0.01	0.06	-0.07
Developmental difficulty, does not affect learning	-0.01	0.01	-0.02	-0.02	0.23
Further assessment	-0.07	-0.06	-0.14	-0.14	-0.21
All children, excluding those with known Special Needs	0.01	0.02	0.03	0.03	-0.03

Table B.11 – Change in the proportion of children AHDN developmentally vulnerable in three or more domains by AHDN group and State and remoteness grouping, 2018 to 2021

AHDN group	ACT-Major City/ Inner	NSW-Major City / Inner	NSW-Other	NT-Other	QLD-Major City/ Inner	QLD-Other	SA-Major City/ Inner Regional	SA-Other	TAS-Major City / Inner Regional	TAS-Other	VIC-Major City/ Inner Regional	VIC-Other	WA-Major City/ Inner Regional	WA-Other
Special needs	-0.7%	2.1%	4.9%	1.6%	0.7%	0.3%	-0.3%	0.1%	5.9%	-10.0%	3.1%	-1.4%	4.6%	-0.4%
Developmental difficulty, affects learning	-0.9%	0.8%	1.6%	-3.6%	-2.2%	-3.8%	1.2%	-3.5%	0.7%	3.5%	1.2%	-0.6%	0.5%	-0.5%
Developmental difficulty, does not affect learning	-0.3%	0.2%	0.2%	-2.6%	-0.8%	0.6%	-0.2%	0.5%	2.7%	-2.0%	0.3%	*	-0.1%	0.7%
Further assessment	-1.9%	-0.7%	-3.1%	-9.9%	-4.1%	-0.5%	-1.9%	-1.4%	3.1%	*	0.5%	*	-0.8%	-8.5%
All children, excluding those with known Special Needs	0.0%	0.5%	0.6%	2.0%	-0.7%	-0.2%	0.2%	-0.7%	1.4%	1.1%	0.3%	-0.8%	0.4%	0.2%

Note: * Suppression of cells that contain less than 15 children for AEDC indicators

Table B.12 –Change in average number of domains children are AHDN developmentally vulnerable by AHDN group and State and remoteness grouping, 2018 to 2021

AHDN group	ACT-Major City/ Inner Regional	NSW-Major City/ Inner Regional	NSW-Other	NT-Other	QLD-Major City/ Inner Regional	QLD-Other	SA-Major City/ Inner Regional	SA-Other	TAS-Major City/ Inner Regional	TAS-Other	VIC-Major City/ Inner Regional	VIC-Other	WA-Major City/ Inner Regional	WA-Other
Special needs	0.03	0.11	0.19	0.12	0.04	0.06	-0.04	0.08	0.13	-0.34	0.10	0.05	0.20	-0.05
Developmental difficulty, affects learning	-0.01	0.04	0.12	-0.12	-0.08	-0.13	0.04	-0.14	0.02	0.05	0.05	-0.01	0.04	-0.01
Developmental difficulty, does not affect learning	0.03	0.00	0.05	-0.12	-0.04	-0.01	0.01	0.04	0.12	-0.21	0.01	*	-0.01	0.08
Further assessment	-0.07	-0.01	-0.20	-0.24	-0.19	-0.03	-0.05	-0.16	0.11	*	-0.00	*	-0.07	-0.27
All children, excluding those with known Special Needs	0.03	0.03	0.06	0.09	-0.04	0.00	0.00	-0.03	0.06	0.02	0.01	-0.04	0.03	0.03

Note: * Suppression of cells that contain less than 15 children for AEDC indicators

Appendix C Propensity reweighting model

A propensity model was used to allow for composition differences between 2018 and 2021 AEDCs (Cycles 4 and 5). A similar approach was also taken to understand the changes between 2015 and 2018. We used a generalised linear model to fit propensities. The target (or response) fitted was the Bernoulli likelihood of whether the observation was from 2018 (1 for 2018, 0 for 2021). A logit link function was used. The model was fit on a random subset of 70% of the observations from 2018 and 2021 datasets. The remaining 30% of observations were used as a validation dataset.

The model produces higher predictions p for combinations of variables more common to 2018. Applying a weight of $p/(1 - p)$ to 2021 observations and taking weighted averages offsets this compositional difference, producing results ‘as if’ the composition was the same as 2018.

Table C.1 shows the coefficients of the model.

Table C.1 –Coefficient file

(Intercept)	Estimate	P-value
(Intercept)	0.156	<0.01
State.ACT	-0.020	0.770
State.NT	-0.032	0.676
State.QLD	0.101	<0.01
State.SA	0.067	0.064
State.TAS	-0.087	0.171
State.VIC	0.125	<0.01
State.WA	0.039	0.181
Special Needs (SN)	0.099	0.060
Developmental difficulty (DD) not affects	0.149	0.013
Requires further assessment	-0.093	0.026
AgeGroup <5	-0.427	<0.01
AgeGroup ≥6	0.195	<0.01
female	-0.060	<0.01
Indigenous	-0.139	<0.01
LBOTE.1	-0.113	<0.01
SEIFA quintile 2	-0.122	<0.01
SEIFA quintile 3	-0.112	<0.01
SEIFA quintile 4	-0.154	<0.01
SEIFA quintile 5	-0.095	<0.01
SEIFA quintile missing	-0.571	<0.01
remoteness: Not Major City/Inner regional	0.027	0.146
SN: autism	-0.296	<0.01
SN: adhd	-0.576	<0.01
SN: gdd	-0.404	<0.01

(Intercept)	Estimate	P-value
SN: intellectual	0.063	0.588
SN: cerebral palsy	-0.150	0.113
SN: other neurological physical	-0.114	0.245
SN: sensory	-0.106	0.256
SN: specified other	0.033	0.567
SN: 2 or more diagnoses	-0.183	<0.01
2 DDs which affect	-0.097	<0.01
3+ DDs which affect	-0.182	<0.01
d_physical_disability_affect.1	0.047	0.483
DD: visual_impairment	0.164	<0.01
d_hearing_impairment_affect.1	0.233	<0.01
DD: speech_impairment	0.079	<0.01
d_learning_disability_affect.1	-0.056	0.103
DD: emotional_problem	-0.037	0.281
d_behavioural_problem_affect.1	-0.091	<0.01
DD: problems_at_home	0.174	<0.01
DD: trauma_isolation_or_difficulties_associatewith_resettlement	0.544	<0.01
d_other_chronic_illness_affect.1	0.104	<0.01
DD: other_neurodevelopmental_disorder	-0.089	0.028
DD: other_any_other_enduring_problems	0.058	0.113
2 DDs which do not affect	-0.022	0.704
3+ DDs which do not affect	-0.142	0.294
DD not affects:physical_disability	0.295	<0.01
DD not affects:visual_impairment	0.121	0.022
DD not affects:hearing_impairment	0.301	<0.01
DD not affects:speech_impairment	-0.056	0.271
DD not affects:learning_disability	-0.311	<0.01
DD not affects:emotional_problem	-0.141	<0.01
DD not affects:behavioural_problem	-0.072	0.218
DD not affects:problems_at_home	0.068	0.204
DD not affects:trauma_isolation_or_difficulties_associatewith_resettlement	0.226	0.081
State.ACT:Special Needs (SN)	0.094	0.473
State.NT:Special Needs (SN)	-0.122	0.417
State.QLD:Special Needs (SN)	-0.010	0.836
State.SA:Special Needs (SN)	-0.027	0.684
State.TAS:Special Needs (SN)	0.052	0.655
State.VIC:Special Needs (SN)	0.146	<0.01

(Intercept)	Estimate	P-value
State.WA:Special Needs (SN)	0.102	0.088
State.ACT:Developmental difficulty (DD) not affects	-0.088	0.390
State.NT:Developmental difficulty (DD) not affects	-0.036	0.757
State.QLD:Developmental difficulty (DD) not affects	-0.037	0.327
State.SA:Developmental difficulty (DD) not affects	0.030	0.581
State.TAS:Developmental difficulty (DD) not affects	0.040	0.636
State.VIC:Developmental difficulty (DD) not affects	-0.117	<0.01
State.WA:Developmental difficulty (DD) not affects	-0.101	0.019
State.ACT:Requires further assessment	0.123	0.322
State.NT:Requires further assessment	0.263	0.106
State.QLD:Requires further assessment	0.008	0.868
State.SA:Requires further assessment	-0.043	0.570
State.TAS:Requires further assessment	-0.207	0.124
State.VIC:Requires further assessment	-0.034	0.484
State.WA:Requires further assessment	-0.178	<0.01
State.ACT:AgeGroup <5	0.736	0.466
State.NT:AgeGroup <5	0.622	<0.01
State.QLD:AgeGroup <5	-0.059	0.503
State.SA:AgeGroup <5	-0.057	0.893
State.TAS:AgeGroup <5	-	<0.01
State.VIC:AgeGroup <5	0.650	0.154
State.WA:AgeGroup <5	0.165	0.061
State.ACT:AgeGroup ≥6	0.177	0.075
State.NT:AgeGroup ≥6	-0.002	0.988
State.QLD:AgeGroup ≥6	-0.241	<0.01
State.SA:AgeGroup ≥6	0.034	0.554
State.TAS:AgeGroup ≥6	0.038	0.617
State.VIC:AgeGroup ≥6	-0.144	<0.01
State.WA:AgeGroup ≥6	-0.003	0.985

Figure C.1 shows the ranges of predictions. We have ordered the validation dataset from lowest propensity to highest and grouped into 5-percentile bands. For the 5% of observations least likely to be from 2018 (far leftmost point), about one-in-three is from 2018. For the 5% of observations most likely to be from 2018 (far rightmost point), about four-in-five are from 2018.

Figure C.1 – Range of predictions on validation dataset

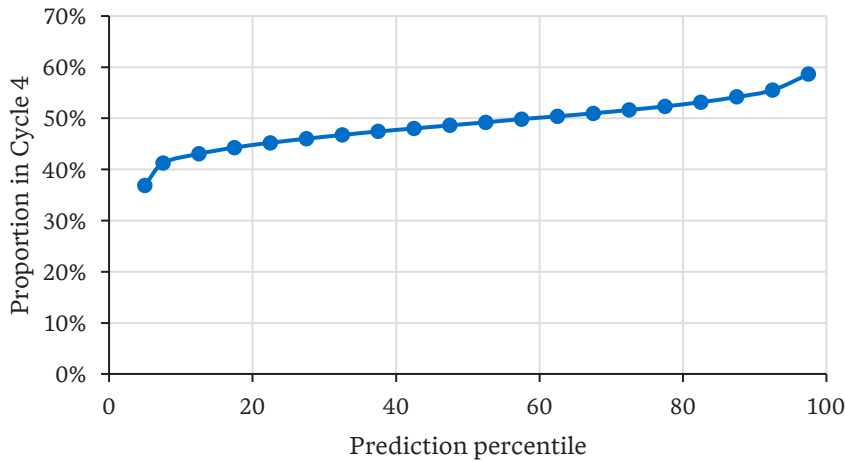
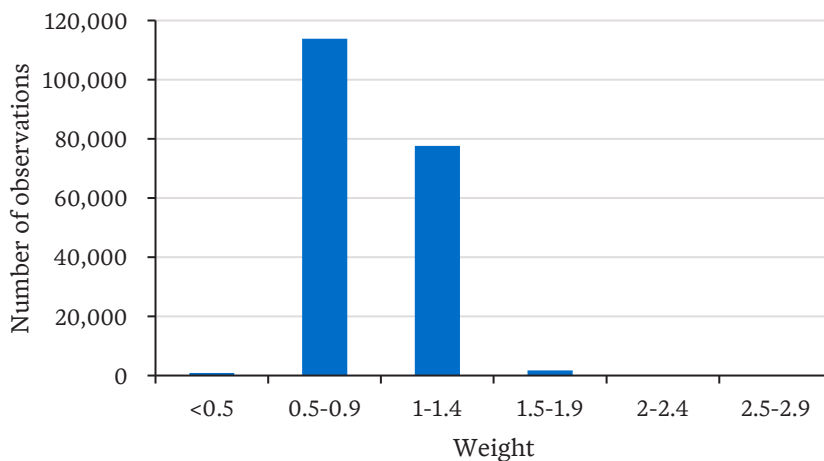


Figure C.2 shows the distribution of weights based on these predictions. Almost all are between 0.5 and 1.49. Previously, when carrying out the analysis between 2015 and 2018, we observed a small portion of weights of 4.5 or above. These were observations which belonged to (small) categories which had seen large shifts in occurrence between cycles. There were no such large (in proportionate terms) shifts. In our analysis we have retained a cap of weights at 5 (so 5 is the maximum weight assigned), however for 2021, no observations have reached this cap.

Figure C.2 – Distribution of weights, 2018 and 2021 cycles



The figures below demonstrate the impact of re-weighting on the proportion of children by some key groupings. Figure C.3 shows the proportion of children by age band. 2021 saw a younger age distribution. This is reweighted back to match the distribution from 2018. Figure C.4 shows the proportion of children by AHDN subgroup. There is an increase in the proportion of children with Autism Spectrum Disorder diagnosis between 2018 and 2021. When 2021 records are re-weighted, the proportion decreases back in line with the 2018 proportion.

Figure C.3 – Proportion of children by age – impact of re-weighting

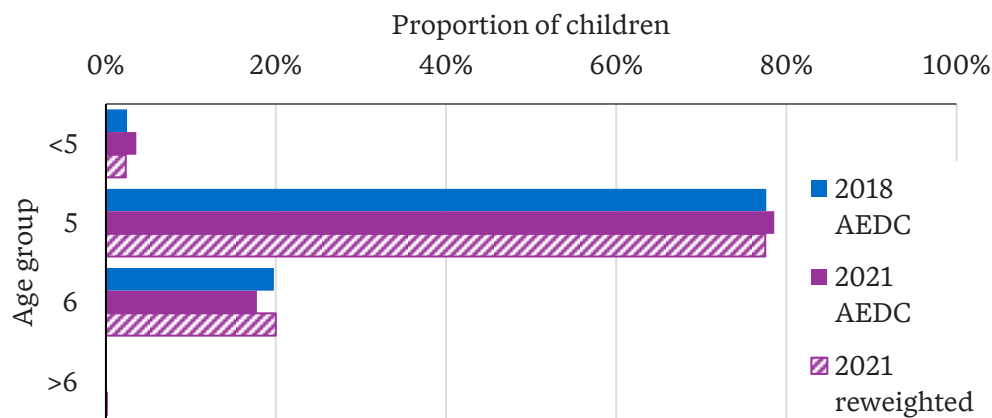


Figure C.4 – Proportion of children with special needs with various diagnoses – impact of re-weighting

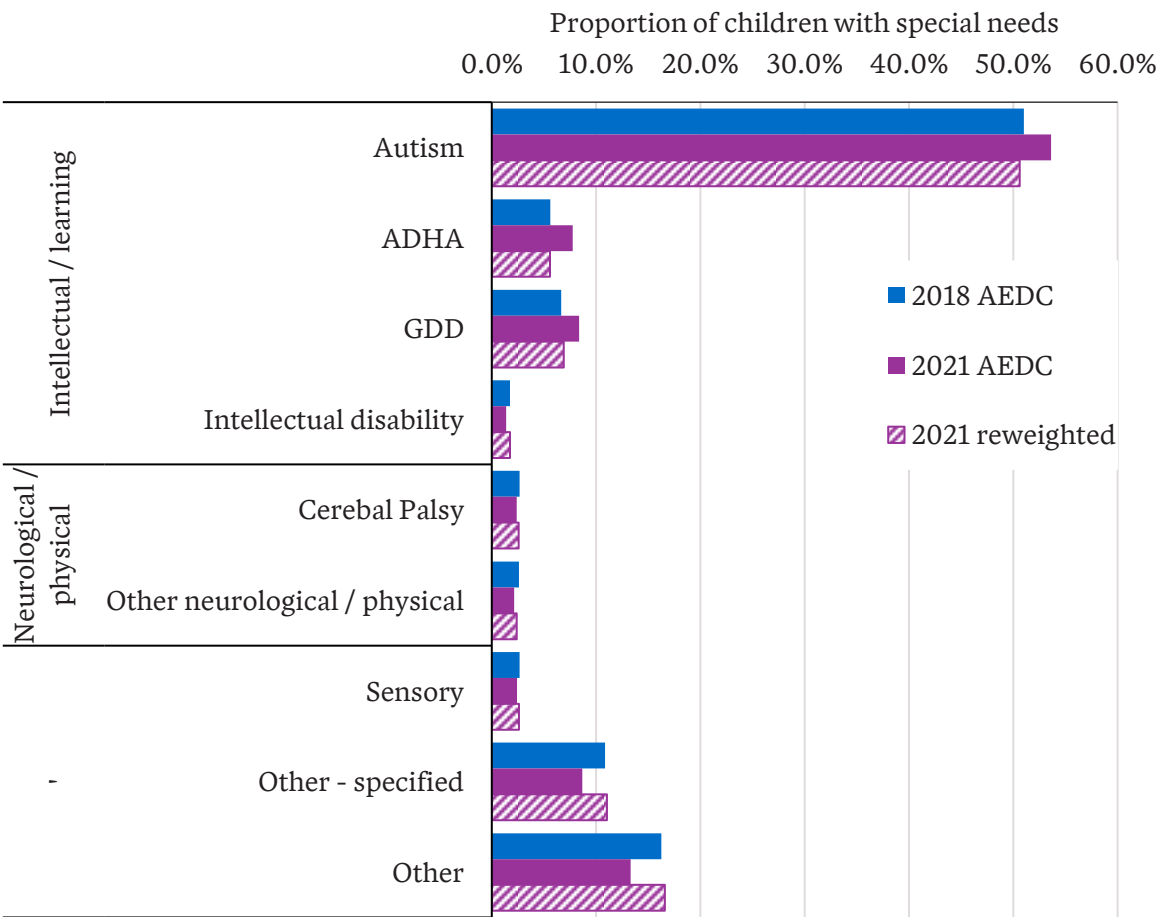
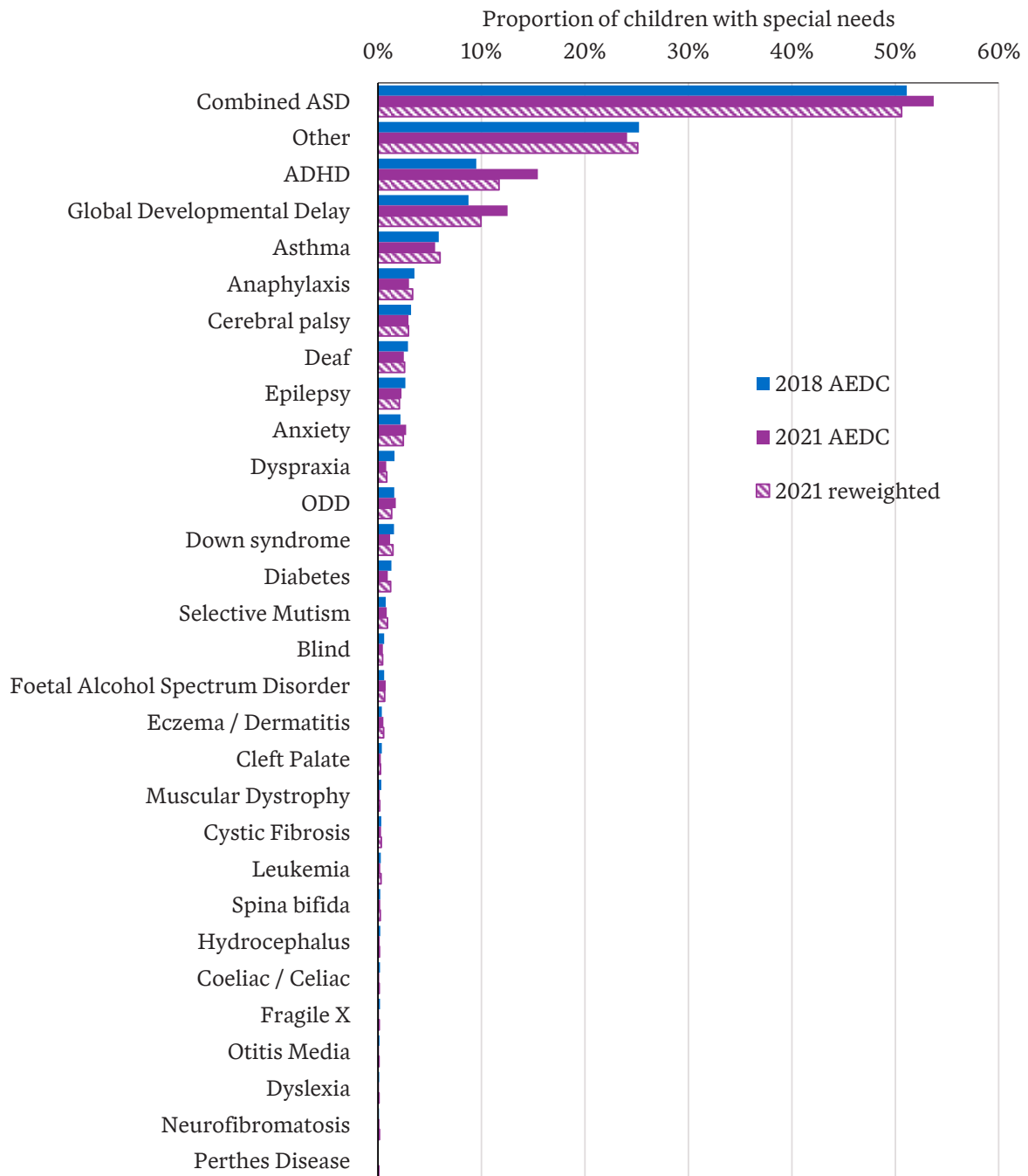


Figure C.5 shows the proportion of children with special needs with various diagnoses. There is an increase in the proportion of children with an Autism Spectrum Disorder diagnosis between Cycles 4 and 5. When Cycle 5 is re-weighted, the proportion decreases to match the proportion from Cycle 4.

Figure C.5 – Proportion of children with special needs with various diagnoses – impact of re-weighting



Notes:

- (a) Children can have multiple diagnoses so proportions will sum to over 100%
- (b) Combined ASD refers to the combined group of Autism spectrum disorder, Autism and Asperger Syndrome indicators which are collected separately and combined in the figure.
- (c) ADHD: Attention Deficit Hyperactive Disorder.
- (d) ODD: Oppositional Defiance Disorder/Oppositional Defiant Disorder.



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