Students with Significant Cognitive Disabilities and Dual Sensory Loss

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Contents

Foreword

This report—the result of a collaboration between the National Center on Deaf-Blindness (NCDB) and Accessible Teaching, Learning, and Assessment Systems (ATLAS)—fills a profound gap in our knowledge of school-age students who are deaf-blind and have significant cognitive disabilities. It is based on an analysis of information of students eligible for statewide alternate assessments from the following two key datasets:

- The National Child Count of Children and Youth Who Are Deaf-Blind—Demographic and other characteristics of children served by state deaf-blind projects
- The First Contact Survey—Teacher-reported characteristics and skills of their students with significant cognitive disabilities enrolled to take the Dynamic Learning Maps® (DLM®) alternate assessments in 17 states

Deaf-blindness involves a combination of hearing and vision loss where those senses are reduced, distorted, or missing entirely. As a result, children and youth with deaf-blindness have limited access to the auditory and visual information upon which most communication and educational strategies are based. Furthermore, approximately 70% have cognitive impairments, and 85% have one or more additional disabilities.

The National Child Count of Children and Youth Who Are Deaf-Blind has been providing vital information about this population since the mid-1980s. The First Contact Survey adds crucial comprehensive data on communication, academic, and other skills, which were analyzed for a subset of students who have known or suspected dual sensory loss.

The report analyzes information from the two datasets where they overlap, and perhaps more significantly, it provides statistics in areas where research has, historically, been quite limited. These areas include

- receptive and expressive communication skills
- hand use
- attention to instruction
- academic skills in reading, writing, math, and science

The findings of this report indicate that students who are deaf-blind face significant challenges in these areas.

Additionally, this report compares the characteristics of students with cortical visual impairment (CVI) and students with other visual impairments. Although this part of the report does not specifically focus on students with known or suspected dual sensory loss, the findings provide important information about CVI, a condition that affects many students who are deaf-blind.

NCDB is grateful for the opportunity to work with ATLAS on this project. The result of our collaboration provides essential information to help educators, technical assistance providers, researchers, and policymakers better understand the disparities faced by this population of students and address how to identify them as early as possible and provide instruction and services that promote their learning, skill development, and access to the general education curriculum.

Many thanks to NCDB's Office of Special Education Programs Project Officer, Susan Weigert, and all the ATLAS and NCDB staff who worked on this project.

Sam Morgan

NCDB Director

Executive Summary

Relatively little is known about the subset of students who have dual sensory loss and also significant cognitive disabilities that make them eligible for statewide alternate assessments. Students with dual sensory loss may not have complete loss of vision or hearing, but instead may have varying degrees, from mild to complete loss. These students may or may not be classified as having multiple disabilities under the Individuals with Disabilities Education Act (IDEA) and may or may not be eligible for statewide alternate assessments. However, students with dual sensory loss who also have significant cognitive disabilities are likely to have profiles that are different from the larger population of students who have significant cognitive disabilities without dual sensory loss. Further, appropriate interventions for students with dual sensory loss may vary depending on the type of impairment; for example, students with cortical visual impairment (CVI) may require different interventions than students with other visual impairments. A clearer understanding of characteristics of students with these intersecting disabilities could inform approaches to identification and service delivery, including instruction that supports access to the general education curriculum.

This report describes a collaboration between the National Center on Deaf-Blindness (NCDB) and Accessible Teaching, Learning, and Assessment Systems (ATLAS) on a project to use existing data sets to describe the population of students with significant cognitive disabilities and known or suspected dual sensory loss. It includes students with suspected dual sensory loss because students with significant cognitive disabilities are reported to have unidentified sensory loss (Erickson & Quick, 2017).

This report is based on data collection from the 2018 National Child Count of Children and Youth Who Are Deaf-Blind (Child Count) and the 2017–2018 First Contact survey. The Child Count is updated annually by every state deaf-blind project to provide information about new children who were identified with dual sensory loss over the course of the year, update or confirm information on previously identified children, and determine those who have exited special education or are no longer eligible to receive state project services. Data on the First Contact survey describe teacher-reported characteristics and skills of their students with significant cognitive disabilities who were enrolled to take the Dynamic Learning Maps® (DLM®) alternate assessments. Both data sets contained information about students' disabilities, sensory characteristics, educational experiences, and use of assistive technology. Each data set also contained unique information (e.g., academic skills for the First Contact survey, intervener services for Child Count data). Analyses are based on students in 17 states that administered DLM alternate assessments in 2017–2018.

The findings are organized according to three broad research questions:

1. What proportion of students with significant cognitive disabilities have dual sensory loss? What are the characteristics of students with dual sensory loss and significant cognitive disabilities?

2. How are students with significant cognitive disabilities and cortical visual impairment different from students with significant cognitive disabilities and other visual impairments?
3. What do the Child Count and First Contact survey data sets indicate about the prevalence of significant cognitive disability and dual sensory loss in the school-aged population?

Questions 1 and 3 are addressed using both data sets, while question 2 is answered using data from the First Contact survey only. Throughout the report, "deaf-blind" is used only to refer to students who formally have the IDEA disability classification. "Known or suspected dual sensory loss" is broader terminology used to describe students who do not have the formal IDEA classification but have reported sensory characteristics that are consistent with dual sensory loss. Brief summaries of results for each research question are provided below. More extensive results and summaries are provided in chapters 3–5.

Question 1: What proportion of students with significant cognitive disabilities have dual sensory loss? What are the characteristics of students with dual sensory loss and significant cognitive disabilities?

Proportion of Students

- Among Child Count students who took an alternate assessment in a DLM state, more than 8% had low vision and moderate hearing loss, and more than 6% had functional loss of vision and hearing.
    - The primary IDEA disability category for about 60% of Child Count students was *multiple disabilities.* About 15% had *deaf-blindness* as their primary disability category, and 8% had *other health impairment* as their primary disability category. Each of the remaining categories accounted for less than 5% of the Child Count population who participated in the DLM alternate assessment.
- Among all First Contact students, 3.5% were deaf or hard of hearing, and 1.8% had questionable hearing with inconclusive testing. Few were blind or had low vision (4.7%), and 2.9% had questionable vision with inconclusive testing. Overall, 0.6% of students had ***known dual sensory loss*** and 0.9% had ***suspected dual sensory loss***.

Student Characteristics

These results are based on Child Count students who took alternate assessments and First Contact students with known or suspected dual sensory loss.

- About 60% of students in each group were reported to have multiple disabilities, and 12% of First Contact students with known dual sensory loss had a primary disability classification of deaf-blindness. The Child Count sample had smaller percentages of students with intellectual disability and autism compared with the First Contact sample.
- The majority of Child Count students who took alternate assessments reportedly had a cognitive (80%), complex health care needs (59%), orthopedic/physical (75%), or speech/language (83%) impairment.

- Among First Contact students with known dual sensory loss, 49% were able to use two hands, and 44% required some physical assistance to perform tasks with their hands. Among those with suspected dual sensory loss, 37% used two hands, and 49% required some physical assistance.
- Regarding their education setting and instruction
    - In First Contact and Child Count data sets, about 10% to 12% of students spend 40% or more of the school day in general education settings. About 10% of students are educated in residential or homebound hospital settings.
    - Among First Contact students, more with known dual sensory loss than suspected dual sensory loss sustained attention to computer-based (22% vs 14%) or teacher-directed (17% vs 8%) instruction. More students with known dual sensory loss (10%) than students with suspected dual sensory loss (5%) access a computer independently.
    - Most First Contact students with known (92%) or suspected (78%) dual sensory loss used at least one type of assistive technology.
    - More than half of Child Count students who take alternate assessments used assistive listening devices or some other assistive technology.
- Findings on First Contact student expressive and receptive communication
    - Most First Contact students with known (66%) or suspected (74%) dual sensory loss did not use speech to meet their expressive communication needs. Rates of augmentative and alternative communication (AAC) use are roughly equivalent in the known (39%) and suspected (40%) dual sensory loss groups.
    - Among speech and sign users, students with known dual sensory loss tended to have more advanced expressive communication than their peers with suspected dual sensory loss.
    - Among students who do not use speech, sign, or AAC, 80% of those with known dual sensory loss and 86% of those with suspected dual sensory loss demonstrated only preintentional communication behaviors.
    - Students with known dual sensory loss reportedly had more receptive communication skills than students with suspected dual sensory loss, although the effect size was small. Both dual sensory loss groups reportedly had less receptive communication than First Contact students without dual sensory loss.
- Findings about First Contact students' academic skills are based on teachers' ratings using their general knowledge of the student, not DLM assessment results.
    - In general, students with known or suspected dual sensory loss had fewer or less frequent use of academic skills than their peers without dual sensory loss. This was true in reading, writing, mathematics, and science.
    - Students with known dual sensory loss had more academic skills than those with suspected dual sensory loss. Sensory loss classification had a small (reading, writing, mathematics) to medium (science) effect in determining whether a student would be reported to exhibit skills more frequently. The academic skill differences between known and suspected dual sensory loss groups were smaller in elementary grades and larger in high school grades.

Question 2: How are students with significant cognitive disabilities and cortical visual impairment different from students with significant cognitive disabilities and other visual impairments?

These results are based on First Contact students with significant cognitive disabilities who have CVI (*N* = 1,510) or who have other visual impairments but not CVI (non-CVI; *N* = 2,846). Results are reported related to their sensory characteristics and disabilities, communication, education, and academics.

Sensory Characteristics and Disabilities

- The CVI group had a lower percentage of students with known hearing loss and a higher percentage of students with questionable hearing compared with the non-CVI group. More students with CVI than without CVI had an unknown degree of hearing loss. Rates of use of auditory aids are similar across groups.
- A greater proportion of students with CVI were unable to use their hands compared to students with other visual impairments. Only 38% of students with CVI used one or two hands, while nearly 77% of students with other visual impairments used one or two hands.
- Students with CVI experienced interfering health issues at a significantly higher rate than did students with other visual impairments (73% versus 45%), and the effect size was moderate. The rate is higher in both groups than the First Contact population as a whole (16%).
- More students with CVI (72%) than without CVI (54%) are reported as having multiple disabilities, but more students without CVI are classified as having autism, intellectual disability, or visual impairment as their primary IDEA disability category.

Communication

- Fewer students with CVI than without CVI (19% vs. 55%) were reported to use speech for expressive communication. More students with CVI than without CVI (48% vs. 31%) used AAC devices. Among students who did not use speech, sign language, or AAC, a larger percentage of the CVI group (89%) than the non-CVI group (75%) demonstrated reflexive and unintentional communicative behaviors.
- Regardless of communication mode, students with CVI used less sophisticated expressive communication than students without CVI, and the effect size was moderate.
- Students without CVI demonstrated more consistent receptive communication skills than students with CVI, and the effect size was large.

Educational Setting, Assistive Technology, and Instruction

- Students with CVI tended to be placed in more restrictive settings compared with students without CVI.
- Over 92% of students with CVI and 95% of students without CVI used at least one assistive device.

- Fewer students with CVI than without CVI were reported to sustain attention to computer-directed (6% vs. 19%) or teacher-directed (8% vs. 20%) instruction.
- Rates of computer use with human support were similar across groups (about 60%), and fewer students with CVI (1%) than with other visual impairments (12%) were reported to access a computer independently.

Academics

- Findings about students' academic skills are based on teachers' ratings using their general knowledge of the student as reported on the First Contact survey, not DLM assessment results.
- Across academic content areas, students with CVI demonstrated academic skills less consistently than did students without CVI. Effect sizes were large in reading, mathematics, and science and small in writing.
- Students without CVI demonstrated some increase in skills from elementary to high school. Skill ratings remained relatively steady across grades for students with CVI.

Question 3: What do the First Contact and Child Count data sets indicate about the prevalence of significant cognitive disability and dual sensory loss in the school-aged population?

First Contact data provide ***single-year estimates*** of the prevalence of deaf-blindness and known or suspected dual sensory loss among ***school-aged students with significant cognitive disabilities***. Child Count data use ***three-year trends*** to report the prevalence of deaf-blindness among ***school-aged students with disabilities who receive IDEA Part B services***. As a result of these differences in underlying populations and calculation methods, direct comparisons of deaf-blindness prevalence rates are not appropriate.

- In the First Contact data, overall prevalence of deaf-blindness among students with significant cognitive disabilities was 1.11 per 1,000, or approximately 0.1%. Rates per state ranged from 0.0 to 3.45 per 1,000 (excluding one outlying state).
- In the Child Count data, overall prevalence of deaf-blindness among students with disabilities receiving Part B services was 1.10, and rates ranged from 0.71 to 2.64 per 1,000.
- In the First Contact data, the prevalence of known dual sensory loss ranged from 0.00 to 11.28 per 1,000. The prevalence of suspected dual sensory loss ranged from 0.00 to 13.93.
    - States with higher rates of known dual sensory loss also had higher rates of suspected dual sensory loss. There was variability across states in whether the known rate or the suspected rate was higher.
    - State deaf-blindness rates were weakly but positively related to prevalence of known dual sensory loss and weakly but negatively related to their prevalence of suspected dual sensory loss.
- In both data sets, less populous states had higher prevalence rates.

- In the First Contact data, the rates of deaf-blindness and suspected dual sensory loss decreased across grade bands, while the rate of known dual sensory loss decreased from elementary to middle school and increased from middle to high school.
- In the Child Count data, the overall prevalence rate of deaf-blindness IDEA disability classification increased slightly from elementary to secondary grades and more substantially between secondary and late secondary (ages 18–21 years).

Conclusion

This study highlighted potential challenges in identifying dual sensory loss among students with significant cognitive disabilities. These challenges may result in reported IDEA disability classifications that are inconsistent with IDEA reporting requirements, as well as unmet educational needs. Based on the First Contact data, it is likely that the state deaf-blindness prevalence rates among students with significant cognitive disabilities are undercounts of the actual population of students with deaf-blindness. The comparison of students with significant cognitive disabilities who have CVI versus other visual impairments also highlighted potential challenges with identification and services.

The findings highlight areas for future research on identification, prevalence, services, and outcomes for students with significant cognitive disabilities and dual sensory loss. Results will enable both organizations to better understand the needs, skills, and experiences of these students and may influence potential improvements to identification, resources, technical assistance, and instruction.

1. Overview

Students who are deaf-blind are defined as those whose combination of hearing and visual losses result in "such severe communication and other developmental and education needs that they cannot be accommodated in special education programs solely for children with deafness or children with blindness" (Title 34 - Education, 2021). Some students may have dual sensory loss but not be classified as having deaf-blindness for the purposes of IDEA eligibility. Students with dual sensory loss may not have complete loss of vision or hearing, but instead may have varying degrees, from mild to complete loss.

Little is known about the subset of students who have dual sensory loss and also significant cognitive disabilities that make them eligible for statewide alternate assessments. Based on IDEA regulations, a student with deaf-blindness and another disability would be classified as having multiple disabilities. However, the view of this population may look different depending on whether sensory loss or cognitive disability is viewed as the primary disability. For example, according to the 2018 Deaf-Blind Child Count conducted by the National Center on Deaf-Blindness (NCDB), 39.2% of students with deaf-blindness take statewide alternate[1] assessments. The same year, in 17 states that used Dynamic Learning Maps® (DLM®) alternate assessments designed for students with the most significant cognitive disabilities, DLM data indicated there were 113 students (0.1% of all students tested) whose primary IDEA disability category was deaf-blindness.

It is possible that students with significant cognitive disabilities have unidentified sensory loss (Erickson & Quick, 2017). For instance, a team might classify a student as having multiple disabilities based on autism and a known visual impairment while the student has unrecognized hearing loss. A clearer understanding of characteristics of students with these intersecting disabilities could inform approaches to identification and service delivery, including instruction that supports access to the general education curriculum. A broad disability classification such as visual impairment can also mask differences in types of impairments that indicate a need for different instructional supports. For example, cortical visual impairment (CVI) requires supports for students' unique visual processing needs rather than materials adapted to address perception. In 2019, 28% of students in the Deaf-Blind Child Count reportedly had CVI.

This report describes a collaboration between the NCDB and Accessible Teaching, Learning, and Assessment Systems (ATLAS) on a project to use existing data sets to describe the population of

[1] Child Count uses the term "alternative" instead of "alternate" assessment. We use "alternate" assessment throughout this report to refer to large-scale assessment for students with significant cognitive disabilities.

students with significant cognitive disabilities and known or suspected dual sensory loss. This collaboration was designed to enable both organizations to better understand the needs, skills, and experiences of these students and will influence potential improvements to resources, technical assistance, and data-collection tools.

NCDB shared the deidentified data set from the 2018 National Child Count of Children and Youth Who Are Deaf-Blind (Child Count) with ATLAS staff. Separately, ATLAS used the deidentified 2017–2018 First Contact survey data that describe teacher-reported characteristics and skills of their students with significant cognitive disabilities who were enrolled to take the DLM alternate assessments. Both data sets contained information about students' disabilities, sensory characteristics, educational experiences, and use of assistive technology. Each data set also contained unique information (e.g., academic skills for the First Contact survey, intervener services for Child Count data).

This report describes the findings from a study of student characteristics. The findings are organized in three sections, based on these research questions:

1. What proportion of students with significant cognitive disabilities have dual sensory loss? What are the characteristics of students with dual sensory loss and significant cognitive disabilities?
2. How are students with significant cognitive disabilities and cortical visual impairment different from students with significant cognitive disabilities and other visual impairments?
3. What do the First Contact and Child Count data sets indicate about the prevalence of significant cognitive disability and dual sensory loss in the school-aged population?

Questions 1 and 3 are addressed using both data sets, while question 2 is answered using only the First Contact survey data. Throughout the report, "deaf-blind" is used only to refer to students who formally have the IDEA disability classification *deaf-blindness.* "Known or suspected dual sensory loss" is broader terminology used to describe students who do not have the formal IDEA classification but have reported sensory characteristics that are consistent with dual sensory loss.

2. Methods

Data Sources

Dynamic Learning Maps First Contact Survey

Accessible Teaching, Learning, and Assessment Systems (ATLAS) administers Dynamic Learning Maps® (DLM®) alternate assessments based on alternate achievement standards to students with the most significant cognitive disabilities. Each year before administering DLM assessments, teachers respond to a First Contact (FC) survey (Nash et al., 2015) for all students enrolled in the assessment. The survey inquires about students' sensory and physical characteristics, accessibility needs, language, communication, and academic skills.

This study used nearly all of the FC survey items. Teachers reported students' primary Individuals with Disabilities Education Act (IDEA) disability category, except in states that use noncategorical models (e.g., "eligible individual"). Teachers answered FC questions about students' hearing and vision impairments, and, if present, the degree of the impairment. They indicated students' primary education settings according to the proportion of time spent in a general education classroom. Teachers reported whether students used any assistive devices to support instruction and assessment, such as those to support vision, hearing, or communication needs. They described students' modality and complexity of expressive communication by answering a series of questions about whether students use speech, sign language, and augmentative and alternative communication (AAC) and the quantity of words they use at one time to meet expressive communicative purposes. The extent of students' receptive communication skills was described using five response options across six items, and information about their reading, mathematics, writing, and science skills were similarly reported. Appendix A contains all FC survey items used in this study.

National Deaf-Blind Child Count

The National Child Count of Children and Youth Who Are Deaf-Blind (CC) is an annual data-collection effort implemented on behalf of the U.S. Department of Education, Office of Special Education Programs by the National Center on Deaf-Blindness (NCDB) to gather information from each state's deaf-blind project. Each U.S. state and territory is asked to supply new or updated information about children who are deaf-blind as part of the annual CC process. To be included in the final count, children must be both eligible to receive services from deaf-blind projects and served through Part B or Part C of the IDEA.

The data in CC[2] focus exclusively on children whose primary IDEA disability category is deaf-blindness and those identified with deaf-blindness who have additional disabilities through which they are eligible for IDEA services. In addition, the CC data collection includes the etiology of students' disabilities. Similar to the FC survey, the CC data collection includes the extent of students' sensory impairments. Education-related information includes the student's primary education setting, use of assistive technology, and use of intervener services. Appendix B includes the CC items used in this study.

Data Preparation

ATLAS staff used a deidentified version of the 2018 FC survey data file and merged state- and grade-level data from other sources using a unique student identifier. NCDB provided cleaned, deidentified data from the national CC. ATLAS staff conducted all statistical analyses using R version 3.6.3 (R Core Team, 2016) and the tidyverse suite of packages (Wickham et al., 2019).

Samples

First Contact

In 2017–2018, DLM assessments were administered in 17 states. IEP teams use state guidance to determine whether a student meets criteria to participate in the assessment.

The FC survey data set contained information for 100,397 students. Aside from prevalence analyses for research questions 1 and 3, we focused on students reported to have sensory loss. Most analyses were delimited to students reported to have some degree of known or suspected dual sensory loss (*N* = 1,519; see New Variables section for how this group was defined). Most students with some degree of vision and hearing loss were in grades 3–5 (*n* = 555, 36.5%) and lived in New York, New Jersey, or Illinois. English was reported to be the primary language for 76.0% of students with known or suspected dual sensory loss (*n* = 1,155), the primary language spoken at home for 69.7% (*n* = 1,058), and the primary language of instruction for 83.1% (*n* = 1,262) of students in this subgroup (Table 2.1).

[2] "CC" is used throughout the report to refer to the Deaf-Blind Child Count data, not the broader IDEA Child Count.

Table 2.1

Demographic Characteristics of First Contact Students with Dual Sensory Loss (N = 1,519)

Characteristic	*n*	%
Grade		
3–5	555	36.5
6–8	535	35.2
9–12	252	16.6
Missing	177	11.7
State		
Alaska	15	1.0
Colorado	130	8.6
Delaware	34	2.2
Illinois	167	11.0
Iowa	76	5.0
Kansas	89	5.9
Maryland	18	1.2
Missouri	105	6.9
New Hampshire	13	0.9
New Jersey	193	12.7
New York	343	22.6
North Dakota	6	0.4
Oklahoma	94	6.2
Rhode Island	20	1.3
Utah	108	7.1
West Virginia	25	1.6
Wisconsin	72	4.7
Missing	11	0.7

National Child Count

The 2018 CC data set contained information for 11,081 students between the ages of 0 and 27. For this analysis, we restricted the data to only those students who would have been eligible to take an alternate assessment based on alternate achievement standards (whether or not the CC survey reported that they did so) by identifying the age range corresponding to the grades in which alternate assessments are administered (grade 3 through high school). We excluded all students over the age of 22 and under the age of 8. To increase the likelihood that they were in third grade, 8-year-old students were included only if their birthdays fell in or after August of 2018. To improve comparability across the two data sets, we also restricted these analyses to

include only students residing in states that were members of the DLM Consortium in 2018. This reduced the sample size to 1,796 students.

This age-restricted group of students was used for some analyses in this study, and they are described in Table 2.2. For other analyses, we further restricted this sample to include only students who were reported as having taken a state alternate assessment (*n* = 898, 50.0% of age-restricted sample).

Within the age-eligible subsample, almost half of identified students were between the ages of 12 and 17 (*n* = 824, 45.9%), and just over half were male (*n* = 999, 55.6%; see Table 2.2). In the subset of students who took alternate assessments, the gender distribution was about the same as in the overall group, and more than 50% (*n* = 455) of students were between the ages of 12 and 17. The proportion of the sample in each state was roughly the same for the larger group and the subsample, except in New Jersey and New York.

Table 2.2

Demographic Characteristics of Age-Eligible and Alternate Assessment Restricted Sample of Child Count Students

Characteristic	All age-eligible in DLM states (*N* = 1,796)		Took alternate assessment in DLM states (*N* = 898)	
	n	%	*n*	%
Age in years				
8–11	484	26.9	195	21.7
12–17	824	45.9	455	50.7
18–21	435	24.2	223	24.8
21+	53	3.0	25	2.8
Gender				
Male	999	55.6	498	55.5
Female	797	44.4	400	44.5
State				
Alaska	12	0.7	7	0.8
Colorado	99	5.5	59	6.6
Delaware	44	2.4	15	1.7
Illinois	284	15.8	143	15.9
Iowa	60	3.3	37	4.1
Kansas	63	3.5	35	3.9
Maryland	145	8.1	84	9.4
Missouri	148	8.2	80	8.9
New Hampshire	55	3.1	18	2.0
New Jersey	160	8.9	128	14.3
New York	322	17.9	74	8.2
North Dakota	22	1.2	5	0.6
Oklahoma	127	7.1	79	8.8
Rhode Island	29	1.6	16	1.8
Utah	81	4.5	43	4.8
West Virginia	49	2.7	30	3.3
Wisconsin	96	5.3	45	5.0

Data Analysis

New Variables

Several analyses in this report are based on scaled variables or subgroups defined by combinations of FC survey items. This section describes the methods for creating those variables.

For research questions 1–3, we created scaled variables for **receptive communication**, **reading skills**, **mathematics skills**, and **science skills**. The items were scaled by averaging across the items relevant to each variable. For example, six items measured receptive communication on a scale from 2 to 5. The scaled receptive communication score was calculated for each student by averaging the scores for the six receptive communication items for that student. To evaluate the internal consistency of items within the new scales for each subgroup, we calculated the Cronbach's alpha reliability for each scale and each sensory-loss group. Table 2.3 summarizes the results. The strongest reliability across all sensory-loss categories was observed for the receptive communication scale. Each scale has high reliability within each subsample, but the science scale alphas are lower than the others.

Table 2.3

Cronbach's Alpha Reliability for Each Scale by Sensory Loss Group

Scale	No dual sensory loss (*N* = 98,878)	Known dual sensory loss (*N* = 649)	Suspected dual sensory loss (*N* = 870)
Receptive communication	.96	.97	.97
Reading skills	.89	.90	.88
Mathematics skills	.88	.89	.84
Science skills	.78	.80	.67

For research questions 1 and 3, we defined subgroups of students with **known dual sensory loss** and **suspected dual sensory loss**. These definitions were not based on deaf-blindness classification. Instead, using teacher responses to the FC survey sensory-characteristics items, we defined "known dual sensory loss" as deaf or hard of hearing and blind or low vision (*N* = 649). We defined "suspected dual sensory loss" (*N* = 870) using these combinations of sensory labels:

- questionable vision and deaf or hard of hearing
- questionable vision and questionable hearing but inconclusive testing
- blind or low vision and questionable hearing but inconclusive testing

Statistics on these groups are presented in Chapter 3, Table 3.3.

In some analyses, we also compared these groups to students with no dual sensory loss. These students may have had degrees of visual or auditory impairment, but they did not fall into the categories described above.

For research question 2, we created two groups of students with visual impairments: those with cortical visual impairment (CVI) and those with visual impairments other than CVI. Students in the FC survey data were classified as having visual impairments if the teacher indicated on the vision item that the student was blind or had low vision. We defined the CVI group as students within the visual-impairment group for whom the teacher reported CVI on the visual-impairment item, and the group of students with visual impairments other than CVI consisted of any student for whom the teacher had not made that selection. Results for these groups are presented in Chapter 4.

Research Question 1

Descriptive statistics on student characteristics were calculated across both data sets where survey questions addressed similar topics. In most cases, results are expressed as item-level frequency distributions. Missing data vary by item and are noted throughout the results in Chapter 3 of the report. For the FC survey items that aggregate into scales (receptive communication, reading, mathematics, science), we also report means, standard deviations, effect sizes, and confidence intervals where appropriate. Also, for the FC survey scale items, two-sample Mann-Whitney *U* tests were conducted to examine whether it is likely that the average of the approximate percentage of time that skills were reported to be exhibited by students was different between the two groups of students. The Mann-Whitney *U* test is a nonparametric test based on ranks; it tests whether the distributions of scaled scores for the two groups of interest appear to be similar (or whether the probability that an observation from one group is likely to exceed that of an observation from the other group is significantly different from the expected probability under the assumption that the distributions are equal, 0.5). Several effect size measures are appropriate for the Mann-Whitney *U* test; here, we use Vargha and Delaney's *A*, which is the probability that the value of a scaled score from one group exceeds the value of a scaled score from the other group (Vargha & Delaney, 2000). This effect size measure can range from 0 to 1, with 0 and 1 indicating complete stochastic domination of one group or the other, and 0.5 indicating no domination. Interpretive ranges for Vargha and Delaney's *A* are reported in Table 2.4. If the effect size was larger than 0.5, the known group was the dominant group (1), and if the effect size was smaller than 0.5, the suspected group was the dominant group (2).

Table 2.4

Effect Size Ranges for Vargha and Delaney's A

Dominant group	Small	Medium	Large
1 - Known	.56 to < .64	.64 to < .71	≥ .71
2 - Suspected	> .34 to .44	> .29 to .34	≤ .29

Table 2.5 summarizes the categories in which results are reported and the data sources on which the results are based.

Table 2.5

Samples Reported in Each Category of Results for Research Question 1

Category of results	First Contact		Child Count	
	Whole sample (*N* = 100,397)	Known or suspected dual sensory loss (*N* = 1,519)	Whole age-restricted sample (*N* = 1,796)	Subgroup taking alternative assessments (*N* = 898)
Sensory impairments	X	X		X
Disability categories and cognitive impairments		X	X	X
Alternate assessment participation	*	*		X
Educational setting and instruction		X		X
Communication		X		
Teacher-reported academic skills		X		

*Since all students in the FC data set take alternate assessments, these results are limited to the CC data set.

For research question 1, we also calculated CC results for students who met the age and alternate assessment criteria for inclusion in this study but were from non-DLM Consortium states. Those results are provided in Appendix C but are not discussed in this report.

Research Question 2

Similar descriptive statistics as for research question 1 were calculated and reported in Chapter 4 for students classified as having CVI and students not classified as having CVI. These analyses are limited to the FC survey data file. Results for this section are typically expressed as item-

level frequency distributions. Missing data vary by item; typically, missing data were excluded in Chapter 4 and percentages are calculated based on the number of valid responses, although exceptions are explicitly noted throughout. For the FC survey items that aggregate into scales (receptive communication, reading, mathematics, science), we also report means, standard deviations, effect sizes, and confidence intervals where appropriate. Also, for the FC survey scale items, similar to the approach for research question 1, two-sample Mann-Whitney *U* tests were conducted to examine whether it is likely that the average approximate percentage of time that skills were reportedly exhibited was different between the two groups of students. Vargha and Delaney's *A* is reported as an effect size measure. *A* indicates the probability that the value of a scaled score from one group exceeds the value of a scaled score from the other group. If the effect size was larger than 0.5, the CVI group was the dominant group (1) and if the effect size was smaller than 0.5, the without CVI group was the dominant group (2).

Research Question 3

The FC and CC data both include data on students with co-occurring cognitive and dual sensory disabilities, but the underlying populations are different. Prevalence rates were calculated and reported in Chapter 5 for both data sets. For the CC data, rates were calculated as a three-year rolling average, whereas rates for FC data are calculated from the 2018 FC data only.

In both data sets, prevalence of deaf-blind IDEA disability classification was calculated by state. For the CC data, prevalence rates were based on the population of students identified with a disability under IDEA Part B; for the FC data, prevalence rates were based on the entire population enrolled in DLM assessments in each state. Because of those differences, CC prevalence is defined as the prevalence of deaf-blindness IDEA disability classification among school-aged students with disabilities, while FC prevalence is defined as the prevalence of a primary IDEA disability classification of deaf-blindness among students with significant cognitive disabilities who are eligible for alternate assessments.

Prevalence rates were additionally calculated by state for the FC data for the known and suspected dual sensory loss groups as defined for research question 1.

All prevalence rates were calculated per 1,000 students and are presented alongside 95% binomial confidence intervals. The relationship between prevalence rates and population size per state is presented. Results are also disaggregated by grade span (FC data) or age group (CC data).

3. Results: First Contact Survey and Child Count Descriptive Statistics

This chapter of the report describes the characteristics of students with sensory loss and significant cognitive disabilities. Results are organized into these sections:

- Sensory Impairments
- IDEA Disability Categories and Cognitive Impairments
- Alternate Assessment Participation
- Educational Setting and Instruction
- Communication
- Academic Skills

Results from both surveys are interspersed, so students are referred to by the data source (e.g., First Contact [FC] students) for clarity.

In some tables throughout this chapter, column totals may not sum to the exact group totals due to missing data or the option to select multiple responses to an item. When missing data are not presented in the table, percentages are based on the number of valid responses. Further, percentages do not always add precisely to 100% due to rounding.

Sensory Impairments

Students with vision and hearing loss are widely diverse in the degree and severity of their loss. Sensory characteristics of students within the FC survey and National Deaf-Blind Child Count (CC) data samples are described below.

Among all students from the FC survey data (*N* = 100,397), 3.5% (*n* = 3,520) were deaf or hard of hearing and 1.8% (*n* = 1,833) had questionable hearing with inconclusive testing. Most students with hearing loss had an unknown severity (*n* = 743, 21.1%) or moderate hearing loss (*n* = 707, 20.1%; see Table 3.1).

Table 3.1

Number and Percentage of First Contact Students with Known Hearing Loss

Classification	*n*	% of group with known hearing loss (*N* = 3,520)	% of whole (*N* = 100,397)
Mild	645	18.3	0.6
Moderate	707	20.1	0.7
Moderately severe	519	14.7	0.5
Severe	333	9.5	0.3
Profound	531	15.1	0.5
Unknown	743	21.1	0.7
Missing	42	1.2	<0.1

Among all students from the FC survey data, a relatively small percentage of students were blind or had low vision (4.7%, *n* = 4,765), and another 2.9% *(n* = 2,922) had questionable vision with inconclusive testing. Most students with known vision loss were reported to have cortical visual impairment (CVI; *n* = 1,510, 31.7%) or low vision (*n* = 1,505, 31.6%; see Table 3.2). About two-fifths of students (*n* = 431, 42.6%) wore corrective lenses.

Table 3.2

Number and Percentage of First Contact Students with Known Vision Loss

Classification	*n*	% of group with known vision loss (*N* = 4,765)	% of whole (*N* = 100,397)
Low vision	1,505	31.6	1.5
Legally blind	1,121	23.5	1.1
Light perception only	269	5.6	0.3
Totally blind	430	9.0	0.4
Cortical visual impairment	1,510	31.7	1.5

Note. Teachers could select multiple categories, so the total percentage is greater than 100%.

Table 3.3 summarizes data regarding students with combined sensory loss. Of 100,397 students, FC surveys indicated that 649 students (0.6%) were both deaf or hard of hearing and blind or had low vision. These 649 students comprise the **known dual sensory loss group** as defined in Chapter 2. Similarly, the previously defined **suspected dual sensory loss group** (*n* = 870) is composed of the 170 students with questionable vision who were deaf or hard of hearing, the 280 students who were blind or had low vision and questionable hearing, and the 420 students with both questionable vision and hearing.

Table 3.3

Number of First Contact Students with Combinations of Hearing and Vision Loss

Hearing	Vision				Total
	No vision loss suspected	Normal with correction	Blind or low vision	Questionable	
No known hearing loss	63,098	23,196	3,817	2,325	92,436
Deaf or hard of hearing	1,341	1,341	649	170	3,501
Questionable hearing but inconclusive testing	605	523	280	420	1,828
Total	65,044	25,060	4,746	2,915	97,765

Note. Teachers did not respond to the hearing-loss item for 2,432 students or to the vision-loss item for 2,496 students.

Table 3.4 displays the severity of hearing and vision loss for the 649 students who were deaf or hard of hearing and blind or had low vision. The extent of the hearing impairment was classified as severe or profound for 32.7% (*n* = 212). Fifty-four (8.3%) of these students were totally blind. A larger proportion had low vision (*n* = 228, 35.1%) or were legally blind (*n* = 206, 31.7%).

Table 3.4

*Severity of Hearing Loss for First Contact Students Who Are Deaf/Hard of Hearing and Blind/Low Vision (*N *= 649)*

Hearing loss	Vision					Total
	Low vision	Legally blind	Light perception	Totally blind	CVI	
Mild	20	22	7	4	15	68
Moderate	50	28	3	9	25	115
Moderately severe	49	29	2	4	25	109
Severe	29	26	6	2	22	85
Profound	35	57	8	20	34	154
Unknown	45	44	9	15	54	167

Note. Teachers could select multiple categories of vision loss, so row totals add to more than 649. CVI = cortical visual impairment.

Table 3.5 displays the vision- and hearing-loss categories of CC students who took an alternate assessment in a DLM state. More than 8% (*n* = 77) of students had low vision and moderate hearing loss, and more than 6% (*n* = 60) had functional loss of vision and hearing.

Table 3.5

*Vision- and Hearing-Loss Classification for Child Count Students (*N *= 898)*

Vision classification	Hearing classification																	
	Mild		Moderate		Moderately severe		Severe		Profound		Progressive		Further testing needed		Functional loss		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Low vision	71	7.9	77	8.6	51	5.7	37	4.1	58	6.5	4	0.4	3	0.3	20	2.2	321	35.7
Legally blind	40	4.5	45	5.0	43	4.8	27	3.0	42	4.7	2	0.2	5	0.6	24	2.7	228	25.4
Light perception only	7	0.8	10	1.1	4	0.4	6	0.7	9	1.0	2	0.2	0	0.0	10	1.1	48	5.3
Totally blind	12	1.3	6	0.7	5	0.6	7	0.8	8	0.9	3	0.3	1	0.1	8	0.9	50	5.6
Progressive loss	2	0.2	4	0.4	3	0.3	3	0.3	6	0.7	0	0.0	0	0.0	0	0.0	18	2.0
Further testing needed	1	0.1	7	0.8	5	0.6	2	0.2	6	0.7	0	0.0	6	0.7	1	0.1	28	3.1
Functional loss	28	3.1	34	3.8	22	2.4	15	1.7	36	4.0	3	0.3	7	0.8	60	6.7	205	22.8
Total	161	17.9	183	20.4	133	14.8	97	10.8	165	18.4	14	1.4	22	2.5	123	13.7	898	100.0

Table 3.6 describes the hearing- and vision-loss classification of FC students with known or suspected dual sensory loss and CC students who took DLM alternate assessments. FC students with known dual sensory loss were more likely to have profound hearing loss (21.4%) as well as to be classified as having low vision (35.3%), being legally blind (31.7%), or having CVI (27.0%). FC students with suspected dual sensory loss followed similar trends but were even more likely to have CVI (41.1%).

Table 3.6

Hearing- and Vision-Loss Classification by Group

Sensory classification	First Contact known dual sensory loss (*N* = 649)		First Contact suspected dual sensory loss (*N* = 870)		Child Count (*N* = 898)	
	n	%	*n*	% [a]	*n*	%
Hearing classification						
Mild	64	10.0	17	10.2	161	17.9
Moderate	106	16.5	23	13.9	183	20.4
Moderately severe	102	15.9	26	15.7	133	14.8
Severe	75	11.7	22	13.3	97	10.8
Profound	137	21.4	38	22.9	165	18.4
Progressive loss					14	1.6
Further testing needed					22	2.4
Functional hearing loss					123	13.7
Unknown	157	24.5	40	24.1		
Vision classification [b]						
Low vision	229	35.3	69	24.6	321	35.7
Legally blind	206	31.7	62	22.1	228	25.4
Light perception	35	5.4	29	10.4	48	5.3
Totally blind	55	8.5	18	6.4	50	5.6
Cortical visual impairment	175	27.0	115	41.1	366	40.8
Progressive loss					18	2.0
Further testing needed					28	3.1
Functional vision loss					205	22.8

Note. Blank cells indicate the response option was not available on the corresponding survey.

[a] FC Hearing classification item is only presented after the teacher indicates the student is deaf or hard of hearing, and FC Vision classification item is only presented after the teacher indicates the student is blind or has low vision. Not all students in the suspected dual sensory loss group were classified these ways. Percentages are based on 166 students for hearing classification and 280 students for vision classification.

[b] Teachers could select multiple responses, so column totals add to more than *N*.

Based on the CC data, 40 students (4.5%) have central auditory processing disorder and 54 (6.0%) have auditory neuropathy.

IDEA Disability Categories and Cognitive Impairments

Students with dual sensory loss often have other disabilities that affect their learning and support needs.

Table 3.7 shows the distribution of primary IDEA disability categories for FC and CC students included in this study. About 60% of students in each group were reported to have an IDEA classification of multiple disabilities. Of the 649 FC students who were reported as having known dual sensory loss, 12.0% (*n* = 78) had a primary disability IDEA classification of deaf-blindness. The CC sample had smaller percentages of students with IDEA classifications of intellectual disability and autism compared with the FC sample.

Table 3.7

Primary IDEA Disability Categories Among Students with Known or Suspected Dual Sensory Loss Who Take Alternate Assessments

Primary IDEA disability category	First Contact known dual sensory loss (*N* = 649)		First Contact suspected dual sensory loss (*N* = 870)		Child Count (*N* = 898)	
	n	%	*n*	%	*n*	%
Autism	11	1.7	53	6.1	13	1.4
Deaf-blindness	78	12.0	6	0.7	132	14.7
Deafness	5	0.8	5	0.6		
Developmental delay	7	1.1	12	1.4	17	1.9
Emotional disturbance	0	0.0	1	0.1	0	0.0
Hearing impairment	4	0.6	5	0.6	24	2.7
Intellectual disability	69	10.6	129	14.8	22	2.4
Multiple disabilities	404	62.2	549	63.1	538	59.9
Orthopedic impairment	5	0.8	5	0.6	4	0.4
Other health impairment	34	5.2	56	6.4	66	7.3
Specific learning disability	1	0.2	1	0.1	0	0.0
Speech or language impairment	2	0.3	6	0.7	20	2.2
Traumatic brain injury	1	0.2	9	1.0	5	0.6

Primary IDEA disability category	First Contact known dual sensory loss (*N* = 649)		First Contact suspected dual sensory loss (*N* = 870)		Child Count (*N* = 898)	
	n	%	*n*	%	*n*	%
Visual impairment, including blindness	14	2.2	12	1.4	11	1.2
Noncategorical	2	0.3	2	0.2	37	4.1
Eligible individual	5	0.8	6	0.7		
Missing	7	1.1	13	1.5	8	0.9

Note. Blank cells indicate the response option was not available on the corresponding survey. FC primary disability is based on teacher report, and CC primary disability is based on IDEA Part B.

Table 3.8 summarizes the number of FC students with each sensory-related primary disability who were reported to have sensory loss. These results are delimited to the students with known or suspected dual sensory loss. Students with primary IDEA disabilities classifications including deafness, hearing impairment, and visual impairment also tended to have some loss of the other sense.

Table 3.8

Primary Sensory-Related IDEA Disability Categories and Reported Hearing and Vision Loss Among First Contact Students

	Sensory-Related IDEA Primary Disability			
Sensory loss	Deaf-blindness (*N* = 84)	Deafness (*N* = 10)	Hearing impairment (*N* = 9)	Visual impairment (*N* = 26)
Hearing loss				
Deaf/hard of hearing	80	10	8	16
Questionable	4	0	1	10
Vision loss				
Normal [a]	0	0	0	0
Blind/low vision	80	5	4	23
Questionable	4	5	5	3
Known dual sensory loss	78	5	4	14
Suspected dual sensory loss	6	5	5	12

[a] With corrective lenses or contacts.

Table 3.9 describes how students used their hands to perform classroom tasks. The largest subgroup of students with known dual sensory loss (*n* = 315, 48.5%) was able to use two hands, while the largest subgroup of students with suspected dual sensory loss (*n* = 425, 48.9%) required some physical assistance to perform tasks with their hands.

Table 3.9

Hand Use Among First Contact Students with Known or Suspected Dual Sensory Loss

Hand use	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Uses two hands together	315	48.5	323	37.1
Uses one hand	119	18.3	141	16.2
Requires physical assistance to perform tasks with hands	287	44.2	425	48.9
Cannot use hands to complete tasks even with assistance	114	17.6	215	24.7

Note. Teachers could select multiple responses, so column totals add to more than *N*.

The CC survey asks respondents about the etiology of students' disabilities. Among 17 etiology categories, a majority of students in this group were reported as having other hereditary syndromes/disorders (24.8%), a complication of prematurity (10.6%), or no determination of etiology (14.9%). Table 3.10 displays these results. The rates of asphyxia and severe head injury were higher in this subset of CC students than in the CC population as a whole (3.9% vs 1.8% and 2.7% vs 1.3%, respectively).

Table 3.10

Etiology Distributions for Child Count Students (N = 898)

Etiology	*n*	%
Asphyxia	35	3.9
CHARGE syndrome	80	8.9
Complication of prematurity	95	10.6
Cytomegalovirus (CMV)	34	3.8
Dandy-Walker syndrome	16	1.8
Down syndrome	34	3.8
Encephalitis	11	1.2
Goldenhar syndrome	8	0.9
Hydrocephaly	20	2.2
Meningitis	15	1.7
Microcephaly	24	2.7
Severe head injury	24	2.7
Stickler syndrome	2	0.2
Usher syndrome (I, II, III)	13	1.4
Other		
Hereditary syndromes/disorders	223	24.8
Postnatal/noncongenital complications	70	7.8
Prenatal/congenital complications	60	6.7
No determination of etiology	134	14.9

The CC survey also asks respondents about students' other impairments in addition to their primary disability. These other impairments may be based on secondary IDEA disability categories and/or respondents' subjective ratings. Table 3.11 shows other reported impairments. As is expected of students taking alternate assessments, the vast majority were reported as having a cognitive impairment (80.0%), and large proportions of students also had complex (58.8%), orthopedic/physical (74.8%), or speech/language (83.2%) impairments. A majority of students had three (28.8%) or four (37.5%) total other impairments. All rates of impairment in the subset of CC students who took alternate assessments are higher than in the entire CC population ("All CC" in Table 3.11, *N* = 11,081).

Table 3.11

Other Impairments for Child Count Students Who Take Alternate Assessments (N = 898)

Impairment	Yes		No		Missing		All CC
	n	%	*n*	%	*n*	%	%
Behavioral	116	12.9	749	83.4	33	3.7	9.2
Cognitive	718	80.0	154	17.1	26	2.9	63.9
Complex	528	58.8	348	38.8	22	2.4	50.5
Orthopedic/physical	672	74.8	212	23.6	14	1.6	58.0
Other impairments	99	11.0	733	81.6	66	7.3	18.6
Speech/language	747	83.2	148	16.5	3	0.3	74.0

We examined the distribution of primary IDEA disability categories for the entire age-eligible CC sample and the subset identified with cognitive impairments (see Table 3.12). In both groups, most students had a primary IDEA disability classification of multiple disabilities or deaf-blindness. Compared to the entire CC population ("All CC" in Table 3.12, *N* = 11,081), fewer students with cognitive impairments were classified with hearing or visual impairment or intellectual disability, but more had multiple disabilities. Percentages of students with cognitive impairment should be interpreted with caution because of challenges with validating that information on the CC survey.

Table 3.12

Primary Disability Category for Child Count Students Age-Eligible for Alternate Assessments

Primary disability category	All age-eligible (*N* = 1,796)		Subgroup with cognitive impairments (*N* = 1,153)		All CC
	n	%	*n*	%	%
Autism spectrum disorder	41	2.3	18	1.6	1.3
Deaf-blindness	330	18.4	196	17.0	18.8
Developmental delay [a]	64	3.6	42	3.6	6.5
Emotional disturbance	3	0.2	1	0.1	0.2
Hearing impairment (includes deafness)	105	5.8	39	3.4	8.9
Intellectual disability	30	1.7	26	2.3	4.9
Multiple disabilities	763	42.5	575	49.9	39.9
Orthopedic impairment	8	0.4	4	0.3	0.7
Other health impairment	130	7.2	81	7.0	6.5
Specific learning disability	1	0.1	1	0.1	0.4
Speech or language impairment	73	4.1	51	4.4	1.2
Traumatic brain injury	11	0.6	9	0.8	1.0
Visual impairment (includes blindness)	60	3.3	20	1.7	4.9
Noncategorical	61	3.4	41	3.6	1.4
Not reported under Part B	25	1.4	15	1.3	1.2
Unknown/missing	91	5.0	34	2.9	2.2

[a] Applicable only up to age 9.

Alternate Assessment Participation

Because all students in the FC survey file were already known to take alternate assessments, this segment of results is based on CC students from DLM states who reportedly took an

alternate assessment (*N* = 898). Statistics are presented for all age-eligible students and for the subset reported to have cognitive impairments.

Table 3.13 shows the percentages of age-eligible CC students participating in alternate assessments by age group and IDEA disability classification. Percentages are relatively consistent across age groups, although students with a primary IDEA disability classification of hearing impairment make up a larger percentage of students taking alternate assessments in older age ranges and the opposite is true for students with a primary IDEA disability classification of other health impairments. Results should be interpreted with caution for students in the 21+ age group.

Table 3.13

Child Count Students Who Took an Alternate Assessment, by Primary IDEA Disability Category and Age Group

Primary IDEA disability category	Age group								*N*	%
	8–11 (*N* = 195)		12–17 (*N* = 455)		18–21 (*N* = 223)		21+ (*N* = 25)			
	n	%	*n*	%	*n*	%	*n*	%		
Autism spectrum disorder	1	0.5	8	1.8	4	1.8	0	0.0	13	1.5
Deaf-blindness	24	12.3	75	16.5	30	13.5	3	12.0	132	14.7
Developmental delay [a]	10	5.1	6	1.3	1	0.5	0	0.0	17	1.9
Emotional disturbance	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hearing impairment (includes deafness)	1	0.5	11	2.4	12	5.4	0	0.0	24	2.7
Intellectual disability	1	0.5	16	3.5	5	2.2	0	0.0	22	2.5
Multiple disabilities	118	60.5	257	56.5	143	64.1	20	80.0	538	59.9
Orthopedic impairment	1	0.5	3	0.7	0	0.0	0	0.0	4	0.5
Other health impairment	25	12.8	34	7.5	7	3.1	0	0.0	66	7.4
Specific learning disability	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Speech or language impairment	1	0.5	13	2.9	4	1.8	2	8.0	20	2.2
Traumatic brain injury	0	0.0	3	0.7	2	0.9	0	0.0	5	0.6
Visual impairment (includes blindness)	3	1.5	5	1.1	3	1.4	0	0.0	11	1.2
Noncategorical	9	4.6	19	4.2	9	4.0	0	0.0	37	4.1
Not reported under Part B	1	0.5	0	0.0	0	0.0	0	0.0	1	0.1
Unknown/missing	0	0.0	5	1.1	3	1.4	0	0.0	8	0.9

[a] Applicable only up to age 9.

Table 3.14 shows the percentages of CC students with cognitive impairments by age group and IDEA disability classification. Students who were reported as having cognitive impairments had variable participation in alternate assessments depending on their age group. Among the 1,153 students reported to have cognitive impairments, 62.3% (*n* = 718) were reported to have taken alternate assessments. Of those, most (*n* = 369, 51.4%) were 12–17 years old. Similar to the results for the entire age-eligible population, students with the IDEA classification of hearing impairments comprise increasing percentages of students who take alternate assessments in higher age ranges while the percentage of students with the IDEA classification of other health impairments decreases in the upper age ranges. Again, results for students in the 21+ age group should be interpreted with caution.

Table 3.14

Child Count Students with Cognitive Impairments Who Took an Alternate Assessment, by Primary IDEA Disability Category and Age Group

Primary IDEA disability category	Age group								*N*	%
	8–11 (*N* = 147)		12–17 (*N* = 369)		18–21 (*N* = 178)		21+ (*N* = 24)			
	n	%	*n*	%	*n*	%	*n*	%		
Autism spectrum disorder	1	0.7	6	1.6	4	2.3	0	0.0	11	1.5
Deaf-blindness	18	12.2	60	16.3	22	12.4	3	12.5	103	14.4
Developmental delay [a]	8	5.4	3	0.8	0	0.0	0	0.0	11	1.5
Emotional disturbance	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hearing impairment (includes deafness)	0	0.0	7	1.9	9	5.1	0	0.0	16	2.2
Intellectual disability	0	0.0	14	3.8	5	2.8	0	0.0	19	2.7
Multiple disabilities	93	63.3	211	57.2	117	65.7	19	79.2	440	61.3
Orthopedic impairment	0	0.0	2	0.5	0	0.0	0	0.0	2	0.3
Other health impairment	18	12.2	29	7.9	6	3.4	0	0.0	53	7.4

Primary IDEA disability category	Age group								*N*	%
	8–11 (*N* = 147)		12–17 (*N* = 369)		18–21 (*N* = 178)		21+ (*N* = 24)			
	n	%	*n*	%	*n*	%	*n*	%		
Specific learning disability	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Speech or language impairment	1	0.7	11	3.0	2	1.1	2	8.3	16	2.2
Traumatic brain injury	0	0.0	2	0.5	2	1.1	0	0.0	4	0.6
Visual impairment (includes blindness)	0	0.0	3	0.8	2	1.1	0	0.0	5	0.7
Noncategorical	7	4.8	16	4.3	7	3.9	0	0.0	30	4.2
Not reported under Part B	1	0.7	0	0.0	0	0.0	0	0.0	1	0.1
Unknown/missing	0	0.0	5	1.4	2	1.1	0	0.0	7	1.0

[a] Applicable only up to age 9.

Educational Setting and Instruction

This section describes findings related to students' educational setting, use of assistive technology, engagement with instruction, computer use, and intervener services. Table 3.15 summarizes the educational settings for FC students with known or suspected dual sensory loss and CC students who took alternate assessments. In the FC sample, 10.8% of students with known dual sensory loss and 9.9% of students with suspected dual sensory loss spend 40% or more of the school day in general education settings. In the CC sample, this increases to 11.8%. Across all groups, about 10% of students are educated in residential or homebound hospital settings.

Table 3.15

Educational Setting of Students Who Take Alternate Assessments

Educational setting	First Contact known dual sensory loss (*N* = 649)		First Contact suspected dual sensory loss (*N* = 870)		Child Count [a] (*N* = 898)	
	n	%	*n*	%	*n*	%
Regular class > 80%	14	2.2	25	2.9	33	3.7
Regular class 40%–79%	56	8.6	61	7.0	73	8.1
Regular class < 40%	288	44.4	427	49.1	310	34.5
Separate school	230	35.4	269	30.9	268	29.8
Residential facility	16	2.5	19	2.2	49	5.5
Homebound/hospital	45	6.9	66	7.6	46	5.1
Parentally placed private school					5	0.6
Unknown/missing	0	0.0	3	0.3	114	12.7

Note. Blank cells indicate the response option was not available on the corresponding survey.
[a] CC results collapsed to common setting labels when original reporting categories varied across states.

Among all age-eligible CC students who took alternate assessments in DLM states (*N* = 898), 8.1% (*n* = 73) received intervener services, 81.4% did not, and information was unknown or missing for 10.5%. Among students receiving intervener services, 30.1% were between the ages of 8 and 11 (*n* = 22), 54.8% were between 12 and 17 (*n* = 40), 12.3% were between 18 and 21 (*n* = 9), and 2.7% were over 21 (*n* = 2).

The FC survey asks questions about students' engagement with computer- and teacher-directed instructional activities (see Table 3.16). Students in both groups generally demonstrated fleeting or little to no attention to computer-directed instruction, but more students with known dual sensory loss than suspected dual sensory loss sustained attention to both types of instruction.

Table 3.16

Engagement During Computer- and Teacher-Directed Instruction Among First Contact Students with Known or Suspected Dual Sensory Loss

Engagement	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Computer engagement				
Generally sustains attention to computer-directed instruction	102	21.9	81	13.8
Demonstrates fleeting attention to computer-directed instructional activities and requires repeated bids or prompts for attention	222	47.7	271	46.2
Demonstrates little or no attention to computer-directed instructional activities	121	26.0	201	34.3
Missing	20	4.3	33	5.6
Teacher engagement				
Generally sustains attention to teacher-directed instruction	107	16.5	68	7.8
Demonstrates fleeting attention to teacher-directed instructional activities and requires repeated bids or prompts for attention	298	45.9	364	41.8
Demonstrates little or no attention to teacher-directed instructional activities	219	33.7	394	45.3
Missing	25	3.9	44	5.1

Note. The computer engagement item only displayed if the teacher responded that the student was able to access a computer per Table 3.17 (*N* = 465 for known dual sensory loss and *N* = 586 for suspected dual sensory loss).

The FC survey also reports on students' computer use and access. A majority of both groups of students access a computer, whether independently or with support (see Table 3.17). However, a larger portion of students with known dual sensory loss (9.7%) than students with suspected dual sensory loss (4.7%) access a computer independently. For both groups, the students who had not used a computer had not done so because teachers reported that their disability prevented their access (83.4% and 86.1%, respectively).

Table 3.17

Computer Use Among First Contact Students with Known or Suspected Dual Sensory Loss

Computer use	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Accesses a computer independently	61	9.4	41	4.7
Accesses a computer independently given assistive technology	25	3.9	21	2.4
Uses a computer with human support (with or without assistive technology)	379	58.4	524	60.2
Has not had the opportunity to access a computer	26	4.0	25	2.9
Cannot access a computer with human or assistive technology support	155	23.9	256	29.4
Missing	3	0.5	3	0.3
No access [a]				
Student disability prevents the student from accessing a computer	151	83.4	242	86.1
The equipment is unavailable	2	1.1	3	1.1
Student refuses to try to use a computer	14	7.7	20	7.1
I (or other educators at this school) have not had the opportunity to instruct the student on computer usage	12	6.6	11	3.9
Missing	2	1.1	5	1.8

[a] Response options only presented when teacher responded “has not had the opportunity to access a computer” or “cannot access a computer with human or assistive technology” in first part of question.

Most students with known (*n* = 595, 91.7%) or suspected (*n* = 682, 78.4%) dual sensory loss used at least one type of assistive technology. Details about types of technologies are provided in Table 3.18. Rates of use were similar across groups for most types of assistive technology,

although larger proportions of students with known dual sensory loss than suspected dual sensory loss were reported to use screen magnification, screen reader, braille, and closed-circuit television (CCTV). Mode of access was similar across groups.

Table 3.18

Use of Assistive Technology Among First Contact Students with Known or Suspected Dual Sensory Loss

Technology	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Type of assistive device				
Screen magnification device	256	39.4	76	27.1
CCTV [a]	33	5.1	7	2.5
Screen reader and/or talking word processor [a]	234	36.1	83	29.6
Manual or electronic braille writing device [a]	22	3.4	8	2.9
Refreshable braille display [a]	6	0.9	0	0.0
Single message devices [a]	104	16.0	136	15.6
Simple devices	56	8.6	72	8.3
Speech generating device	66	10.2	101	11.6
No voice output technology	161	24.8	194	22.3
Mode of access [b]				
Standard computer keyboard	167	35.9	200	34.1
Scanning with switches	57	12.3	78	13.3
Keyboard with large keys or alternate keyboard	77	16.6	63	10.8
Touch screen	297	63.9	372	63.5
Standard mouse or head mouse	113	24.3	145	24.7
Eye gaze	13	2.8	25	4.3

Note. Teachers could select multiple categories of assistive technology, so row totals add to more than *N*.

[a] Item displayed only if teachers had previously responded that the student was blind or low vision (*N* = 649 for known dual sensory loss, *N* = 280 for suspected dual sensory loss).

[b] Item displayed only if the teacher previously responded that the student was able to access a computer per Table 3.17 (*N* = 465 for known dual sensory loss and *N* = 586 for suspected dual sensory loss).

Substantially more students with known dual sensory loss than suspected dual sensory loss used classroom amplification or unilateral or bilateral hearing aids (see Table 3.19).

Table 3.19

Use of Hearing Assistance Among First Contact Students with Known or Suspected Dual Sensory Loss

Hearing assistance	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Classroom amplification	182	28.0	93	10.7
Unilateral hearing aid	64	9.9	30	3.4
Bilateral hearing aid	236	36.4	65	7.5
Cochlear implant	70	10.8	22	2.5
Sign language	153	23.6	173	19.9

Note. Teachers could select multiple categories of hearing assistance, so row totals add to more than *N*.

Table 3.20 summarizes the rates of assistive technology use as reported on the CC survey for students who take alternate assessments. Most students used some other technology (55.7%), and half used assistive listening devices (53.3%). Among students who used additional technology, 38.4% (*n* = 192) did not use assistive listening devices or cochlear implants.

Table 3.20

*Use of Assistive Technology Among Child Count Students (*N *= 898)*

Assistive technology	Yes		No		Missing	
	n	%	*n*	%	*n*	%
Additional technology	500	55.7	313	34.9	85	9.5
Assistive listening device	479	53.3	364	40.5	55	6.1
Cochlear implant	79	8.8	767	85.4	52	5.8

Communication

The FC survey includes questions about the mode and complexity of students' expressive communication and the frequency with which they demonstrate certain receptive communication skills. Information about expressive communication mode is summarized in

Table 3.21. Most students with known or suspected dual sensory loss did not use speech to meet their expressive communication needs. A larger percentage of students with known dual sensory loss used speech and/or sign compared with students with suspected dual sensory loss. Rates of use of augmentative and alternative communication (AAC) are roughly equivalent. Among the 26.5% of students with known sensory loss who do not communicate using speech, sign, or AAC, 80.2% demonstrated preintentional communication behaviors. Of the 35.7% of students with suspected dual sensory loss who do not use speech, sign, or AAC to communicate, 86.2% demonstrated preintentional communication behaviors.

Table 3.21

Expressive Communication Modalities Among First Contact Students by Sensory-Loss Classification

Student uses expressive communication modality	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Speech				
Yes	218	33.6	229	26.4
No	430	66.4	640	73.6
Sign				
Yes	136	21.0	135	15.5
No	512	79.0	734	84.5
AAC				
Yes	250	38.6	351	40.4
No	398	61.4	518	59.6
Other (if no speech, sign, or AAC) [a]				
Uses conventional gestures and vocalizations to communicate intentionally	9	5.2	17	5.5
Uses only unconventional vocalizations, gestures, and/or body movement to communicate intentionally	29	16.9	30	9.6
Behaviors may be reflexive and not intentionally communicative but can be interpreted as communication	138	80.2	268	86.2

Note. AAC = augmentative and alternative communication.

[a] Percentages based on totals of 172 students in the known group and 311 students in the suspected group who answered “no” to speech, sign, and AAC.

Among all students with known or suspected dual sensory loss who used symbols to communicate, the majority (60.9% for known and 63.6% for suspected) chose from one or two symbols at a time when communicating. A majority of students with known dual sensory loss who used symbols used real objects (68.1%, *n* = 237), photos (63.2%, *n* = 220), or line drawing symbol sets (50.3%, *n* = 175). The distribution was similar for students with suspected dual sensory loss who used symbols; 67.9% used real objects (*n* = 317), 69.4% used photos (*n* = 324), and 51.8% used line drawing symbol sets (*n* = 242).

Table 3.22 summarizes the complexity of expressive communication for students reportedly using each mode (i.e., based on "yes" responses in Table 3.21). Among speech and sign users, students with known dual sensory loss tended to have more sophisticated expressive communication than their peers with suspected dual sensory loss. The distributions of expressive communication sophistication do not follow the same pattern for AAC users; 82.8% of students with known dual sensory loss and 77.2% of students with suspected dual sensory loss used one symbol to meet simple communication needs. In other words, among students who used AAC, more students with suspected dual sensory loss (22.8%) than students with known dual sensory loss (17.2%) could use single symbols for a range of communication purposes or combine symbols for any purpose.

Table 3.22

Sophistication of First Contact Students' Expressive Communication Used in Each Mode, by Sensory-Loss Classification

Expressive communication	Known dual sensory loss		Suspected dual sensory loss	
	n	%	*n*	%
Speech				
Regularly combines three or more spoken words according to grammatical rules to accomplish a variety of communicative purposes	124	56.9	76	33.2
Usually uses two spoken words at a time to meet a variety of more complex communicative purposes	62	28.4	78	34.1
Usually uses only one spoken word at a time to meet a limited number of simple communicative purposes	32	14.7	75	32.8
Sign				
Regularly combines three or more signed words according to grammatical rules to accomplish a variety of communicative purposes	9	6.6	3	2.2
Usually uses two signed words at a time to meet a variety of more complex communicative purposes	22	16.2	16	11.9
Usually uses only one signed word at a time to meet a limited number of simple communicative purposes	105	77.2	116	85.9
Augmentative and alternative communication				
Regularly combines three or more symbols according to grammatical rules to accomplish the four major communicative purposes	9	3.6	10	2.8
Usually uses two symbols at a time to meet a variety of more complex communicative purposes	34	13.6	70	19.9
Usually uses only one symbol to meet a limited number of simple communicative purposes	207	82.8	271	77.2

Note. Percentages are based on total "yes" responses in Table 3.21.

Table 3.23 summarizes the frequency with which students in each group demonstrated specific receptive communication skills. In general, students with known dual sensory loss reportedly had more frequent use of specific receptive communication skills than students with suspected dual sensory loss.

Table 3.23

Frequency of Use of Receptive Communication Skills Among First Contact Students by Sensory-Loss Classification

Frequency of use of receptive communication skills (Percent of the time)	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Can point to, look at, or touch things in the immediate vicinity when asked				
0%–20%	249	38.4	393	45.3
21%–50%	122	18.8	197	22.7
51%–80%	112	17.3	134	15.4
> 80%	165	25.5	144	16.6
Can perform simple actions, movements or activities when asked				
0%–20%	294	45.4	459	52.9
21%–50%	109	16.8	165	19.0
51%–80%	100	15.4	118	13.6
> 80%	145	22.4	126	14.5
Responds appropriately in any modality (speech, sign, gestures, facial expressions) when offered a favored item that is not present or visible				
0%–20%	286	44.3	433	49.9
21%–50%	105	16.3	190	21.9
51%–80%	119	18.4	137	15.8
> 80%	136	21.1	107	12.3
Responds appropriately in any modality (speech, sign, gestures, facial expressions) to single words that are spoken or signed				
0%–20%	266	41.3	439	50.6
21%–50%	137	21.3	199	22.9
51%–80%	115	17.9	134	15.4
> 80%	126	19.6	96	11.1

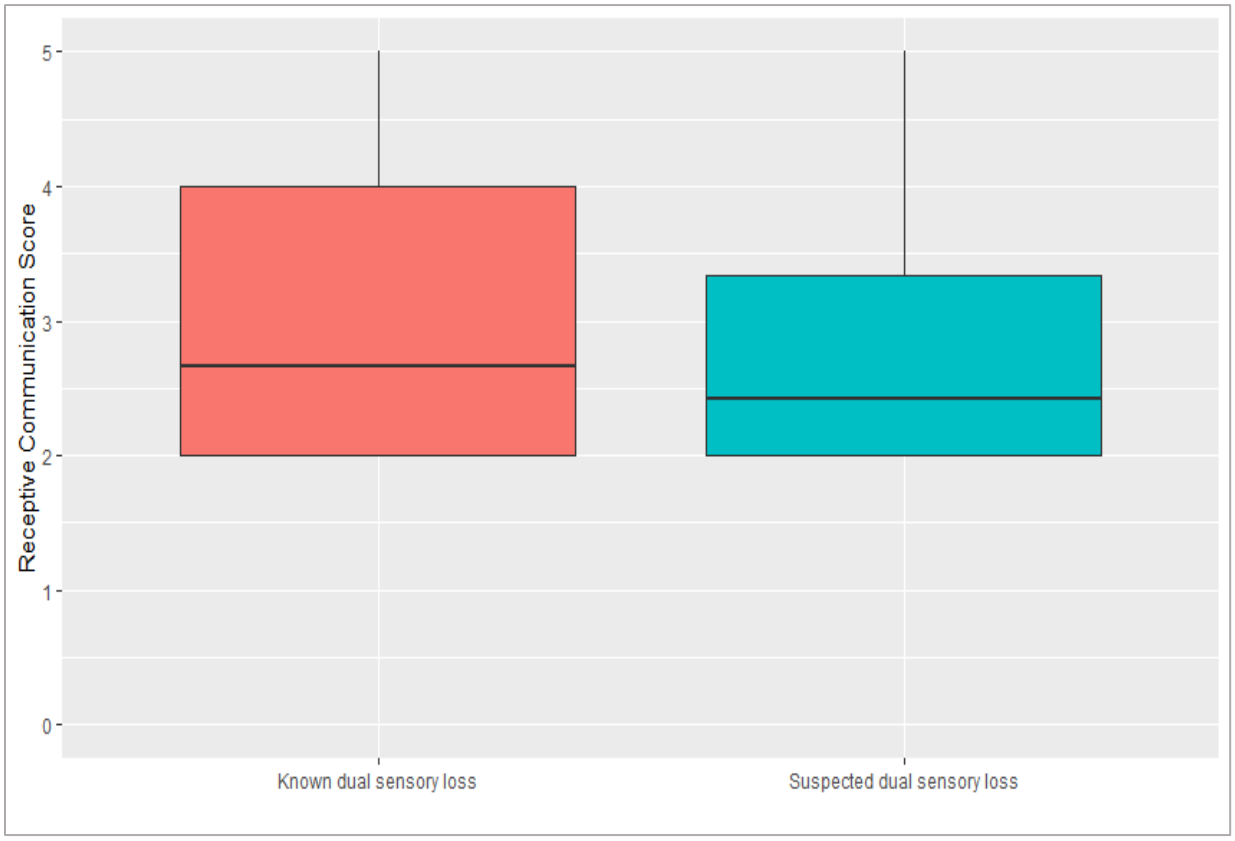
Frequency of use of receptive communication skills (Percent of the time)	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)	
	n	%	*n*	%
Responds appropriately in any modality (speech, sign, gestures, facial expressions) to phrases and sentences that are spoken or signed				
0%–20%	299	46.4	476	54.8
21%–50%	132	20.5	199	22.9
51%–80%	115	17.8	121	13.9
> 80%	99	15.3	72	8.3
Follows two-step directions presented verbally or through sign				
0%–20%	396	61.5	617	71.3
21%–50%	94	14.6	144	16.6
51%–80%	89	13.8	74	8.6
> 80%	65	10.1	30	3.5

Note. Item totals do not match group totals due to missing data.

We combined receptive communication items into a single scale and examined group means. In both groups, the distribution was slightly positively skewed (see Figure 3.1). Students with known dual sensory loss had better overall receptive communication skills (M = 3.09, SD = 1.08) than did students with suspected dual sensory loss (M = 2.82, SD = 0.95). A Mann-Whitney U test confirmed that while the mean receptive communication distributions for the dual sensory loss groups are significantly different (W = 313,966, p < .001), sensory-loss classification had a small effect in determining whether a student would be reported to have a higher receptive communication score (A = .56). Both groups had a lower receptive communication score than FC students without known or suspected dual sensory loss (M = 4.06, SD = .93; not shown in figure).

Figure 3.1

Distribution of Receptive Communication Scale Scores by Sensory-Loss Classification



Academic Skills

In one section of the FC survey, teachers describe the frequency with which students demonstrate certain academic skills. Teachers' ratings are based on their general knowledge of the student, not DLM assessment results. In this section of the report, the frequency distributions are reported for specific skills in each subject (i.e., reading, writing, mathematics, science). For reading, mathematics, and science, frequencies are followed by group comparisons (known vs. suspected dual sensory loss) on mean skill ratings per subject and grade/grade band. Mean ratings are on a four-point scale based on the original ranges (1 = 0%–20%, 2 = 21%–50%, 3 = 51%–80%, 4 = > 80%). We describe demonstration of a skill more than 80% of the time as "consistent."

Although the number of responses per item vary in this section, column headings reflect total sample size. In other words, missing responses are excluded when calculating the percentages.

Reading and Writing

In reading, fewer students with suspected dual sensory loss than with known dual sensory loss were reported to consistently demonstrate a skill, and this was true across all reading skills (see

Table 3.24). Students with no dual sensory loss were more frequently reported to consistently demonstrate reading skills than either dual sensory loss group as well. For the lowest-level reading skill, 17.8% of students with known dual sensory loss recognized single symbols more than 80% of the time, compared to 10.2% of students with suspected dual sensory loss, and 47.6% of students with no dual sensory loss. For the highest-level reading skill, 2.2% of students with known dual sensory loss explained or elaborated on text more than 80% of the time, compared to 0.5% of students with suspected dual sensory loss, and 4.8% of students with no dual sensory loss.

Table 3.24

Frequency of Reading Skill Use by Sensory-Loss Classification

Reading skill	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		No dual sensory loss (*N* = 98,878)	
	n	%	*n*	%	*n*	%
Recognizes single symbols presented visually or tactually						
< 80% of the time	523	82.2	776	89.8	50,319	52.4
> 80% of the time	113	17.8	88	10.2	45,764	47.6
Understands purpose of print or braille but not necessarily by manipulating a book						
< 80% of the time	521	81.9	775	89.7	52,999	55.2
> 80% of the time	115	18.1	89	10.3	43,084	44.8
Matches sounds to symbols or signs to symbols						
< 80% of the time	554	87.1	813	94.1	62,506	65.1
> 80% of the time	82	12.9	51	5.9	33,577	34.9
Reads words, phrases, or sentences in print or braille when symbols are provided with the words						
< 80% of the time	555	87.3	822	95.1	65,939	68.6
> 80% of the time	81	12.7	42	4.9	30,144	31.4

Reading skill	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		No dual sensory loss (*N* = 98,878)	
	n	%	*n*	%	*n*	%
Identifies individual words without symbol support						
< 80% of the time	573	90.1	828	95.8	69,816	72.7
> 80% of the time	63	9.9	36	4.2	26,266	27.3
Reads text presented in print or braille without symbol support but without comprehension						
< 80% of the time	598	94.0	840	97.2	78,291	81.5
> 80% of the time	38	6.0	24	2.8	17,792	18.5
Reads text presented in print or braille without symbol support and with comprehension						
< 80% of the time	616	96.9	859	99.4	89,464	93.1
> 80% of the time	20	3.1	5	0.6	6,618	6.9
Explains or elaborates on text read in print or braille						
< 80% of the time	622	97.8	860	99.5	91,429	95.2
> 80% of the time	14	2.2	4	0.5	4,653	4.8

Table 3.25 describes teachers' judgments of students' reading levels. Consistent with the results shown in Table 3.24, more students with suspected dual sensory loss did not read any words in print or braille (71.6%) than students with known dual sensory loss (60.7%). Only 6.0% (*n* = 52) of students with suspected dual sensory loss read above a first-grade level, compared to 12.8% (*n* = 83) of students with known dual sensory loss.

Table 3.25

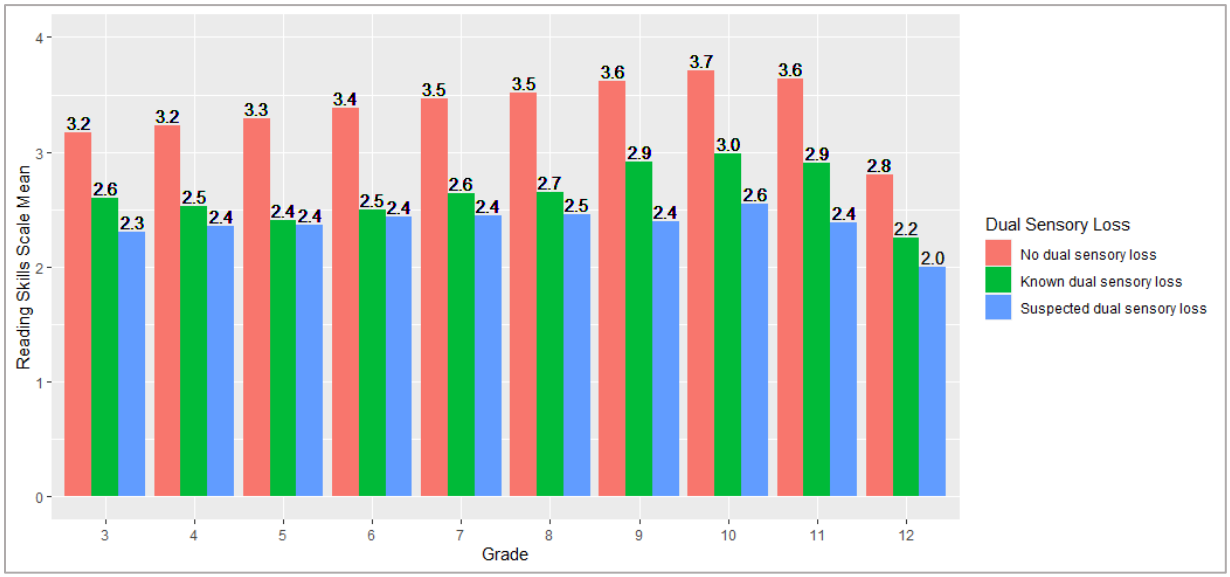
Instructional Reading Level by Sensory-Loss Classification

Instructional level of reading text with comprehension	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		Total	
	n	%	*n*	%	*n*	%
Above third-grade level	15	2.3	5	0.6	20	1.3
Above second-grade level to third-grade level	21	3.2	8	0.9	29	1.9
Above first-grade level to second-grade level	47	7.2	39	4.5	86	5.7
Primer to first-grade level	66	10.2	73	8.4	139	9.2
Reads only a few words or up to pre-primer level	93	14.3	116	13.3	209	13.8
Does not read any words when presented in print or braille (not including environmental signs or logos)	394	60.7	623	71.6	1,017	67.0
Missing	13	2.0	6	0.7	19	1.3

We combined the reading-skills items into a single scale and compared the means across sensory-loss groups. For students without dual sensory loss, the mean was 3.42 (*SD* = 0.95). For students with known dual sensory loss, the mean was 2.65 (*SD* = 0.89). For students with suspected dual sensory loss, the mean was 2.40 (*SD* = 0.68). A Mann-Whitney *U* test found that while the reading skill frequency distributions for the dual sensory loss groups are significantly different (*W* = 318,838, $p < .001$), sensory-loss classification had a small effect in determining whether a student would be reported to exhibit reading skills more frequently (*A* = .57). Figure 3.2 displays the mean response of the reading items by dual sensory loss classification and grade level. Teachers rated the reading skills of students with suspected dual sensory loss consistently across all grades. Mean ratings increased slightly for students with known dual sensory loss and with no dual sensory loss in higher grades. (The lower mean in grade 12 should be interpreted with caution given the small sample size.)

Figure 3.2

Reading Skills by Grade Level and Sensory-Loss Classification



For the writing section on the FC survey, teachers are asked to indicate the highest writing skill a student has demonstrated even once during instruction (see Table 3.26). Consistent with previous results, 24.2% of students with suspected dual sensory loss were reported to have written at least once at a higher level than scribbles or randomly writing/selecting letters or symbols, compared to 32.9% of students with known dual sensory loss and 74.6% of students with no dual sensory loss. Very few students in both dual sensory loss groups wrote sentences or complete ideas or paragraphs using spelling.

Table 3.26

Highest Writing Skill Demonstrated by Students by Sensory-Loss Classification

Writing skill	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		No dual sensory loss (*N* = 98,878)	
	n	%	*n*	%	*n*	%
Writes paragraph-length text without copying, using spelling (with or without word prediction)	7	1.1	1	0.1	3,652	3.8
Writes sentences or complete ideas without copying, using spelling (with or without word prediction)	34	5.3	16	1.9	12,518	13.0
Writes words or simple phrases without copying, using spelling (with or without word prediction)	47	7.4	31	3.6	17,388	18.1
Writes words using letters to accurately reflect some of the sounds	20	3.1	21	2.4	9,601	10.0
Writes using word banks or picture symbols	23	3.6	44	5.1	6,610	6.9
Writes by copying words or letters	78	12.3	96	11.1	21,940	22.8
Scribbles or randomly writes/selects letters or symbols	427	67.1	655	75.8	24,359	25.4

A Mann-Whitney *U* test found that while the highest-level writing skill distributions for the dual sensory loss groups are significantly different ($W = 246{,}744$, $p < .001$), sensory-loss classification had a small effect in determining whether a student would be reported to exhibit higher levels of writing skills ($A = .44$).

Figure 3.3, Figure 3.4, and Figure 3.5 display the highest-level writing skill for students with known or suspected dual sensory loss, disaggregated by grade band. Students from both dual sensory loss groups show an increase in writing skills in higher grade bands. Students with suspected dual sensory loss demonstrated more similar skills across grade bands compared to students with known dual sensory loss, who tended to demonstrate a slightly larger increase in writing skills from elementary through high school.

Figure 3.3

Highest Writing Skill Demonstrated: Elementary Grade Band (3–5)

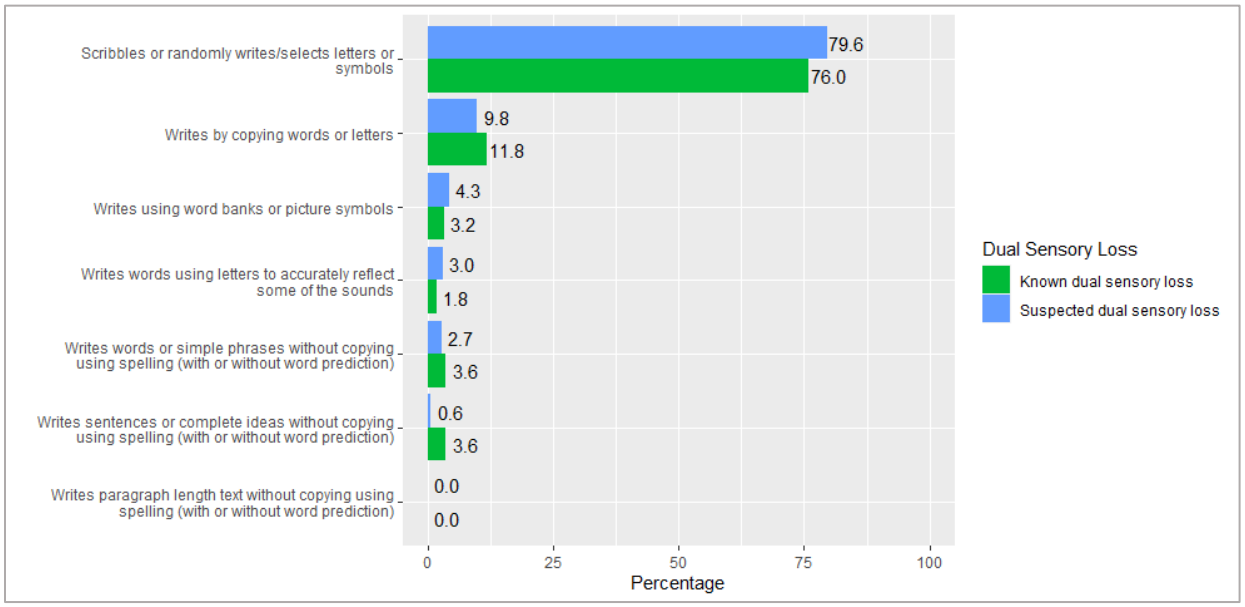


Figure 3.4

Highest Writing Skill Demonstrated: Middle School Grade Band (6–8)

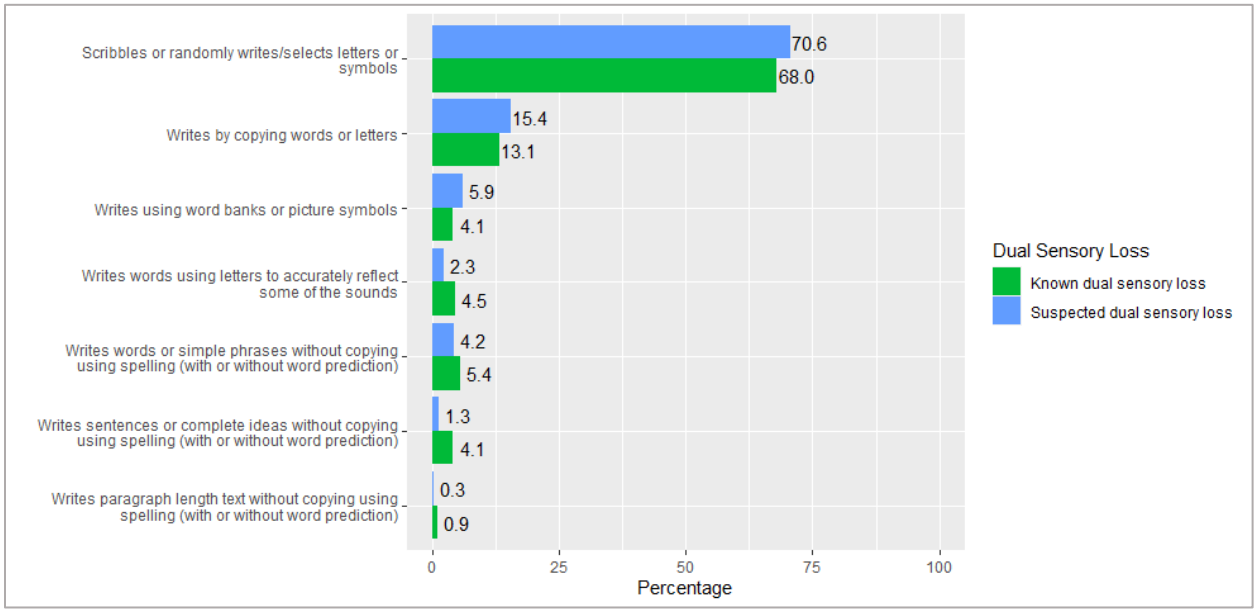
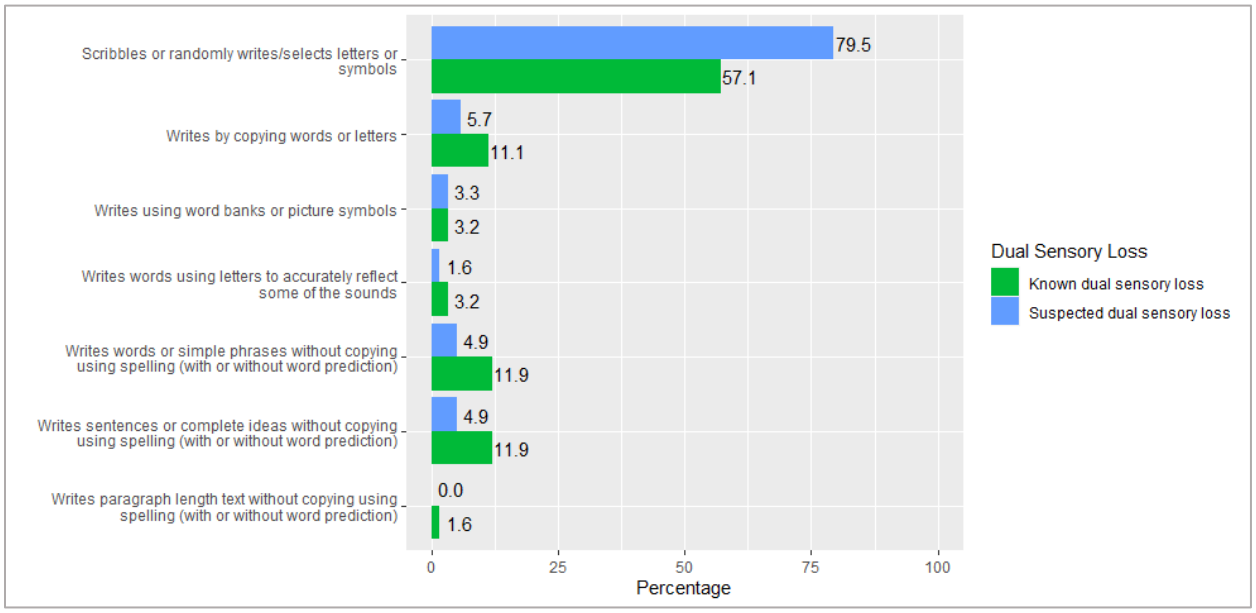


Figure 3.5

Highest Writing Skill Demonstrated: High School Grade Band (9–12)



Mathematics

Teachers rated the approximate frequency with which students demonstrated various mathematics skills (see Table 3.27). Fewer students with suspected dual sensory loss than with known dual sensory loss demonstrated math skills consistently, across all skills. Students with no dual sensory loss demonstrated math skills more frequently than either of the dual sensory loss groups. Group discrepancies were larger for skills such as shape identification, sorting by common attributes, and counting than for other skills (e.g., measuring, using multiplication and division).

Table 3.27

Frequency of Mathematics Skill Use by Sensory-Loss Classification

Mathematics skill	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		No dual sensory loss (*N* = 98,878)	
	n	%	*n*	%	*n*	%
Creates or matches patterns of objects or images						
< 80% of the time	542	85.2	791	91.6	56,696	59.0
> 80% of the time	94	14.8	73	8.4	39,373	41.0
Uses a calculator						
< 80% of the time	599	94.2	843	97.6	82,420	85.8
> 80% of the time	37	5.8	21	2.4	13,649	14.2
Tells time using an analog or digital clock						
< 80% of the time	613	96.4	854	98.8	86,001	89.5
> 80% of the time	23	3.6	10	1.2	10,068	10.5
Uses common measuring tools (e.g., ruler or measuring cup)						
< 80% of the time	626	98.4	861	99.7	92,212	96.0
> 80% of the time	10	1.6	3	0.3	3,857	4.0
Uses a schedule, agenda, or calendar to identify or anticipate sequence of activities						
< 80% of the time	583	91.7	864	96.5	78,264	81.5
> 80% of the time	53	8.3	30	3.5	17,805	18.5
Identifies simple shapes in two or three dimensions (e.g., square, circle, triangle, cube, sphere)						
< 80% of the time	534	84.0	791	91.6	57,745	60.1
> 80% of the time	102	16.0	73	8.4	38,324	39.9
Sorts objects by common properties (e.g., color, size, shape)						
< 80% of the time	519	81.6	774	89.6	82,100	54.2
> 80% of the time	117	18.4	90	10.4	43,969	45.8
Counts more than two objects						
< 80% of the time	482	75.8	737	85.3	41,505	43.2
> 80% of the time	154	24.2	127	14.7	54,564	56.8

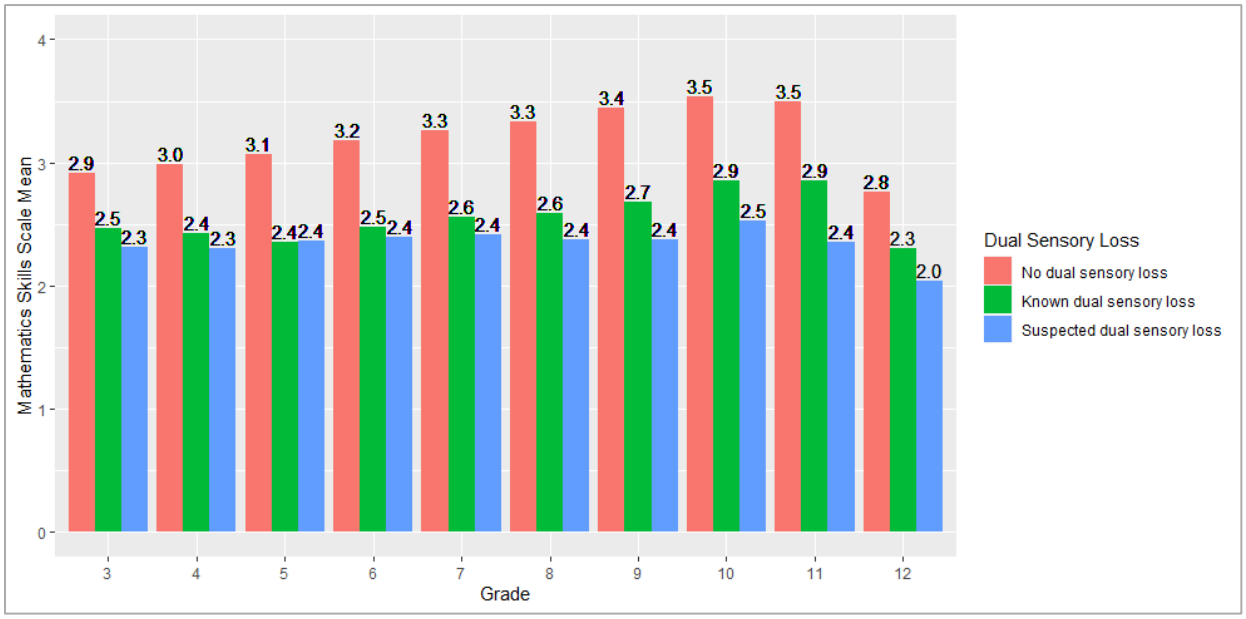
Mathematics skill	Known dual sensory loss (*N* = 649)		Suspected dual sensory loss (*N* = 870)		No dual sensory loss (*N* = 98,878)	
	n	%	*n*	%	*n*	%
Adds or subtracts by joining or separating groups of objects						
< 80% of the time	565	88.8	819	94.8	65,683	68.4
> 80% of the time	71	11.2	45	5.2	30,386	31.6
Adds and/or subtracts using numerals						
< 80% of the time	578	90.9	834	96.5	72,833	75.8
> 80% of the time	58	9.1	30	3.5	23,236	24.2
Forms groups of objects for multiplication or division						
< 80% of the time	625	98.3	860	99.5	90,849	94.6
> 80% of the time	11	1.7	4	0.5	5,220	5.4
Multiplies and/or divides using numerals						
< 80% of the time	629	98.9	861	99.7	92,106	95.9
> 80% of the time	7	1.1	3	0.3	3,963	4.1
Uses an abacus						
< 80% of the time	629	98.9	861	99.7	94,448	98.3
> 80% of the time	7	1.1	3	0.3	1,621	1.7

We combined the mathematics-skills items into a single scale and compared the means across sensory-loss groups. For students without dual sensory loss, the mean was 3.22 (*SD* = 0.77). For students with known dual sensory loss, the mean was 2.57 (*SD* = 0.73). For students with suspected dual sensory loss, the mean was 2.37 (*SD* = 0.55). A Mann-Whitney *U* test found that while the mathematics skill frequency distributions for the dual sensory loss groups are significantly different (*W* = 312,504, $p < .001$), sensory-loss classification had a small effect in determining whether a student would be reported to exhibit mathematics skills more frequently (*A* = .55).

Figure 3.6 displays the mean rating for mathematics items by dual sensory loss classification and grade level. Average ratings remained stable across grades for students with suspected dual sensory loss but increased slightly for students with known dual sensory loss and students with no dual sensory loss. (Means for the high school grades should be interpreted with caution given the smaller sample sizes.)

Figure 3.6

Mathematics Skills by Grade Level and Sensory-Loss Classification



Science

Teachers rated the approximate percentage of time students demonstrated various science skills (see Table 3.28). Fewer students with suspected dual sensory loss than with known dual sensory loss demonstrated science skills consistently. Students with no dual sensory loss demonstrated science skills more frequently than students in either of the dual sensory loss groups. The discrepancies were not as large in science as in other subjects because both groups tended to demonstrate the skills less frequently. The largest gap was observed for the skill of sorting objects by common attributes (14.6% of students with known dual sensory loss, 7.9% of students with suspected dual sensory loss, and 36.2% of students with no dual sensory loss demonstrated the skill consistently).

Table 3.28

Frequency of Science Skill Use by Sensory-Loss Classification

Science skill	Known dual sensory loss (*N* = 521)		Suspected dual sensory loss (*N* = 648)		No dual sensory loss (*N* = 80,487)	
	N	%	*n*	%	*n*	%
Sorts objects or materials by common properties (e.g., color, size, shape)						
< 80% of the time	445	85.4	597	92.1	51,377	63.8
> 80% of the time	76	14.6	51	7.9	29,110	36.2
Identifies similarities and differences						
< 80% of the time	489	93.9	632	97.5	66,738	82.9
> 80% of the time	32	6.1	16	2.5	13,749	17.1
Recognizes patterns						
< 80% of the time	493	94.6	628	96.9	66,951	83.2
> 80% of the time	28	5.4	20	3.1	13,536	16.8
Compares initial and final conditions to determine if something changed						
< 80% of the time	509	97.7	642	99.1	76,068	94.5
> 80% of the time	12	2.3	6	0.9	4,418	5.5
Uses data to answer questions						
< 80% of the time	515	98.8	647	99.8	78,235	97.2
> 80% of the time	6	1.2	1	0.2	2,251	2.8
Identifies evidence that supports a claim						
< 80% of the time	516	99.0	647	99.8	79,242	98.5
> 80% of the time	5	1.0	1	0.2	1,244	1.5
Identifies cause and effect						
< 80% of the time	512	98.3	648	100.0	79,058	98.2
> 80% of the time	9	1.7	0	0.0	1,427	1.8
Uses diagrams to explain phenomena						
< 80% of the time	519	99.6	647	99.8	79,533	98.8
> 80% of the time	2	0.4	1	0.2	953	1.2

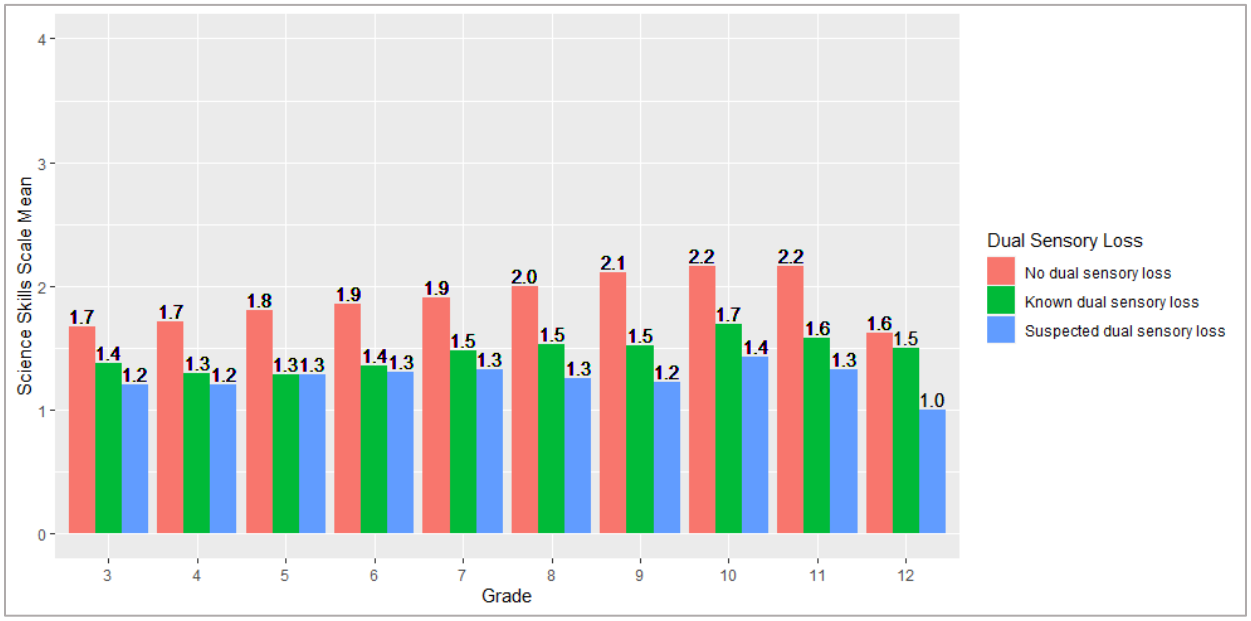
Note. Responses to science items are only required in states that use DLM science assessments and only in tested grades (typically once each in elementary, middle, and high school). As a result, the group sizes for the science items are smaller than for reading and mathematics (*N* = 521 for known dual sensory loss, *N* = 648 for suspected dual sensory loss, and *N* = 80,487 for no dual sensory loss).

We combined the science-skills items into a single scale and compared the means across sensory-loss groups. For students without dual sensory loss, the mean was 1.90 (*SD* = 0.72). For students with known dual sensory loss, the mean was 1.43 (*SD* = 0.63). For students with suspected dual sensory loss, the mean was 1.27 (*SD* = 0.47). A Mann-Whitney *U* test found that the science skill frequency distributions for the dual sensory loss groups were significantly different (*W* = 188,636, *p* < .001), and sensory-loss classification had a medium effect in determining whether a student would be reported to exhibit science skills more frequently (*A* = .33).

Figure 3.7 displays the mean science score by dual sensory loss classification and grade level. Mean scores are relatively consistent across grades in both dual sensory loss groups, although the known dual sensory loss group shows a slight increase in the higher grades. Mean scores for the students with no dual sensory loss appear to show a more pronounced slight increase in the higher grades. (Means for the high school grades should be interpreted with caution given the smaller sample sizes.)

Figure 3.7

Science Skills by Grade Level and Sensory-Loss Classification



Summary

This chapter described students with sensory loss and significant cognitive disabilities using both the FC and CC data sets. Key findings are summarized below.

Sensory Impairments

- Among all students from the FC survey data (*N* = 100,397), 3.5% were deaf or hard of hearing and 1.8% (*n* = 1,833) had questionable hearing with inconclusive testing. Most students with hearing loss had an unknown severity (21.1%) or moderate hearing loss (20.1%).
- A relatively small percentage of FC students were blind or had low vision (4.7%), and another 2.9% had questionable vision with inconclusive testing. Most students with known vision loss were reported to have cortical visual impairment (CVI; 31.7%) or low vision (31.6%).
- In the entire FC data set, 0.6% of students had **known dual sensory loss**: they were both deaf or hard of hearing and blind or had low vision. Another 0.9% had **suspected dual sensory loss**, including 170 students with questionable vision who were deaf or hard of hearing, 280 students who were blind or had low vision and questionable hearing, and 420 students with both questionable vision and hearing.
- Among CC students who took an alternate assessment in a DLM state, more than 8% had low vision and moderate hearing loss, and more than 6% had functional loss of vision and hearing.
- FC students with known dual sensory loss were more likely to have profound hearing loss (21.4%) as well as to be identified as having low vision (35.3%), being legally blind (31.7%), or having CVI (27.0%). FC students with suspected dual sensory loss followed similar trends but were even more likely to have CVI (41.1%). Among CC students, the degree of sensory loss was more variable and 40.8% had CVI.

Disability Categories and Cognitive Impairments

- Among FC students with known or suspected dual sensory loss and CC students who took alternate assessments, about 60% of students in each group were classified as having multiple disabilities, and 12% of FC students with known dual sensory loss had a primary disability classification of deaf-blindness. The CC sample had smaller percentages of students with IDEA disability classifications of intellectual disability and autism compared with the FC sample.
- Among CC students who took alternate assessments, a majority had other hereditary syndromes/disorders (24.8%), a complication of prematurity (10.6%), or no determination of etiology (14.9%). The rates of asphyxia and severe head injury were higher in this subset of CC students than in the CC population as a whole (3.9% vs. 1.8% and 2.7% vs. 1.3%, respectively).
- The majority of CC students who took alternate assessments were reported as having a cognitive impairment (80.0%), complex other health needs (58.8%), orthopedic/physical (74.8%), or speech/language (83.2%) impairments. A majority of students had three (28.8%) or four (37.5%) total other impairments. Compared to the entire CC population, fewer students with cognitive impairments had IDEA disability classifications of hearing or visual impairment or intellectual disability, but more had multiple disabilities.
- Among FC students with known dual sensory loss 48.5% were able to use two hands and 44.2% required some physical assistance to perform tasks with their hands. Among FC

students with suspected dual sensory loss, 37.1% used two hands and 48.9% required some physical assistance.

Alternate Assessment Participation

- About 60% of CC students who take alternate assessments have a primary disability label of multiple disabilities and 14.7% have deaf-blindness. The percentage of students who have a primary disability of hearing impairment increases across age ranges.

Educational Setting and Instruction

- About 10% to 12% of students (10.8% with known dual sensory loss, 9.9% of students with suspected dual sensory loss, and 11.8% of CC students) spend 40% or more of the school day in general education settings. Across all groups, about 10% of students are educated in residential or homebound hospital settings.
- Among all age-eligible CC students who took alternate assessments, 8.1% received intervener services. Most receiving intervener services were between the ages of 8 and 11 (30.1%) or ages 12 to 17 (54.8%).
- FC students with known or suspected dual sensory loss generally demonstrated fleeting or little to no attention to computer-directed instruction, but more students with known dual sensory loss than suspected dual sensory loss sustained attention to computer-based (21.9% vs 13.8%) or teacher-directed (16.5% vs 7.8%) instruction. A majority of both groups of students access a computer, whether independently or with support. However, a larger portion of students with known dual sensory loss (9.7%) than students with suspected dual sensory loss (4.7%) access a computer independently.
- Most FC students with known (91.7%) or suspected (78.4%) dual sensory loss used at least one type of assistive technology. Rates of use were similar across groups for most types of assistive technology, although larger proportions of students with known dual sensory loss than suspected dual sensory loss were reported to use screen magnification, screen reader, braille, and closed-circuit television (CCTV). Substantially more students with known dual sensory loss than suspected dual sensory loss used classroom amplification or unilateral or bilateral hearing aids.
- More than half of CC students who take alternate assessments used assistive listening devices (53.3%) or some other assistive technology (55.7%).

Communication

- Most FC students with known or suspected dual sensory loss did not use speech to meet their expressive communication needs (66.4% and 73.6%, respectively). A larger percentage of students with known dual sensory loss used speech and/or sign compared with students with suspected dual sensory loss. Rates of AAC use are roughly equivalent in the known dual sensory loss (38.6%) and suspected dual sensory loss (40.4%) groups.
- Among the 26.5% of students with known sensory loss who do not use speech sign or AAC, 80.2% demonstrated only preintentional communication behaviors. Of the 35.7% of students with suspected dual sensory loss, 86.2% demonstrated only preintentional communication behaviors.
- Among all students with known or suspected dual sensory loss who used symbols to communicate, the majority (60.9% for known and 63.6% for suspected) chose from one

or two symbols at a time when communicating. Among speech and sign users, students with known sensory loss tended to have more sophisticated expressive communication than their peers with suspected dual sensory loss.

- Students with known dual sensory loss had more frequent use of specific receptive communication skills than students with suspected dual sensory loss. Students with known dual sensory loss had better overall receptive communication skill (*M* = 3.09, *SD* = 1.08) than did students with suspected dual sensory loss (*M* = 2.82, *SD* = 0.95), although sensory-loss classification had a small effect in determining whether a student would be reported to have a higher receptive communication score. Both sensory loss groups had less receptive communication than FC students without known or suspected dual sensory loss (*M* = 4.06, *SD* = .93).

Academics

Findings about FC students' academic skills are based on teachers' ratings using their general knowledge of the student, not DLM assessment results.

- In general, students with known or suspected dual sensory loss had fewer or less frequent use of academic skills than their peers without dual sensory loss. Students with known dual sensory loss had more academic skills than those with suspected dual sensory loss. Sensory loss classification had a small (reading, writing, mathematics) to medium (science) effect in determining whether a student would be reported to exhibit skills more frequently.
- In reading, students with suspected dual sensory loss reportedly had less consistent use of skills than students with known dual sensory loss. More students with suspected dual sensory loss did not read any words in print or braille (71.6%) than students with known dual sensory loss (60.7%). Only 6.0% of students with suspected dual sensory loss read above a first-grade level, compared to 12.8% of students with known dual sensory loss. Teachers rated the reading skills of students with suspected dual sensory loss in similar ways across all grades. Mean ratings increased slightly in higher grades for students with known dual sensory loss and with no dual sensory loss.
- In writing, very few students in both dual sensory loss groups wrote sentences or complete ideas or paragraphs using spelling. About one quarter of students with suspected dual sensory loss (24.2%) were reported to have written at least once at a higher level than scribbles or randomly writing/selecting letters or symbols, compared to 32.9% of students with known dual sensory loss and 74.6% of students with no dual sensory loss. Students from both dual sensory loss groups show an increase in writing skills in higher grade bands, although those with known dual sensory loss tended to demonstrate a slightly larger increase in writing skills from elementary through high school compared to those with suspected dual sensory loss.
- In mathematics, the discrepancies between skills for students with known, suspected, or no dual sensory loss were larger for skills such as shape identification, sorting by common attributes, and counting than for other skills (e.g., measuring, using multiplication and division). Average mathematics skill ratings remained stable across

grades for students with suspected dual sensory loss but increased slightly for students with known dual sensory loss and students with no dual sensory loss.

- In science, students with no dual sensory loss demonstrated skills more frequently than students in either of the dual sensory loss groups. The discrepancies were not as large in science as in other subjects because all groups tended to demonstrate the skills less frequently. The largest gap was observed for the skill of sorting objects by common attributes. Specifically, 14.6% of students with known dual sensory loss, 7.9% of students with suspected dual sensory loss, and 36.2% of students with no dual sensory loss demonstrated the skill consistently. Mean scores are relatively consistent across grades in both dual sensory loss groups, although the known dual sensory loss group shows a slight increase in the higher grades.

4. Results: Students with and without Cortical Visual Impairment

The purpose of this portion of the study was to explore potential differences between students with cortical visual impairment (CVI) and students with other visual impairments within the First Contact (FC) survey data on students with significant cognitive disabilities. We explored similar learner and education characteristics in Chapter 3, including

- sensory and physical characteristics, disabilities, and English language status
- expressive and receptive communication
- education settings and assistive technologies
- academic skills

We divided students with FC survey data who were reported as having some vision impairment into two groups: those with CVI and those without CVI (but with some other category of visual impairment). In the 2018 FC survey, 4,765 students were reported as having some vision impairment. Of those, 1,510 (31.7%) had CVI and 2,846 (59.7%) did not. Teachers did not indicate the type of visual impairment for the remaining 409 students. Because teachers were able to select more than one impairment classification, students with CVI may have had additional visual impairments.

Table 4.1 summarizes the number and percentage of students for each type of visual impairment. Most students with some vision impairment had CVI or low vision or were legally blind. Nearly half of students without CVI had low vision, and less than 10% of students with CVI were reported to have comorbid visual impairments.

Table 4.1

Types of Visual Impairments of Students with and without CVI

Vision impairment	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Low vision	108	7.2	1,397	49.1
Legally blind	147	9.7	974	34.2
Light only	57	3.8	212	7.4
Totally blind	31	2.1	399	14.0
CVI	1,510	100.0	0	0.0

Note. Teachers could select multiple categories of vision loss, so row totals add to more than *N*.

We used the CVI response option as the grouping variable for all remaining analyses in this chapter.

In tables throughout this chapter, column totals may not sum to the exact overall CVI or non-CVI group total due to missing data or the option to select multiple responses to an item. When data are missing, percentages are based on the number of valid responses. Additionally, percentages do not always add precisely to 100% due to rounding.

Sensory and Physical Characteristics, Disabilities, English Language

Table 4.2 summarizes the number and percentage of students who had a hearing impairment. Compared with the non-CVI group, the CVI group had a lower percentage of students with known hearing loss and a higher percentage of students with questionable hearing.

Table 4.2

Hearing Loss Among Students with and without CVI

Hearing loss	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
No known hearing loss	1,213	80.7	2,241	79.0
Deaf or hard of hearing	175	11.6	453	16.0
Questionable	115	7.7	144	5.1

Of students with known hearing loss, the rates of the magnitude of hearing loss were similar for students with and without CVI, although more CVI students than non-CVI students had an unknown degree of hearing loss (see Table 4.3).

Table 4.3

Degree of Hearing Loss Among Students Who Are Deaf or Hard of Hearing, with and without CVI

Degree of hearing loss	CVI (*N* = 175)		Non-CVI (*N* = 453)	
	n	%	*n*	%
Mild	15	8.6	48	10.6
Moderate	25	14.3	80	17.7
Moderately severe	25	14.3	74	16.4
Severe	22	12.6	52	11.5
Profound	34	19.4	102	22.6
Unknown	54	30.9	95	21.1

Some teachers may use classroom amplification or sign language, which helps all students, regardless of the presence of hearing loss. Table 4.4 summarizes the type of auditory aids used by students with visual impairments and with questionable hearing loss or who are deaf/hard of hearing. Rates of use are similar across groups, although slightly larger percentages of students without CVI used classroom amplification, bilateral hearing aids, or sign language.

Table 4.4

Use of Auditory Aids by Students with and without CVI

Auditory aid	CVI (*N* = 290)		Non-CVI (*N* = 597)	
	n	%	*n*	%
Classroom amplification	55	19.0	140	23.5
Unilateral hearing aid	15	5.2	50	8.4
Bilateral hearing aid	60	20.7	175	29.3
Cochlear implant	19	6.6	50	8.4
Sign language	43	14.8	140	23.5

Note. Teachers selected all choices that applied.

Table 4.5 describes how students used their hands to perform classroom tasks. A greater proportion of students with CVI were unable to use their hands compared to students with other visual impairments. Nearly 38% of students with CVI used one or two hands, while nearly 77% of students with other visual impairments used one or two hands.

Table 4.5

Use of Hands to Perform Tasks Among Students with and without CVI

Hand use	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Uses two hands together	276	18.3	1,574	55.3
Uses one hand	294	19.5	611	21.5
Requires physical assistance to perform tasks with hands	853	56.5	1,116	39.2
Cannot use hands to complete tasks even with assistance	494	32.7	349	12.3

Note. Teachers could select multiple categories of hand use, so row totals add to more than *N*.

Teachers reported that 73.3% of students with CVI (n = 1,089) and 45% of students without CVI (n = 1,242) had health issues that interfered with instruction or assessment. Students with CVI experienced interfering health issues at a significantly higher rate than did students with other visual impairments (z = 19.01, p < .001). The effect size was moderate (d = 0.28); the difference between the proportions was estimated precisely and shown to be much greater than zero ($CI_{0.95}$: 0.25, 0.31).

Table 4.6 summarizes the primary IDEA disability categories among students with and without CVI. The most notable differences are seen in the categories of multiple disabilities, autism, intellectual disability, and visual impairments. More students with CVI (71.8%) than students without CVI (54.1%) are reported as having the IDEA disability classification of multiple disabilities, but more students without CVI than students with CVI have IDEA disability classifications of autism, intellectual disability, and visual impairments.

Table 4.6

Primary IDEA Disability Category Among Students with and without CVI

Primary IDEA disability category	CVI (N = 1,495)		Non-CVI (N = 2,820)	
	n	%	*n*	%
Autism	29	1.9	130	4.6
Deaf-blindness	32	2.1	58	2.1
Deafness	0	0.0	5	0.2
Developmental delay	17	1.1	33	1.2
Emotional disturbance	0	0.0	5	0.2
Hearing impairment	0	0.0	5	0.2
Intellectual disability	109	7.3	478	17.0
Multiple disabilities	1,074	71.8	1,526	54.1
Orthopedic impairment	19	1.3	28	1.0
Other health impairment	94	6.3	194	6.9
Specific learning disability	0	0.0	12	0.4
Speech or language impairment	0	0.0	9	0.3
Traumatic brain injury	59	3.9	47	1.7
Visual impairment, including blindness	38	2.5	265	9.4
Noncategorical	1	0.1	3	0.1
Eligible individual	23	1.5	22	0.8

Table 4.7 summarizes teachers' responses to questions about students' primary language. Differences between groups are small, but slightly more students with CVI than students without CVI had English as their primary language, English as the primary language spoken in their home, and English as the primary language used for their instruction.

Table 4.7

Primary Language Use Among Students with and without CVI

English as primary language	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Is English the student's primary language?				
Yes	1,263	83.6	2,347	82.5
No	130	8.6	224	7.9
Missing/no response	117	7.7	275	9.7
Is English the primary language spoken in the student's home?				
Yes	1,169	77.4	2,115	74.3
No	166	11.0	353	12.4
Unknown	58	3.8	101	3.5
Missing/no response	117	7.7	277	9.7
Is English the primary language used for the student's instruction?				
Yes	1,362	90.2	2,485	87.3
No	7	0.5	24	0.8
Missing/no response	141	9.3	337	11.8

Communication

Table 4.8 describes the various modes of expressive communication of students with CVI and without CVI. Students with CVI had more sophisticated expressive communication needs than did students with other visual impairments. For example, fewer students with CVI than without CVI (19% vs. 55%) were reported to use speech for expressive communication, and more students with CVI than without CVI (48% vs. 31%) used augmentative and alternative communication (AAC). Of students who did not use speech, sign language, or an AAC (35.7% of students with CVI and 19% of students without CVI), more students with CVI demonstrated reflexive and unintentional communicative behaviors than did students without CVI (89% vs. 75%).

Table 4.8

Mode of Expressive Communication Instruction Among Students with and without CVI

Mode of expressive communication	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Speech				
Yes	290	19.2	1,569	55.2
No	1,220	80.8	1,274	44.8
Sign				
Yes	67	4.4	234	8.2
No	1,443	95.6	2,609	91.8
AAC				
Yes	722	47.8	869	30.6
No	788	52.2	1,974	69.4
Other (if no speech, sign, or AAC) [a]				
Uses conventional gestures and vocalizations to communicate intentionally but does not yet use symbols or sign language	13	2.4	58	10.7
Uses only unconventional vocalizations, unconventional gestures, and/or body movement to communicate intentionally	58	10.8	90	16.7
Behaviors may be reflexive and not intentionally communicative but can be interpreted as communication	479	88.9	407	75.4

Note. AAC = augmentative and alternative communication.

[a] Percentages based on totals of 539 students in the CVI group and 540 students in the non-CVI group who answered “no” to speech, sign, and AAC.

Students with CVI demonstrated less-sophisticated communication using speech and AAC than did students with other visual impairments (see Table 4.9). For example, students with CVI were reported to regularly combine three or more spoken words using grammatical rules less frequently than students without CVI (43.4% vs. 58.2%). This difference in level of communication sophistication between students with CVI and students without CVI was greatest when comparing students who used speech versus other modes of communication.

Table 4.9

Sophistication of Expressive Communication Among Students with and without CVI

Expressive communication sophistication	CVI		Non-CVI	
	n	%	*n*	%
Speech				
Regularly combines three or more spoken words according to grammatical rules to accomplish a variety of communicative purposes	126	43.4	913	58.2
Usually uses two spoken words at a time to meet a variety of more complex communicative purposes	87	30.0	407	26.0
Usually uses only one spoken word at a time to meet a limited number of simple communicative purposes	77	26.6	248	15.8
Sign				
Regularly combines three or more signed words according to grammatical rules to accomplish a variety of communicative purposes	2	3.0	8	3.4
Usually uses two signed words at a time to meet a variety of more complex communicative purposes	7	10.4	27	11.5
Usually uses only one signed word at a time to meet a limited number of simple communicative purposes	58	86.6	199	85.0
AAC				
Regularly combines three or more symbols according to grammatical rules to accomplish the four major communicative purposes	12	1.7	31	3.6
Usually uses two symbols at a time to meet a variety of more complex communicative purposes	68	9.4	151	17.4
Usually uses only one symbol to meet a limited number of simple communicative purposes	642	88.9	687	79.1

Note. Percentages based on total "yes" responses in Table 4.8. AAC = augmentative and alternative communication.

Table 4.10 displays the level of expressive communication complexity for students in both groups who use one or more modes of expressive communication, regardless of communication mode. Students with CVI used less-sophisticated expressive communication than students without CVI [$\chi^2(2, N = 4{,}356) = 335.11, p < .001$]. The effect size was moderate ($V = 0.20$).

Table 4.10

Expressive Communication Sophistication Across Communication Modes of Students with and without CVI

Expressive communication sophistication	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Regularly combines three or more spoken words, signs, or symbols	137	14.1	938	40.7
Usually uses two spoken words, signs, or symbols	151	15.6	527	22.9
Usually uses only one spoken word, sign, or symbol	683	70.3	837	36.4

Students responded to spoken or signed language in many ways.

Table 4.11 displays the responses to statements about the approximate amount of time a student used each receptive communication skill. Across all items, one-third or fewer students demonstrated receptive language skills consistently (more than 80% of the time), but rates of consistent use were higher for students without CVI than for those with CVI. For example, 34.2% of the students without CVI and 10.3% of students with CVI were reported to consistently point, look at, or touch things in the immediate vicinity when asked. The same was true for more sophisticated receptive communication skills: 13.3% of students without CVI and 2.5% of students with CVI were reported to follow two-step directions more than 80% of the time. When the separate items were combined into a single receptive communication scale, students without CVI had a higher mean receptive communication scale score (M = 3.4, SD = 1.1) than students with CVI (M = 2.6, SD = 0.8; d = 0.8). A Mann-Whitney U test found that the mean receptive communication distributions differed significantly between the with CVI and without CVI groups (W = 1,247,502, $p < .001$), and CVI status had a large effect in determining whether a student would be reported to have a higher receptive communication score (A = .29).

Table 4.11

Frequency of Use of Receptive Communication Skills Among Students with and without CVI

Receptive communication scale items	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Can point to, look at, or touch things in the immediate vicinity when asked (e.g., pictures, objects, body parts)	839	55.6	821	29.0
0%–20%	332	22.0	483	17.0
21%–50%	184	12.2	560	19.8
51%–80%	155	10.3	969	34.2
> 80%				
Can perform simple actions, movements or activities when asked (e.g., comes to teacher's location, gives an object to teacher or peer, locates, or retrieves an object)	993	65.8	885	31.2
0%–20%	251	16.6	510	18.0
21%–50%	145	9.6	534	18.8
51%–80%	121	8.0	904	31.9
> 80%				
Responds appropriately in any modality (speech, sign, gestures, facial expressions) when offered a favored item that is not present or visible (e.g., "Do you want some ice cream?")				
0%–20%	840	55.7	817	28.9
21%–50%	327	21.7	528	18.7
51%–80%	192	12.7	582	20.6
> 80%	150	9.9	904	31.9
Responds appropriately in any modality (speech, sign, gestures, facial expressions) to single words that are spoken or signed				
0%–20%	832	55.2	788	27.9
21%–50%	358	23.8	609	21.6
51%–80%	189	12.5	580	20.5
> 80%	127	8.4	848	30.0
Responds appropriately in any modality (speech, sign, gestures, facial expressions) to phrases and sentences that are spoken or signed				
0%–20%	896	59.5	893	31.6

Receptive communication scale items	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
21%–50%	325	21.6	610	21.6
51%–80%	195	13.0	626	22.2
> 80%	89	5.9	696	24.6
Follows two-step directions presented verbally or through sign (e.g., gets a worksheet or journal and begins to work, distributes items needed by peers for a lesson or activity, looks at requested or desired item and then looks at location where it should go)	1,246	82.8	1,358	48.1
0%–20%	137	9.1	535	18.9
21%–50%	84	5.6	557	19.7
51%–80%	38	2.5	375	13.3
> 80%				

Educational Setting and Assistive Technology

Table 4.12 displays students' educational setting. Generally, students with CVI were placed in more-restrictive settings than were students without CVI. More students with CVI were reported to be in a separate school, homebound, or in a hospital than were students without CVI, while more students without CVI were reported to be in a regular classroom, resource room, or separate class in a regular school.

Table 4.12

Educational Setting of Students with and without CVI

Educational setting	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Regular class	19	1.3	79	2.8
Resource room	118	7.8	321	11.3
Separate class	663	43.9	1,389	48.8
Separate school	601	39.8	888	31.2
Residential facility	29	1.9	63	2.2
Homebound/hospital	79	5.2	104	3.7

Students used a variety of assistive devices during instruction and assessment. Table 4.13 displays the use of assistive devices for students with CVI and students without CVI. Students with CVI used some devices at similar rates as students without CVI (e.g., screen magnification devices, screen readers and/or talking word processors, simple devices, touch screens). Fewer students with CVI were reported to use braille devices (1.1% vs. 7.5%), but more students with CVI were reported to use single message devices (30.5% vs. 13.4%), as well as scanning with switches (33.3% vs. 9.5%).

Table 4.13

Assistive Devices Used by Students with and without CVI

Technology	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Type of assistive device				
Screen magnification device	593	39.3	1,130	39.7
CCTV	60	4.0	175	6.1
Screen reader and/or talking word processor	615	40.7	1,074	37.7
Manual or electronic braille writing device	15	1.0	179	6.3
Refreshable braille display	1	0.1	34	1.2
Single message devices	461	30.5	380	13.4
Simple devices	130	8.6	209	7.3
Speech generating device	162	10.7	252	8.9
No voice output technology	226	15.0	913	32.1
Mode of access [a]				
Standard computer keyboard	129	13.2	894	41.4
Scanning with switches	325	33.3	206	9.5
Keyboard with large keys or alternate	105	10.8	469	21.7
Touch screen	611	62.6	1,188	55.0
Standard mouse or head mouse	117	12.0	653	30.2
Eye gaze	50	5.1	45	2.1

Note. Teachers could select multiple categories of assistive technology, so row totals add to more than *N*.

[a] Item displayed only if the teacher previously responded that the student was able to access a computer per Table 4.16 (*N* = 976 for CVI and *N* = 2,160 for non-CVI).

Table 4.14 displays the number of assistive devices used by students with CVI and without CVI. Over 92% of students with CVI used at least one assistive device, compared to 95% of students without CVI. More students without CVI used three or more devices.

Table 4.14

Number of Assistive Devices Used by Students with and without CVI

No. of assistive devices used	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	N	%	*n*	%
0	108	7.2	142	5.0
1	317	21.0	466	16.4
2	424	28.1	670	23.5
3	367	24.3	780	27.4
4	174	11.5	431	15.1
5	93	6.2	240	8.4
6	20	1.3	91	3.2
7	5	0.3	24	0.8
8	1	0.1	1	< 0.1
9	0	0.0	1	< 0.1
10	1	0.1	0	0.0

Table 4.15 describes student engagement with computer- and teacher-directed instruction. Fewer students with CVI than without CVI were reported to sustain attention to computer-directed (5.8% vs. 19.3%) or teacher-directed (7.5% vs. 19.6%) instruction.

Table 4.15

Engagement in Computer- and Teacher-Directed Instruction Among Students with and without CVI

Engagement type	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Computer				
Generally sustains attention to computer-directed instruction	88	9.0	549	25.4
Demonstrates fleeting attention to computer-directed instructional activities and requires repeated bids or prompts	531	54.4	1,082	50.1
Demonstrates little or no attention to computer-directed instructional activities	335	34.3	439	20.3
Missing	22	2.3	90	4.2
Teacher				
Generally sustains attention to teacher-directed instruction	111	7.4	540	19.0
Demonstrates fleeting attention to teacher-directed instructional activities and requires repeated bids or prompts	792	52.5	1,504	52.8
Demonstrates little or no attention to teacher-directed instructional activities	579	38.3	711	25.0
Missing	28	1.9	91	3.2

Note. The computer engagement item only displayed if the teacher responded that the student was able to access a computer per Table 4.16 (*N* = 976 for CVI and *N* = 2,160 for non-CVI).

Table 4.16 describes students' computer use. While rates of use with human support were similar across groups, fewer students with CVI than with other visual impairments were reported to access a computer independently. Teachers report most students who do not access computers fail to do so because of their disability, although the disability-related barrier may or may not be related to their vision.

Table 4.16

Computer Use Among Students with and without CVI

Computer use	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	N	%	*n*	%
Accesses a computer independently	21	1.4	336	11.8
Accesses a computer independently given assistive technology	27	1.8	114	4.0
Uses a computer with human support (with or without assistive technology)	928	61.5	1,710	60.3
Has not had the opportunity to access a computer	48	3.2	127	4.5
Cannot access a computer with human or assistive technology support	484	32.1	550	19.4
No access [a]				
Student disability prevents the student from accessing a computer	465	88.7	530	80.3
The equipment is unavailable	3	0.6	13	2.0
Student refuses to try to use a computer	27	5.2	53	8.0
I (or other educators at this school) have not had the opportunity to instruct the student on computer usage	29	5.5	64	9.7

[a] Response options only presented when teacher responded "has not had the opportunity to access a computer" or "cannot access a computer with human or assistive technology" in first part of question.

Academics

In one section of the FC survey, teachers describe the frequency with which students demonstrate certain academic skills. Teachers' ratings are based on their general knowledge of the student, not DLM assessment results. In this section of the report, the frequency distributions are reported for specific skills in each academic subject (i.e., reading, writing, mathematics, science). For reading, mathematics, and science, frequencies are followed by group comparisons of mean skill ratings per subject and grade/grade band. Mean ratings are on a four-point scale based on the original ranges (1 = 0%–20%, 2 = 21%–50%, 3 = 51%–80%, 4 = > 80%). We describe demonstration of a skill more than 80% of the time as "consistent."

Although the number of responses per item vary in this section, column headings reflect total sample size. In other words, missing responses are excluded when calculating the percentages.

Reading and Writing

In reading, fewer students with CVI than without CVI were reported to consistently demonstrate a skill, and this was true across all reading skills (see Table 4.17). For the lowest-level reading skill, 24.8% of students without CVI recognized single symbols more than 80% of the time, compared to 5.6% of students with CVI. For the highest-level reading skill, 2.9% of students without CVI explained or elaborated on text more than 80% of the time, compared to 0.5% of students with CVI. The distribution of ratings was more skewed for students with CVI, toward the 0%–20% range, compared with students without CVI.

Table 4.17

Frequency of Reading Skill Use Among Students with and without CVI

Reading skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Recognizes single symbols presented visually or tactually (e.g., letters, numerals, environmental signs such as restroom symbols, logos, trademarks, or business signs such as fast-food restaurants)				
0–20%	973	67.3	1,035	37.2
21–50%	269	18.6	507	18.2
51–80%	123	8.5	551	19.8
> 80%	81	5.6	689	24.8

Reading skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Understands purpose of print or braille but not necessarily by manipulating a book (e.g., knows correct orientation, can find beginning of text, understands purpose of text in print or braille, enjoys being read to)				
0–20%	1,138	78.7	1,272	45.7
21–50%	135	9.3	365	13.1
51–80%	85	5.9	420	15.1
> 80%	88	6.1	725	26.1
Matches sounds to symbols or signs to symbols (e.g., matches sounds to letters presented visually or tactually, matches spoken or signed words to written words)				
0–20%	1,185	82.0	1,353	48.6
21–50%	130	9.0	429	15.4
51–80%	77	5.3	453	16.3
> 80%	54	3.7	547	19.7
Reads words, phrases, or sentences in print or braille when symbols are provided with the words				
0–20%	1,274	88.1	1,593	57.3
21–50%	80	5.5	372	13.4
51–80%	47	3.3	369	13.3
> 80%	45	3.1	448	16.1
Identifies individual words without symbol support (e.g., recognizes words in print or braille; can choose correct word using eye gaze)				
0–20%	1,271	87.9	1,634	58.7
21–50%	90	6.2	387	13.9
51–80%	45	3.1	378	13.6
> 80%	40	2.8	383	13.8
Reads text presented in print or braille without symbol support **without** comprehension	1,321	91.4	1,807	65.0
0–20%	68	4.7	380	13.7
21–50%	38	2.6	356	12.8

Reading skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
51–80%	19	1.3	239	8.6
> 80%				
Reads text presented in print or braille without symbol support **with** comprehension (e.g., locates answers in text, reads and answers questions, retells after reading, completes maze task)				
0–20%	1,344	92.9	1,942	69.8
21–50%	69	4.8	418	15.0
51–80%	26	1.8	319	11.5
> 80%	7	0.5	103	3.7
Explains or elaborates on text read in print or braille				
0–20%	1,377	95.2	2,059	74.0
21–50%	35	2.4	394	14.2
51–80%	27	1.9	248	8.9
> 80%	7	0.5	81	2.9

Overall, teachers rated the reading skills of students with CVI (*M* = 2.2, *SD* = 0.5) lower than those of students without CVI (*M* = 2.9, *SD* = 1.0; *d* = 0.6). A Mann-Whitney *U* test found that the reading skill frequency distributions differed significantly between the CVI and without CVI groups (*W* = 1,203,737, *p* < .001), and CVI status had a large effect in determining whether a student would be reported to exhibit reading skills more frequently (*A* = .28). Figure 4.1 displays the mean response of the reading items by CVI classification and grade level. Teachers rated the reading skills of students with CVI consistently across all grades. Mean ratings increased slightly for students without CVI in higher grades. (The lower mean in grade 12 should be interpreted with caution given the small sample size.)

Figure 4.1

Mean Ratings of Student Reading Skills, by Grade and CVI Classification

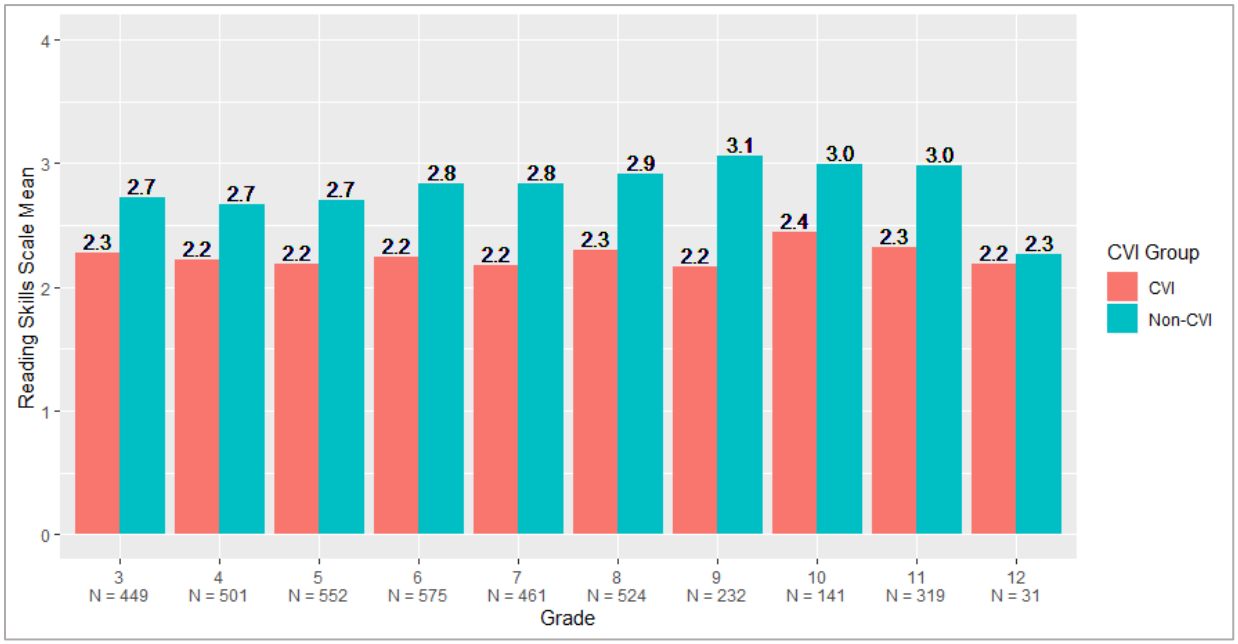


Table 4.18 describes teachers' judgments of students' reading levels. Consistent with the results shown in Table 4.17, most students with CVI did not read any words in print or braille (84%) compared to about half of students without CVI (50.8%). Only 3.2% (*n* = 47) of students with CVI read above a first-grade level, compared to 18% (*n* = 500) of students without CVI. A large percentage of students with CVI may have been precluded from accessing braille because they were not able to use their hands (see Table 4.5).

Table 4.18

Instructional Reading Level of Print or Braille with Comprehension Among Students with and without CVI

Reading level	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Above third-grade level	6	0.4	75	2.7
Above second-grade level to third-grade level	12	0.8	167	6.0
Above first-grade level to second-grade level	29	2.0	258	9.3
Primer to first-grade level	44	3.0	398	14.3
Reads only a few words or up to preprimer level	140	9.7	470	16.9
Does not read any words when presented in print or braille (not including environmental signs or logos)	1,215	84.0	1,414	50.8

Teachers selected the highest-level writing skill that the student demonstrated at least one time (see Table 4.19). Only 10.3% of students with CVI were reported to have written at least once at a higher level than scribbles or randomly writing/selecting letters or symbols, compared to 42% of students without CVI. Very few students in both groups wrote sentences or complete ideas or paragraphs using spelling.

Table 4.19

Highest-Level Writing Skill Among Students with and without CVI

Highest writing level	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Writes paragraph-length text without copying using spelling (with or without word prediction)	3	0.2	52	1.9
Writes sentences or complete ideas without copying using spelling (with or without word prediction)	14	1.0	171	6.1
Writes words or simple phrases without copying using spelling (with or without word prediction)	23	1.6	265	9.5
Writes words using letters to accurately reflect some of the sounds	17	1.2	166	6.0
Writes using word banks or picture symbols	52	3.6	138	5.0
Writes by copying words or letters	40	2.8	370	13.3
Scribbles or randomly writes/selects letters or symbols	1,297	89.7	1,620	58.2

A Mann-Whitney *U* test found that while the highest-level writing skill distributions differed significantly between the CVI and without CVI groups (W = 2,654,247, $p < .001$), CVI status had a small effect in determining whether a student would be reported to exhibit higher levels of writing skills (A = .62).

Figure 4.2, Figure 4.3, and Figure 4.4 display students' highest writing skill, by grade band and CVI classification. Students with CVI demonstrated very similar skills across all grade bands; that is, there did not appear to be an increase in writing skills as students progressed through school. Students without CVI demonstrated some increase in writing skills from elementary to high school.

Figure 4.2

Highest-Level Writing Skill Among Students with and without CVI, Grades 3–5

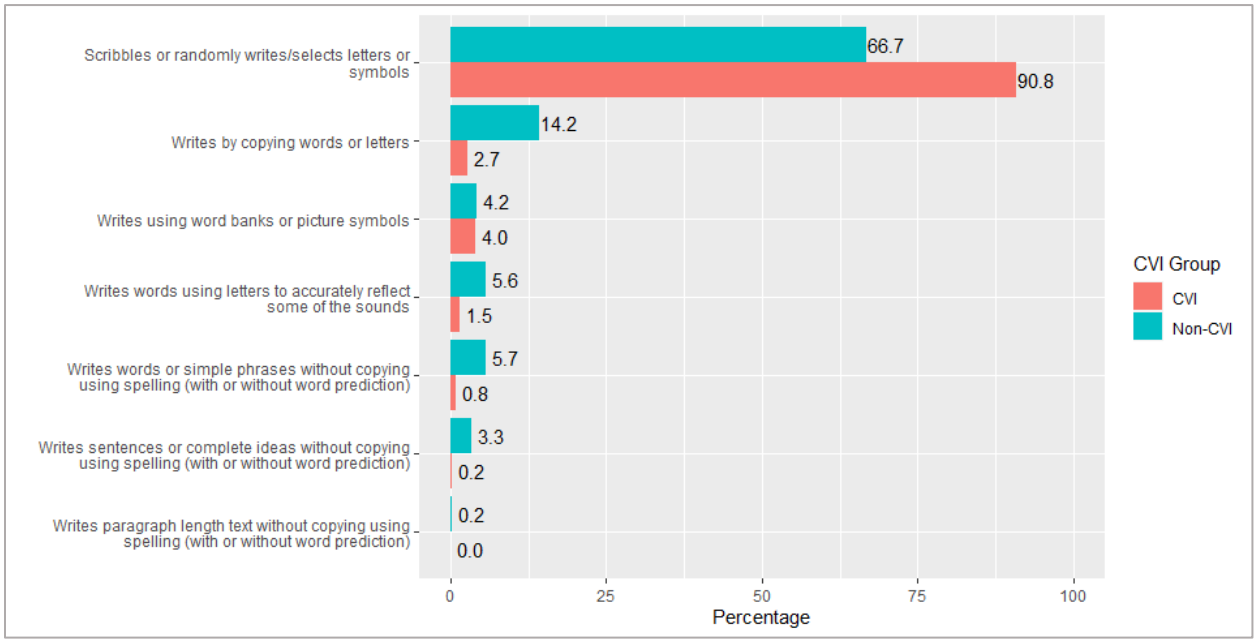


Figure 4.3

Highest-Level Writing Skill Among Students with and without CVI, Grades 6–8

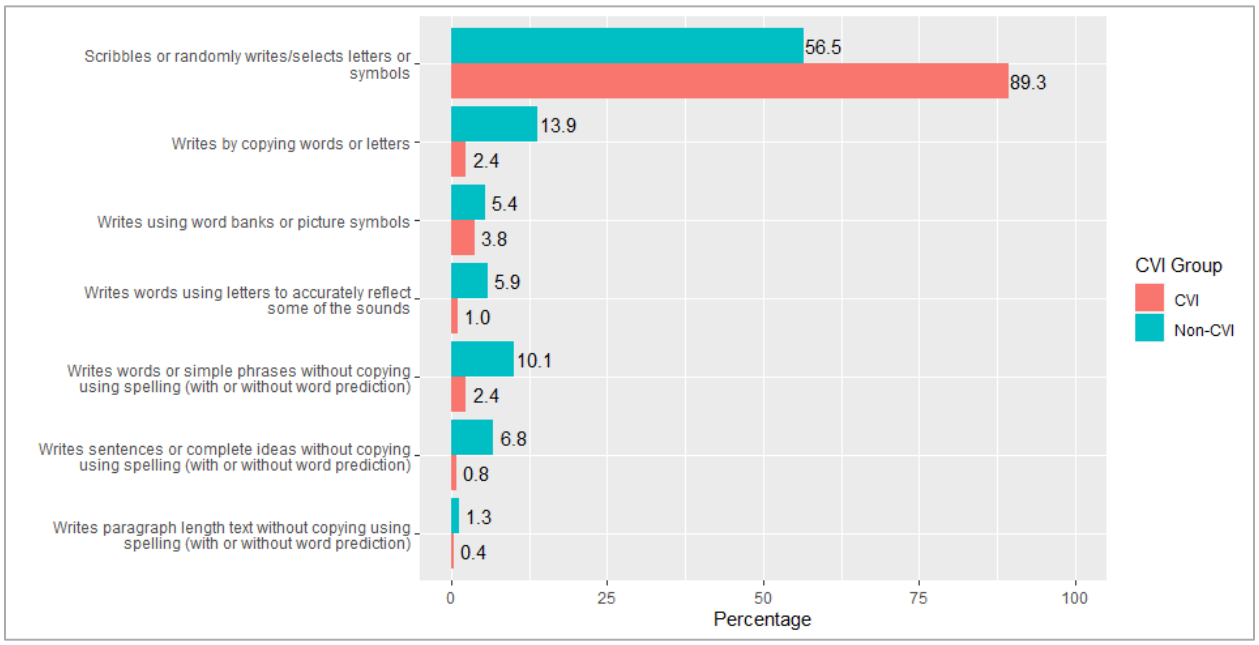
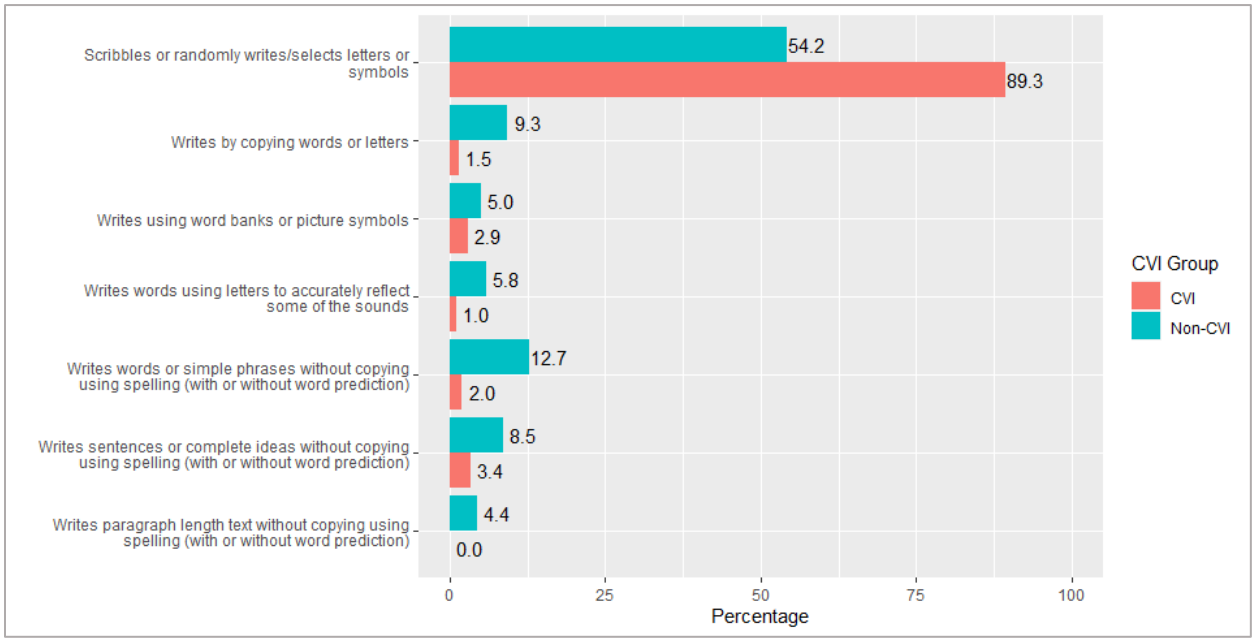


Figure 4.4

Highest-Level Writing Skill Among Students with and without CVI, Grades 9–12



Mathematics

Teachers rated the approximate frequency with which students demonstrated various mathematics skills (see Table 4.20). Fewer students with CVI than without CVI demonstrated math skills consistently across all skills. Group discrepancies were larger for skills such as shape identification, sorting by common attributes, and counting than for other skills (e.g., measuring, using multiplication and division). Frequency distributions for students with CVI were heavily skewed toward the 0%–20% frequency, while distributions for students without CVI varied more by item. Since many math skills require the use of hands in addition to some degree of visual acuity, students with CVI may not have had access to the materials needed to demonstrate skills.

Table 4.20

Frequency of Mathematics Skill Use Among Students with and without CVI

Mathematics skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Creates or matches patterns of objects or images				
0%–20%	1,071	74.1	1,174	42.2
21%–50%	208	14.4	530	19.1
51%–80%	98	6.8	510	18.3
> 80%	69	4.8	568	20.4
Uses a calculator				
0%–20%	1,388	96.0	2,059	74.0
21%–50%	25	1.7	304	10.9
51%–80%	22	1.5	217	7.8
> 80%	11	0.8	202	7.3
Tells time using an analog or digital clock	1,343	92.9	1,930	69.4
0%–20%	70	4.8	445	16.0
21%–50%	22	1.5	273	9.8
51%–80%	11	0.8	134	4.8
> 80%				
Uses common measuring tools (e.g., ruler, measuring cup)				
0%–20%	1,343	92.9	2,028	72.9
21%–50%	75	5.2	526	18.9
51%–80%	25	1.7	176	6.3
> 80%	3	0.2	52	1.9
Uses a schedule, agenda, or calendar to identify or anticipate sequence of activities				
0%–20%	1,159	80.2	1,489	53.5
21%–50%	168	11.6	617	22.2
51%–80%	84	5.8	414	14.9
> 80%	35	2.4	262	9.4
Identifies simple shapes in two or three dimensions (e.g., square, circle, triangle, cube, sphere)				
0%–20%	968	66.9	1,046	37.6

Mathematics skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
21%–50%	269	18.6	548	19.7
51%–80%	131	9.1	592	21.3
> 80%	78	5.4	596	21.4
Sorts objects by common properties (e.g., color, size, shape)				
0%–20%	1,012	70.0	1,047	37.6
21%–50%	230	15.9	525	18.9
51%–80%	130	9.0	545	19.6
> 80%	74	5.1	665	23.9
Counts more than two objects				
0%–20%	1,057	73.1	1,095	39.4
21%–50%	172	11.9	344	12.4
51%–80%	112	7.7	396	14.2
> 80%	105	7.3	947	34.0
Adds or subtracts by joining or separating groups of objects				
0%–20%	1,262	87.3	1,535	55.2
21%–50%	92	6.4	386	13.9
51%–80%	60	4.1	425	15.3
> 80%	32	2.2	436	15.7
Adds and/or subtracts using numerals				
0%–20%	1,328	91.8	1,770	63.6
21%–50%	64	4.4	355	12.8
51%–80%	35	2.4	346	12.4
> 80%	19	1.3	311	11.2
Forms groups of objects for multiplication or division				
0%–20%	1,415	97.9	2,373	85.3
21%–50%	21	1.5	238	8.6
51%–80%	8	0.6	103	3.7
> 80%	2	0.1	68	2.4
Multiplies and/or divides using numerals	1,424	98.5	2,475	89.0
0%–20%	11	0.8	177	6.4
21%–50%	7	0.5	80	2.9
51%–80%	4	0.3	50	1.8
> 80%				

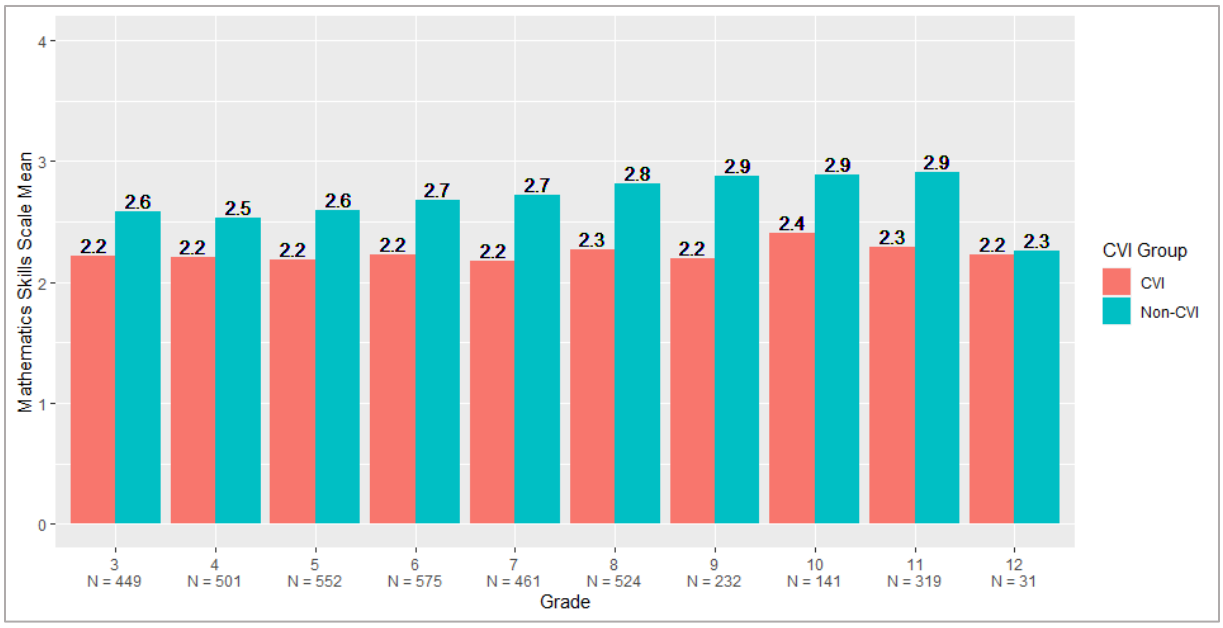
Mathematics skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	n	%	*n*	%
Uses an abacus				
0%–20%	1,427	98.7	2,607	93.7
21%–50%	13	0.9	93	3.3
51%–80%	5	0.3	45	1.6
> 80%	1	0.1	37	1.3

Overall, teachers rated the mathematics skills of students with CVI (*M* = 2.2, *SD* = 0.4) lower than they rated the skills of students without CVI (*M* = 2.7, *SD* = 0.8; *d* = 0.5). A Mann-Whitney *U* test found that the mathematics skill frequency distributions differed significantly between the CVI and without CVI groups (*W* = 1,159,571, *p* < .001), and CVI status had a large effect in determining whether a student would be reported to exhibit mathematics skills more frequently (*A* = .27).

Figure 4.5 displays the mean rating for mathematics items by CVI classification and grade level. Average ratings remained stable across grades for students with CVI but increased slightly for students without CVI.

Figure 4.5

Mean Ratings of Student Mathematics Skills by Grade and CVI Classification



Science

Teachers rated the approximate percentage of time students demonstrated various science skills (see Table 4.21). Fewer students with CVI than without CVI demonstrated science skills consistently. The discrepancies were not as large in science as in other subjects because both groups tended to demonstrate the skills less frequently. The largest gap was observed for the skill of sorting objects by common attributes (17.7% of students without CVI and 4.3% of students with CVI demonstrated the skill consistently).

Table 4.21

Frequency of Science Skill Use Among Students with and without CVI

Science skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	N	%	*n*	%
Sorts objects or materials by common properties (e.g., color, size, shape)				
0%–20%	900	71.8	908	39.5
21%–50%	203	16.2	521	22.7
51%–80%	97	7.7	462	20.1
> 80%	54	4.3	407	17.7
Identifies similarities and differences				
0%–20%	998	79.6	1,148	50.0
21%–50%	156	12.4	554	24.1
51%–80%	79	6.3	388	16.9
> 80%	21	1.7	208	9.1
Recognizes patterns				
0%–20%	1,027	81.9	1,201	52.3
21%–50%	137	10.9	523	22.8
51%–80%	63	5.0	400	17.4
> 80%	27	2.2	174	7.6
Compares initial and final conditions to determine if something changed				
0%–20%	1,147	91.5	1,600	69.6
21%–50%	73	5.8	410	17.8
51%–80%	24	1.9	218	9.5
> 80%	10	0.8	70	3.0

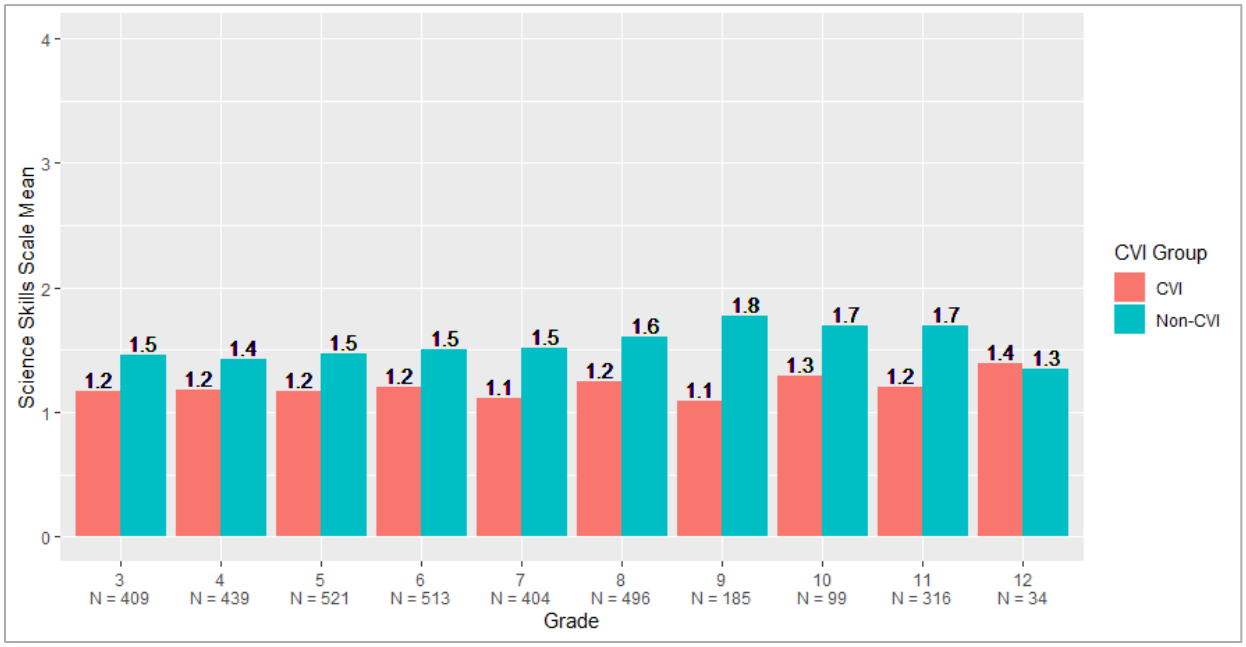
Science skill frequency	CVI (*N* = 1,510)		Non-CVI (*N* = 2,846)	
	N	%	*n*	%
Uses data to answer questions				
0%–20%	1,151	91.8	1,708	74.3
21%–50%	72	5.7	420	18.3
51%–80%	27	2.2	138	6.0
> 80%	4	0.3	32	1.4
Identifies evidence that supports a claim				
0%–20%	1,196	95.4	1,873	81.5
21%–50%	40	3.2	317	13.8
51%–80%	17	1.4	87	3.8
> 80%	1	0.1	21	0.9
Identifies cause and effect				
0%–20%	1,110	88.5	1,705	74.2
21%–50%	115	9.2	432	18.8
51%–80%	22	1.8	132	5.7
> 80%	7	0.6	29	1.3
Uses diagrams to explain phenomena				
0%–20%	1,230	98.1	2,020	87.9
21%–50%	18	1.4	199	8.7
51%–80%	6	0.5	65	2.8
> 80%	0	0.0	14	0.6

Note. Responses to science items are only required in states that use DLM science assessments and only in tested grades (typically once each in elementary, middle, and high school). As a result, the group sizes for the science items are smaller than for reading and mathematics (*N* = 1,254 for CVI and *N* = 2,298 for non-CVI).

Overall, students without CVI had a higher mean science-skill score (*M* = 1.5, *SD* = 0.7) than students with CVI (*M* = 1.2, *SD* = 0.4; *d* = 0.4). A Mann-Whitney *U* test found that the science skill frequency distributions differed significantly between the CVI and without CVI groups (*W* = 906,453, $p < .001$), and CVI status had a large effect in determining whether a student would be reported to exhibit science skills more frequently (*A* = .21). Figure 4.6 displays the mean science score by CVI classification and grade level. Mean scores are relatively consistent across grades. (Means for the high school grades should be interpreted with caution given the smaller sample sizes.)

Figure 4.6

Mean Ratings of Student Science Skills by Grade and CVI Classification



Summary

This chapter contains findings on subsets of students with significant cognitive disabilities who have CVI (*N* = 1,510) and who have other visual impairments but not CVI (*N* = 2,846) to better understand the variability in characteristics and educational experiences of these groups. Findings are summarized below.

Sensory and Physical Characteristics, Disabilities, and Language

- Compared with the non-CVI group, the CVI group had a lower percentage of students with known hearing loss and a higher percentage of students with questionable hearing. More students with CVI than without CVI had an unknown degree of hearing loss.
- Rates of use of auditory aids are similar across groups, although slightly larger percentages of students without CVI used classroom amplification, bilateral hearing aids, or sign language.
- A greater proportion of students with CVI were unable to use their hands compared to students without CVI. Nearly 38% of students with CVI used one or two hands, while nearly 77% of students with other visual impairments used one or two hands.
- Teachers reported that 73.3% of students with CVI (*n* = 1,089) and 45% of students without CVI (*n* = 1,242) had health issues that interfered with instruction or assessment. Students with CVI experienced interfering health issues at a significantly higher rate

than did students with other visual impairments and the effect size was moderate. The rate is higher in both groups than the FC population as a whole (16%).
- More students with CVI (71.8%) than students without CVI (54.1%) are reported as having multiple disabilities, but more students without CVI than students with CVI have a primary IDEA disability classifications of autism, intellectual disability, and visual impairments.
- Slightly more students with CVI than students without CVI had English as the primary language spoken in their home or English as the primary language used for their instruction. In both cases, the difference was about three percentage points.

Communication

- Fewer students with CVI than without CVI (19% vs. 55%) were reported to use speech for expressive communication, and more students with CVI than without CVI (48% vs. 31%) used AAC devices. Of students who did not use speech, sign language, or AAC (36% of students with CVI and 19% of students without CVI), a larger percentage of students with CVI than students without CVI demonstrated reflexive and unintentional communicative behaviors (89% vs. 75%).
- Students with CVI demonstrated less sophisticated communication using speech and AAC than did students with other visual impairments. For example, students with CVI were reported to regularly combine three or more spoken words using grammatical rules less frequently than students without CVI (43.4% vs. 58.2%). Regardless of communication mode, students with CVI used less sophisticated expressive communication than students without CVI and the effect size was moderate.
- Across all receptive communication items, one-third or fewer students in both groups demonstrated receptive language skills consistently, but rates of consistent use were higher for students without CVI than for those with CVI. For example, 34.2% of the students without CVI and 10.3% of students with CVI were reported to consistently point, look at, or touch things in the immediate vicinity when asked. The group differences in receptive communication were statistically significant and the effect size was large.

Educational Setting, Assistive Technology, and Instruction

- Students with CVI tended to be placed in more restrictive settings compared with students without CVI.
- Students with CVI used some devices during instruction and assessment at similar rates as students without CVI (e.g., screen magnification devices, screen readers and/or talking word processors, simple devices, touch screens). Fewer students with CVI were reported to use braille devices (1% vs. 8%), but more students with CVI were reported to use single message devices (31% vs. 13%) and scanning with switches (33% vs. 10%). Over 92% of students with CVI and 95% of students without CVI used at least one assistive device.
- Fewer students with CVI than without CVI were reported to sustain attention to computer-directed (5.8% vs. 19.3%) or teacher-directed (7.5% vs. 19.6%) instruction.

- While rates of computer use with human support were similar across groups (61.5% CVI, 60.3% non-CVI), fewer students with CVI (1.4%) than with other visual impairments (11.8%) were reported to access a computer independently.

Academics

Findings about FC students' academic skills are based on teachers' ratings using their general knowledge of the student, not DLM assessment results.

- Across subjects, students with CVI demonstrated specific academic skills less consistently than did students without CVI. Overall teacher-reported academic skills were significantly different in all subjects. Effect sizes were large in reading, mathematics, and science, and small in writing.
- Teachers rated the reading skills of students with CVI similarly across all grades. Mean ratings increased slightly for students without CVI in higher grades.
- In writing, only 10.3% of students with CVI were reported to have written at least once at a higher level than scribbles or randomly writing/selecting letters or symbols, compared to 42% of students without CVI. Very few students in both groups wrote sentences or complete ideas or paragraphs using spelling. Students with CVI demonstrated very similar skills across all grade bands; that is, there did not appear to be an increase in writing skills as students progressed through school. Students without CVI demonstrated some increase in writing skills from elementary to high school.
- In mathematics, group discrepancies were larger for skills such as shape identification, sorting by common attributes, and counting than for other skills (e.g., measuring, using multiplication and division). Since many math skills require the use of hands in addition to some degree of visual acuity, students with CVI may not have had access to the materials needed to demonstrate skills. Average ratings remained stable across grades for students with CVI but increased slightly for students without CVI.
- Fewer students with CVI than without CVI demonstrated science skills consistently. The discrepancies were not as large in science as in other subjects because both groups tended to demonstrate the skills less frequently. The largest gap was observed for the skill of sorting objects by common attributes (17.7% of students without CVI and 4.3% of students with CVI demonstrated the skill consistently). Mean science skill scores are relatively consistent across grades for students with CVI and increase slightly in upper grades for students without CVI.

5. Results: Prevalence Analysis

The results in this chapter address research questions based on deaf-blindness prevalence rates per state within the First Contact (FC) survey and National Deaf-Blind Child Count (CC) data sets. FC provides data on the prevalence of deaf-blindness among students with significant cognitive disabilities who take alternate assessments, while CC provides data on the prevalence of deaf-blindness among school-aged students with disabilities who receive services under IDEA Part B.

Prevalence rates were calculated from FC survey data for students with the primary IDEA disability classification of deaf-blindness, for students with known dual sensory loss, and for students with suspected dual sensory loss. (Known and suspected dual sensory loss are defined in Chapter 2, New Variables.) Data are limited to the 2018 FC survey responses with a valid record for the student's state of residence (*N* = 100,149). Rates were calculated per 1,000 students enrolled in DLM assessments (i.e., students with significant cognitive disabilities) by state and for the whole sample. A 95% binomial confidence interval is also included, centered on the prevalence rate for each state.

For CC data, prevalence rates were calculated based on a three-year rolling average, for ages 6–21 from years 2016–2018. All CC prevalence rates were calculated as the number of students with deaf-blindness per 1,000 students receiving special education services based on numbers reported on the Part B, IDEA Child Count. The data were not further restricted to those who reportedly take alternate assessments. States were restricted to those in the FC survey data set.

Research questions include:

1. What are the deaf-blindness prevalence rates per state, according to the FC and CC data sets?
2. What are the prevalence rates for known or suspected dual sensory loss among FC students? How are those rates related to deaf-blindness prevalence rates?
3. How are prevalence rates related to state population (FC and CC)?
4. How do prevalence rates vary by grade band (FC) or age range (CC)?

Deaf-Blindness Prevalence Rates

Table 5.1 shows the prevalence rates of students with a primary IDEA disability classification of deaf-blindness in the FC and CC data. In the FC data, overall prevalence was 1.11 of the students with significant cognitive disabilities, per 1,000, or 0.11%. Rates per state ranged from 0.0 to 13.98 per 1,000. Excluding Delaware as an outlier, the highest rate was 3.45 per 1,000. In the CC data, overall prevalence was 1.10 of all students with disabilities and rates ranged from 0.71 to 2.64 per 1,000. Caution is warranted when drawing comparisons between the data sets due to differences in how prevalence was calculated and the underlying populations on which the calculations are based.

Table 5.1

Prevalence Rates for Deaf-Blindness Classification in First Contact and Child Count Data (per 1,000 Students)

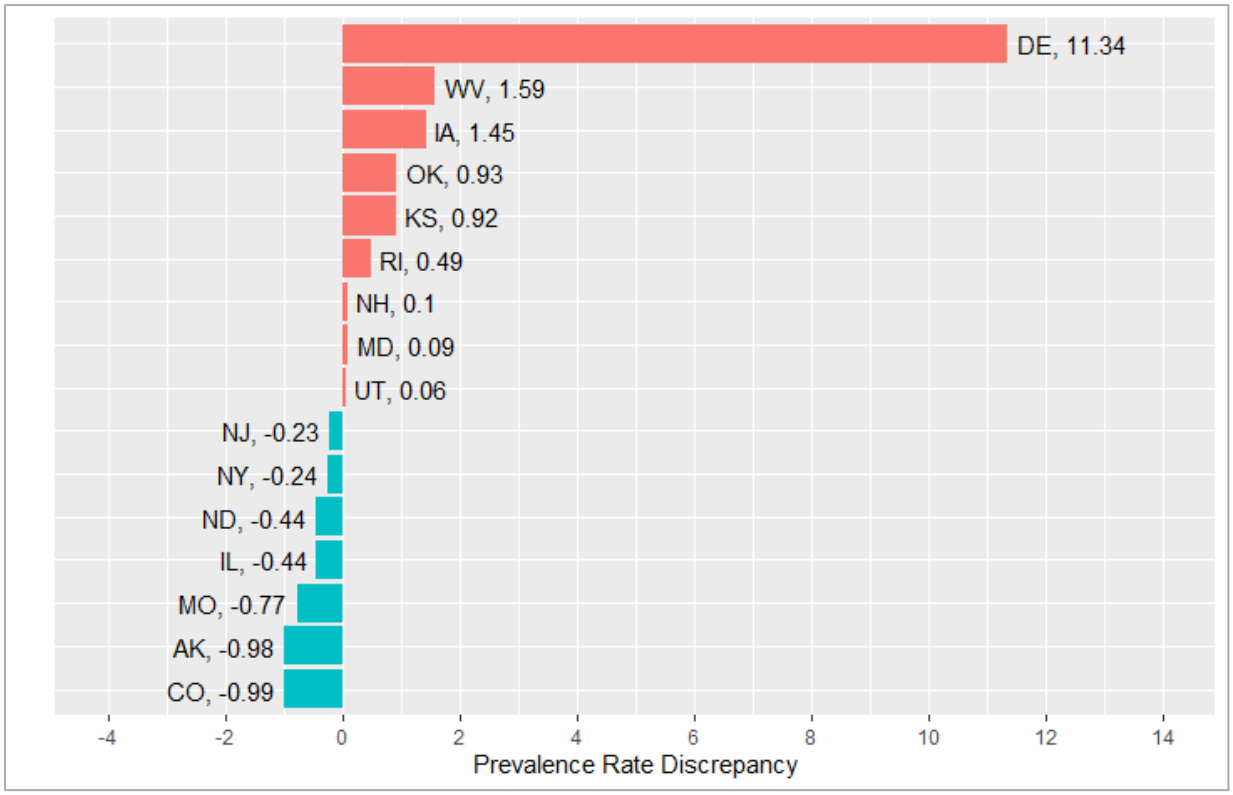
	First Contact (*N* = 111)			Child Count (*N* = 5,454)		
	Rate	95% CI		Rate	95% CI	
		LL	*UL*		*LL*	*UL*
Alaska	0.00	0.00	0.00	0.98	0.86	1.09
Colorado	0.16	−0.15	0.47	1.15	1.13	1.17
Delaware	13.98	7.56	20.39	2.64	2.50	2.79
Illinois	0.72	0.25	1.19	1.16	1.12	1.19
Iowa	2.59	0.80	4.39	1.14	1.12	1.15
Kansas	2.16	0.75	3.57	1.24	1.15	1.33
Maryland	1.75	0.04	3.46	1.66	1.62	1.69
Missouri	0.61	0.01	1.20	1.38	1.35	1.41
New Hampshire	2.25	−0.86	5.36	2.15	2.12	2.17
New Jersey	0.56	0.15	0.98	0.79	0.75	0.84
New York	0.47	0.21	0.72	0.71	0.68	0.74
North Dakota	1.36	−1.31	4.03	1.80	1.72	1.87
Oklahoma	2.16	1.07	3.24	1.23	1.20	1.26
Rhode Island	1.96	−0.75	4.67	1.47	1.37	1.57
Utah	1.26	0.25	2.26	1.20	1.18	1.22
West Virginia	3.45	0.90	6.00	1.86	1.61	2.11
Wisconsin	0.77	0.10	1.45	—	—	—
Overall	**1.11**	**0.90**	**1.31**	**1.10**	**1.09**	**1.10**

Note. CI = confidence interval; LL = lower limit; UL = upper limit. FC prevalence is based on students with significant cognitive disabilities enrolled for DLM assessments, and CC prevalence is based on IDEA Part B Child Count.

Figure 5.1 illustrates the discrepancies between deaf-blindness prevalence rates according to the FC and CC data. Rates were higher in the FC data for Delaware, West Virginia, Iowa, Oklahoma, and Kansas. Rates were higher in CC data for Colorado, Alaska, and Missouri. The discrepancies between FC and CC prevalence rates were lower than 0.5 in eight states.

Figure 5.1

Discrepancy between Deaf-Blindness Prevalence Rates for First Contact and Child Count Data



Note: FC prevalence is based on students with significant cognitive disabilities enrolled for DLM assessments, and CC prevalence is based on IDEA Part B Child Count.

Prevalence Rates for Known or Suspected Dual Sensory Loss

We next examined the rates at which FC students were identified as having known or suspected dual sensory loss. The prevalence of known dual sensory loss ranged from 4.09 to 11.28 per 1,000 students with significant cognitive disabilities. The prevalence of suspected dual sensory loss ranged from 2.62 to 13.93 per 1,000 students with significant cognitive disabilities (see Table 5.2).

Table 5.2

*First Contact Prevalence Rates (per 1,000 Students) by State for Known and Suspected Dual Sensory Loss (*N *= 100,149)*

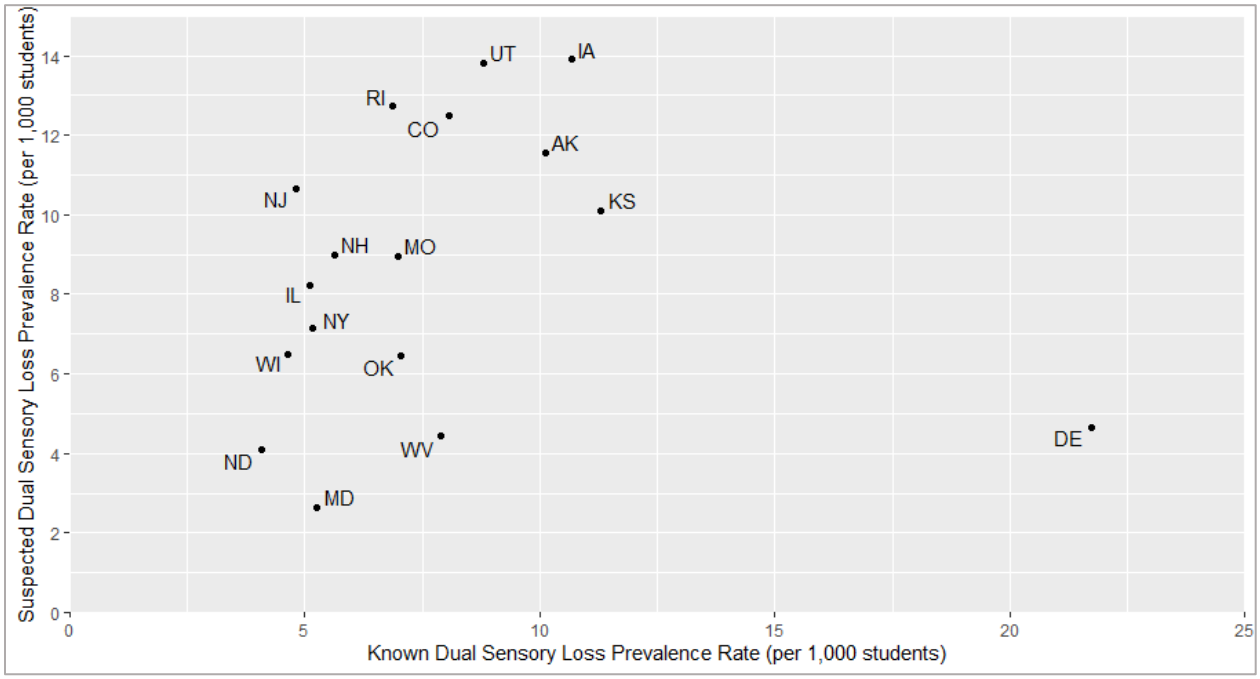
State	Known prevalence rate (*N* = 644)	95% CI on known prevalence rate		Suspected prevalence rate (*N* = 864)	95% CI on suspected prevalence rate	
		LL	*UL*		*LL*	*UL*
Alaska	10.12	2.66	17.57	11.56	3.60	19.53
Colorado	8.06	5.85	10.26	12.48	9.74	15.21
Delaware	21.74	13.77	29.70	4.66	0.94	8.38
Illinois	5.10	3.86	6.35	8.21	6.63	9.79
Iowa	10.69	7.06	14.32	13.93	9.80	18.06
Kansas	11.28	8.08	14.49	10.08	7.05	13.12
Maryland	5.24	2.28	8.20	2.62	0.53	4.72
Missouri	6.97	4.96	8.98	8.94	6.67	11.22
New Hampshire	5.62	0.71	10.54	9.00	2.79	15.21
New Jersey	4.81	3.60	6.03	10.67	8.87	12.47
New York	5.18	4.33	6.02	7.15	6.16	8.14
North Dakota	4.09	−0.53	8.70	4.09	−0.53	8.70
Oklahoma	7.04	5.08	9.00	6.47	4.58	8.35
Rhode Island	6.86	1.79	11.92	12.73	5.86	19.61
Utah	8.80	6.15	11.45	13.83	10.51	17.14
West Virginia	7.89	4.04	11.73	4.44	1.54	7.33
Wisconsin	4.64	2.99	6.30	6.50	4.54	8.46
Overall	**6.43**	**5.94**	**6.93**	**8.63**	**8.05**	**9.20**

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

In some states (e.g., Delaware), the high known prevalence rate was offset by a lower suspected prevalence rate, suggesting districts were good at identifying students with dual sensory loss. However, excluding Delaware, the relationship between prevalence rates for known and suspected dual sensory loss groups was relatively strong and positive (r = .77 without Delaware; r = .25 with Delaware; see Figure 5.2).

Figure 5.2

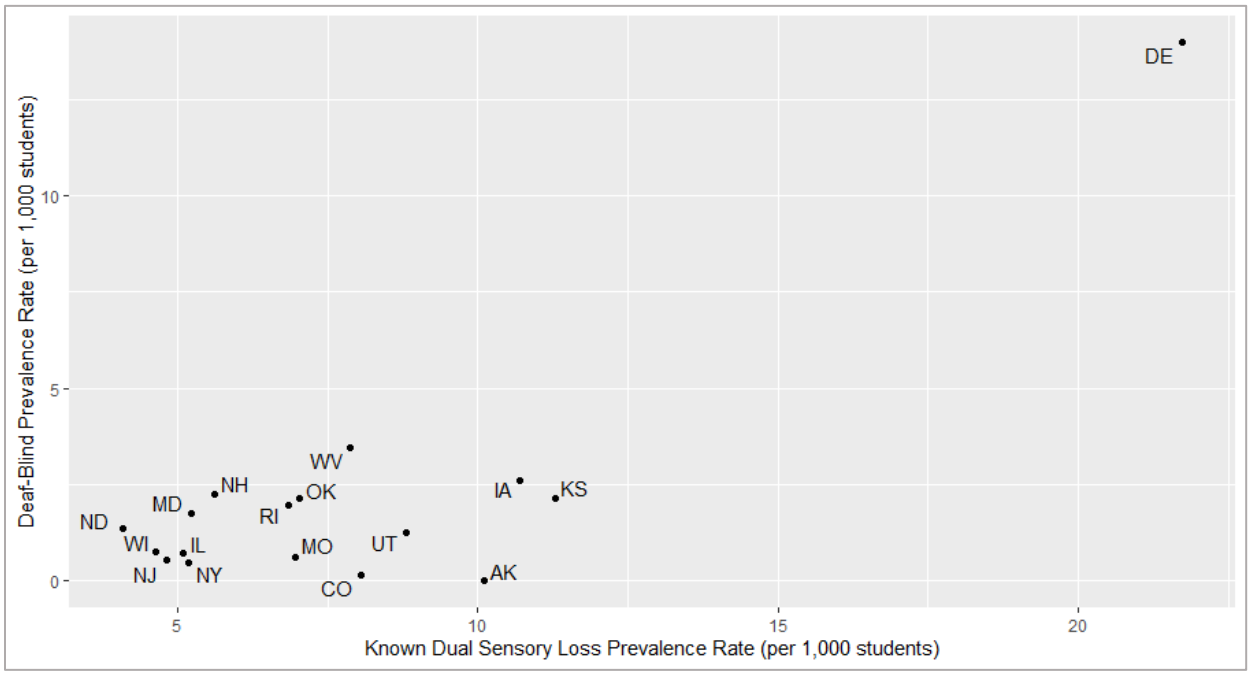
First Contact Prevalence Rates Among Known and Suspected Dual Sensory Loss Groups



Known dual sensory loss and deaf-blindness prevalence rates among FC students were positively but weakly correlated, although again Delaware had an impact on that relationship (r = .24, p = .36 without Delaware; r = .85 with Delaware; see Figure 5.3).

Figure 5.3

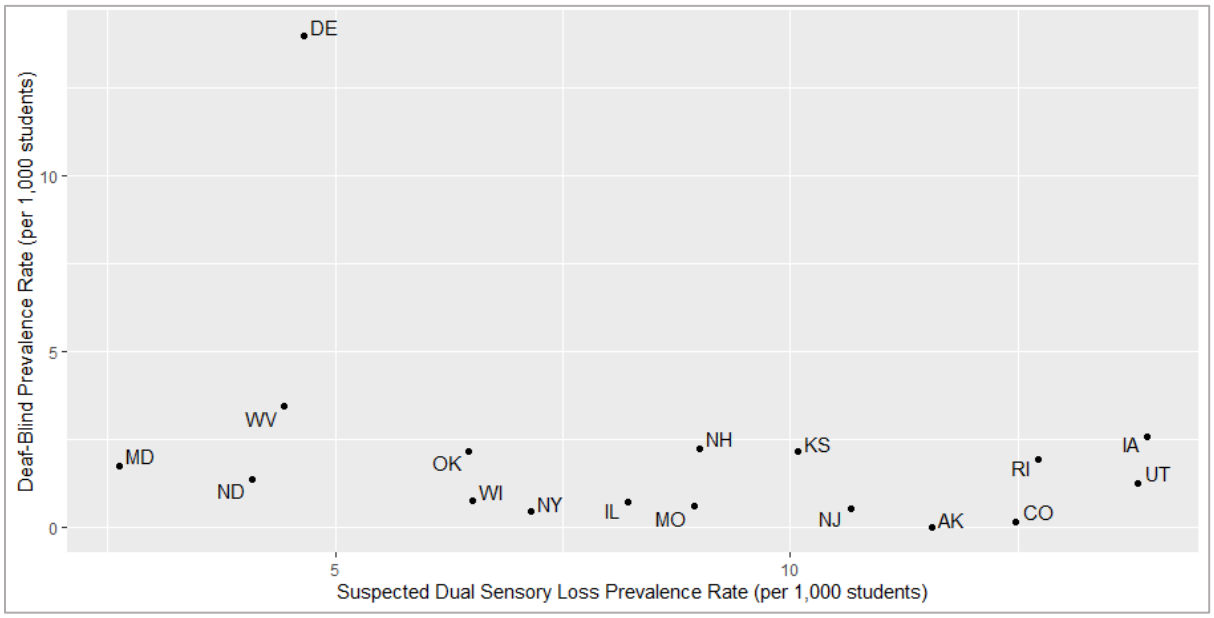
First Contact Prevalence of Known Dual Sensory Loss by First Contact Prevalence of Deaf-Blindness, by State



States with higher deaf-blindness prevalence rates had lower suspected dual sensory loss rates, but this relationship was not significant (r = −.34, p = .19 with Delaware; r = −.21, p = .45 without Delaware; see Figure 5.4).

Figure 5.4

First Contact Prevalence of Suspected Dual Sensory Loss by First Contact Prevalence of Deaf-Blindness, by State



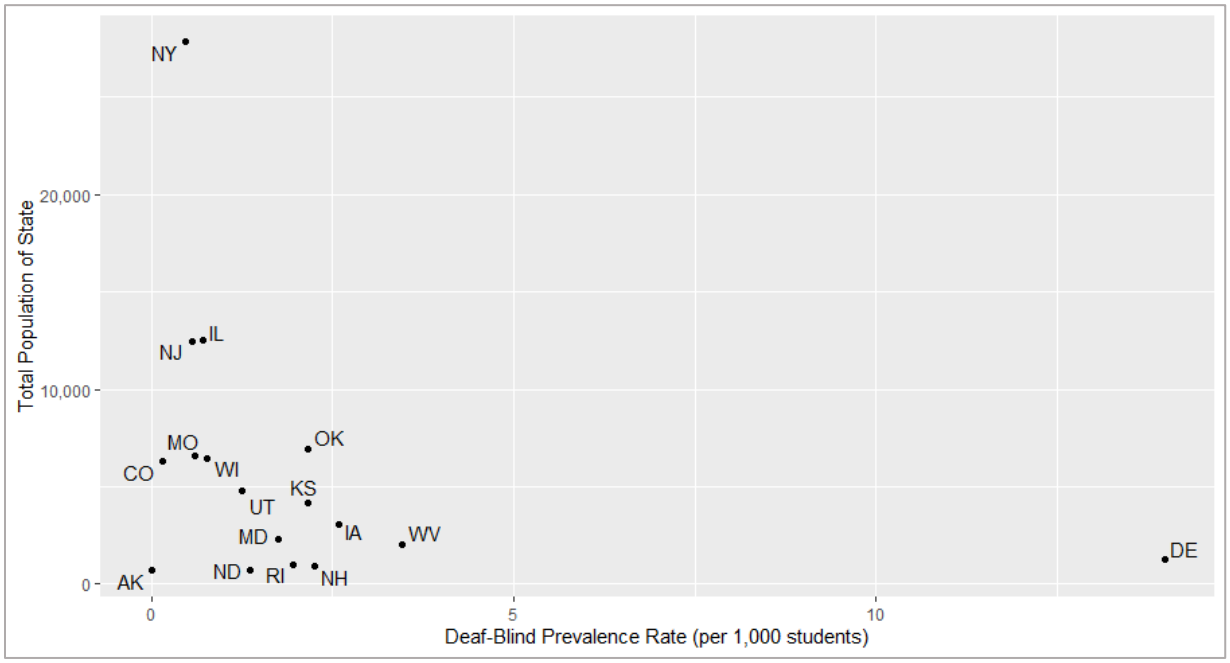
Overall, the relationship between deaf-blind prevalence rates and known or suspected dual sensory loss prevalence rates appears to exist but to be non-significant. The relationship is weak and positive for known dual sensory loss, and weak and negative for suspected dual sensory loss. Delaware's inclusion or exclusion has a heavy influence on the strength of the relationship between the prevalence rates.

Relationship Between Prevalence Rate and State Population Size

Both data sets were used to explore the relationship between deaf-blindness prevalence rates and total state population. In the FC data, prevalence and total state population were weakly correlated when Delaware was included ($r = -.29$, $p = .25$) but moderately negatively related when Delaware was excluded ($r = -.44$, $p = .092$; see Figure 5.5). New York was also an outlier in this case.

Figure 5.5

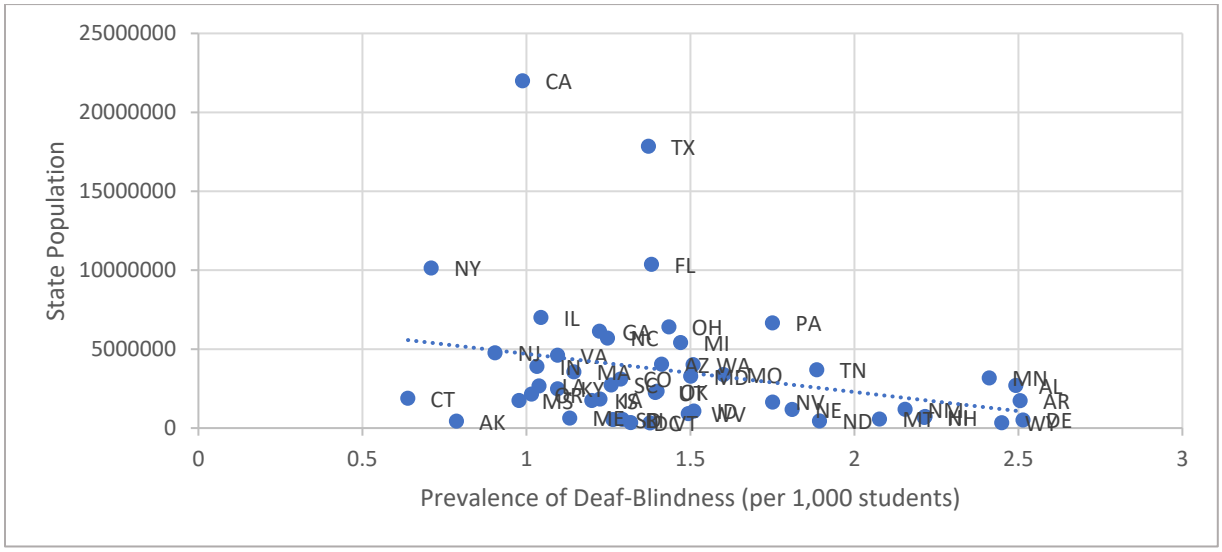
First Contact Deaf-Blindness Prevalence Rate by Total State Population



For the CC data, the relationship between prevalence rates and state populations was evaluated looking at 2018 data ages ranging from birth to 21 years for both groups and across all states (not just those using DLM assessments). There is a weak negative correlation between deaf-blind prevalence and size of state population ($r = -.29$, $p < .05$; see Figure 5.6).

Figure 5.6

Child Count Prevalence of Deaf-Blindness Related to Population of State (From Birth to Age 21)



Prevalence Rates by Grade Span or Age Range

Prevalence rates can be described by grade band for the FC data and by age range for the CC data. Caution is warranted in making direct comparisons because FC prevalence is based on students with significant cognitive disabilities enrolled for DLM assessments and CC prevalence is based on all school-aged students with disabilities who receive services under IDEA Part B Child Count.

In Table 5.3, prevalence rates are reported by grade band for the entire FC data set (across states), along with a 95% confidence interval centered on the overall mean rate per 1,000 students with significant cognitive disabilities. The rates of deaf-blindness and suspected dual sensory loss decreased across grade bands, while the rate of known dual sensory loss decreased from elementary to middle school and increased from middle to high school.

Table 5.3

First Contact Prevalence Rates per 1,000 Students with Significant Cognitive Disabilities by Grade Band

	Elementary school (*N* = 34,770)				Middle school (*N* = 35,985)				High school (*N* = 18,851)			
		Prevalence	95% CI			Prevalence	95% CI			Prevalence	95% CI	
	n	rate	*LL*	*UL*	*n*	rate	*LL*	*UL*	*n*	rate	*LL*	*UL*
Deaf-blindness	42	1.21	1.17	1.24	41	1.14	1.12	1.16	20	1.06	0.97	1.15
Known dual sensory loss	226	6.50	6.45	6.55	226	6.28	6.23	6.33	129	6.84	6.76	6.93
Suspected dual sensory loss	329	9.46	9.40	9.53	309	8.59	8.53	8.63	123	6.52	6.47	6.58

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 5.4 displays the same FC prevalence rates (i.e., deaf-blindness, known dual sensory loss, and suspected dual sensory loss) by state and grade band per 1,000 students with significant cognitive disabilities. In general, the suspected dual sensory loss prevalence rate tends to be higher than the known dual sensory loss prevalence rate, which in turn tends to be higher than the deaf-blind prevalence rate. Deaf-blind classification and known dual sensory loss prevalence rates are generally fairly stable across grade bands or follow the pattern in the overall sample (see Table 5.3), whereas suspected dual sensory loss prevalence rates tend to decrease by the high school grade band.

Table 5.4

First Contact Prevalence Rates of Deaf-Blindness, Known Dual Sensory Loss, and Suspected Dual Sensory Loss per 1,000 Students with Significant Cognitive Disabilities, by Grade Band and State

State and Group	Elementary school (*N* = 34,770)	Middle school (*N* = 35,985)	High school (*N* = 18,851)	Total [a] (*N* = 100,149)
Alaska				
Deaf-blind	0.00	0.00	0.00	0.00
Known	9.62	11.15	11.17	10.12
Suspected	24.04	7.43	5.59	11.56
Colorado				
Deaf-blind	0.00	0.00	0.52	0.16
Known	9.06	7.44	7.83	8.06
Suspected	16.52	9.92	10.96	12.48
Delaware				
Deaf-blind	13.86	8.11	22.66	13.98
Known	23.09	18.26	25.50	21.74
Suspected	6.93	6.09	0.00	4.66
Illinois				
Deaf-blind	0.82	0.78	0.54	0.72
Known	5.95	3.92	8.11	5.10
Suspected	8.82	7.65	9.19	8.21
Iowa				
Deaf-blind	0.98	2.92	3.42	2.59
Known	12.71	9.73	10.22	10.69
Suspected	17.60	12.65	10.22	13.93

State and Group	Elementary school (*N* = 34,770)	Middle school (*N* = 35,985)	High school (*N* = 18,851)	Total [a] (*N* = 100,149)
Kansas				
Deaf-blind	2.93	3.58	0.00	2.16
Known	13.17	13.61	7.06	11.28
Suspected	12.44	10.74	5.88	10.08
Maryland				
Deaf-blind	1.48	3.84	0.00	1.75
Known	7.40	5.12	3.80	5.24
Suspected	2.96	3.84	1.27	2.62
Missouri				
Deaf-blind	1.39	0.00	0.60	0.61
Known	6.03	4.90	10.73	6.97
Suspected	8.35	11.15	8.35	8.94
New Hampshire				
Deaf-Blind	0.00	0.00	16.39	2.25
Known	5.41	2.56	16.39	5.62
Suspected	16.22	5.13	0.00	9.00
New Jersey				
Deaf-blind	0.59	0.41	0.57	0.56
Known	3.32	6.81	4.54	4.81
Suspected	10.94	12.58	5.11	10.67
New York				
Deaf-blind	0.64	0.31	0.29	0.47
Known	4.73	5.30	4.90	5.18
Suspected	6.56	6.83	3.75	7.15
North Dakota				
Deaf-blind	0.00	3.26	0.00	1.36
Known	3.76	3.26	0.00	4.09
Suspected	7.52	0.00	0.00	4.09
Oklahoma				
Deaf-blind	2.18	2.78	0.00	2.16
Known	7.28	7.54	5.82	7.04
Suspected	6.55	5.55	7.28	6.47
Rhode Island				
Deaf-blind	0.00	4.59	0.00	1.96
Known	4.75	9.17	6.25	6.86
Suspected	14.25	13.76	6.25	12.73

State and Group	Elementary school (*N* = 34,770)	Middle school (*N* = 35,985)	High school (*N* = 18,851)	Total [a] (*N* = 100,149)
Utah				
Deaf-blind	1.38	1.96	0.66	1.26
Known	11.00	10.45	4.62	8.80
Suspected	14.44	13.72	11.87	13.83
West Virginia				
Deaf-blind	4.35	2.50	3.77	3.45
Known	8.70	5.01	11.32	7.89
Suspected	1.45	7.51	7.55	4.44
Wisconsin				
Deaf-blind	1.68	0.99	0.00	0.77
Known	6.17	2.48	4.39	4.64
Suspected	11.77	5.96	3.08	6.50
Overall				
Deaf-blind	**1.21**	**1.14**	**1.06**	**1.11**
Known	**6.50**	**6.28**	**6.84**	**6.43**
Suspected	**9.46**	**8.59**	**6.52**	**8.63**

[a] Total is based on full sample of students in FC including students with no reported grade band (*n* = 10,543).

In CC data, prevalence can be reported by age ranges that roughly correspond with grades 1–6, 7–12, and 12+.

Table 5.5 summarizes the deaf-blindness prevalence rates among school-aged students with disabilities by age group. The overall prevalence rate increases slightly from elementary to secondary grades and more substantially between secondary and late secondary (ages 18–21 years).

Table 5.5

Child Count Prevalence Rate by Age Group per 1,000 Students Receiving Part B Services

	Ages 6–11 (*N* = 2,123)				Ages 12–17 (*N* = 2,203)				Ages 18–21 (*N* = 1,128)			
		Prevalence	95% CI			Prevalence	95% CI			Prevalence	95% CI	
	n	rate	*LL*	*UL*	*n*	rate	*LL*	*UL*	*n*	rate	*LL*	*UL*
Alaska	20	0.79	0.63	0.94	28	1.27	1.17	1.36	1	0.37	−0.03	0.77
Colorado	119	0.91	0.88	0.94	138	1.16	1.10	1.22	45	3.30	2.89	3.71
Delaware	67	2.27	2.21	2.34	66	2.35	2.20	2.50	29	7.74	6.62	8.86
Illinois	304	0.84	0.79	0.88	363	0.99	0.96	1.02	230	4.98	4.89	5.06
Iowa	84	0.95	0.92	0.98	86	1.06	1.00	1.12	32	4.00	3.44	4.57
Kansas	125	1.30	1.20	1.40	86	1.05	0.93	1.17	20	2.36	2.01	2.71
Maryland	190	1.41	1.35	1.47	196	1.47	1.41	1.54	83	5.55	5.08	6.02
Missouri	185	1.10	1.07	1.14	216	1.41	1.36	1.45	66	4.05	3.53	4.57
New Hampshire	79	2.22	2.09	2.35	52	1.35	1.20	1.51	35	10.54	9.59	11.49
New Jersey	207	0.68	0.59	0.76	160	0.50	0.48	0.52	153	5.05	4.82	5.28
New York	324	0.50	0.47	0.53	393	0.62	0.59	0.66	237	3.48	3.42	3.55
North Dakota	31	1.60	1.53	1.67	29	1.67	1.47	1.87	10	4.69	3.42	5.97
Oklahoma	160	1.10	1.07	1.13	135	0.91	0.89	0.94	83	5.90	5.58	6.22
Rhode Island	18	0.63	0.45	0.81	54	1.86	1.67	2.05	19	4.59	3.57	5.61
Utah	104	0.91	0.87	0.95	99	1.03	0.99	1.06	62	6.52	5.74	7.31
West Virginia	106	1.64	1.45	1.82	102	1.91	1.62	2.20	23	3.62	2.77	4.46
Wisconsin	—	—	—	—	—	—	—	—	—	—	—	—
Overall [a]	**2,123**	**0.89**	**0.88**	**0.90**	**2,203**	**0.95**	**0.95**	**0.95**	**1,128**	**4.48**	**4.45**	**4.51**

Note. CC prevalence rate per 1,000 in special education per numbers from the Part B, IDEA Child Count. Data were calculated from years 2016–2018. CI = confidence interval; LL = lower limit; UL = upper limit.

[a] **Overall** is prevalence rate for all DLM states combined for each age group.

Summary

This chapter described results for four research questions related to prevalence data in the FC and CC data sets. Results for the research questions based on FC and CC data should be interpreted with caution. Direct comparisons of deaf-blindness prevalence rates are not appropriate because of the different methods of calculating prevalence rates and the different

underlying populations of students (i.e., all students with disabilities or those with significant cognitive disabilities).

What are the deaf-blindness prevalence rates per state, according to the FC and CC data sets?

The prevalence calculations were based on a single year for FC and on a three-year rolling average for CC. In the FC data, overall prevalence of deaf-blindness among students with significant cognitive disabilities was 1.11 per 1,000, or 0.11%; rates per state ranged from 0.0 to 13.98 per 1,000. Excluding Delaware as an outlier, the highest prevalence was 3.45 per 1,000 students.). In the CC data, overall prevalence of deaf-blindness among all students with disabilities was 1.10, and rates ranged from 0.71 to 2.64 per 1,000.

What are the prevalence rates for known or suspected dual sensory loss among FC students? How are those rates related to deaf-blindness prevalence rates?

The prevalence of known dual sensory loss ranged from 0.00 to 11.28 per 1,000 students with significant cognitive disabilities. The prevalence of suspected dual sensory loss ranged from 0.0 to 13.93. There was a strong, positive relationship between a state's rates of known and suspected dual sensory loss. There was variability across states in whether the known rate or the suspected rate was higher.

There was a nonsignificant relationship between states' prevalence of deaf-blindness and prevalence of dual sensory loss among students with significant cognitive disabilities. State deaf-blindness rates were weakly but positively related to prevalence of known dual sensory loss and weakly but negatively related to their prevalence of suspected dual sensory loss.

How are prevalence rates related to state population (FC and CC)?

There was a weak to moderate negative relationship between prevalence rate and state population size. In other words, less populous states had higher prevalence rates. This was true for the FC data on students with significant cognitive disabilities and the CC data on students with disabilities who receive IDEA Part B services.

How do prevalence rates vary by grade band (FC) or age range (CC)?

In the FC data, the rates of IDEA deaf-blindness classification and suspected dual sensory loss among students with significant cognitive disabilities decreased across grade bands, while the rate of known dual sensory loss decreased from elementary to middle school and increased from middle to high school.

In the CC data, the overall prevalence rate of IDEA deaf-blindness classification among school-aged students with disabilities increased slightly from elementary to secondary grades and more substantially between secondary and late secondary (ages 18–21 years).

6. Conclusion

The purpose of this study was to learn more about the population of students with dual sensory loss and significant cognitive disabilities. The two data sets offered different primary lenses: the First Contact (FC) survey data consisted of students known to have significant cognitive disabilities, and the Deaf-Blind Child Count (CC) data had students known to have deaf-blindness. There are some likely limitations of the data. For instance, methods of collecting CC data vary by state and likely reflect different ways of counting. Further, the CC variable about alternate assessment participation may not be updated annually, so some students who no longer take alternate assessments may have been included in the sample for this study. This may be especially true for CC students ages 18–21 years, who in theory would not be eligible for any alternate academic assessment but who comprised nearly 28% of the CC sample for this analysis. This study was also based on the 2017–2018 school year. The FC data may include students who would not participate in statewide alternate assessments today, as states have taken steps to meet the ESSA guideline of having no more than 1% of students in tested grades participate in alternate assessments. Thus, the FC data may overrepresent students who had more academic skills and have since exited alternate assessments. With those limitations in mind, the results still contribute to collective understandings of the population and point to some ideas for educational practice.

Identifying Students with Deaf-Blindness

Classifying a student as deaf-blind requires teams to draw conclusions about dual sensory loss and consider that evidence along with other disabilities when choosing the disability classification to report for IDEA. This study highlighted potential challenges in both of these areas.

Dual Sensory Loss

In the FC data set, more students were identified with visual impairments than hearing impairments. In contrast, based on 2019–2020 IDEA Part B Child Count data on all students with disabilities (U.S. Department of Education, 2021), all but one state reported a higher percentage of students with hearing impairments (HI) than visual impairments (VI); the median difference between HI and VI prevalence in Part B Child Count was 5 percentage points (HI = 8%, VI = 3%). The pattern in the FC data indicates there is a strong likelihood of underidentification of sensory loss, potentially due in part to caregivers attributing behaviors to intellectual disability and not recognizing the potential for sensory loss (Kiani & Miller, 2010). Though diagnostic overshadowing is a challenge in the area of visual impairment (Carvill, 2001; Harvey et al., 2020), the challenge of diagnostic overshadowing appears to be greater in the area of hearing loss (Beers et al., 2014; Fitzpatrick et al., 2014; Erickson & Quick, 2017).

There is further evidence of likely underidentification of dual sensory loss among students with significant cognitive disabilities: students with suspected dual sensory loss make up 0.8% of the

FC population—a group that is larger than the group with known dual sensory loss (0.6%). Whether dual sensory loss is known or suspected seems to make a difference in the sophistication and mode of students' communication, their AAC use, their attention during instruction, their independent use of computers, and the independence of their hand use. The fact that students with suspected dual sensory loss fare worse in these areas may not be surprising, since the skills needed to participate in sensory testing to confirm dual sensory loss are similar to the skills needed to participate in, and benefit from, instruction. As a result, efforts to confirm suspected sensory loss are inconclusive because of the limitations of the testing. While students with known dual sensory loss have more academic skills than those with suspected dual sensory loss, both groups lack access to critical supports such as those provided by interveners and likely lack access to appropriate academic instruction and early intervention. Their peers without dual sensory loss had higher academic skills in all subjects and had larger increases in average skills in upper grades.

Along with the group differences noted above, there were a few cases where groups in this analysis were similar to one another or to the larger population. For example, educational settings were similar across both FC groups (known and suspected) and CC students. And within the CC data set, the proportion of CC students in our sample who received intervener services (8.1%) was nearly identical to what was reported for the entire CC population (8%).

Disability Classifications

Under IDEA regulations, students with significant cognitive disabilities and deaf-blindness should be reported in the multiple disabilities category. States that collect data on secondary IDEA disability categories may provide additional guidance on using deaf-blindness as a secondary classification. Under ESSA and IDEA, students must have significant cognitive disabilities to be eligible to take alternate assessments. Based on this combination of requirements, students who have dual sensory impairments and who take alternate assessments would in theory have an IDEA disability classification of multiple disabilities. The FC and CC data both suggest most teams follow this guidance. Yet, in this study, we found that 12% of FC students with dual sensory loss had a primary classification of deaf-blindness. This suggests that there may not be consensus on the most appropriate primary area of IDEA eligibility when students have significant cognitive disabilities and deaf-blindness. It is possible teams are relying on criteria or guidance beyond IDEA regulations when choosing a primary disability category for a student with significant cognitive disabilities and known dual sensory loss.

It is also possible that students with the IDEA disability classification of multiple disabilities were given that label due to a cognitive disability and some other non-sensory disability while sensory disabilities were unrecognized. If students with suspected dual sensory loss were confirmed to have dual sensory loss, more students with significant cognitive disabilities would likely receive Part B special education services appropriate for deaf-blindness.

In 2018, there were 8,013 children aged 6–21 years reported on the National Deaf-Blind Child Count (National Center on Deaf-Blindness, 2019). In contrast, the U.S. Department of Education (2019) reported that only 1,425 students in that age range were reported under the IDEA disability category of deaf-blindness. We might have predicted higher deaf-blindness prevalence rates in the FC data than in the overall IDEA Part B Child Count data since the FC population includes an overrepresentation of students with multiple and complex disabilities. On the other hand, deaf-blindness can go unrecognized when behaviors that are common to sensory loss and cognitive disabilities are attributed to the cognitive disability (Beers et al., 2014; Harvey et al., 2020; Hoevenaars-van den Boom et al., 2009). It is likely that the state deaf-blindness prevalence rates among students with significant cognitive disabilities based on the FC data (see Chapter 5) are undercounts of the real population of students with deaf-blindness who are otherwise eligible to participate in alternate assessments based on alternate achievement standards.

While the overall deaf-blindness prevalence rates were the same in the FC and CC data sets, there was much more variability in the FC data. Delaware in particular was an outlier across all of the FC prevalence analyses. This observation might be due to the state's unique service delivery model, in which deaf-blind services are provided as consultation services and noted on the student's individualized educational plan (IEP). This model allows the state deaf-blind project to build local capacity through intensive technical assistance. Delaware also has substantial state funding in addition to federal funding for its deaf-blind project. In the FC data, deaf-blindness prevalence rates are likely to be underestimates if the student was classified as having multiple disabilities. Also, states use a variety of methods to identify students with deaf-blindness for IDEA Part B reporting, which may lead to undercounting in some states. When states work to improve their data collection over time, counts can change drastically. For example, after New York made an effort to validate and clean its Deaf-Blind Child Count data, the state doubled its count in 2019 compared to the 74 students reported in 2018 (see Table 2.2).

The large percentage of CC students who take alternate assessment and have multiple disabilities as their primary IDEA disability classification may be an indication that IEP teams recognize a general level of complexity in students' characteristics and needs. However, a multiple disabilities label does not necessarily mean that teams design instruction that specifically addresses each student's unique dual sensory loss and cognitive disability, nor does it mean that the team has considered sensory loss as the known intellectual disability combined with physical and/or communication impairments would qualify a student for IDEA Part B services in the multiple disabilities category.

While the prevalence analyses (Chapter 5) may inform future work on identification of students with deaf-blindness, this report does not offer a conclusive answer to epidemiological questions such as, what is the prevalence of deaf-blindness among students with significant cognitive disabilities? Or, what proportion of students with disabilities have deaf-blindness and a

significant cognitive disability? States may not be able to use overall population size or geographic area to estimate the expected number of students with this combination of disabilities, as less than 20% of the variability in deaf-blindness prevalence rate could be accounted for by population size and there were no noticeable patterns by geographic region. This study did not explore other sources of variability in the prevalence rates. Furthermore, no point of comparison is available for the prevalence of deaf-blindness among students who take statewide general assessments.

Implications for Practice

Identification

The likely underidentification of dual sensory loss among students with significant cognitive disabilities has immediate implications for practice. Identification of deaf-blindness makes a student eligible for different services and supports than they might receive with multiple disabilities as their primary IDEA disability classification. Correctly identifying a student as deaf-blind creates the potential to develop a more appropriate IEP and deliver more effective services. One likely barrier to accurate identification is the assessment process. If a state relies on medical evaluations to determine sensory loss and a student with a significant cognitive disability does not have the skills to engage in the medical evaluation process, the finding is likely to be that the student could not be tested—in which case, the sensory loss goes undetected and the student potentially remains underserved.

While medical evaluations may be inconclusive, teachers are in a position to notice student behaviors that may be indicative of vision or hearing loss. One way to improve identification of dual sensory loss is to provide teachers with training and tools that would help them identify potential signs of sensory loss and refer to the student for expert evaluation when needed. Speech-language pathologists also could use these trainings and tools as they often provide services to students with significant cognitive disabilities. The combination of FC survey questions used to define suspected dual sensory loss in this study could be the starting point for a screening tool. Learning more about how teachers perceive their students' hearing and vision when they complete the FC survey may provide insights that help refine the tool or inform the design of training or guidance on how to use the tool. This approach to identifying potential dual sensory loss, if followed by conclusive diagnostic and functional evaluation, could help address underidentification at earlier stages. However, IEP teams would need to be willing to act on new information about sensory loss and overcome hesitancy to change an initial classification (Herbster, 2015).

If an initial screening tool identified a student as having suspected dual sensory loss and the student was referred for further evaluation, subsequent evaluation methods need to take into account the student's unique sensory, physical, and communication characteristics. For example, diagnostic assessments should allow for a range of student response modalities and

include structured interviews with teachers and related service providers who have extensive experience with the student. Teachers of the visually impaired, hearing impaired, or deaf-blind students should be enlisted to support more specific and in-depth sensory evaluation.

State-level prevalence rates for deaf-blindness, known dual sensory loss, and suspected dual sensory loss (see Chapter 5) could prove useful for identifying opportunities for technical assistance or evaluating the impact of technical assistance already received. For example, a state with a higher prevalence of suspected dual sensory loss than known dual sensory loss may wish to provide technical assistance to improve identification methods. Disaggregating the data by grade band could also support more timely identification. If a state notices different rates by grade band, they may need to investigate further to understand the reason for the trend. For example, if the prevalence decreases from elementary to middle school, is it because students had effective interventions in elementary school and no longer needed services? Or is there a potential systematic loss of needed services occurring in the transition from elementary to middle grades? Since state education agencies have direct access to their own FC data, they could replicate the calculations in this report annually to track longitudinal changes in rates of known and suspected dual sensory loss.

Instruction and Assessment

Improvements are needed in instructional practices for students with dual sensory loss. Even when dual sensory loss is suspected and not confirmed, teams should consider designing instruction and services that presume dual sensory loss so students have more opportunities to be successful, rather than waiting for outcomes of additional evaluations. Especially if hearing loss is more likely to be unidentified, teachers without expertise in deaf-blindness may need assistance developing strategies that do not rely extensively on verbal instruction. When 62% of students with known dual sensory loss and 74% of students with suspected dual sensory loss cannot use their hands to complete tasks, even with assistance, teachers also need alternatives to ensure students can be cognitively engaged in instruction when options for physically demonstrating their knowledge are limited. Teachers will likely need consultation to identify and evaluate potential AAC options appropriate for each student, and these options must provide access to communication in the context of academic and content area instruction.

This study also has implications for making appropriate large-scale assessment participation decisions and providing effective accessibility supports during assessment administration. States provide guidance to IEP teams on criteria that make students eligible for alternate assessments rather than general assessments. Some states include IQ score ranges or disability categories in the description but caution against using that information as a sole criterion, and most states also include lists of criteria that should not lead to a decision that a student should participate in alternate assessment (Thurlow et al., 2019). States may benefit from augmenting this guidance for students with multiple and complex disabilities, especially to help teams confirm it is the student's cognitive disability that makes them seem eligible for alternate

assessment and not the result of unrecognized sensory loss and limited instructional opportunity due to inadequately designed instruction and supports.

Given the heterogeneity within the population of students with dual sensory loss and significant cognitive disabilities, teachers could benefit from guidance on appropriate accessibility supports during assessment including universal tools and accommodations. At the very least, accessibility guidance documents could be expanded with considerations for when students have particular kinds of vision or hearing impairments, communicate using certain modalities, can or cannot use physical movement to demonstrate their understandings, and differ in their use of AAC. Teachers might also welcome other resources, such as a video featuring vignettes of accessibility decision-making for a variety of students with dual sensory loss. In assessment systems that use online recording of students' personal needs and preferences, capturing additional information about sensory characteristics could prompt recommendations to consider certain accessibility supports that are appropriate given the assessment's design and administration methods.

Students with Cortical-Visual Impairment (CVI)

Based on the FC data, 32% of students who have significant cognitive disabilities and visual impairments have CVI. This rate is slightly higher than what is typically seen in the broader CC data (e.g., 29% of the population in the 2019 Deaf-Blind Child Count) but lower than the subset of CC students who take alternate assessments (41%; see Chapter 3). Students with CVI are more likely to have multiple disabilities as a primary IDEA disability label. This may be a sign that educators with expertise in multiple disabilities have been trained to look for CVI when students have other disabilities. It is possible that teachers with certain disability specializations (e.g., autism) are not as aware of CVI and that the non-CVI group contained students with unidentified CVI. Given that characteristics of CVI are often mistaken as autism-like characteristics (Philip & Dutton, 2014) or intellectual disability (Lueck & Dutton, 2015), the underdiagnosis of CVI among groups of students within these IDEA disability categories is likely.

The CVI and non-CVI groups differed in several ways that are important for how they access instruction.

Most students with CVI (81%) and fewer than half of students with other visual impairments (45%) reportedly do not use speech to communicate. These figures point to potential limited educational opportunities and outcomes. For example, Erickson and Geist (2016) found that students with significant cognitive disabilities who do not use speech to communicate are more likely to be served in segregated settings, more likely to have motor and sensory impairments even if they use aided AAC, and less likely to use syntactically complex communication.

Students with CVI often have more severe and multiple disabilities that include physical disabilities (Hatton et al., 2007; Swift et al., 2008). The FC data on hand use revealed that students with CVI were far more likely than those without CVI to need assistance to use their hands (57% vs. 39%) or to not be able to use their hands to perform tasks even with assistance

(32% vs. 12%). These figures are larger than for the entire FC population (15% need assistance, 2% cannot even with assistance; Burnes & Clark, 2020). Physical actions may also explain gaps between reported communication sophistication and demonstration of receptive communication skills when responding requires physical movement. For example, 68% of students with CVI and 86% of students with other visual impairments communicate intentionally, yet 66% of students with CVI and 31% of students with other visual impairments infrequently (< 20% of the time) perform simple actions, movements, or activities when asked. For receptive communication that allows response in any modality (e.g., respond appropriately when offered a favored item that is not present), the percent of students infrequently demonstrating the skill drops to 56% of students with CVI but remains relatively similar (29%) for students with other visual impairments.

Limited hand use likely introduces barriers for a range of educational activities including AAC use, access to tools for writing, and using computers. These challenges were noted in the current analysis. Nearly all AAC users with CVI (89%) have access to single symbols used to communicate for a limited range of purposes. Only 24% of students with CVI can use a standard or large keyboard, compared with 63% of students with other visual impairments. The discrepancies in highest writing skill among students with CVI versus other visual impairments suggest that the physical and communication challenges that impair receptive and expressive communication also impair access to writing. If the student is unable to write with a pencil or access a standard keyboard, alternate pencils are available (Hanser, 2006). However, teachers are likely to require training in the selection and use of these alternate pencils in the context of teaching writing as a way to communicate ideas.

Group differences in teachers' ratings of student engagement also have implications for instruction. The general pattern of greater attention paid to computer-directed instruction than to teacher-directed instruction was consistent with the findings for the overall population (Burnes & Clark, 2020). However, students without CVI were more likely to demonstrate sustained attention to computer-based or teacher-directed instruction, and students with CVI were more likely to demonstrate little to no attention to either type of instruction. It is possible teachers responded based on the notion that attention required **visual** behaviors, such as making eye contact with the teacher or the object of instruction, yet many students with CVI have difficulty attending to vision when given other sensory input (e.g., hearing, tactile; Roman-Lantzy, 2019). Further, CVI can impair a student's ability to use vision to direct their movement (Lehman, 2012). Among the 63% of students with CVI who attend at all to computer-based instruction, attention to on-screen content may be a sign the student finds the content visually engaging but that they are not cognitively engaged with the content of instruction. It is also possible that these students can alternate their visual and auditory attention when working on the computer while their teachers require them to coordinate the two. If teachers do not accurately interpret student behaviors that are a sign of engagement or disengagement, it would be challenging to ensure students have opportunities to truly access and make progress

in the general curriculum. Both visual impairment groups were less likely than their peers without visual impairments to attend at all to computer-based instruction (96% of whom can attend independently or with support; Burnes & Clark, 2020), highlighting potential inequities when relying on computer-based instruction.

Students without CVI had more academic skills than students with CVI in all subjects. In reading especially, the differences may be indicative of dominant instructional models that are not effective for students with CVI. For example, 84% of students with CVI do not read any words in print or braille, compared with 51% of students with other visual impairments. Lack of access to and understanding of text has been noted in another study of students with CVI and complex communication needs (Blackstone et al., 2021). CVI impacts visual and visual motor processes including but not limited to the ability to identify objects and shapes (Lueck & Dutton, 2015) and engage in visual joint attention (Summers & Impey, 2011). Identifying objects and shapes are often viewed as skills that students must demonstrate before they are asked to identify letters and words. Furthermore, establishing visual joint attention is an important aspect of shared book reading (Pellegrini & Galda, 2003). In the absence of the development of these skills that are largely viewed as necessary precursor skills, students with CVI may not be provided with adequate or appropriate opportunities to engage in literacy learning.

Challenges in identifying objects and shapes also impacts access to AAC. Though the myth of symbol hierarchies has been disproven in the research (Romski & Sevcik, 2005), traditional assumptions that students must progress from objects to photos to line drawings before they can understand print (Mirenda & Locke, 1989) still appear to impact teacher practice (Ruppar, 2015). Furthermore, these beliefs may explain the limited access students with CVI have to AAC supports beyond symbols that are presented one at a time, presumably to remove the need to visually distinguish symbols from one another.

More guidance is needed on how teachers can find relevance in the general education curriculum and support students' symbolic development in the context of academics, rather than seeing symbolic communication as a gateway or prerequisite to academic instruction.

More guidance is also needed on how to support learning for students with CVI who are served in classrooms for students with multiple disabilities. Additional resources may be needed to configure the environment to support learning in classrooms with a lot of stimuli or to identify appropriate AAC options. Students with CVI often lack access to teachers of the visually impaired (Blackstone et al., 2021). When these students do not have a visual impairment or deaf-blindness as their primary disability, they may not have full access to needed services.

Future Research

This study prompted several directions for future research. For example:

1. Descriptive or phenomenological research on IEP team decision-making processes, particularly regarding (a) choice of primary IDEA disability classification and its impacts

on interventions, assessment decisions, and educational goals; and (b) IEP team resources that influence decisions to evaluate for additional services.
2. A longitudinal study on students identified with suspected dual sensory loss, following them through evaluations and determinations, to better understand (a) the rate of undetected dual sensory loss in the population of students with significant cognitive disabilities and (b) the accessibility of evaluation options for this population.
3. Development of and efficacy research on nonmedical evaluations of sensory loss among students with significant cognitive disabilities.
4. Basic research on teacher and IEP team considerations and decisions regarding instructional models that may not serve students in this population (e.g., symbol hierarchies, readiness model), which could inform the design of intervention research targeting their pedagogical content knowledge (especially in literacy).
5. Replication and extension of findings in this study regarding communication, including access to communication systems and specific forms of symbolic representations (e.g., graphic symbols with and without high contrast; tactual symbols) and vocabulary (e.g., core vocabulary versus concrete or fringe vocabulary).
6. Efficacy research on AAC, particularly in academic and interactive contexts.
7. Studies that uncover promising practices in providing access to computer-based instruction for students with significant cognitive disabilities and dual sensory loss, including implications for families supporting remote instruction.
8. Policy analysis on federal and state criteria and regulations for identifying visual and hearing impairments and the impacts on identification rates, especially among students with significant cognitive disabilities.
9. Descriptive research on identification and data collection methods (see Schles, 2021 and Schles et al., 2021 for methodological examples).
10. Epidemiological research on deaf-blindness prevalence rates in the population of students with significant cognitive disabilities.
11. Epidemiological research on the prevalence of CVI in the population of students with significant cognitive disabilities.
12. Surveys of medical providers on identification of CVI in the population of students with significant cognitive disabilities.
13. Exploration of academic outcomes, including alternate assessment results, for students with known or suspected dual sensory loss.
14. Descriptive or phenomenological research on student engagement with teacher-directed instruction.

Conclusion

This project was designed to help the National Center on Deaf-Blindness (NCDB) and Accessible Teaching, Learning, and Assessment Systems (ATLAS) use existing data sets to describe the population of students with significant cognitive disabilities and known or suspected dual sensory loss. The intent was to help both organizations better understand the needs, skills, and experiences of this group of students and subsequently inform potential improvements to

resources, technical assistance, and data-collection tools. The results reveal important differences in the physical, communication, and academic profiles of students with known and suspected deaf-blindness compared to their peers who receive Part B special education services and those who have significant cognitive disabilities and participate in alternate assessments. They also reveal important evidence of underidentification of sensory loss and dual sensory loss among students with significant cognitive disabilities. The results have implications for current practice in identification, instruction, and assessment. Further, they point to the need for a broad range of research.

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Appendices

A. First Contact survey items
B. Child Count data elements list
C. Child Count data tables for sample of states that do not use DLM Assessments

Appendix A: First Contact Survey Items

SPECIAL EDUCATION

Special Education Services

Select the student's Primary Disability

- Autism
- Deaf-blindness
- Deafness
- Developmental delay
- Emotional disturbance
- Hearing impairment
- Intellectual disability
- Multiple disabilities
- Orthopedic impairment
- Other health impairment
- Specific learning disability
- Speech or language impairment
- Traumatic brain injury
- Visual impairment, including blindness
- Non-categorical
- Eligible Individual

Educational Placement: Chose the option that best describes the student's educational placement. "Regular Class" means a typical classroom, not a resource room or separate class.

- 80% or more of the day in Regular Class
- 40% - 79% of the day in Regular Class
- Less than 40% of the day in Regular Class
- Separate School: includes public or private separate day school for students with disabilities, at public school expense
- Residential Facility: includes public or private separate residential school for students with disabilities, at public school expense
- Homebound/Hospital Environment: includes students placed in and receiving special education in a hospital or homebound program

SENSORY CAPABILITIES

Hearing

Hearing

- No hearing loss suspected/documented
- Questionable hearing but testing inconclusive
- Deaf or hard of hearing

Classification of Hearing Impairment

- Mild (26-40 dB loss)
- Moderate (41-55 dB loss)
- Moderately Severe (56-70 dB loss)
- Severe (71-90 dB loss) 5. Profound (91+ dB loss)
- Unknown

Hearing: Mark all that apply-

- Uses personal or classroom amplification (e.g., personal FM device)
- Uses unilateral hearing aid
- Uses bilateral hearing aid
- Has cochlear implant
- Uses oral language
- Uses sign language

Vision

Vision

- No vision loss suspected or documented
- Normal vision with glasses or contact lenses
- Blind or low vision, including vision that is not completely corrected with glasses or contact lenses
- Questionable vision but testing inconclusive

Classification of Visual Impairment (select all that apply)

- Low Vision (acuity of 20/70 to 20/200 in the better eye with correction.)
- Legally Blind (acuity of 20/200 or less or field loss to 20 degrees or less in the better eye with correction.)
- Light Perception Only
- Totally Blind
- Cortical Visual Impairment

Vision: Mark all that apply-

- Requires enlarged print
- Requires tactile media (objects, tactile graphics, and tactile symbols)
- Requires or uses Braille
    - Uncontracted Braille
    - Contracted Braille
    - UEB

Technological Visual Aids: Mark all that apply-

- Screen magnification device (fits over standard monitor) or software (e.g., Closeview for Mac, ZoomText)
- CCTV
- Screen reader and/or talking word processor
- Manual (e.g., Perkins Brailler) or Electronic (e.g., Mountbatten Brailler) Braille writing device
- Device with refreshable Braille display

MOTOR CAPABILITIES AND HEALTH

Arm/ Hand Control and Health

Arm and hand control: Mark all that apply-

- Uses two hands together to perform tasks
- Uses only one hand to perform tasks
- Requires physical assistance to perform tasks with hands
- Cannot use hands to complete tasks even with assistance

Does the student have any health issues (e.g., fragile medical condition, seizures, therapy or treatment that prevents the student from accessing instruction, medications, etc.) that interfere with instruction or assessment?

- No
- Yes

COMPUTER INSTRUCTION

Computer Use and Instruction

Computer Use: Select the student's primary use of a computer during instruction

- Accesses a computer independently
- Accesses a computer independently given assistive technology
- Uses a computer with human support (with or without assistive technology)

- This student has not had the opportunity to access a computer
- This student cannot access a computer with human or assistive technology support

Why has this student not had the opportunity to access a computer during instruction?

- Student's disability prevents the student from accessing a computer
- The equipment is unavailable
- Student refuses to try to use a computer
- I (or other educators) at this school have not had the opportunity to instruct the student on computer usage

Computer access during instruction: Mark all that apply-

- Standard computer keyboard
- Keyboard with large keys or alternative keyboard (e.g., Intellikeys)
- Touch screen (e.g., touch screen computer, tablet, iPad, iPod touch)
- Standard mouse or head mouse
- Eye gaze technology (e.g., Tobii, EyeGaze Edge)
- Scanning with switches (one or two-switch scanning)

Level of attention to computer-directed instruction

- Generally sustains attention to computer-directed instruction
- Demonstrates fleeting attention to computer-directed instructional activities and requires repeated bids or prompts for attention
- Demonstrates little or no attention to computer-directed instructional activities

Level of attention to teacher-directed instruction

- Generally sustains attention to teacher-directed instruction
- Demonstrates fleeting attention to teacher-directed instructional activities and requires repeated bids or prompts for attention
- Demonstrates little or no attention to teacher-directed instructional activities

COMMUNICATION

Expressive Communication

*Does the student use speech to meet expressive communication needs?

- Yes

- No

*Choose the highest statement that describes the student's expressive communication with speech

- Regularly combines 3 or more spoken words according to grammatical rules to accomplish a variety of communicative purposes (e.g., sharing complex information, asking/answering longer questions, giving directions to another person)
- Usually uses 2 spoken words at a time to meet a variety of more complex communicative purposes (e.g., obtaining things including absent objects, social expressions beyond greetings, sharing information, directing another person's attention, asking/answering questions, and commenting)
- Usually uses only 1 spoken word at a time to meet a limited number of simple communicative purposes (e.g., refusing/rejecting things, making choices, requesting attention, greeting, and labeling)

*Does the student use sign language in addition to or in place of speech to meet expressive communication needs?

- Yes
- No

*Choose the highest statement that describes the student's expressive communication with sign language

- Regularly combines 3 or more signed words according to grammatical rules to accomplish a variety of communicative purposes (e.g., sharing complex information, asking/answering longer questions, giving directions to another person)
- Usually uses 2 signed words at a time to meet a variety of more complex communicative purposes (e.g., obtaining things including absent objects, social expressions beyond greetings, sharing information, directing another person's attention, asking/answering brief questions, and commenting)
- Usually uses only 1 signed word at a time to meet a limited number of simple communicative purposes (e.g., refusing/rejecting things, making choices, requesting attention, greeting, and labeling)

Select the student's primary sign system

- American Sign Language (ASL)
- Signed Exact English (SEE)
- Hybrid or idiosyncratic/personalized signing system

Alternate Communication

*Does the student use augmentative or alternative communication in addition to or in place of speech or sign language to meet expressive communication needs?

- Yes
- No

*Choose the highest statement that describes the student's expressive communication with augmentative or alternative communication

- Regularly combines 3 or more symbols according to grammatical rules to accomplish the 4 major communicative purposes (e.g., expressing needs and wants, developing social closeness, exchanging information, and fulfilling social etiquette routines)
- Usually uses 2 symbols at a time to meet a variety of more complex communicative purposes (e.g., obtaining things including absent objects, social expressions beyond greetings, sharing information, directing another person's attention, asking/answering brief questions, commenting)
- Usually uses only 1 symbol to meet a limited number of simple communicative purposes (e.g., refusing/rejecting things, making choices, requesting attention, greeting)

Augmentative or alternative communication

How many symbols does the student choose from when communicating? (choose the highest that applies)

- 1 or 2 at a time
- 3 or 4 at a time
- 5 to 9 at a time
- 10 or more at a time

What types of symbols does the student use? (choose all that apply)

- Real objects
- Tactual symbols
- Photos
- Line drawing symbol sets (Boardmaker, PCS, Symbol Stix, other)
- Text Only

What voice output technology does the student use? (choose all that apply)

- Single message devices (e.g., BIGmac)
- Simple devices (e.g., GoTalk; QuickTalker; SuperTalker)
- Speech generating device (e.g., Tobii-DynaVox, PRC/PrentkeRomich)
- None

If the student does not use speech, sign language, or augmentative or alternative communication, which of the following statements best describes the student's expressive communication? Choose the highest statement that applies

- Uses conventional gestures (e.g., waving, nodding and shaking head, thumbs up/down), looking, pointing, and/or vocalizations to communicate intentionally but does not yet use symbols or sign language
- Uses only unconventional vocalizations (e.g., grunts), unconventional gestures (e.g., opening mouth wide to indicate hunger), and/or body movement to communicate intentionally
- Exhibits behaviors that may be reflexive and are not intentionally communicative but can be interpreted by others as communication (e.g., crying, laughing, reaching for an object, pushing an object away)

Receptive Communication

Receptive communication: MARK EACH ONE to show how consistently the student uses each skill. 1) 0% - 20% of the time - Almost never, 2) 21% - 50% of the time - Occasionally, 3) 51 – 80% of the time - Frequently, 4) More than 80% of the time - Consistently

If the student previously demonstrated and no longer receives instruction, mark "More than 80%."

A. Can point to, look at, or touch things in the immediate vicinity when asked (e.g., pictures, objects, body parts)
B. Can perform simple actions, movements or activities when asked (e.g., comes to teacher's location, gives an object to teacher or peer, locates or retrieves an object)
C. Responds appropriately in any modality (sign, gestures, facial expressions) when offered a favored item that is not present or visible (e.g., "Do you want some ice cream?")
D. Responds appropriately in any modality (sign, gestures, facial expressions) to single words that are spoken or signed
E. Responds appropriately in any modality (sign, gestures, facial expressions) to phrases and sentences that are spoken or signed
F. Follows 2-step directions presented verbally or through sign (e.g., gets a worksheet or journal and begins to work, distributes items needed by peers for a lesson or activity, looks at requested or desired item and then looks at location where it should go)

LANGUAGE

Primary Language

Is English the student's primary language?

- Yes
- No

Is English the primary language spoken in the student's home?

- Yes
- No
- Unknown

Is English the primary language used for the student's instruction?

- Yes
- No

ACADEMIC

***Reading Skills – Entire Section is Required**

Reading skills: MARK EACH ONE to show how consistently the student uses each skill. 1) 0% - 20% of the time - Almost never, 2) 21% - 50% of the time - Occasionally, 3) 51 – 80% of the time - Frequently, 4) More than 80% of the time - Consistently

If the student previously demonstrated and no longer receives instruction, mark "More than 80%."

A. Recognizes single symbols presented visually or tactually (e.g., letters, numerals, environmental signs such as restroom symbols, logos, trademarks, or business signs such as fast food restaurants)
B. Understands purpose of print or Braille but not necessarily by manipulating a book (e.g., knows correct orientation, can find beginning of text, understands purpose of text in print or Braille, enjoys being read to)
C. Matches sounds to symbols or signs to symbols (e.g., matches sounds to letters presented visually or tactually, matches spoken or signed words to written words)
D. Reads words, phrases, or sentences in print or Braille when symbols are provided with the words
E. Identifies individual words without symbol support (e.g., recognizes words in print or Braille; can choose correct word using eye gaze)
F. Reads text presented in print or Braille without symbol support but WITHOUT comprehension
G. Reads text presented in print or Braille without symbol support and WITH comprehension (e.g., locates answers in text, reads and answers questions, retells after reading, completes maze task)
H. Explains or elaborates on text read in print or Braille

Student's approximate instructional level of reading text with comprehension (print or braille): Mark the highest one that applies

- Above third grade level
- Above second grade level to third grade level
- Above first grade level to second grade level
- Primer to first grade level
- Reads only a few words or up to pre-primer level
- Does not read any words when presented in print or Braille (not including environmental signs or logos)

***Math Skills Entire Section is required**

Math skills: MARK EACH ONE to show how consistently the student uses each skill. 1) 0% - 20% of the time - Almost never, 2) 21% - 50% of the time - Occasionally, 3) 51 – 80% of the time - Frequently, 4) More than 80% of the time - Consistently

If the student previously demonstrated and no longer receives instruction, mark "More than 80%."

A. Creates or matches patterns of objects or images
B. Identifies simple shapes in 2 or 3 dimensions (e.g., square, circle, triangle, cube, sphere)
C. Sorts objects by common properties (e.g., color, size, shape)
D. Counts more than two objects
E. Adds or subtracts by joining or separating groups of objects
F. Adds and/or subtracts using numerals
G. Forms groups of objects for multiplication or division
H. Multiplies and/or divides using numerals
I. Uses an abacus
J. Uses a calculator
K. Tells time using an analog or digital clock
L. Uses common measuring tools (e.g., ruler or measuring cup)
M. Uses a schedule, agenda, or calendar to identify or anticipate sequence of activities

***Writing Skills Entire Section is Required**

Indicate the highest level that describes the student's writing skills. Choose the highest level that the student has demonstrated even once during instruction, not the highest skill demonstrated consistently.

Writing includes any method the student uses to write using any writing tool that includes access to all 26 letters of the alphabet. Examples of these tools include paper and pencil, traditional keyboards, alternate keyboards and eye-gaze displays of letters.

A. Writes paragraph length text without copying using spelling (with or without word prediction)
B. Writes sentences or complete ideas without copying using spelling (with or without word prediction)
C. Writes words or simple phrases without copying using spelling (with or without word prediction)

D. Writes words using letters to accurately reflect some of the sounds
E. Writes using word banks or picture symbols
F. Writes by copying words or letters
G. Scribbles or randomly writes/selects letters or symbols

***Science Skills Entire Section is required**

Science skills: MARK EACH ONE to show how consistently the student uses each skill. 1) 0% - 20% of the time - Almost never, 2) 21% - 50% of the time - Occasionally, 3) 51 – 80% of the time - Frequently, 4) More than 80% of the time - Consistently

If the student previously demonstrated and no longer receives instruction, mark "More than 80%."

A. Sorts objects or materials by common properties (e.g., color, size, shape)
B. Identifies similarities and differences
C. Recognizes patterns
D. Compares initial and final conditions to determine if something changed.
E. Uses data to answer questions.
F. Identifies evidence that supports a claim.
G. Identifies cause and effect relationships.
H. Uses diagrams to explain phenomena.

End of Survey

2018 National Deaf-Blind Child Count Code Sheet

Column 1 - State

Alpha code: 2 digit uppercase letter state abbreviation.

Column 2 - Identification Code

Alpha code: 4 digit uppercase letter code created using the first two characters of the first name and the first two characters of the last name of the individual. Duplications in this field are Acceptable. For names that are hyphenated, use the first 2 characters of the beginning name of the hyphenated name. For example, John Doe-Rey would be coded as JODO.

Column 3 - Child Number

Numeric: A unique *number* (e.g., 13791) for each individual. Code numbers should remain the same for each individual across years. If your state uses state assigned student codes, it is suggested this code be used.

Column 4 - Gender

Numeric. Acceptable codes:

0. Male
1. Female

Column 5 - Month of Birth

Numeric. Acceptable format:

One or two digit month of birth. MM

Column 6 - Day Birth

Numeric. Acceptable format:

One or two digit day of birth. DD

Column 7 - Year of Birth

Numeric. Acceptable format:

Four digit year of birth. YYYY

Column 8 - Etiology

Numeric. Acceptable codes:

Hereditary/Chromosomal Syndromes and Disorders

101. Aicardi syndrome
102. Alport syndrome
103. Alstrom syndrome
104. Apert syndrome (Acrocephalosyndactyly, Type 1)
105. Bardet-Biedl syndrome (Laurence Moon-Biedl)
106. Batten disease
107. CHARGE Syndrome
108. Chromosome 18, Ring 18
109. Cockayne syndrome
110. Cogan Syndrome
111. Cornelia de Lange
112. Cri du chat syndrome (Chromosome 5p- syndrome)
113. Crigler-Najjar syndrome
114. Crouzon syndrome (Craniofacial Dysotosis)
115. Dandy Walker syndrome
116. Down syndrome (Trisomy 21 syndrome)
117. Goldenhar syndrome
118. Hand-Schuller-Christian (Histiocytosis X)
119. Hallgren syndrome
120. Herpes-Zoster (or Hunt)
121. Hunter Syndrome (MPS II)
122. Hurler syndrome (MPS I-H)
123. Kearns-Sayre syndrome
124. Klippel-Feil sequence
125. Klippel-Trenaunay-Weber syndrome
126. Kniest Dysplasia
127. Leber congenital amaurosis
128. Leigh Disease
129. Marfan syndrome
130. Marshall syndrome
131. Maroteaux-Lamy syndrome (MPS VI)
132. Moebius syndrome
133. Monosomy 10p
134. Morquio syndrome (MPS IV-B)
135. NF1 - Neurofibromatosis (von Recklinghausen disease)
136. NF2 - Bilateral Acoustic Neurofibromatosis
137. Norrie disease
138. Optico-Cochleo-Dentate Degeneration
139. Pfieffer syndrome
140. Prader-Willi
141. Pierre-Robin syndrome
142. Refsum syndrome
143. Scheie syndrome (MPS I-S)
144. Smith-Lemli-Opitz (SLO) syndrome
145. Stickler syndrome
146. Sturge-Weber syndrome
147. Treacher Collins syndrome
148. Trisomy 13 (Trisomy 13-15, Patau syndrome)
149. Trisomy 18 (Edwards syndrome)
150. Turner syndrome
151. Usher I syndrome
152. Usher II syndrome
153. Usher III syndrome
154. Vogt-Koyanagi-Harada syndrome
155. Waardenburg syndrome
156. Wildervanck syndrome
157. Wolf-Hirschhorn syndrome (Trisomy 4p)
199. Other _____

Pre-Natal/Congenital Complications

201. Congenital Rubella
202. Congenital Syphilis
203. Congenital Toxoplasmosis
204. Cytomegalovirus (CMV)
205. Fetal Alcohol syndrome
206. Hydrocephaly
207. Maternal Drug Use
208. Microcephaly
209. Neonatal Herpes Simplex (HSV)
299. Other_____

Related to Prematurity

401. Complications of Prematurity

Post-Natal/Non-Congenital Complications

301. Asphyxia
302. Direct Trauma to the eye and/or ear
303. Encephalitis
304. Infections
305. Meningitis
306. Severe Head Injury
307. Stroke
308. Tumors
309. Chemically Induced
399. Other _____

Undiagnosed

501. No Determination of Etiology

Column 9- Race/Ethnicity

Numeric. Acceptable codes:

1. American Indian or Alaska Native
2. Asian
3. Black
4. Hispanic
5. White
6. Native Hawaiian /Pacific Islander
7. Two or more races

Column 10 - Documented Vision Loss

Please note: Items 5 and 8 are intentionally not used and they are unavailable as an option.

Numeric. Acceptable codes:

1. Low Vision (visual acuity of 20/70 to 20/200>)
2. Legally Blind (visual acuity of 20/200 or less or a field restriction of 20 degrees)
3. Light Perception Only
4. Totally Blind
5. ***Intentionally not used***
6. Diagnosed Progressive Loss, or
7. Further Testing Needed, or
8. ***Intentionally not used***
9. Documented Functional Vision Loss

Column 11 - Cortical Vision Impairment

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Column 12 - Documented Hearing Loss

Please note: Item 8 is intentionally not used or available as an option.

Numeric. Acceptable codes:

1. Mild (26-40 dB loss)
2. Moderate (41-55 dB loss)
3. Moderately Severe (56-70 dB loss)
4. Severe (71-90 dB loss)
5. Profound (91+ dB loss)
6. Diagnosed Progressive Loss, or
7. Further Testing Needed, or
8. ***Intentionally not used***
9. Documented Functional Hearing Loss

Column 13 - Central Auditory Processing Disorder

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Column 14 - Auditory Neuropathy

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Column 15 - Cochlear Implants

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Columns 16-21 - Other Impairments or Conditions

- **Column 16 -** Orthopedic/Physical Impairments
- **Column 17 -** Cognitive Impairments
- **Column 18 -** Behavioral Disorders
- **Column 19 -** Complex Health Care Needs
- **Column 20 -** Communication/Speech/Language Impairments
- **Column 21 -** Other

Numeric. Acceptable Codes (Indicate for each field.):

0. No
1. Yes
2. Unknown

Column 22

Column 22 is intentionally not used. Previously this column was titled “Funding Category.”

Column 23 - Part C Category Code

Numeric. Acceptable codes:

1. At-risk for developmental delays *(as defined by the state’s Part C Lead Agency)*
2. Developmentally Delayed

888. Not Reported under Part C of IDEA

Column 24 - Part B Category Code

Numeric. Acceptable codes:

1. Intellectual Disability
2. Hearing Impairment (includes deafness)
3. Speech or Language Impairment
4. Visual Impairment (includes blindness)
5. Emotional Disturbance

6. Orthopedic Impairment
7. Other Health Impairment
8. Specific Learning Disability
9. Deaf-blindness
10. Multiple Disabilities
11. Autism
12. Traumatic Brain Injury
13. Developmentally Delayed-age 3 through 9
14. Non-Categorical

888. Not Reported under Part B of IDEA

Column 25 - Early Intervention Setting (Birth through 2)

Numeric. Acceptable codes:

1. Home
2. Community-based settings
3. Other settings

Column 26 - Educational Setting (3-5 and 6-21)

Numeric. Acceptable codes: ***(Enter only one code for 3 - 21.)***

ECSE (3-5) Settings

1. In a regular EC program 10+ hours/week with services
2. In a regular EC program 10+ hours/week –services elsewhere
3. In a regular EC program less than 10 hours/week with services
4. In a regular EC program less than 10 hours/week – services elsewhere
5. Attending a separate class
6. Attending a separate school
7. Attending a residential facility
8. Service provider location
9. Home

School aged (6-21) settings

10. Inside the regular class 80% or more of day
11. Inside the regular class 40% to 79% of day
12. Inside the regular class less than 40% of day
13. Separate school
14. Residential facility
15. Homebound/Hospital
16. Correctional facilities
17. Parentally placed in private schools

Column 27 - Participation in Statewide Assessments

Numeric. Acceptable codes:

1. Regular grade-level state assessment
2. Regular grade-level state assessment with accommodations
3. Alternate assessment
4. ***No longer used***
5. ***No longer used***
6. Not required at age or grade level
7. Parent Opt Out

Column 28 - Part C Exiting Status (Birth through 2)

Numeric. Acceptable codes:

0. In a Part C early intervention program
1. Completion of IFSP *prior to reaching maximum age* for Part C
2. Eligible for IDEA, Part B
3. Not eligible for Part B, exit with referrals to other programs
4. Not eligible for Part B, exit with no referrals
5. Part B eligibility not determined
6. Deceased
7. Moved out of state
8. Withdrawal by parent (or guardian)
9. Attempts to contact the parent and/or child were unsuccessful

Column 29 - Part B Exiting Status

Please note: Item 7 is intentionally not used or available as an option.

Numeric. Acceptable codes:

0. In ECSE or school-aged special education program
1. Transferred to regular education
2. Graduated with regular high school diploma
3. Received a certificate
4. Reached maximum age
5. Died
6. Moved, known to be continuing
7. Intentionally not used
8. Dropped out

Column 30 – Deaf-Blind Project Exiting Status

Numeric. Acceptable codes:

0. Eligible to receive services from the deaf-blind project
1. No longer eligible to receive services from the deaf-blind project

Column 31 - Living Setting

Numeric. Acceptable codes:

1. Home: Parents
2. Home: Extended family
3. Home: Foster parents
4. State residential facility
5. Private residential facility
6. Group home (less than 6 residents)
7. Group home (6 or more residents)
8. Apartment (with non-family person(s))
9. Pediatric nursing home

555. Other

Column 32 - Corrective Lenses

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Column 33 - Assistive Listening Devices

Numeric. Acceptable codes:

0. No

1. Yes
2. Unknown

Column 34 - Additional Assistive Technology

Numeric. Acceptable codes:

0. No
1. Yes
2. Unknown

Column 35 – Intervener Services

Numeric. Acceptable codes:

0. No
1. Yes (from an individual with the title and function of an intervener **OR** from an individual with the function of an intervener working under a different title)
2. Unknown

Appendix C: Child Count Data Tables for Sample of Non-DLM States

This appendix contains results that correspond with sections in Chapters 2 and 3 that describe findings from the Child Count data set delimited to states that use DLM assessments. These appendix tables are based on the remaining subset of states that do not use DLM assessments. Table numbers correspond with the tables in the main report chapters.

Table 2.1

Demographic Characteristics of Child Count Students

Characteristic	All age-eligible in non-DLM states (*N* = 6,034) *N*	All age-eligible in non-DLM states (*N* = 6,034) %	Took alternate assessment (*N* = 3,078) *N*	Took alternate assessment (*N* = 3,078) %
Age in years				
8–11	1,687	28.0	700	22.7
12–17	2,744	45.5	1,516	49.3
18–21	1,467	24.3	788	25.6
21+	136	2.3	74	2.4
Gender				
Male	3,243	54.0	1,702	55.5
Female	2,763	46.0	1,367	44.5
State				
Alabama	175	2.9	100	3.2
Arizona	167	2.8	125	4.1
Arkansas	186	3.1	110	3.6
California	875	14.5	374	12.2
Connecticut	46	0.8	20	0.6
District of Columbia	12	0.2	4	0.1
Florida	485	8.0	168	5.5
Georgia	218	3.6	132	4.3
Hawaii	43	0.7	15	0.5
Idaho	43	0.7	0	0.0
Indiana	177	2.9	88	2.9
Kentucky	118	2.0	78	2.5
Louisiana	81	1.3	15	0.5
Maine	32	0.5	6	0.2
Massachusetts	195	3.2	106	3.4
Michigan	227	3.8	147	4.8
Minnesota	291	4.8	191	6.2

Characteristic	All age-eligible in non-DLM states (*N* = 6,034) *N*	All age-eligible in non-DLM states (*N* = 6,034) %	Took alternate assessment (*N* = 3,078) *N*	Took alternate assessment (*N* = 3,078) %
Mississippi	49	0.8	30	1.0
Montana	38	0.6	20	0.6
Nebraska	84	1.4	46	1.6
Nevada	72	1.2	48	1.6
New Mexico	74	1.2	58	1.9
North Carolina	224	3.7	120	3.9
Ohio	358	5.9	169	5.5
Oregon	69	1.1	25	0.8
Pacific Basin	47	0.8	26	0.8
Pennsylvania	316	5.2	168	5.5
Puerto Rico	31	0.5	13	0.4
South Carolina	99	1.6	42	1.4
South Dakota	20	0.3	9	0.3
Tennessee	173	2.9	71	2.3
Texas	620	10.3	319	10.4
Vermont	12	0.2	9	0.3
Virgin Islands	18	0.3	3	0.1
Virginia	160	2.7	99	3.2
Washington	168	2.8	100	3.2
Wyoming	31	0.5	24	0.8

Table 3.2

*Vision- and Hearing-Loss Classification for Child Count Students (*N *= 3,078)*

	Hearing classification																	
	Mild		Moderate		Moderately severe		Severe		Profound		Progressive		Further testing needed		Functional loss		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Vision classification																		
Low vision	163	5.3	190	6.2	156	5.1	105	3.4	222	7.2	4	0.1	35	1.1	83	2.7	958	31.1
Legally blind	110	3.6	170	5.5	139	4.5	117	3.8	216	7.0	8	0.3	46	1.5	85	2.8	891	28.9
Light perception only	25	0.8	26	0.8	20	0.6	18	0.6	33	1.1	0	0.0	10	0.3	39	1.3	171	5.6
Totally blind	24	0.8	33	1.1	16	0.5	18	0.6	39	1.3	1	0.0	17	0.6	26	0.8	174	5.7
Progressive loss	7	0.2	8	0.3	6	0.2	9	0.3	31	1.0	1	0.0	4	0.1	4	0.1	70	2.3
Further testing needed	5	0.2	14	0.5	6	0.2	6	0.2	26	0.8	0	0.0	38	1.2	19	0.6	114	3.7
Functional loss	74	2.4	133	4.3	81	2.6	70	2.3	119	3.9	2	0.1	31	1.0	190	6.2	700	22.7
Total	408	13.3	574	18.6	424	13.8	343	11.1	686	22.3	16	0.5	181	5.9	446	14.5	3,078	100.0

Table 3.3

Hearing and Vision Loss Classification by Group

Sensory classification	First Contact known dual sensory loss (*N* = 649) *N*	First Contact known dual sensory loss (*N* = 649) %	First Contact suspected dual sensory loss (*N* = 870) *n*	First Contact suspected dual sensory loss (*N* = 870) % [a]	Child Count (*N* = 3,078) *n*	Child Count (*N* = 3,078) %
Hearing classification						
Mild	64	10.0	17	10.2	408	13.3
Moderate	106	16.5	23	13.9	574	18.6
Moderately severe	102	15.9	26	15.7	424	13.8
Severe	75	11.7	22	13.3	343	11.1
Profound	137	21.4	38	22.9	686	22.3
Progressive loss					16	0.5
Further testing needed					181	5.9
Functional hearing loss					446	14.5
Unknown	157	24.5	40	24.1		
Vision classification [b]						
Low vision	229	35.3	69	24.6	958	31.1
Legally blind	206	31.7	62	22.1	891	28.9
Light perception	35	5.4	29	10.4	171	5.6
Totally blind	55	8.5	18	6.4	174	5.7
Cortical visual impairment	175	27.0	115	41.1	1,003	32.6
Progressive loss					70	2.3
Further testing needed					114	3.7
Functional vision loss					700	22.7

Note. Blank cells indicate the response option was not available on the corresponding survey.

[a] FC Hearing classification item is only presented after the teacher indicates the student is deaf or hard of hearing, and FC Vision classification item is only presented after the teacher indicates the student is blind or has low vision. Not all students in the suspected dual sensory loss group were identified these ways. Percentages are based on 166 students for hearing classification and 280 students for vision classification.

[b] Teachers could select multiple responses, so column totals add to more than *N*.

Table 3.4

Primary Disabilities Among Students Who Take Alternate Assessments With Known or Suspected Dual Sensory Loss

Primary disability	Known dual sensory loss (*N* = 649) *n*	Known dual sensory loss (*N* = 649) %	Suspected dual sensory loss (*N* = 870) *N*	Suspected dual sensory loss (*N* = 870) %	Child Count (*N* = 3,078) *n*	Child Count (*N* = 3,078) %
Autism	11	1.7	53	6.1	38	1.2
Deaf-blindness	78	12.0	6	0.7	555	18.0
Deafness	5	0.8	5	0.6		
Developmental delay	7	1.1	12	1.4	49	1.6
Emotional disturbance	0	0.0	1	0.1	15	0.5
Hearing impairment	4	0.6	5	0.6	132	4.3
Intellectual disability	69	10.6	129	14.8	280	9.1
Multiple disabilities	404	62.2	549	63.1	1,367	44.4
Orthopedic impairment	5	0.8	5	0.6	30	1.0
Other health impairment	34	5.2	56	6.4	142	4.6
Specific learning disability	1	0.2	1	0.1	2	0.1
Speech or language impairment	2	0.3	6	0.7	6	0.2
Traumatic brain injury	1	0.2	9	1.0	33	1.1
Visual impairment, including blindness	14	2.2	12	1.4	112	3.6
Noncategorical	2	0.3	2	0.2	16	0.5
Eligible individual	5	0.8	6	0.7	20	0.6
Missing	7	1.1	13	1.5	281	9.1

Note. Blank cells indicate the response option was not available on the corresponding survey.

Table 3.5

Etiology Summary Distributions for Child Count Students (N = 3,078)

Etiology	*n*	%
Asphyxia	64	2.1
CHARGE syndrome	252	8.2
Complication of prematurity	357	11.6
Cytomegalovirus (CMV)	92	3.0
Dandy-Walker syndrome	38	1.2
Down syndrome	122	4.0
Encephalitis	17	0.6
Goldenhar syndrome	34	1.1
Hydrocephaly	76	2.5
Meningitis	46	1.5
Microcephaly	91	3.0
Severe head injury	44	1.4
Stickler syndrome	15	0.5
Usher syndrome (I, II, III)	47	1.5
Other		
Hereditary syndromes/disorders	880	28.6
Postnatal noncongenital	183	5.9
Prenatal congenital complications	193	6.3
No determination of etiology	527	17.1

Table 3.6

Other Impairments for Child Count Students (N = 3,078)

Impairment	Yes *n*	Yes %	No *n*	No %	Missing *n*	Missing %
Behavioral	374	12.2	2,548	82.8	156	5.1
Cognitive	2,568	83.4	427	13.9	83	2.7
Complex	1,728	56.1	1,245	40.4	105	3.4
Orthopedic/physical	1,923	62.5	1,035	33.6	120	3.9
Other impairments	712	23.1	1,954	63.5	412	13.4
Speech/language	2,526	82.1	411	13.4	141	4.6

Table 3.7

Primary Disability for Child Count Students

Primary-disability category	All age-eligible (*N* = 6,034) *n*	All age-eligible (*N* = 6,034) %	Other cognitive impairments (*N* = 3,900) *n*	Other cognitive impairments (*N* = 3,900) %
Autism spectrum disorder	57	0.9	38	1.0
Deaf-blindness	1,087	18.0	620	15.9
Developmental delay [a]	164	2.7	104	2.7
Emotional disturbance	20	0.3	12	0.3
Hearing impairment (includes deafness)	562	9.3	189	4.8
Intellectual disability	353	5.9	301	7.7
Multiple disabilities	2,047	33.9	1,670	42.8
Orthopedic impairment	59	1.0	49	1.3
Other health impairment	295	4.9	200	5.1
Specific learning disability	25	0.4	8	0.2
Speech or language impairment	24	0.4	9	0.2
Traumatic brain injury	62	1.0	49	1.3
Visual impairment (includes blindness)	337	5.6	129	3.3
Noncategorical	34	0.6	10	0.3
Not reported under Part B	100	1.7	68	1.7
Unknown/missing	808	13.4	444	11.4

[a] Applicable only up to age 9.

Table 3.8

Child Count Students Who Took an Alternate Assessment by Primary Disability and Age Group

Primary disability	Age 8–11 (*N* = 700) *n*	Age 8–11 (*N* = 700) %	Age 12–17 (*N* = 1,516) *n*	Age 12–17 (*N* = 1,516) %	Age 18–21 (*N* = 788) *n*	Age 18–21 (*N* = 788) %	Age 21+ (*N* = 74) *n*	Age 21+ (*N* = 74) %	*N*	%
Autism spectrum disorder	10	1.4	20	1.3	8	1.0	0	0.0	38	1.2
Deaf-blindness	131	18.7	287	18.9	124	15.7	13	17.6	555	18.0
Developmental delay [a]	25	3.6	18	1.2	6	0.8	0	0.0	49	1.6
Emotional disturbance	2	0.3	6	0.4	5	0.6	2	2.7	15	0.5
Hearing impairment (includes deafness)	27	3.9	52	3.4	47	6.0	6	8.1	132	4.3
Intellectual disability	43	6.1	141	9.3	88	11.2	8	10.8	280	9.1
Multiple disabilities	327	46.7	664	43.8	350	44.4	26	35.1	1,367	44.4
Orthopedic impairment	2	0.3	14	0.9	10	1.3	4	5.4	30	1.0
Other health impairment	39	5.6	77	5.1	24	3.0	2	2.7	142	4.6
Specific learning disability	1	0.1	0	0.0	1	0.1	0	0.0	2	0.1
Speech or language impairment	2	0.3	3	0.2	1	0.1	0	0.0	6	0.2
Traumatic brain injury	10	1.4	13	0.9	9	1.1	1	1.3	33	1.1

Primary disability	Age 8–11 (*N* = 700) *n*	Age 8–11 (*N* = 700) %	Age 12–17 (*N* = 1,516) *n*	Age 12–17 (*N* = 1,516) %	Age 18–21 (*N* = 788) *n*	Age 18–21 (*N* = 788) %	Age 21+ (*N* = 74) *n*	Age 21+ (*N* = 74) %	*N*	%
Visual impairment (includes blindness)	18	2.6	55	3.6	36	4.6	3	4.1	112	3.6
Noncategorical	1	0.1	8	0.5	6	0.8	1	1.3	16	0.5
Not reported under Part B	5	0.7	10	0.7	5	0.6	0	0.0	20	0.6
Unknown/ missing	57	8.1	148	9.8	68	8.6	8	10.8	281	9.1

[a] Applicable only up to age 9.

Table 3.9

Child Count Students With Other Cognitive Impairments Who Took an Alternate Assessment, by Primary Disability and Age Group (N = 2,568)

Primary disability	Age 8–11 (*N* = 586) *n*	Age 8–11 (*N* = 586) %	Age 12–17 (*N* = 1,285) *n*	Age 12–17 (*N* = 1,285) %	Age 18–21 (*N* = 642) *n*	Age 18–21 (*N* = 642) %	Age 21+ (*N* = 55) *N*	Age 21+ (*N* = 55) %	*N*	%
Autism spectrum disorder	9	1.5	14	1.1	5	0.8	0	0.0	28	1.1
Deaf-blindness	104	17.7	230	17.9	96	15.0	11	20.0	441	17.2
Developmental delay [a]	20	3.4	8	0.6	3	0.5	0	0.0	31	1.2
Emotional disturbance	1	0.2	4	0.3	2	0.3	2	3.6	9	0.4
Hearing impairment (includes deafness)	18	3.1	38	3.0	29	4.5	1	1.8	86	3.3

Primary disability	Age 8–11 (*N* = 586) *n*	Age 8–11 (*N* = 586) %	Age 12–17 (*N* = 1,285) *n*	Age 12–17 (*N* = 1,285) %	Age 18–21 (*N* = 642) *n*	Age 18–21 (*N* = 642) %	Age 21+ (*N* = 55) *N*	Age 21+ (*N* = 55) %	*N*	%
Intellectual disability	36	6.1	125	9.7	81	12.6	5	9.1	247	9.6
Multiple disabilities	287	49.0	601	46.8	304	47.4	22	40.0	1,214	47.3
Orthopedic impairment	2	0.3	13	1.0	10	1.6	3	5.5	28	1.1
Other health impairment	34	5.8	65	5.1	21	3.3	2	3.6	122	4.8
Specific learning disability	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Speech or language impairment	1	0.2	3	0.2	0	0.0	0	0.0	4	0.2
Traumatic brain injury	10	1.7	12	0.9	5	0.8	1	1.8	28	1.1
Visual impairment (includes blindness)	15	2.6	36	2.8	24	3.7	2	3.6	77	3.0
Noncategorical	1	0.2	5	0.4	2	0.3	0	0.0	8	0.3
Not reported under Part B	4	0.7	10	0.8	4	0.6	0	0.0	18	0.7
Unknown/ missing	44	7.5	121	9.4	56	8.7	6	10.9	227	8.8

[a] Applicable only up to age 9.

Table 3.10

Educational Setting of Students Who Take Alternate Assessments

Educational setting	Known dual sensory loss (*N* = 649) *n*	Known dual sensory loss (*N* = 649) %	Suspected dual sensory loss (*N* = 870) *n*	Suspected dual sensory loss (*N* = 870) %	Child Count[a] (*N* = 3,078) *n*	Child Count[a] (*N* = 3,078) %
Regular class > 80% (regular class)	14	2.2	25	2.9	145	4.7
Regular class 40%–79% (resource room)	56	8.6	61	7.0	257	8.3
Regular class < 40% (separate class)	288	44.4	427	49.1	1,596	51.9
Separate school	230	35.4	269	30.9	653	21.2
Residential facility	16	2.5	19	2.2	118	3.8
Homebound/hospital	45	6.9	66	7.6	196	6.4
Parentally placed private school					22	0.7
Unknown/missing	0	0.0	3	0.3	91	3.0

Note. Blank cells indicate the response option was not available on the corresponding survey.
[a] CC results collapsed to common setting labels when original reporting categories varied across states.

Table 3.11

Use of Assistive Technology Among Child Count Students (N = 3,078)

Assistive technology	Yes *n*	Yes %	No *n*	No %	Missing *n*	Missing %
Additional technology	1,615	52.5	928	30.1	535	17.4
Assistive listening device	1,396	45.4	1,138	37.0	544	17.7
Cochlear implant	317	10.3	2,165	70.3	596	19.4