



National Center and State Collaborative

# **NCSC Validity Evaluation**

## **Learner Characteristics Inventory Project Report**

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National Center and State Collaborative

## Learner Characteristics Inventory Project Report:

### *A Product of the NCSC Validity Evaluation*

*Elizabeth Towles-Reeves*

*Jacqueline Kearns*

*Claudia Flowers*

*Laura Hart*

*Allison Kerbel*

*Harold Kleinert*

*Rachel Quenemoen*

*Martha Thurlow<sup>1</sup>*

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<sup>1</sup> While Towles-Reeves and Kearns are lead authors, the authors that follow are significant contributors listed in alphabetical order.



National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with significant cognitive disabilities.

NCSC is a collaborative of 24 states (18 core and 6 Tier II states) and five organizations. The NCSC core partner states include: Alaska, Arizona, Connecticut, District of Columbia, Florida, Georgia, Indiana, Louisiana, Nevada, New York, North Dakota, Pacific Assessment Consortium (PAC-6)<sup>2</sup>, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, and Wyoming. As of July 2012, the NCSC Tier II affiliated states include Arkansas, Delaware, Idaho, Maine, Maryland, and Oregon. Tier II states will provide usability and sustainability tests to refine NCSC products before they are released for broad dissemination in 2015, thus ensuring that other states are able to implement them without intensive support from project staff.

The five NCSC partner organizations include: National Center on Educational Outcomes (NCEO) at the University of Minnesota, National Center for the Improvement of Educational Assessment (Center for Assessment), University of North Carolina at Charlotte, University of Kentucky, and edCount, LLC.



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<sup>2</sup> The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

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# Executive Summary

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This report summarizes the learner characteristics of students who participated in alternate assessments based on alternate achievement standards (AA-AAS) during the 2010-11 or 2011-12 academic year across 18 states that are partners of the National Center and State Collaborative (NCSC) project. Learner characteristics data were collected on 49,669 students across the 18 states. The sampling method varied across the states, with response rates ranging from 15% to 100%.

## Results

The NCSC partner states showed a relatively even distribution of students in each IEP grade level, although the partner states differed in the grades in which the AA-AAS is administered in high school. As expected, the majority of students who participated in the AA-AAS across all NCSC partner states are between the ages of 6 and 18 years old. In each NCSC partner state, the distribution of students across grade levels by age range mirrored expected patterns. On average across all NCSC partner states, intellectual disability was the most frequently reported IDEA disability category for students who participate in the AA-AAS (56%), followed by autism (22%), and multiple disabilities (9%). There were some differences noted among the partner states. One state (State 9) reported a relatively high percentage of students receiving services through the categories of other health impairment and “other” (10% and 11% respectively). Because the IDEA disability categories of developmental delay and specific learning disability were not separate categories on the LCI, responses of “other” could have represented students from these two IDEA disability categories.

The percentage of students who primarily speak a language other than English varied across the NCSC partner states, ranging from 3% to 36% of students with the most significant cognitive disabilities who participated in the AA-AAS. Teachers most frequently reported the primary educational setting for students who participated in the AA-AAS as a self-contained classroom with some special or academic inclusion (68%). State 9 and State 15 had relatively high percentages of students primarily in a resource room (40% and 45%, respectively) compared to the other NCSC partner states. States 9 and 12 reported a relatively high percentage of students who participated in the AA-AAS in a general education class inclusive/collaborative setting (16% and 20%, respectively). State 11 had a relatively high percentage of students in special schools (28%). Overall, only a very small percentage of students in this study were reported as primarily served in inclusive/general education settings (3%), and only an additional 5% of students were served in resource placements (defined as spending between 40% and 79% of the school day in regular education settings).

Across all NCSC partner states, teachers reported that the majority of students (69%) participating in the AA-AAS used symbolic language to communicate; 18% of students used intentional communication, but not at a symbolic level (emerging symbolic); and 10% communicated primarily through cries, facial expressions, change in muscle tone,

etc., but showed no clear use of objects/textures, regularized gestures, pictures, signs, etc., in communicating (pre-symbolic). Compared to other NCSC states, State 12 had a relatively low percentage of symbolic language users (49%) and a relatively high percentage of emerging symbolic language users (33%); State 3 reported a relatively low percentage of pre-symbolic communicators who participated in the AA-AAS (<1%). Regarding receptive communication characteristics across all NCSC partner states, 49% of students independently followed 1-2 step directions, and 37% of the students required additional cues to follow 1-2 step directions.

Most students who participated in the AA-AAS across all NCSC partner states had vision within normal limits (70%) or had corrected vision within normal limits (21%) and most students had hearing within normal limits (92%). The majority of students who participated in the AA-AAS across all NCSC partner states: had no significant motor dysfunction that required adaptations (81%); initiated and sustained social interactions (54%) or responded to social interaction, but did not initiate or sustain social interactions (32%); attended at least 90% of school days (84%) with an additional 10% attending approximately 75% of school days. Very few students taking the AA-AAS regularly missed school due to health issues across all NCSC partner states.

The LCI delineates five reading categories for students who participate in the AA-AAS. Across all NCSC partner states, approximately 65% of students could read written text or Braille: 39% of students read basic sight words, simple sentences, directions, bullets, and/or lists in print or Braille; 22% of students could read fluently with basic, literal understanding; and 4% of students across all NCSC partner states could read fluently with critical understanding in print or Braille.

Conversely, 16% of students had no observable awareness of print or Braille. In mathematics across all NCSC partner states, 42% of students performed computational procedures with or without a calculator, and 26% of students could count with 1:1 correspondence to at least 10, or made numbered sets of items; 15% of students reportedly had no observable awareness or use of numbers. Compared to other NCSC partner states, State 16 reported a relatively low percentage of students who did computational procedures with or without a calculator (18%), and conversely, it had a relatively high percentage of students who counted with 1:1 correspondence to at least 10 (51%) or who counted by rote to five (27%).

## **Implications for Consideration**

These data were gathered to describe and document the characteristics of students participating in AA-AAS during 2010-11 or 2011-12 across the states in the NCSC consortium. The LCI data have specific implications for summative assessment design, while also informing the validity argument to support the uses of test scores and interpretation of those scores from the summative assessment. Further, the LCI data hold implications for curriculum, instruction, and capacity building; each of these are critical parts of the NCSC assessment and accountability system designed to improve student outcomes and prepare students for community, college, and careers. This report explicates nine implications for consideration in using LCI data in developing a

new summative assessment within an accountability system augmented by curricular, instructional, and capacity building materials and supports.

# Learner Characteristics Inventory Project Report

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## Introduction

This report presents baseline data collected as part of the validity evaluation for the National Center and State Collaborative (NCSC) project across all of the 18 core partner states. NCSC is funded through a four year General Supervision Enhancement Grant (GSEG) from the Office of Special Education Programs at the US Department of Education. Its purpose is to create a system of high quality supports and resources for educators who work with students with the most significant cognitive disabilities, including the development of an alternate assessment based on alternate achievement standards (AA-AAS) that allows these students to demonstrate what they know and can do in relation to the Common Core State Standards. NCSC is a collaborative project among 24 states (18 core and 6 Tier II state partners) and five partner organizations, including edCount, LLC, the validity evaluator for the project.

To establish a clear understanding of each state's target student population for the AA-AAS, researchers partnered with states to gather and analyze Learner Characteristics Inventory data (LCI; Kearns, Kleinert, Kleinert, & Towles-Reeves, 2006). Researchers collected data from an administration of the LCI in each NCSC core partner state; this report presents the LCI results across all of the 18 core partner states.

## Literature Review

The conceptual framework for this research on the learner characteristics of students participating in AA-AAS stems from the National Research Council's Committee on the Foundations of Assessment's conception of the "assessment triangle" (Pellegrino, Chudowsky, & Glaser, 2001). Pellegrino et al. (2001) defined three pillars on which every assessment must rest: "a model of how students represent knowledge and develop competence in the subject domain, tasks or situations that allow one to observe students' performance, and an interpretation method for drawing inferences from the performance evidence thus obtained" (p. 2). The authors suggest these pillars make up an assessment triangle, and that this triangle of cognition, observation, and interpretation must be articulated, aligned, and coherent for inferences drawn from the assessment to have integrity. This baseline study examines the learner characteristics of the students who are assessed with AA-AAS, specifically focusing on the cognition vertex of the assessment triangle. As Towles-Reeves, Kearns, Kleinert, and Kleinert (2009) describe,

The students for whom AA-AAS is appropriate represent two problems that challenge traditional measurement theory. First, these students represent a small percentage of the total assessed population of students with and without disabilities...Secondly, they are reportedly a highly

diverse group, particularly with regard to learner characteristics, available response repertoires, and often competing complex medical conditions (Heward, 2006; Orelove, Sobsey, & Silberman, 2004). However, little empirical data exist to verify the extent to which students with these learning characteristics are represented in the assessed population. (p.5)

In addition, Kearns, Towles-Reeves, Kleinert, and Kleinert (2009) suggested that defining the population of students who participate in AA-AAS as critical in the validity evaluation of these assessments.

Although there are limited empirical data about the characteristics of students who participate in AA-AAS, a few studies have been conducted to inform our understanding of this population and the parameters around “who” participates in these assessments. First, the National Center on Educational Outcomes (NCEO) collected data on the development and status of state alternate assessments through online surveys of state department personnel. NCEO reported this information at several points in time. In early 1999, 34 states responded to the survey and reported developing (or being in the process of developing) eligibility criteria for their AA-AAS (Thompson, Erickson, Thurlow, Ysseldyke, & Callender, 1999). By the summer of 2000, 46 states reported having participation guidelines. In 2005, all 50 states reported having a definition of “significant cognitive disabilities,” which often serves as an important criterion in participation guidelines for students in AA-AAS (Thompson, Thurlow, Johnstone, & Altman, 2005). Still, the definition across states varies and is left open for interpretation by each state.

The only study that provided data documenting the characteristics of students participating in AA-AAS, besides those conducted with the LCI, stems from an investigation into an AA-AAS pilot conducted by Almond and Bechard (2005). The students participating in that study “were appropriate for alternate assessment but may not fully represent students with the most significant disabilities who are eligible to take alternate assessments” (p. 3).

To help states document who the students are who participate in their AA-AAS, researchers at the National Alternate Assessment Center (NAAC) developed the LCI in conjunction with experts in the fields of occupational therapy, physical therapy, speech/language therapy, deaf-blindness, reading, mathematics, and special education. After conducting two pilot studies and a process to ensure respondents could complete the instrument reliably, researchers at NAAC administered the LCI in seven states during the 2006-07 school year to collect data about the characteristics of students who participate in AA-AAS (Kearns, Towles-Reeves, Kleinert, Kleinert, & Thomas, 2011).

To provide a baseline in understanding these early findings, Kearns et al. (2011) reported that across these seven states, most students (61%-79%) used symbolic

language<sup>3</sup> to communicate, with smaller percentages of students rated as emerging symbolic<sup>4</sup> or pre-symbolic<sup>5</sup> in their expressive communication. In terms of receptive communication, two primary groups of students emerged: 37%-56% of students independently followed one- to two-step directions without requiring additional cues, and 34%-51% of students required additional cues to follow one- to two-step directions. Augmentative and alternative communication use varied, with 24%-77% of students who showed no clear use of objects, gestures, pictures, or signs to communicate using an AAC system; 37%-57% of students who used intentional communication, but not at a symbolic level, using an AAC system; and 6%-20% of students who used symbolic language to communicate using an AAC system. The largest group of students (33%-50%) was rated as reading basic sight words, simple sentences, directions, bullets, or lists in print or Braille, while 18%-25% of students were rated as not yet having a sight word vocabulary, but being aware of text/Braille, following directionality, making letter distinctions, or telling a story from pictures. In mathematics, 32%-57% of students were rated as able to complete computational procedures with or without a calculator, while 12%-17% of students were reported to have no observable awareness or use of numbers.

The Theory of Action (TOA) for the NCSC GSEG project claims “the appropriate students are identified for the AA-AAS.” The LCI data from this study will provide baseline data across the project to help researchers understand who the students are (i.e., their learning characteristics) who participated in AA-AAS in 2010-11 or 2011-12 across the states in the consortium. Researchers will follow up with another administration of the LCI in the final year of the project to gather data on the students participating in the newly developed NCSC assessment. At that time, the partner states and the project leadership can use the LCI data to revise participation guidelines and to inform technical manuals for the AA-AAS. The LCI data collected in the final year of the project will also represent a baseline against which states can track students across time to determine changes in the numbers of students with response repertoires, the numbers of students developing communicative competence, etc.

## **Methodology**

### **Instrumentation**

Researchers at NAAC designed the LCI to describe the characteristics of students who participate in the AA-AAS. The LCI is not meant to be used to classify or diagnose students, and should not be used as the basis for decision making about student

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<sup>3</sup> The student uses symbolic language to communicate: Student uses verbal or written words, signs, Braille, or language-based augmentative systems to request, initiate, and respond to questions, describe things or events, and express refusal.

<sup>4</sup> The student uses intentional communication, but not at a symbolic language level: Student uses understandable communication through such modes as gestures, pictures, objects/textures, points, etc., to clearly express a variety of intentions.

<sup>5</sup> The student communicates primarily through cries, facial expressions, change in muscle tone, etc., but no clear use of objects/textures, regularized gestures, pictures, signs, etc., to communicate.

placement or instruction. LCI results enhance the demographic data available about the characteristics of students who participate in AA-AAS, and can reveal the extent to which patterns of those characteristics emerge across years within states and then across states within a single year. Sixteen learner characteristics are assessed:

1. Student's grade
2. Student's age in years
3. Student's primary Individuals with Disabilities Education Act (IDEA) disability category
4. English learner status
5. Primary language, if not English
6. Primary classroom setting
7. Expressive communication profile
8. Augmentative and alternative communication (AAC) use
9. Receptive communication profile
10. Vision
11. Hearing
12. Motor function
13. Engagement
14. Health issues / Attendance
15. Reading
16. Mathematics

Appendix A provides the complete LCI survey. The LCI is submitted by each student's teacher for every student participating in the AA-AAS (Towles-Reeves et al., 2009).

## **Process**

Different methods were used to collect LCI data for each of the partner states. Ten of the NCSC partner states collected LCI data as part of their AA-AAS system; all but one of these states submitted their aggregated LCI data for this study during the 2010-11 school year. One state submitted data for the 2011-12 school year because data were not available for the 2010-11 school year.

In six states, data were collected by researchers specifically for this study. For these six states, researchers developed an electronic survey format of the LCI and worked with the states to disseminate the link to the appropriate audiences. Five<sup>6</sup> states sent the link

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<sup>6</sup> One of the five states also sent the link to its AA-AAS Advisory Board and another one of the five states also sent the link to a group of special education teachers who subscribed to an electronic resource.

for the survey to their special education directors, administrators, or test coordinators and asked them to disseminate the link to teachers of students who may participate in the AA-AAS during the 2010-11 school year; one state sent the link directly to principals in its schools and requested dissemination down to their teachers of students completing the 2010-11 AA-AAS. Students' teachers were directed to complete this survey for each student who participated in the 2010-11 AA-AAS.

Finally, one state collected LCI data using its own survey tool and submitted its aggregated data to researchers for analysis. A second state sent the link of the electronic survey developed by researchers to its special education teachers, but required submission of the LCI through its AA-AAS for each student (teachers printed the LCI, completed it, and returned it with the student's assessment). Thus, with the exception of one state (State 1), all of the NCSC partner states submitted LCI data for students participating in the AA-AAS in 2010-11 school year (see Exhibit 1 for data collection method, number of students, and number of responses per state).

### ***Response Rate***

States distributed LCIs to teachers of 96,108 students eligible to participate in the AA-AAS during the 2010-11 (and 2011-12 for State 1) school year. LCIs were returned for 49,669 students across the 18 states. The LCI response rates in individual states ranged from 15% to 100% with an average of 65% (see Exhibit 1). For the 10 states that collected LCI data through the administration of their AA-AAS, the average response rate was 91% (ranging from 44% to 100%). For the 6 states that collected LCI data using the electronic survey link, the average response rate was 34% (ranging from 15% to 59%). The two states that uniquely gathered data and submitted to researchers had response rates of 20% and 41%.



## Exhibit 1. Response Rate by State

	# of students <sup>7</sup>	# of LCI Responses	LCI Response Rate (%)	Data Collection Method
<b>State 1<sup>8</sup></b>	673	673	100	Collected by state
<b>State 2</b>	6,678	6,678	100	Collected by state
<b>State 3</b>	3,684	3,498	95	Collected by state
<b>State 4</b>	443	434	98	Collected by state
<b>State 5</b>	19,575	14,701	75	Collected by state
<b>State 6</b>	9,508	3,048	32	Research survey
<b>State 7</b>	6,652	1,970	30	Research survey
<b>State 8</b>	2,950	1,081	37	Research survey
<b>State 9</b>	646	205	32	Collected by state
<b>State 10</b>	2,100	429	20	Unique method
<b>State 11</b>	17,844	2,600	15	Research survey
<b>State 12</b>	373	373	100	Collected by state
<b>State 13</b>	14,571	5,904	41	Unique method
<b>State 14</b>	945	912	97	Collected by state
<b>State 15</b>	861	861	100	Collected by state
<b>State 16</b>	3,175	3,175	100	Collected by state
<b>State 17</b>	5,000	2,938	59	Research survey
<b>State 18</b>	430	189	44	Collected by state
<b>Total</b>	96,108	49,669	65% average <sup>9</sup>	NA

<sup>7</sup> Students expected to participate in AA-AAS in 2010-2011 (in State 1, the 2011-2012 school year)

<sup>8</sup> Data from State 1 are from the 2011-2012 school year

<sup>9</sup> The average percentage based on an average of all state response rates. The average response rate using the total number of students eligible to participate in the alternate assessment divided by the number of respondents was 52%.

## Results

### *Student's Grade*

The NCSC partner states showed a relatively even distribution of students in each grade level (see Exhibit 2). Under the Elementary and Secondary Education Act, states must assess students in grades 3-8 and at least one high school grade; students in kindergarten and grades 1 and 2 are not required to participate in the AA-AAS for federal accountability purposes. NCSC partner states differed in the grades in which the AA-AAS is administered in high school.

## Exhibit 2. Number and Percentage of Students by IEP Grade Level

	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 9		Grade 10		Grade 11		Grade 12		High school (total)		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	65	10	80	12	70	10	113	17	81	12	85	13	97	14	82	12	0	0	0	0	179	27	0	0
<b>State 2</b>	911	14	938	14	924	14	956	14	915	14	836	13	13	0	929	14	115	2	141	2	1,198	18	0	0
<b>State 3</b>	523	15	499	14	509	15	509	15	512	15	467	13	19	1	443	13	11	0	6	0	479	14	0	0
<b>State 4</b>	64	15	57	13	66	15	56	13	73	17	59	14	4	1	42	10	2	0	0	0	48	11	11	3
<b>State 5</b>	1,617	11	1,739	12	1,787	12	1,569	11	1,668	11	1,744	12	1,511	10	1,577	11	1,486	10	0	0	4,574	31	3	0
<b>State 6</b>	404	13	372	12	403	13	352	12	352	12	408	13	7	0	13	0	487	16	45	1	552	18	86	3
<b>State 7</b>	207	11	146	7	179	9	169	9	158	8	145	7	157	8	129	7	136	7	173	9	595	30	66	3
<b>State 8</b>	136	13	168	16	135	12	108	10	111	10	131	12	4	0	135	12	105	10	7	1	251	23	40	4
<b>State 9</b>	29	14	29	14	27	13	21	10	29	14	28	14	1	0	0	0	41	20	0	0	42	20	0	0
<b>State 10</b>	59	14	43	10	46	11	72	17	66	15	63	15	0	0	0	0	70	16	0	0	70	16	7	2
<b>State 11<sup>10</sup></b>	279	11	347	13	330	13	347	13	309	12	296	11	44	2	35	1	150	6	147	6	376	14	56	2
<b>State 12</b>	33	9	40	11	30	8	47	12	35	9	37	10	24	6	30	8	23	6	44	12	121	32	0	0
<b>State 13</b>	742	13	900	15	782	13	765	13	797	13	916	16	7	0	8	0	975	17	12	0	1,002	17	0	0
<b>State 14</b>	104	11	129	14	98	11	92	10	100	11	89	10	0	0	103	11	111	12	0	0	214	23	0	0
<b>State 15</b>	119	14	135	16	132	15	144	17	107	12	111	13	0	0	0	0	113	13	0	0	113	13	0	0
<b>State 16</b>	460	14	549	17	486	15	465	15	463	15	397	13	0	0	355	11	0	0	0	0	355	11	0	0
<b>State 17</b>	319	11	352	12	350	12	354	12	320	11	330	11	232	8	236	8	219	7	78	3	765	26	102	3
<b>State 18</b>	18	10	29	15	20	11	23	12	28	15	37	20	0	0	0	0	32	17	2	1	34	18	0	0
<b>Total</b>	6,089	12	6,552	13	6,374	13	6,162	13	6,124	13	6,179	13	2,120	4	4,117	8	4,076	8	655	1	10,968	22	371	1

\*Note. The percentage represents the number of students in each grade out of the total number of students submitting an LCI in each state.

<sup>10</sup> State 11 also reported students in “High school/secondary” ( $n=118$ , 4.54%) and “Multi-age classroom/ungraded” ( $n=87$ , 3.35%)

## Student's Age in Years

As expected, the majority of students who participated in the AA-AAS across all NCSC partner states were between the ages of 6 and 18 years (see Exhibit 3). In each NCSC partner state, the distribution of students across grade levels by age range mirrored expected patterns; these findings are not shown here, but are reported in each state's individual LCI report.

**Exhibit 3. Number and Percentage of Students by Age Range**

Age	1 to 3		4 to 5		6 to 11		12 to 14		15 to 18		19 to 21		22+		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	0	0	0	0	228	34	262	39	183	27	0	0	0	0	0	0
<b>State 2</b>	4	0	2	0	2,983	45	2,314	35	1,292	19	78	1	5	0	0	0
<b>State 3</b>	1	0	0	0	1,177	34	1,460	42	838	24	21	1	1	0	0	0
<b>State 4</b>	0	0	0	0	201	46	175	40	57	13	0	0	1	0	0	0
<b>State 5</b>	0	0	1	0	4,977	34	4,813	33	4,699	32	185	1	1	0	25	0
<b>State 6</b>	7	0	45	1	1,217	40	932	31	607	20	149	5	1	0	90	3
<b>State 7</b>	12	1	50	3	727	37	435	22	527	27	129	7	9	0	81	4
<b>State 8</b>	0	0	0	0	391	36	325	30	290	27	39	4	1	0	35	3
<b>State 9</b>	0	0	0	0	75	37	77	38	47	23	3	1	0	0	3	1
<b>State 10</b>	1	0	0	0	172	40	170	40	72	17	8	2	0	0	6	1
<b>State 11</b>	2	0	8	0	1,180	45	804	31	462	18	56	2	0	0	88	3
<b>State 12</b>	0	0	0	0	145	38	104	28	97	26	29	8	1	0	1	0
<b>State 13</b>	6	0	7	0	2,371	40	2,280	39	1,146	19	94	2	0	0	0	0
<b>State 14</b>	0	0	0	0	404	44	258	28	237	26	13	1	0	0	0	0
<b>State 15</b>	0	0	0	0	258	30	381	44	191	22	31	4	0	0	0	0
<b>State 16</b>	0	0	0	0	1,960	62	862	27	353	11	0	0	0	0	0	0
<b>State 17</b>	0	0	6	0	1,050	36	950	32	822	28	61	2	2	0	47	2
<b>State 18</b>	0	0	0	0	61	32	79	42	47	25	2	1	0	0	0	0
<b>Total</b>	33	0	119	0	19,577	39	16,681	34	11,967	24	898	2	22	0	376	1

\*Note. The percentage represents the number of students in each age range out of the total number of students submitting an LCI in each state.

### ***Student's Primary Individuals with Disabilities Education Act (IDEA) Disability Category***

On average across all NCSC partner states, intellectual disability was the most frequently reported IDEA disability category for students who participated in the AA-AAS, followed by autism, and multiple disabilities (see Exhibit 4 and Exhibit 5). State 9 reported a relatively high percentage of students classified with other health impairment (10%) or other (11%). Because the IDEA disability categories of developmental delay and specific learning disability were not separate categories on the LCI, responses of “other” could have represented students from these two IDEA disability categories.

**Exhibit 4. Number and Percentage of Students by IDEA Disability Category**

IDEA Disability Category	Intellectual disability/ mental retardation <sup>11</sup>		Multiple disabilities		Autism		Speech/ language impairment		Hearing impairment		Visual impairment		Traumatic brain injury		Emotional disability		Deaf/ Blind		Other health impairment		Orthopedic		Other		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	277	41	148	22	133	20	0	0	3	0	0	0	4	1	7	1	1	0	62	9	3	0	21	3	14	2
<b>State 2</b>	3,753	56	833	12	1,485	22	19	0	33	0	17	0	33	0	73	1	6	0	159	2	53	1	214	3	0	
<b>State 3<sup>12</sup></b>																										
<b>State 4</b>	163	38	79	18	111	26	1	0	0	0	0	0	2	0	1	0	0	0	13	3	2	0	2	0	60	14
<b>State 5<sup>13</sup></b>	9,486	65	0	0	3,491	24	160	1	109	1	56	0	76	1	218	1	20	0	376	3	277	2	341	2	91	1
<b>State 6</b>	2,001	66	128	4	628	21	19	1	18	1	7	0	22	1	21	1	9	0	128	4	26	1	33	1	8	0
<b>State 7</b>	1,019	52	322	16	425	22	17	1	6	0	4	0	15	1	44	2	2	0	61	3	20	1	32	2	3	0
<b>State 8</b>	556	51	178	16	255	24	0	0	5	0	3	0	11	1	3	0	0	0	37	3	16	1	10	1	7	1
<b>State 9</b>	113	55	8	4	26	13	2	1	1	0	0	0	5	2	0	0	1	0	21	10	4	2	23	11	1	0
<b>State 10</b>	197	46	91	21	104	24	0	0	0	0	0	0	7	2	2	0	3	1	19	4	4	1	2	0	0	0
<b>State 11</b>	807	31	798	31	589	23	147	6	6	0	7	0	16	1	35	1	8	0	113	4	4	0	65	3	5	0
<b>State 12</b>	102	27	114	30	91	24	6	2	8	2	1	0	0	0	0	0	6	2	19	5	4	1	25	7	1	0
<b>State 13</b>	2,844	48	695	12	1,310	22	51	1	31	1	85	1	45	1	110	2	22	0	218	4	31	1	354	6	108	2
<b>State 14</b>	307	34	137	15	284	31	18	2	6	1	1	0	7	1	16	2	0	0	70	8	4	0	54	6	8	1
<b>State 15</b>	457	53	234	27	128	15	0	0	1	0	2	0	8	1	2	0	0	0	7	1	4	0	0	0	18	2
<b>State 16</b>	2,015	63	3	0	700	22	19	1	18	1	29	1	22	1	27	1	0	0	134	4	68	2	140	4	0	0
<b>State 17</b>	1,645	56	538	18	462	16	54	2	11	0	7	0	14	0	15	1	4	0	97	3	28	1	57	2	6	0
<b>State 18</b>	92	49	30	16	35	19	6	3	0	0	1	1	1	1	3	2	0	0	8	4	1	1	12	6	0	0
<b>Total</b>	25,834	56	4,336	9	10,257	22	519	1	256	1	220	0	288	1	577	1	82	0	1,542	3	549	1	1,385	3	330	1

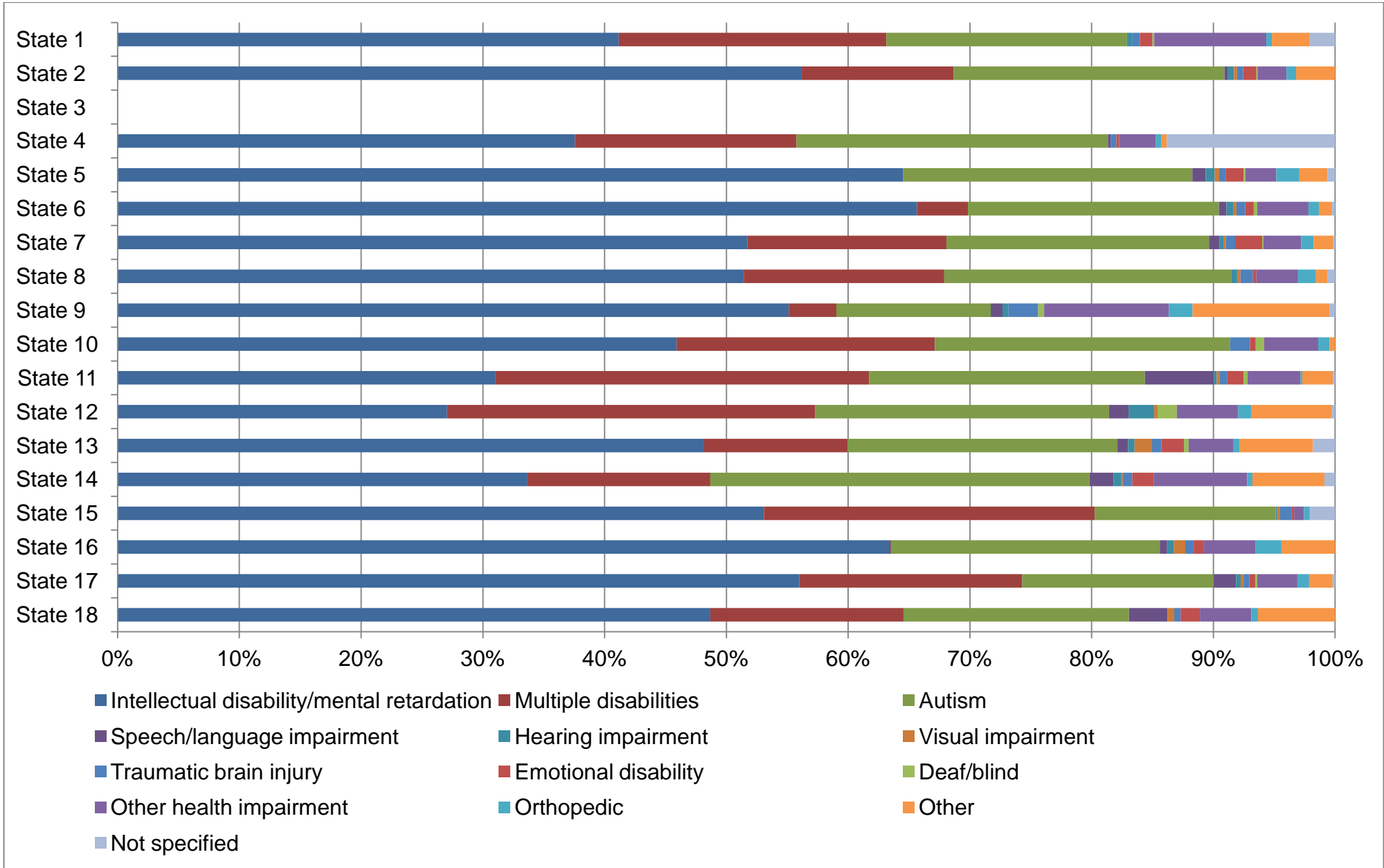
\*Note. The percentage represents the number of students in each disability category out of the total number of students submitting an LCI in each state.

<sup>11</sup> Includes mild, moderate, and profound.

<sup>12</sup> State 3 did not collect data on IDEA disability categories.

<sup>13</sup> State 5 did not list "multiple disabilities" as an IDEA disability category.

Exhibit 5. Percentage of Students in Each IDEA Disability Category by State



## Student's Primary Language

The percentage of students who primarily speak a language other than English varied across the NCSC partner states, ranging from 3% of students in State 16 to 36% of students in the State 12 (see Exhibit 6 and Exhibit 7).

**Exhibit 6. Number and Percentage of Students by Primary Language**

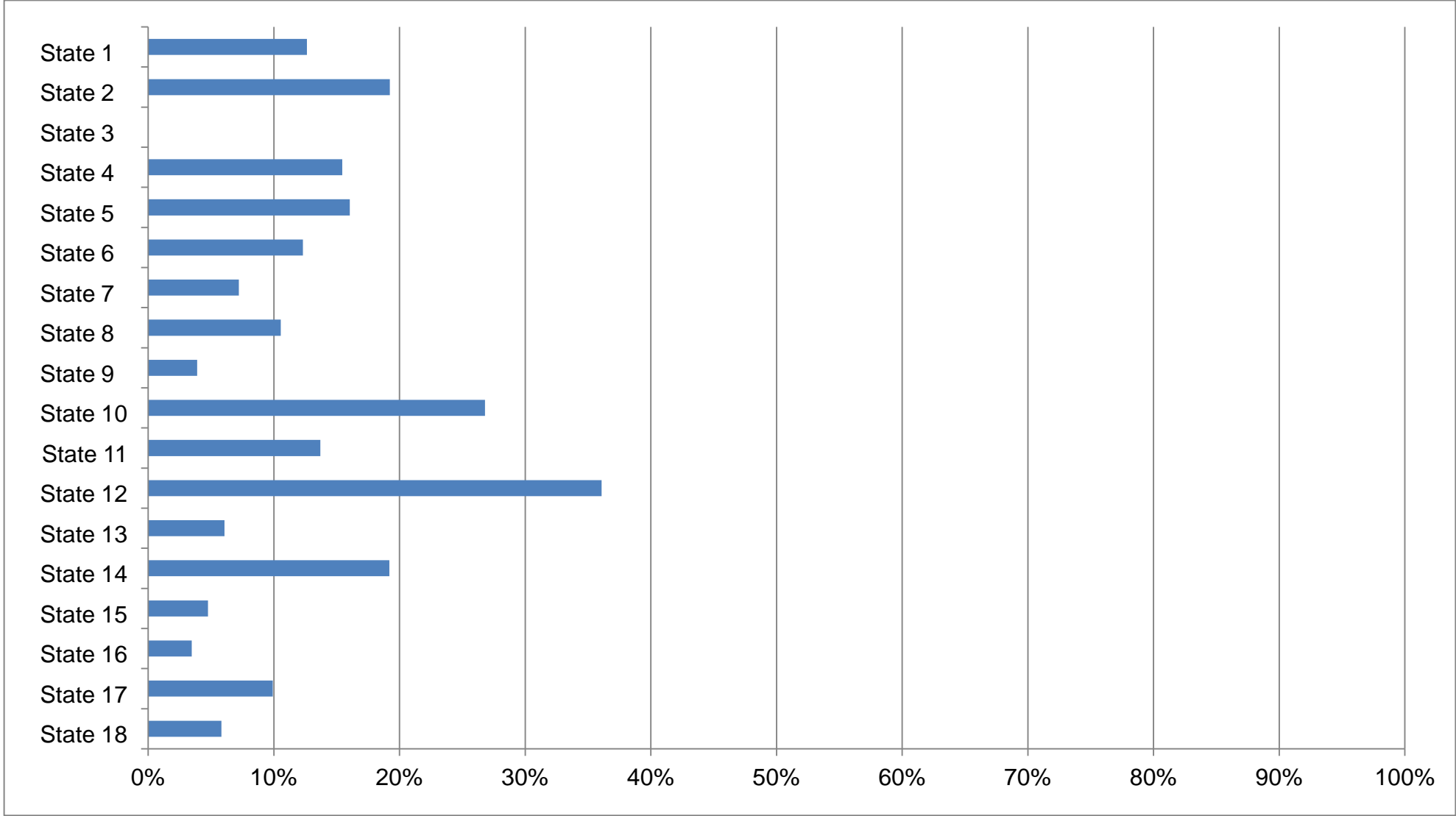
Primary Language	English		A language other than English		Not specified	
	n	%*	n	%	n	%
State 1	573	85	85	13	15	2
State 2	5,394	81	1,284	19	0	0
State 3 <sup>14</sup>						
State 4	352	81	67	15	15	3
State 5	11,954	81	2,359	16	388	3
State 6	2,664	87	375	12	9	0
State 7	1,821	92	142	7	7	0
State 8	957	89	114	11	10	1
State 9	197	96	8	4	0	0
State 10	314	73	115	27	0	0
State 11	2,253	87	339	13	8	0
State 12	241	64	136	36	0	0
State 13	5,546	94	358	6	0	0
State 14	700	77	175	19	37	4
State 15	820	95	41	5	0	0
State 16	3,063	96	110	3	2	0
State 17	2,630	90	291	10	17	1
State 18	178	94	11	6	0	0
<b>Total</b>	<b>39,657</b>	<b>86</b>	<b>6,010</b>	<b>13</b>	<b>508</b>	<b>1</b>

\*Note. The percentage represents the number of students in each characteristic category (i.e., primarily speaks English) out of the total number of students submitting an LCI in each state.

<sup>14</sup> State 3 did not collect data on students' primary language.



**Exhibit 7. Percentage of Students Who Speak a Language other than English by State**



### ***Student's Primary Classroom Setting***

On average across all NCSC partner states, teachers most frequently reported a primary classroom setting for students who participated in the AA-AAS as a self-contained special education classroom with some special inclusion (68%; see Exhibit 8 and Exhibit 9). State 9 and State 15 had relatively high percentages of students primarily in a resource room (40% and 45%, respectively) compared to the other NCSC partner states. States 9 and 12 reported a relatively high percentage of students who participated in the AA-AAS in a general education class inclusive/collaborative setting (16% and 20%, respectively). State 11 had a relatively high percentage of students in special schools (28%).

**Exhibit 8. Number and Percentage of Students by Primary Classroom Setting**

Primary Classroom Setting			Self-contained special education with some special inclusion		Self-contained special education with some academic inclusion		Resource room/general education		General education class inclusive/collaborative		Not specified	
	Special school											
	n	%*	n	%	n	%	n	%	n	%	n	%
State 1	27	4	462	69	101	15	32	5	13	2	16	2
State 2	544	8	4,818	72	712	11	319	5	285	4	0	0
State 3 <sup>15</sup>												
State 4 <sup>16</sup>												
State 5	2,746	19	10,523	72	741	5	280	2	291	2	120	1
State 6	155	5	2,470	81	312	10	50	2	33	1	28	1
State 7	104	5	1,218	62	384	19	145	7	97	5	22	1
State 8	49	5	699	65	232	21	66	6	22	2	13	1
State 9	1	0	38	19	48	23	83	40	33	16	2	1
State 10	44	10	278	65	71	17	24	6	12	3	0	0
State 11	731	28	1,568	60	146	6	56	2	74	3	25	1
State 12	3	1	128	34	68	18	86	23	76	20	0	0
State 13	1,002	17	2,900	49	799	14	777	13	318	5	108	2
State 14	192	21	440	48	212	23	13	1	42	5	13	1
State 15 <sup>17</sup>	46	5	306	36	0	0	387	45	41	5	12	1
State 16	181	6	2,994	94	0 <sup>18</sup>	0	0	0	0	0	0	0
State 17	178	6	2,031	69	479	16	138	5	73	2	39	1
State 18	20	11	99	52	40	21	30	16	0	0	0	0
<b>Total</b>	<b>6,023</b>	<b>13</b>	<b>30,972</b>	<b>68</b>	<b>4,345</b>	<b>10</b>	<b>2,486</b>	<b>5</b>	<b>1,410</b>	<b>3</b>	<b>398</b>	<b>1</b>

\*Note. The percentage represents the number of students in each classroom setting out of the total number of students submitting an LCI in each state.

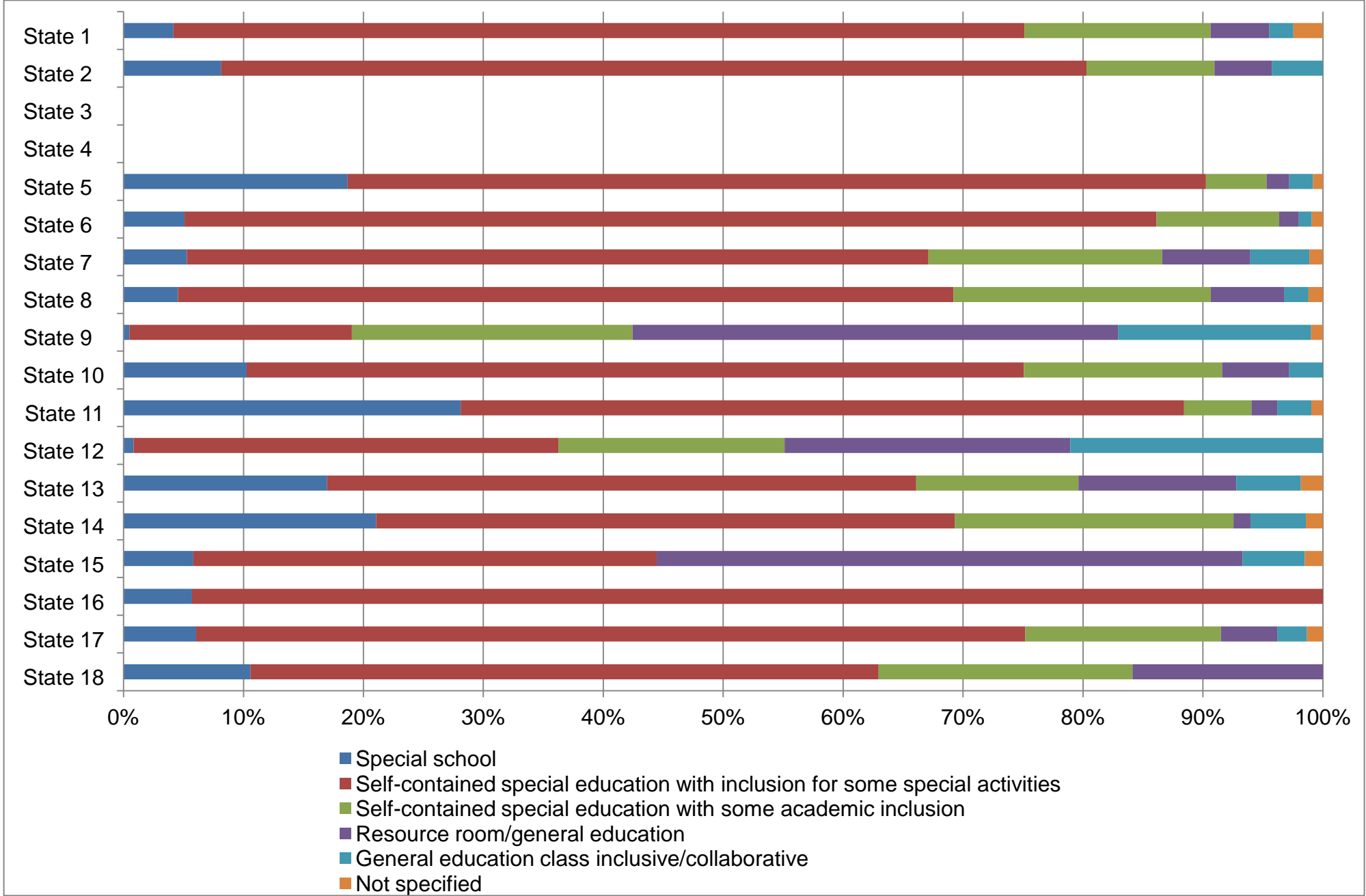
<sup>15</sup> State 3 did not collect data on students' primary classroom setting.

<sup>16</sup> State 4 did not collect data on students' primary classroom setting.

<sup>17</sup> State 15 included two additional classroom setting choices: "Home/hospital" ( $n=9$ , 1.05%) and "Residential facility" ( $n=60$ , 6.97%), which are not represented in this table.

<sup>18</sup> Unlike other project states, State 16 only used two codes for primary classroom setting: 1) special schools, and 2) self-contained classroom. This difference did not have a substantial effect on the percentages reported in the total column; the percentages differed by less than 2% when calculated without including State 16.

Exhibit 9. Percentage of Students in Each Primary Classroom Setting by State



## ***Expressive Communication***

Across all NCSC partner states, teachers reported that the majority of students participating in the AA-AAS (69%; see Exhibit 10 and \*Note. The percentage represents the number of students in each expressive communication category out of the total number of students submitting an LCI in each state.

Exhibit 11) used symbolic language to communicate, 18% of students used intentional communication, but not at a symbolic level (emerging symbolic), and 10% communicated primarily through cries, facial expressions, change in muscle tone, etc., but showed no clear use of objects/textures, regularized gestures, pictures, signs, etc., to communicate (pre-symbolic). Compared to other NCSC states, State 12 had a relatively low percentage of symbolic language users (49%) and a relatively high percentage of emerging symbolic language users (33%); State 3 reported a relatively low percentage of pre-symbolic communicators who participated in the AA-AAS (<1%).

**Exhibit 10. Number and Percentage of Students by Expressive Communication**

	Symbolic <sup>19</sup>		Emerging symbolic <sup>20</sup>		Pre-symbolic <sup>21</sup>		Not specified	
	n	%*	n	%	n	%	n	%
<b>State 1</b>	475	71	118	18	63	9	17	3
<b>State 2</b>	4,666	70	1,299	19	713	11	0	0
<b>State 3</b>	2,627	75	585	17	3	<1	283	8
<b>State 4</b>	301	69	82	19	32	7	19	4
<b>State 5</b>	10,169	69	2,719	18	1,662	11	151	1
<b>State 6</b>	1,792	59	670	22	490	16	96	3
<b>State 7</b>	1,291	66	356	18	257	13	66	3
<b>State 8</b>	619	57	251	23	167	15	44	4
<b>State 9</b>	166	81	16	8	7	3	16	8
<b>State 10</b>	278	65	88	21	60	14	3	1
<b>State 11</b>	1,765	68	491	19	242	9	102	4
<b>State 12</b>	185	49	126	33	65	17	1	0
<b>State 13</b>	4,565	77	813	14	418	7	108	2
<b>State 14</b>	601	66	207	23	51	6	53	6
<b>State 15</b>	605	70	116	13	68	8	72	8
<b>State 16</b>	1,994	63	483	15	367	12	331	10
<b>State 17</b>	1,881	64	576	20	406	14	75	3
<b>State 18</b>	138	73	29	15	19	10	3	2
<b>Total</b>	34,118	69	9,025	18	5,090	10	1,440	3

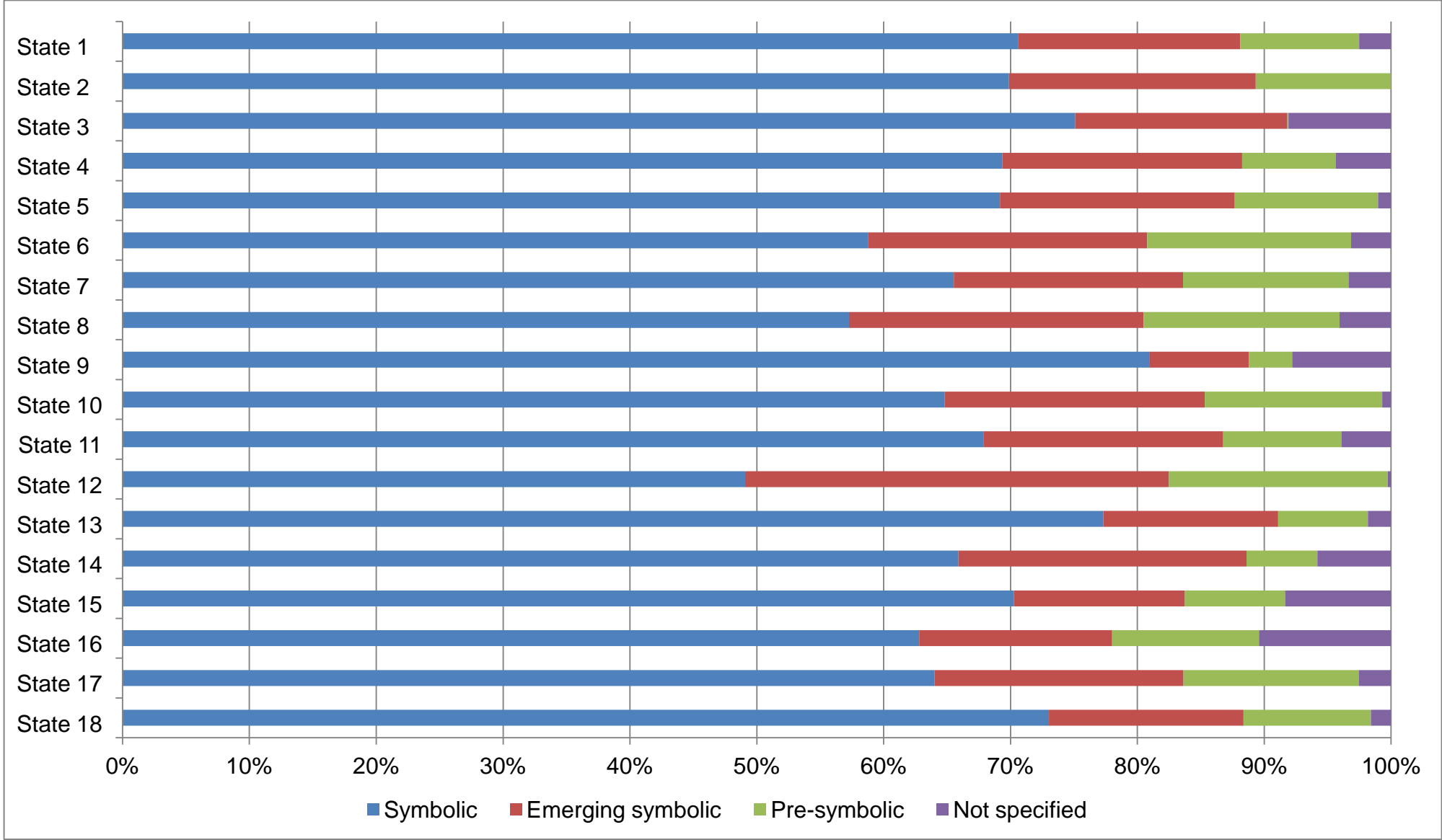
\*Note. The percentage represents the number of students in each expressive communication category out of the total number of students submitting an LCI in each state.

<sup>19</sup> The student uses symbolic language to communicate: Student uses verbal or written words, signs, Braille, or language-based augmentative systems to request, initiate, and respond to questions, describe things or events, and express refusal.

<sup>20</sup> The student uses intentional communication, but not at a symbolic language level: Student uses understandable communication through such modes as gestures, pictures, objects/textures, points, etc., to clearly express a variety of intentions.

<sup>21</sup> The student communicates primarily through cries, facial expressions, change in muscle tone, etc., but no clear use of objects/textures, regularized gestures, pictures, signs, etc., to communicate.

Exhibit 11. Percentage of Students in Each Expressive Communication Category by State





## Use of Augmentative and Alternative Communication Systems

The majority of students across all NCSC partner states did not use an augmentative or alternative communication (AAC) system in addition to or in place of oral speech (74%; see Exhibit 12 and Exhibit 13). Compared to other NCSC states, State 12 and State 14 reported relatively high percentages of students who used AAC (27% and 31%, respectively). Over half of the responses in State 16 did not specify whether students used AAC (61%). Teachers in State 7, State 8, and State 17 did not specify AAC use for relatively high percentages of students in those states (22%, 21% and 21%, respectively).

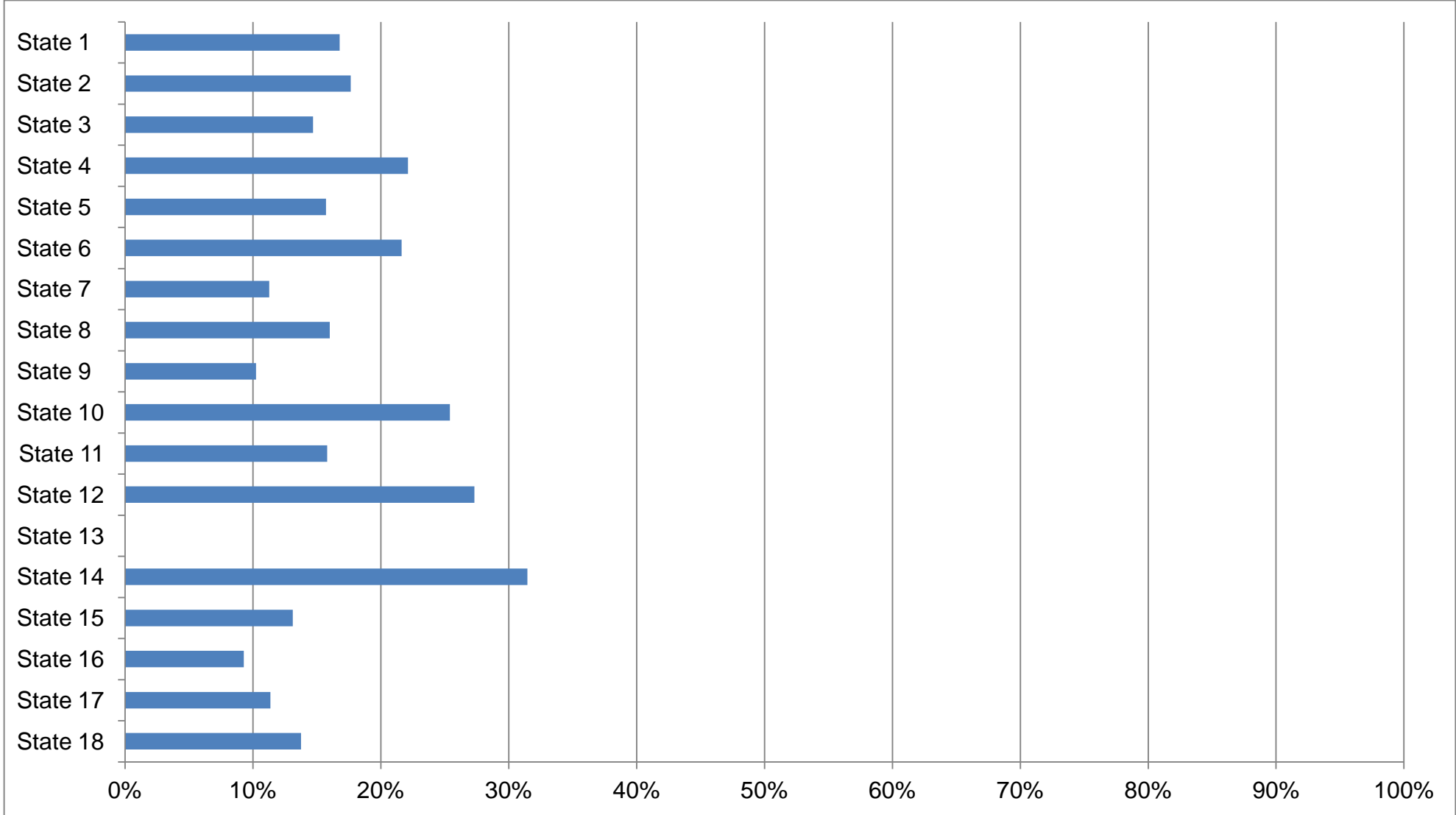
**Exhibit 12. Number and Percentage of Students by AAC Use**

	Student uses AAC		Student does not use AAC		Not specified	
	n	%*	n	%	n	%
<b>State 1</b>	113	17	543	81	17	3
<b>State 2</b>	1,179	18	5,499	82	0	0
<b>State 3</b>	514	15	2,697	77	287	8
<b>State 4</b>	96	22	299	69	39	9
<b>State 5</b>	2,309	16	12,194	83	198	1
<b>State 6</b>	659	22	1,972	65	417	14
<b>State 7</b>	222	11	1,311	67	437	22
<b>State 8</b>	173	16	682	63	226	21
<b>State 9</b>	21	10	161	79	23	11
<b>State 10</b>	109	25	320	75	0	0
<b>State 11</b>	411	16	1,890	73	299	12
<b>State 12</b>	103	27	274	73	0	0
<b>State 13<sup>22</sup></b>						
<b>State 14</b>	287	31	587	64	38	4
<b>State 15</b>	113	13	669	78	79	9
<b>State 16</b>	295	9	950	30	1,930	61
<b>State 17</b>	334	11	1,986	68	618	21
<b>State 18</b>	26	14	160	85	3	2
<b>Total</b>	6,964	16	32,194	74	4,611	11

\*Note. The percentage represents the number of students in each AAC category out of the total number of students submitting an LCI in each state.

<sup>22</sup> State 13 collected data on the use of specific assistive technology devices.

**Exhibit 13. Percentage of Students who Use AAC by State**



## *Use of Augmentative and Alternative Communication Systems and Expressive Communication*

The majority of students across all NCSC partner states used symbolic language and did not use an augmentative /or alternative communication (AAC) system in addition to or in place of oral speech (56%; see Exhibit 14). Only 5% of students were symbolic communicators who used AAC. Ten percent of students were emerging symbolic communicators who did not use AAC, while 6% were pre-symbolic communicators who did not use AAC.

**Exhibit 14. Number and Percentage of Students: AAC Use by Expressive Communication Characteristics**

		Symbolic <sup>23</sup>	Emerging symbolic <sup>24</sup>	Pre-symbolic <sup>25</sup>	Not specified
<b>Student uses AAC</b>	<b>n</b>	1,967	2,909	1,926	49
	<b>% of total*</b>	5	7	4	0
<b>Student does not use AAC</b>	<b>n</b>	24,254	4,483	2,469	445
	<b>% of total</b>	56	10	6	1
<b>Not specified</b>	<b>n</b>	2,857	702	214	821
	<b>% of total</b>	7	2	0	2

\*Note. The percentage represents the number of students using/not using AAC in each expressive communication category out of the total number of students submitting an LCI in each state.

<sup>23</sup> The student uses symbolic language to communicate: Student uses verbal or written words, signs, Braille, or language-based augmentative systems to request, initiate, and respond to questions, describe things or events, and express refusal.

<sup>24</sup> The student uses intentional communication, but not at a symbolic language level: Student uses understandable communication through such modes as gestures, pictures, objects/textures, points, etc., to clearly express a variety of intentions.

<sup>25</sup> The student communicates primarily through cries, facial expressions, change in muscle tone, etc., but no clear use of objects/textures, regularized gestures, pictures, signs, etc., to communicate.

## Receptive Language

The NCSC partner states reported relatively even distributions of students who participate in AA-AAS across the categories of language characteristics (see Exhibit 15 and

Exhibit 16). Respondents indicated that 49% of students independently follow 1-2 step directions, and 37% of the population requires additional cues to follow 1-2 step directions.

**Exhibit 15. Number and Percentage of Students by Receptive Language**

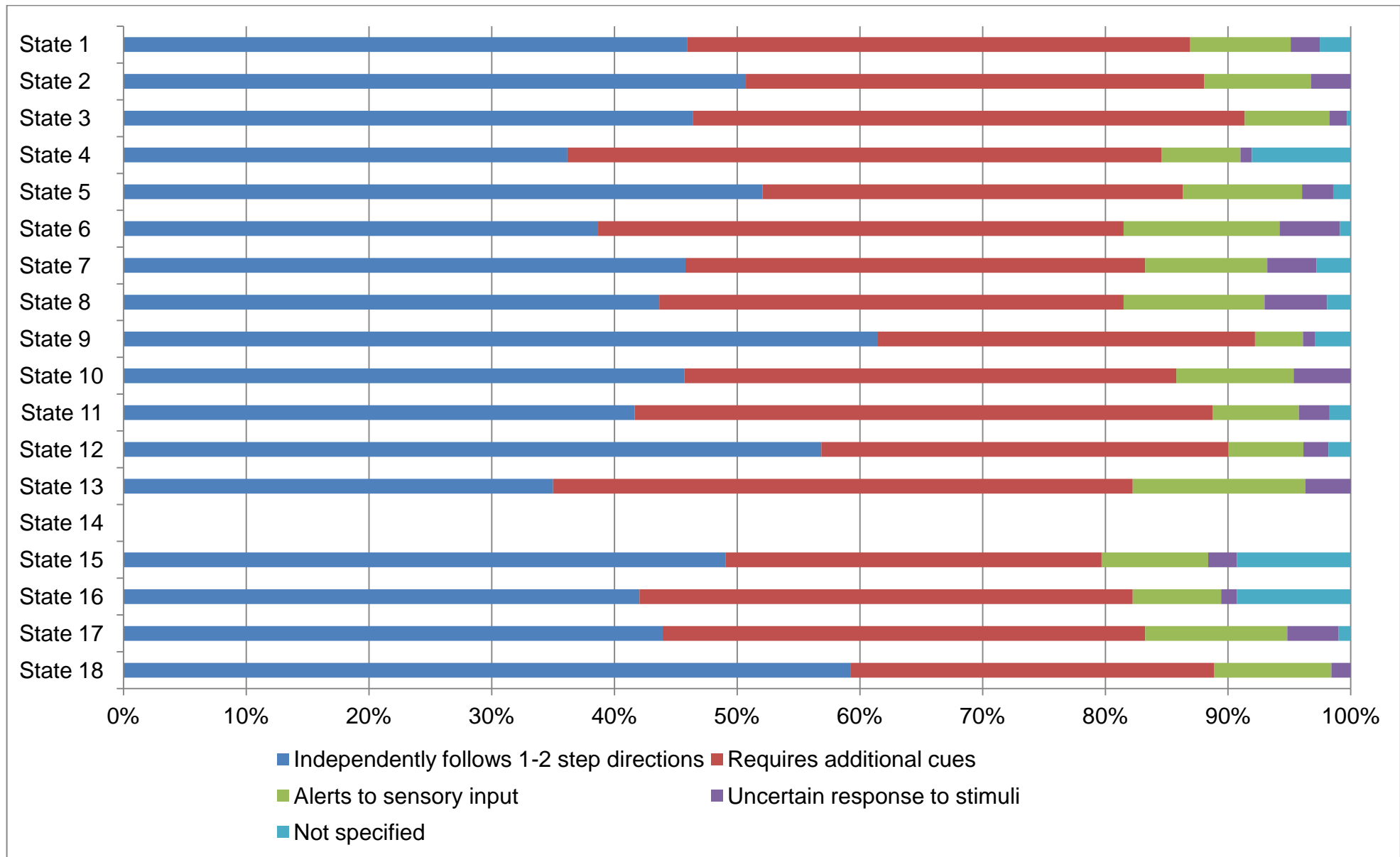
Receptive Language	Independently follows 1-2 step directions		Requires additional cues		Alerts to sensory input		Uncertain response to sensory stimuli		Not specified	
	n	% <sup>26</sup>	n	%	n	%	n	%	n	%
State 1	309	46	276	41	55	8	16	2	17	3
State 2	3,386	51	2,495	37	580	9	217	3	0	0
State 3	1,622	46	1,574	45	241	7	50	1	11	0
State 4	157	36	210	48	28	6	4	1	35	8
State 5	7,654	52	5,034	34	1,429	10	373	3	211	1
State 6	1,179	39	1,305	43	387	13	150	5	27	1
State 7	902	46	738	37	196	10	79	4	55	3
State 8	472	44	409	38	124	11	55	5	21	2
State 9	126	61	63	31	8	4	2	1	6	3
State 10	196	46	172	40	41	10	20	5	0	0
State 11	1,083	42	1,224	47	183	7	65	3	45	2
State 12	3,357	57	1,958	33	361	6	120	2	108	2
State 13	132	35	178	47	53	14	14	4	0	0
State 14 <sup>27</sup>										
State 15	1,557	49	973	31	276	9	74	2	295	9
State 16	362	42	346	40	62	7	11	1	80	9
State 17	1,291	44	1,155	39	340	12	123	4	29	1
State 18	112	59	56	30	18	10	3	2	0	0

<sup>26</sup> Note. The percentage represents the number of students in each receptive language category out of the total number of students submitting an LCI in each state.

<sup>27</sup> State 14 did not collect data on receptive language.

Total	23,897	49	18,166	37	4,382	9	1,376	3	940	2
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Exhibit 16. Percentage of Students in Each Receptive Language Category by State



## Vision

Most students who participated in the AA-AAS across all NCSC partner states had vision within normal limits (70%; see Exhibit 17) or had corrected vision within normal limits (21%).

**Exhibit 17. Number and Percentage of Students by Vision Category**

Vision	Vision within normal limits		Corrected vision within normal limits		Student uses vision for some activities of daily living		No functional use/ unable to determine functional use of vision		Not specified	
	n	%*	n	%	n	%	n	%	n	%
<b>State 1</b>	431	64	180	27	26	4	19	3	17	3
<b>State 2</b>	4,467	67	1,691	25	298	4	222	3	0	0
<b>State 3</b>	2,423	69	790	23	162	5	118	3	5	0
<b>State 4</b>	334	77	49	11	10	2	7	2	34	8
<b>State 5</b>	11,199	76	2,463	17	508	3	356	2	175	1
<b>State 6</b>	2,133	70	577	19	175	6	130	4	33	1
<b>State 7</b>	1,221	62	549	28	85	4	72	4	43	2
<b>State 8</b>	754	70	200	19	59	5	43	4	25	2
<b>State 9</b>	128	62	64	31	5	2	1	0	7	3
<b>State 10</b>	304	71	85	20	22	5	15	3	3	1
<b>State 11</b>	1,747	67	595	23	154	6	54	2	50	2
<b>State 12</b>	281	75	43	11	37	10	16	4	0	0
<b>State 13</b>	4,147	70	1,270	22	252	4	102	2	133	2
<b>State 14</b>	639	70	201	22	35	4	13	1	24	3
<b>State 15</b>	482	56	249	29	45	5	13	2	72	8
<b>State 16</b>	2,137	67	535	17	130	4	79	2	294	9
<b>State 17</b>	1,937	66	673	23	158	5	136	5	34	1
<b>State 18</b>	99	52	81	43	5	3	1	1	3	2
<b>Total</b>	34,863	70	10,295	21	2,166	4	1,397	3	952	2

\*Note. The percentage represents the number of students in each vision category out of the total number of students submitting an LCI in each state.

## Hearing

Most students who participated in the AA-AAS across all NCSC partner states had hearing within normal limits (92%; see Exhibit 18).

**Exhibit 18. Number and Percentage of Students in Each Hearing Category by State**

Hearing	Hearing within normal limits		Corrected hearing loss within normal limits		Hearing loss aided but still with significant loss		Profound loss, even with aids		Unable to determine functional use of hearing		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	598	89	20	3	10	1	5	1	23	3	17	3
<b>State 2</b>	6,149	92	139	2	115	2	64	1	211	3	0	0
<b>State 3</b>	3,260	93	53	2	55	2	20	1	105	3	5	0
<b>State 4</b>	381	88	9	2	4	1	2	0	6	1	32	7
<b>State 5</b>	13,872	94	149	1	163	1	122	1	216	1	179	1
<b>State 6</b>	2,735	90	79	3	54	2	44	1	93	3	43	1
<b>State 7</b>	1,758	89	40	2	33	2	15	1	77	4	47	2
<b>State 8</b>	990	92	17	2	10	1	3	0	35	3	26	2
<b>State 9</b>	190	93	4	2	5	2	0	0	1	0	5	2
<b>State 10</b>	395	92	8	2	10	2	4	1	12	3	0	0
<b>State 11</b>	2,374	91	45	2	49	2	28	1	47	2	57	2
<b>State 12</b>	322	85	14	4	10	3	13	3	18	5	0	0
<b>State 13</b>	5,470	93	101	2	89	2	56	1	55	1	133	2
<b>State 14</b>	842	92	21	2	10	1	7	1	10	1	22	2
<b>State 15</b>	753	87	14	2	8	1	5	1	7	1	74	9
<b>State 16</b>	2,743	86	42	1	38	1	10	0	47	1	295	9
<b>State 17</b>	2,674	91	53	2	52	2	23	1	104	4	32	1
<b>State 18</b>	181	96	4	2	1	1	0	0	2	1	1	1
<b>Total</b>	45,687	92	812	2	716	1	421	1	1,069	2	968	2

\*Note. The percentage represents the number of students in each hearing category out of the total number of students submitting an LCI in each state.

## Motor

The majority of students who participated in the AA-AAS across all NCSC partner states had no significant motor dysfunction that required adaptations (81%; see Exhibit 19).

**Exhibit 19. Number and Percentage of Students in Each Motor Category by State**

Motor	No significant motor dysfunction that requires adaptations		Requires adaptations to support motor functioning <sup>28</sup>		Uses wheelchair, positioning equipment, assistive devices for most activities		Needs personal assistance for most/all motor activities		Not specified	
	n	% <sup>29</sup>	n	%	n	%	n	%	n	%
<b>State 1</b>	547	81	55	8	22	3	32	5	17	3
<b>State 2</b>	5,565	83	404	6	264	4	445	7	0	0
<b>State 3</b>	2,920	83	259	7	120	3	194	6	5	0
<b>State 4</b>	354	82	18	4	6	1	24	6	32	7
<b>State 5</b>	12,311	84	619	4	595	4	986	7	190	1
<b>State 6</b>	2,261	74	233	8	221	7	297	10	36	1
<b>State 7</b>	1,530	78	144	7	81	4	163	8	52	3
<b>State 8</b>	773	72	83	8	77	7	120	11	28	3
<b>State 9</b>	169	82	17	8	7	3	7	3	5	2
<b>State 10</b>	329	77	40	9	21	5	36	8	3	1
<b>State 11</b>	2,042	79	194	7	124	5	185	7	55	2
<b>State 12</b>	293	78	26	7	19	5	38	10	1	0
<b>State 13</b>	4,959	84	261	4	203	3	348	6	133	2
<b>State 14</b>	708	78	81	9	30	3	66	7	27	3
<b>State 15</b>	658	76	45	5	26	3	60	7	72	8
<b>State 16</b>	2,374	75	142	4	136	4	229	7	294	9
<b>State 17</b>	2,301	78	174	6	148	5	278	9	37	1
<b>State 18</b>	157	83	25	13	2	1	4	2	1	1
<b>Total</b>	40,251	81	2,820	6	2,102	4	3,512	7	988	2

<sup>28</sup> Example: walker, adapted utensils, and/or keyboard.

<sup>29</sup> Note. The percentage represents the number of students in each motor category out of the total number of students submitting an LCI in each state.



## Engagement

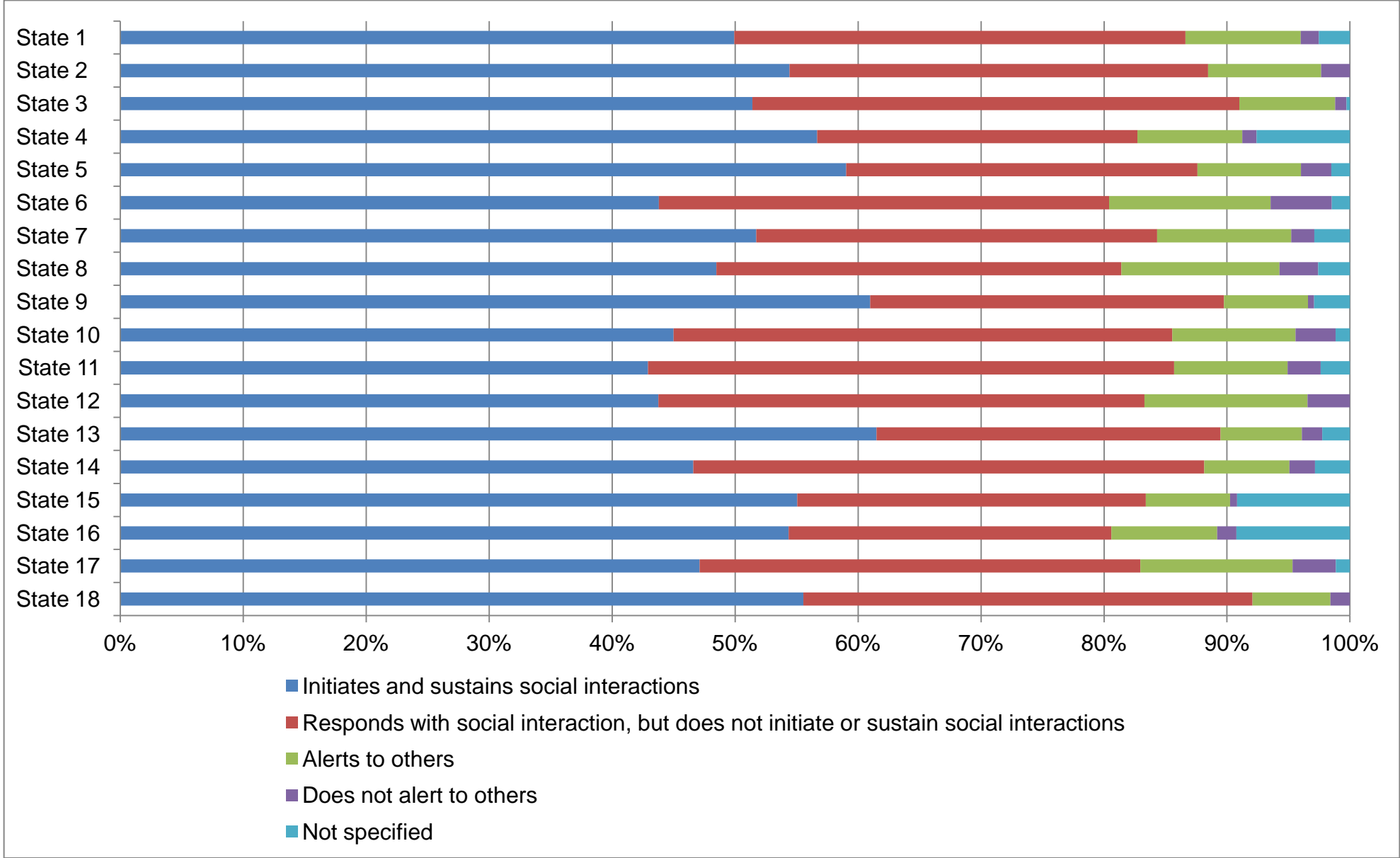
The majority of students who participated in the AA-AAS across all NCSC partner states initiated and sustained social interactions (54%; see Exhibit 20 and Exhibit 21) or responded with social interaction, but did not initiate or sustain social interactions (32%).

**Exhibit 20. Number and Percentage of Students in Each Engagement Category by State**

Engagement	Initiates and sustains social interactions		Responds with social interaction, but does not initiate or sustain social interactions		Alerts to others		Does not alert to others		Not specified	
	n	%*	n	%	n	%	n	%	n	%
State 1	336	50	247	37	63	9	10	1	17	3
State 2	3,635	54	2,272	34	614	9	157	2	0	0
State 3	1,798	51	1,385	40	273	8	32	1	10	0
State 4	246	57	113	26	37	9	5	1	33	8
State 5	8,677	59	4,200	29	1,238	8	363	2	223	2
State 6	1,335	44	1,116	37	400	13	152	5	45	1
State 7	1,019	52	642	33	215	11	37	2	57	3
State 8	524	48	356	33	139	13	34	3	28	3
State 9	125	61	59	29	14	7	1	0	6	3
State 10	193	45	174	41	43	10	14	3	5	1
State 11	1,116	43	1,112	43	240	9	70	3	62	2
State 12	165	44	149	40	50	13	13	3	0	0
State 13	3,631	62	1,652	28	390	7	98	2	133	2
State 14	425	47	379	42	63	7	19	2	26	3
State 15	474	55	244	28	59	7	5	1	79	9
State 16	1,726	54	833	26	273	9	50	2	293	9
State 17	1,384	47	1,053	36	364	12	103	4	34	1
State 18	105	56	69	37	12	6	3	2	0	0
<b>Total</b>	<b>26,914</b>	<b>54</b>	<b>16,055</b>	<b>32</b>	<b>4,487</b>	<b>9</b>	<b>1,166</b>	<b>2</b>	<b>1,051</b>	<b>2</b>

\*Note. The percentage represents the number of students in each engagement category out of the total number of students submitting an LCI in each state.

Exhibit 21. Percentage of Students in Each Engagement Category by State



### ***Health Issues/Attendance***

The majority of students who participated in the AA-AAS across all NCSC partner states attended at least 90% of school days (84%; see Exhibit 22 and Exhibit 23), and an additional 10% attended approximately 75% of school days. Very few students who took the AA-AAS regularly missed school due to health issues across all NCSC partner states.

**Exhibit 22. Number and Percentage of Students by Health Issues/Attendance Category**

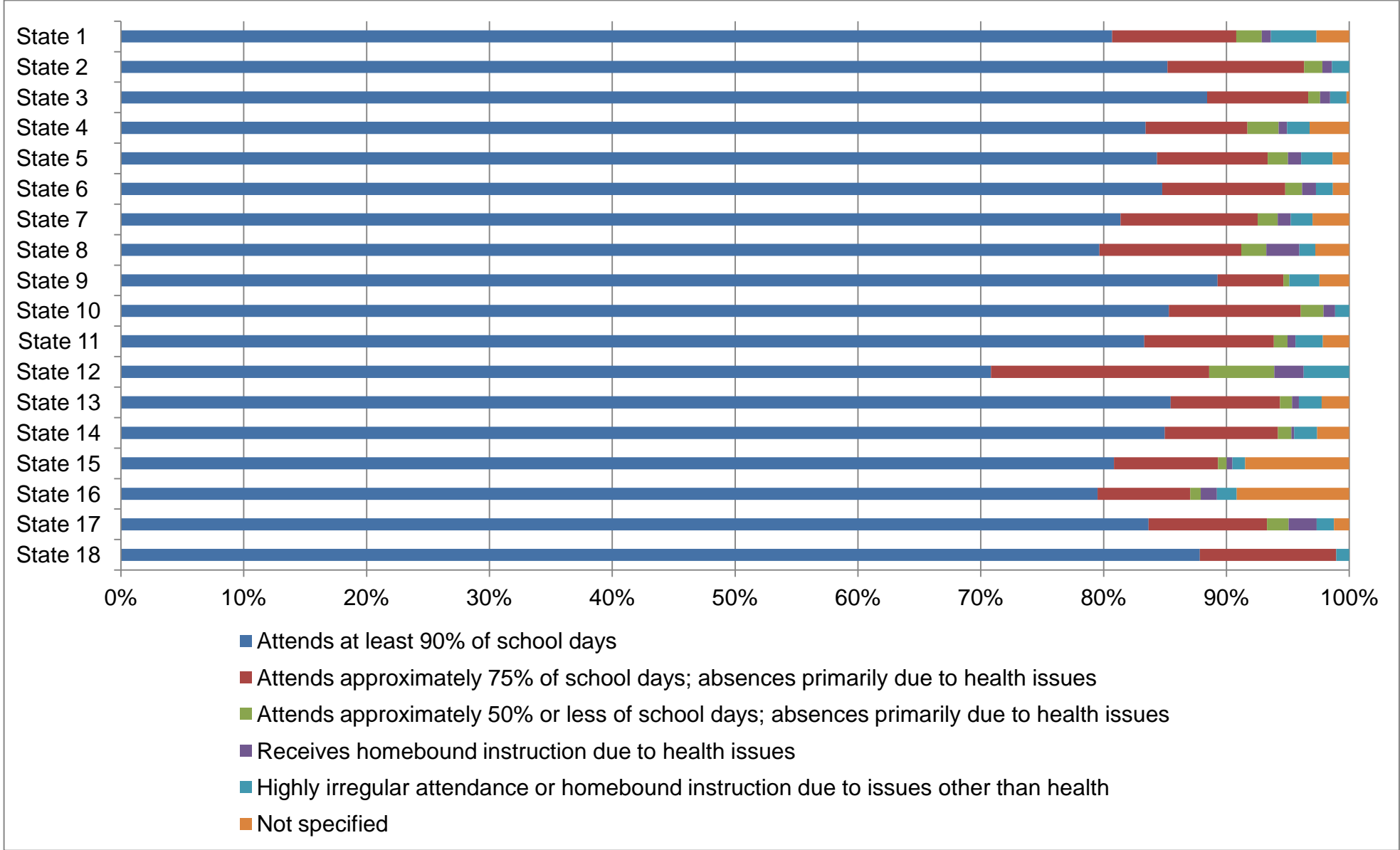
Health Issues/ Attendance	Attends at least 90% of school days		Attends approximately 75% of school days <sup>30</sup>		Attends approximately 50% or less of school days <sup>31</sup>		Homebound instruction due to health issues		Regular absences or homebound instruction due to non-health issues		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	543	81	68	10	14	2	5	1	25	4	18	3
<b>State 2</b>	5,689	85	743	11	99	1	52	1	95	1	0	0
<b>State 3</b>	3,093	88	288	8	34	1	28	1	47	1	8	0
<b>State 4</b>	362	83	36	8	11	3	3	1	8	2	14	3
<b>State 5</b>	12,399	84	1,324	9	243	2	158	1	376	3	201	1
<b>State 6</b>	2,584	85	305	10	42	1	34	1	42	1	41	1
<b>State 7</b>	1,603	81	220	11	32	2	21	1	35	2	59	3
<b>State 8</b>	861	80	125	12	22	2	29	3	14	1	30	3
<b>State 9</b>	183	89	11	5	1	0	0	0	5	2	5	2
<b>State 10</b>	366	85	46	11	8	2	4	1	5	1	0	0
<b>State 11</b>	2,166	83	274	11	29	1	17	1	58	2	56	2
<b>State 12</b>	267	71	67	18	20	5	9	2	14	4	0	0
<b>State 13</b>	5,045	85	526	9	58	1	33	1	109	2	133	2
<b>State 14</b>	775	85	84	9	10	1	2	0	17	2	24	3
<b>State 15</b>	696	81	73	8	6	1	4	0	9	1	73	8
<b>State 16</b>	2,524	79	240	8	27	1	42	1	51	2	291	9
<b>State 17</b>	2,458	84	283	10	52	2	67	2	41	1	37	1
<b>State 18</b>	166	88	21	11	0	0	0	0	2	1	0	0
<b>Total</b>	41,780	84	4,734	10	708	1	508	1	953	2	990	2

\*Note. The percentage represents the number of students in each health issues/attendance category out of the total number of students submitting an LCI in each state.

<sup>30</sup> Absences primarily due to health issues.

<sup>31</sup> Absences primarily due to health issues.

Exhibit 23. Percentage of Students in Each Health Issues/Attendance Category by State



## ***Reading***

The LCI delineates five reading categories for students who participated in the AA-AAS. Across all NCSC partner states, approximately 65% of students could read written text or Braille: 39% of students read basic sight words, simple sentences, directions, bullets, or lists in print or Braille, 22% of students could read fluently with basic, literal understanding (see Exhibit 24 and Exhibit 25), and 4% of students across all NCSC partner states could read fluently with critical understanding in print or Braille. Sixteen percent of students have no observable awareness of print or Braille. In comparison to other NCSC states, State 8, State 12, State 16, and State 17 had relatively low percentages of students who read fluently with basic literal understanding compared to other states (9%, 5% 10%, and 12%, respectively).

**Exhibit 24. Number and Percentage of Students in Each Reading Category**

Reading Skills	Reads fluently with critical understanding in print or Braille <sup>32</sup>		Reads fluently with basic literal understanding in print or Braille <sup>33</sup>		Reads basic sight words in print or Braille <sup>34</sup>		Aware of text/Braille <sup>35</sup>		No observable awareness of print or Braille		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	24	4	161	24	279	41	99	15	91	14	19	3
<b>State 2</b>	297	4	1,403	21	2,571	38	1,318	20	1,089	16	0	0
<b>State 3</b>	1	0	827	24	1,706	49	475	14	481	14	8	0
<b>State 4</b>	9	2	67	15	177	41	114	26	52	12	15	3
<b>State 5</b>	973	7	3,813	26	4,776	32	2,428	17	2,526	17	185	1
<b>State 6</b>	49	2	411	13	1,131	37	563	18	841	28	53	2
<b>State 7</b>	60	3	383	19	731	37	372	19	365	19	59	3
<b>State 8</b>	22	2	92	9	407	38	249	23	285	26	26	2
<b>State 9</b>	5	2	74	36	90	44	13	6	17	8	6	3
<b>State 10</b>	14	3	81	19	173	40	61	14	98	23	2	0
<b>State 11</b>	62	2	553	21	1,177	45	334	13	408	16	66	3
<b>State 12</b>	4	1	18	5	150	40	109	29	96	25	0	0
<b>State 13</b>	393	7	1,815	31	2,170	37	524	9	869	15	133	2
<b>State 14</b>	15	2	180	20	382	42	183	20	131	14	21	2
<b>State 15</b>	43	5	284	33	267	31	97	11	98	11	72	8
<b>State 16</b>	0	0	319	10	2,041	64	752	24	61	2	2	0
<b>State 17</b>	67	2	365	12	1,225	42	596	20	645	22	40	1
<b>State 18</b>	10	5	61	32	65	34	27	14	23	12	3	2
<b>Total</b>	2,048	4	10,907	22	19,518	39	8,314	17	8,176	16	710	1

\*Note. The percentage represents the number of students in each reading category out of the total number of students submitting an LCI in each state.

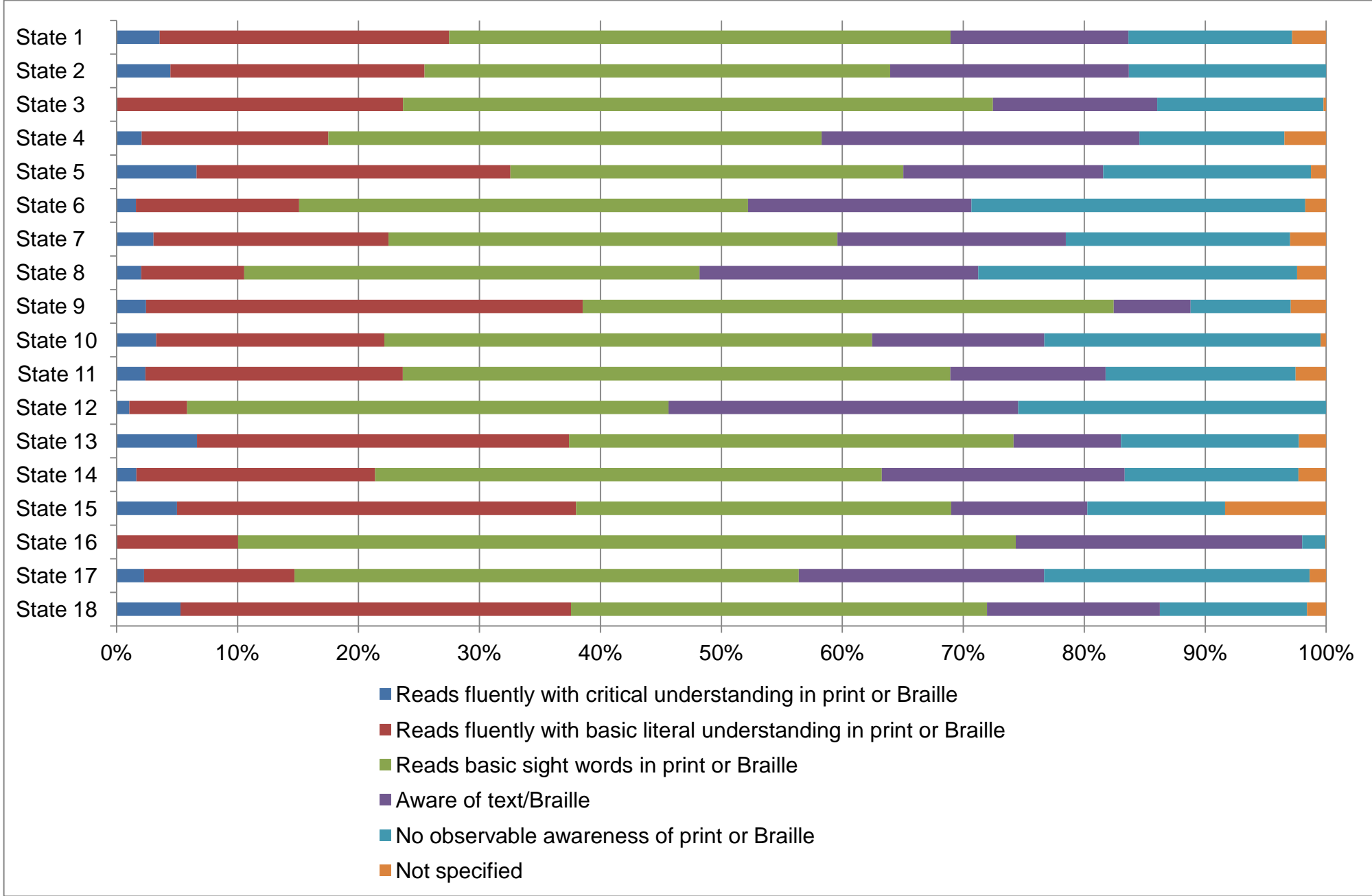
<sup>32</sup> Student differentiates fact/opinion, point of view, emotional response, etc

<sup>33</sup> Student reads from paragraphs/short passages with narrative/informational texts.

<sup>34</sup> Student reads simple sentences, directions, bullets, and/or lists.

<sup>35</sup> Student follows directionality, makes letter distinctions, or tells a story from pictures that are not linked to the text.

Exhibit 25. Percentage of Students in Each Reading Category by State





## ***Mathematics***

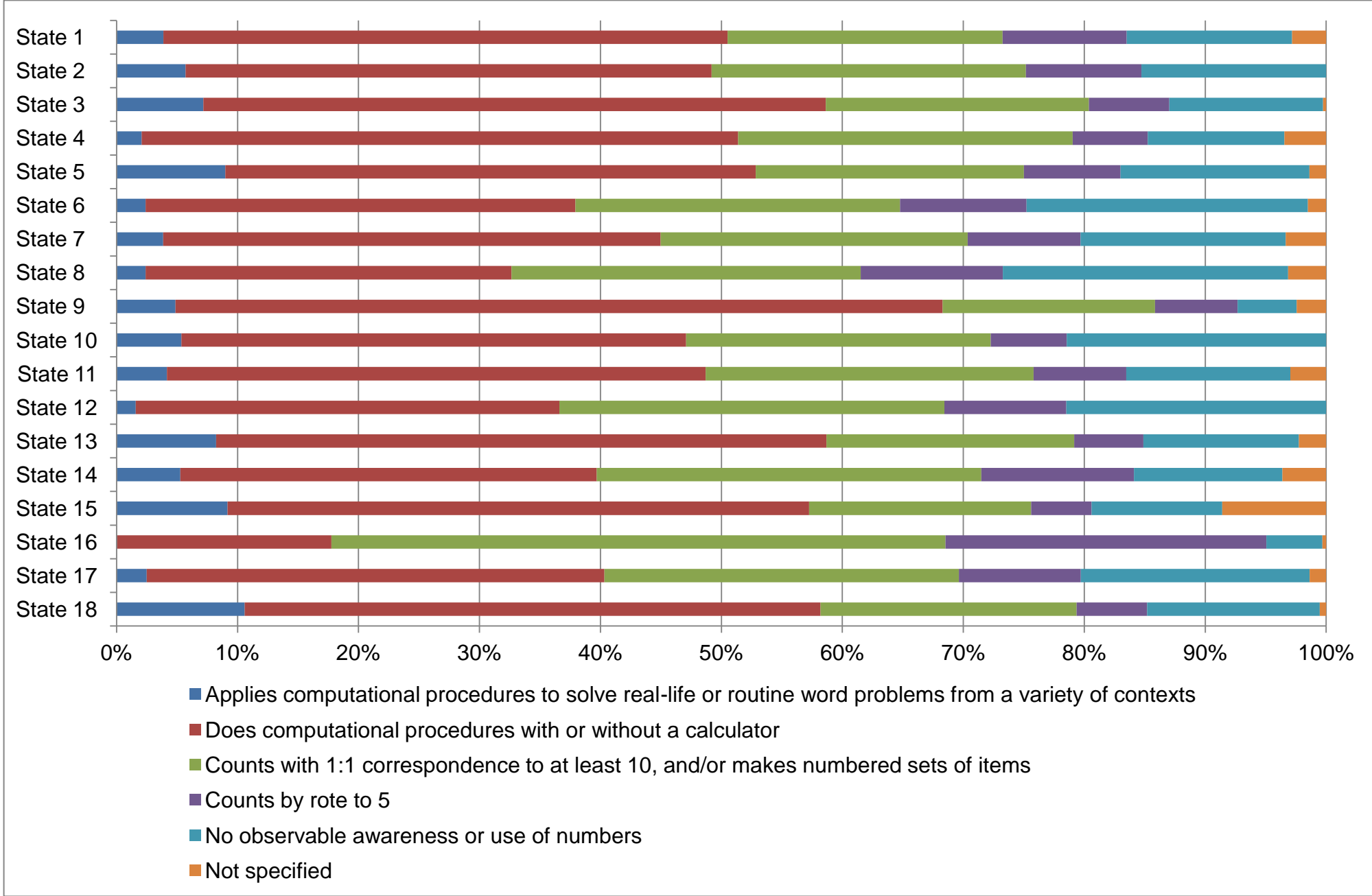
The LCI delineates five mathematics categories for students who participate in the AA-AAS (see Exhibit 26 and Exhibit 27). Across all NCSC partner states, 42% of students performed computational procedures with or without a calculator, and 26% of students could count with 1:1 correspondence to at least 10, or make numbered sets of items; 15% of students reportedly had no observable awareness or use of numbers. Compared to other NCSC partner states, State 16 reported a relatively low percentage of students who did computational procedures with or without a calculator (18%) and a relatively high percentage of students who counted with 1:1 correspondence to at least 10 (51%) and could count by rote to five (27%).

**Exhibit 26. Number and Percentage of Students in Each Mathematics Category by State**

Mathematics Skills	Applies procedures to solve real-life or routine word problems from a variety of contexts		Does computational procedures with or without a calculator		Counts with 1:1 correspondence to at least 10, and/or makes numbered sets of items		Counts by rote to 5		No observable awareness or use of numbers		Not specified	
	n	%*	n	%	n	%	n	%	n	%	n	%
<b>State 1</b>	26	4	314	47	153	23	69	10	92	14	19	3
<b>State 2</b>	381	6	2,904	43	1,735	26	638	10	1,020	15	0	0
<b>State 3</b>	251	7	1,800	51	761	22	232	7	445	13	9	0
<b>State 4</b>	9	2	214	49	120	28	27	6	49	11	15	3
<b>State 5</b>	1,321	9	6,447	44	3,259	22	1,175	8	2,296	16	203	1
<b>State 6</b>	73	2	1,083	36	818	27	319	10	709	23	46	2
<b>State 7</b>	76	4	810	41	500	25	184	9	334	17	66	3
<b>State 8</b>	26	2	327	30	312	29	127	12	255	24	34	3
<b>State 9</b>	10	5	130	63	36	18	14	7	10	5	5	2
<b>State 10</b>	23	5	179	42	108	25	27	6	92	21	0	0
<b>State 11</b>	108	4	1,158	45	705	27	199	8	353	14	77	3
<b>State 12</b>	6	2	132	35	120	32	38	10	81	21	0	0
<b>State 13</b>	486	8	2,979	50	1,209	20	338	6	759	13	133	2
<b>State 14</b>	48	5	314	34	290	32	115	13	112	12	33	4
<b>State 15</b>	79	9	414	48	158	18	43	5	93	11	74	9
<b>State 16</b>	0	0	564	18	1,612	51	842	27	147	5	10	0
<b>State 17</b>	73	2	1,112	38	861	29	296	10	556	19	40	1
<b>State 18</b>	20	11	90	48	40	21	11	6	27	14	1	1
<b>Total</b>	3,016	6	20,971	42	12,797	26	4,694	9	7,430	15	765	2

\*Note. The percentage represents the number of students in each mathematics category out of the total number of students submitting an LCI in each state.

Exhibit 27. Percentage of Students in Each Mathematics Category by State



## **Limitations**

As with any research, there were limitations of the data and interpretations for this study. For some states, the sample may not be representative of students who were administered AA-AAS. Because the response rate for most states was lower than 100% and there is no information about the non-responders, the descriptive statistics reported should be interpreted with caution; sampling error and non-response bias may be present (e.g., if the data were analyzed based on a different sample of students, the statistics could vary from sample to sample).

Second, we used different data collection methods across this study. The highest response rates were obtained from those 10 states that collected LCI data as a direct part of their respective alternate assessments (overall response rate of 91% across these 10 states). For the 6 states that collected LCI data using the electronic survey link, the average response rate was only 34% (ranging from 15% to 59%). The two states that uniquely gathered data and submitted to researchers had response rates of 20% and 41%. Given these variations in response rates, we cannot be sure that similar sets of students were being sampled through each data collection method.

## **Implications for Consideration**

These data were gathered to describe and document the characteristics of students currently participating in AA-AAS across the states in the NCSC consortium. The LCI data have specific implications for summative assessment design, while also informing the validity argument to support the uses of test scores and interpretation of those scores from the summative assessment. For example, the LCI results in “profiles” of students (essentially combinations of LCI characteristics such as expressive communication, receptive language, vision, motor, and hearing) that directly guide sampling for conducting item/bias reviews, cognitive labs, and field testing. The results from these studies will be used to ensure the assessment meets the needs of the wide variety of learners participating in AA-AAS.

Further, the LCI data hold implications for curriculum, instruction, and capacity building; each of these are critical parts of the NCSC assessment and accountability system designed to improve student outcomes and prepare students for community, college, and careers. Below, we explicate nine implications for consideration in using LCI data in developing a new summative assessment within an accountability system augmented by curricular, instructional, and capacity building materials and supports.

### **Summative Assessment Design Implications**

The primary purpose for gathering data on the characteristics of these learners is to examine the diversity within the population so that the assessment can be designed to include as many students as possible. The implications for assessment design include participation policy and validity evaluation, but also relate directly to evidence-centered

design and item development. Descriptions of these purposes and specific implications are specified below.

- Participation Policies for AA-AAS

- Given the wide ranges of learners and the current variations in states' alternate assessment participation policies (Musson, Thomas, Towles-Reeves, & Kearns, 2010), participation policies for AA-AAS must outline specific guidelines for student participation. These policies must also include training for teachers and Individualized Education Program (IEP) team members for understanding the students best served by participating in an AA-AAS, and explicate monitoring procedures to ensure the appropriate students are participating in the AA-AAS from year to year.

To further support training for teachers and IEP teams, monitoring of student participation rates across years and across states in the NCSC project, and ensuring representative student data for these purposes, this study suggests including the LCI in the assessment process. Response rates were 57% higher (overall response rate of 91%) from states that gathered data as part of the summative assessment process, as opposed to those that used other sampling techniques (overall response rate of 34%).

- Using LCI Data to Inform an Evidence-Centered Design Process

- Evidence-centered design (ECD) is a process of assessment design that involves gathering, organizing, and transforming information in a variety of representational forms, within the framework of a clearly articulated assessment argument. "A strength of ECD is the support it provides for the development of items and tasks for all students that focus on construct-relevant content, minimize the impact of construct-irrelevant skills, and take into account appropriate accessibility options" (Cameto, Haertel, Morrison, & Russell, 2010, p. 1). As supported by this study, the unique and wide array of learning characteristics of the students who participate in AA-AAS should be used to inform the item design patterns and task templates for summative assessment item development through the ECD process.

- Developing and Using Learner Characteristics Profiles

- Developing learner characteristics profiles and applying these to sampling frameworks during bias and accessibility reviews, cognitive labs, item tryouts, and field tests allow for differentiation in samples for targeting specific research questions around item functioning. Ensuring a representation of participants (across expressive communication, receptive language, vision, hearing, and motor characteristics) in these

reviews/tests will allow for an interpretation of data patterns within and across groups to refine the summative assessment, specifically item types and designs.

- Validity Evaluation Research and LCI Data
  - The NCSC project Theory of Action includes claims related to summative assessment design (e.g., *The appropriate students are identified for the AA-AAS*) while the assessment system itself is anchored by the goal that students with the most significant cognitive disabilities will achieve increasingly higher academic outcomes and leave high school ready for post-secondary life. The LCI data provide an avenue by which to monitor intended and unintended positive and negative consequences of the AA-AAS to ensure the system achieves the intended goals without introducing unintended negative consequences.

## **Curriculum, Instruction, and Capacity Building Implications**

As with assessment design implications, the characteristics of the learners provide a glimpse of the population, so that evidence-based instructional practices can be identified, curriculum and instructional design tools can be developed, and trends in the population can be detected that may need special capacity building intervention. We have explicated a few examples of the important characteristics below.

- Building Communicative Competence
  - Based on this study, approximately 28% of the students participating in AA-AAS do not use symbolic expressive communication, presenting a significant challenge for collecting reliable, valid data on their achievement. Further, for the 10% of students identified by their teachers as *pre-symbolic* (i.e., communicating primarily through cries, facial expressions, but who have no clear use of gestures, pictures, signs, etc.), only 40% use AAC; and of the 18% of students identified by their teachers as *emerging symbolic* (using only a limited number of gestures, signs, pictures, etc.) only 39% use AAC. Such large numbers of students without AAC suggest the need for focused interventions and high quality professional development strategies to ensure all students have a consistent mode of communication, essential for both access to the general education curriculum and for showing what these students know and can do.
- Least restrictive environment
  - The fact that slightly over 90% of the students in our sample are receiving instruction *primarily* in separate classrooms or special schools has very significant implications for access to the general curriculum for students with significant cognitive disabilities. While access to the general

curriculum is not the same thing as educational setting, a number of researchers have noted the importance of *instructional context* (e.g., presence of peers without disabilities, teachers trained in the academic subject matter, authentic learning materials, opportunities for incidental learning) as an integral element of the curriculum itself, and one that cannot easily be replicated in more separate educational settings (Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2009; Jackson, Ryndak, & Wehmeyer, 2008/2009).

- Curriculum, Instruction, and Capacity Building Materials

- Classroom teachers are the key factor in student achievement (Ball & Cohen, 1999; Borko, 2004; Cohen & Hill, 2000) and are an important part of the accountability system. However, many teachers of students with the most significant cognitive disabilities need guidance in translating academic content standards into instruction and assessments. Additionally, educators may not understand what concept or skill to teach next once a student masters an objective. Further, teachers are challenged by the fact that students participating in AA-AAS are a heterogeneous group with varying entry skills into the academic content standards, and thus may not know how to differentiate instruction for this population (Karvonen, Wakeman, Flowers, & Browder, 2007).

The data from this study supported the heterogeneity of the population of students participating in AA-AAS and further suggest the need to support teacher understanding of what to teach and how to teach it. The NCSC instructional resources will support teachers in addressing the Common Core State Standards for students participating in the AA-AAS and are derived from current research-based methods for teaching literacy and mathematics to students with significant disabilities (e.g., Browder, Jimenez, & Trela, in press; Browder, Lee, & Mims, 2011; Courtade, Browder, Spooner, & DiBiase, 2010; Browder, Trela, Courtade, Jimenez, Knight, & Flowers, 2012; Jimenez, Browder, & Spooner, 2012; Jimenez, Browder, & Courtade, 2009; Mims, Browder, Baker, Lee, & Spooner, 2009). The curriculum, instruction, and capacity building materials will provide examples of how the project is considering the wide array of students participating in the AA-AAS.

- Further, our data on students' reading skills indicated that approximately 65% of students could read written text or Braille. In mathematics, 43% of students performed computational procedures with or without a calculator, and 26% of students could count with 1:1 correspondence to at least 10, and/or make numbered sets of items. However, 16% of students had no observable awareness of print or Braille, and 15% had no observable awareness or use of numbers. Over time, we expect to see a dramatic shift in these numbers once all teachers are empowered to teach students

with the most significant cognitive disabilities in an academic rich curriculum, with the appropriate and corresponding supports used during instruction and assessment.

## **Accountability system implications**

The alternate assessments being developed to measure student achievement of the Common Core State Standards are designed for use in accountability systems that have been required under the Elementary and Secondary Education Act (ESEA). Reauthorization of ESEA is pending, but accountability for student achievement has been a decades-long feature of ESEA, with large-scale assessment results central to the accountability determinations. Still, there are emerging indications that states can benefit from LCI data to understand who the students are who participate in alternate assessments, both in overall state plans for implementation of the CCSS and specifically in implementation of system accountability and educator evaluation systems.

- Overall state plans for implementation of the CCSS and focused accountability
  - Flexibility Waivers are being granted by the U.S. Department of Education and are designed to support states in continuing the work of transitioning students, teachers, and schools to higher standards, to support states' efforts to move forward with next-generation accountability systems, and to support SEA and LEA development of evaluation systems that go beyond minimum highly qualified teacher standards. Over half of the states have received the waivers as of July, 2012, but most plans were cited for incomplete description of how students with disabilities and English learners were included in state planning (Klein, 2012). Specifically, almost all states struggled to articulate how they would ensure that these students would benefit from the focus on College and Career Ready standards, and there were limited examples of state policies that reflected the complexities of students who participate in AA-AAS. The LCI data for each state can help structure conversations among stakeholders and policy leaders to ensure all students benefit from these new reforms.
- State plans for implementation of educator evaluation systems
  - This particular population presents unique challenges for educator evaluation systems primarily because: a) there is a very small number of students at each grade (even in our largest states with high response rates, the largest single grade enrollment for any grade was 1,787 in our NCSC LCI data), and b) students in the AA-AAS receive services from a variety of teaching and related service staff, each of whom contributes to student learning (Holdheide, Goe, Croft, & Reschly, 2010). Furthermore, little is known about evaluating teacher and principal effectiveness related to this population of students. Principals regularly report a "lack of understanding" of what teachers serving this population should know and



do (Towles-Reeves, Kleinert, & Anderman, 2008), while teachers report that principals have low expectations of achievement for these students, as well as a lack of resources for effectively providing access to the general curriculum (Flowers, Ahlgrim-Dezell, Browder, & Spooner, 2005).

The implications introduced in this section will be further explicated in a series of NCSC reports over the course of the project, as part of the project validity evaluation and research agenda. In addition, the project will provide partner states practical observational and documentation tools related to these implications, in order to monitor the implementation of the project curriculum, instruction, and assessment resources. These tools will be designed to support the positive intended consequences and mitigate unintended negative consequences noted in the NCSC Theory of Action.

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# Appendix A: Learner Characteristics Inventory

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1. **Student's grade:** \_\_\_\_\_
2. **Student's age in years:** \_\_\_\_\_
3. **Student's primary IDEA disability label:**
  - o Intellectual Disability/Mental Retardation (includes Mild, Moderate, and Profound)
  - o Multiple Disabilities
  - o Autism
  - o Speech/Language Impairment
  - o Hearing Impairment
  - o Visual Impairment
  - o Traumatic Brain Injury
  - o Emotional Disability
  - o Deaf/Blind
  - o Other Health Impairment
  - o Orthopedic
  - o Other
4. **Is your student's primary language a language other than English?**
  - o Yes
  - o No
5. **If yes, what is your student's primary language** (the dominant language spoken in the student's home)? \_\_\_\_\_
6. **What is the student's primary classroom setting?**
  - o Special school
  - o Regular school, *self-contained special education classroom*, some special inclusion (students go to art, music, PE) but return to their special education class for most of school day.
  - o Regular school, *primarily self-contained special education classroom*, some academic inclusion (students go to some general education academic classes (such as reading, math, science, in addition to specials) but are in general education classes less than 40% of the school day).
  - o Regular school, *resource room/general education class*, students receive resource room services, but are in general education classes 40% or more of the school day.
  - o Regular school, *general education class inclusive/collaborative* (students based in general education classes, special education services are primarily delivered in the general education classes) – at least 80% of the school day is spent in general education classes.

- 7. Expressive Communication** (check the best description)
- o Uses symbolic language to communicate: Student uses verbal or written words, signs, Braille, or language-based augmentative systems to request, initiate, and respond to questions, describe things or events, and express refusal.
  - o Uses intentional communication, but not at a symbolic language level: Student uses understandable communication through such modes as gestures, pictures, objects/textures, points, etc., to clearly express a variety of intentions.
  - o Student communicates primarily through cries, facial expressions, change in muscle tone, etc., but no clear use of objects/textures, regularized gestures, pictures, signs, etc., to communicate.
- 8. Does your student use an augmentative communication system in addition to or in place of oral speech?**
- o Yes
  - o No
- 9. Receptive Language** (check the best description)
- o Independently follows 1-2 step directions presented through words (e.g. words may be spoken, signed, printed, or any combination) and does NOT need additional cues.
  - o Requires additional cues (e.g., gestures, pictures, objects, or demonstrations/models) to follow 1-2 step directions.
  - o Alerts to sensory input from another person (auditory, visual, touch, movement) BUT requires actual physical assistance to follow simple directions.
  - o Uncertain response to sensory stimuli (e.g., sound/voice; sight/gesture; touch; movement; smell).
- 10. Vision** (check the best description)
- o Vision within normal limits.
  - o Corrected vision within normal limits.
  - o Low vision; uses vision for some activities of daily living.
  - o No functional use of vision for activities of daily living, or unable to determine functional use of vision.
- 11. Hearing** (check the best description)
- o Hearing within normal limits.
  - o Corrected hearing loss within normal limits.
  - o Hearing loss aided, but still with a significant loss.
  - o Profound loss, even with aids.
  - o Unable to determine functional use of hearing.

**12. Motor** (check the best description)

- o No significant motor dysfunction that requires adaptations.
- o Requires adaptations to support motor functioning (e.g., walker, adapted utensils, and/or keyboard).
- o Uses wheelchair, positioning equipment, and/or assistive devices for most activities.
- o Needs personal assistance for most/all motor activities.

**13. Engagement** (check the best description)

- o Initiates and sustains social interactions.
- o Responds with social interaction, but does not initiate or sustain social interactions.
- o Alerts to others.
- o Does not alert to others.

**14. Health Issues/Attendance** (check the best description)

- o Attends at least 90% of school days.
- o Attends approximately 75% of school days; absences primarily due to health issues.
- o Attends approximately 50% or less of school days; absences primarily due to health issues.
- o Receives Homebound Instruction due to health issues.
- o Highly irregular attendance or homebound instruction due to issues *other* than health.

**15. Reading** (check the best description)

- o Reads fluently with critical understanding in print or Braille (e.g., to differentiate fact/opinion, point of view, emotional response, etc).
- o Reads fluently with basic (literal) understanding from paragraphs/short passages with narrative/informational texts in print or Braille.
- o Reads basic sight words, simple sentences, directions, bullets, and/or lists in print or Braille.
- o Aware of text/Braille, follows directionality, makes letter distinctions, or tells a story from the pictures that is not linked to the text.
- o No observable awareness of print or Braille.

**16. Mathematics** (check the best description)

- o Applies computational procedures to solve real-life or routine word problems from a variety of contexts.
- o Does computational procedures with or without a calculator.
- o Counts with 1:1 correspondence to at least 10, and/or makes numbered sets of items.
- o Counts by rote to 5.
- o No observable awareness or use of numbers.