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Table 4.13. Topics offered in professional development or training offered by states or districts

Response category	Percentage of states	Percentage of districts	Standard error
Delivering a curriculum focused on language/literacy skills	41	70	2.1
Delivering a curriculum focused on social-emotional/behavioral skills	51	64	2.2
Delivering an intervention focused on language/literacy skills	49	61	2.2
Delivering an intervention focused on social-emotional/behavioral skills	63	70	2.1
Addressing the needs of children with specific disabilities	61	63	2.2
New policies, regulations, guidelines for serving children with disabilities	51	54	2.2
Using assessments to inform instructional planning and data driven decision-making	65	69	2.1
Transitioning from Part C to Part B	14	.	0.3
Family engagement	6	.	0.2
Inclusive practices	12	.	0.3
Other topics	53	16	1.6
Number of responses	49	920	

. Value not reported due to small sample sizes (only 1 or 2 responses), or the standard error is more than 50 percent of the estimate.

Notes: Respondents responded to each of these questions separately, thus responses will not sum to 100 percent. The sample for this table included state 619 coordinators reporting that the state provides support for professional development or training for teachers or staff working with children ages 3 through 5 with disabilities (n = 49) and district preschool special education coordinators reporting that the district offers professional development or training for preschool teachers and special education staff that focuses on working with children ages 3 through 5 with disabilities (n = 920). Findings for districts are weighted and reported along with their standard error (see Technical appendix). The number of district responses is rounded to the nearest 10.

Readers should interpret findings from this table with caution. Differences in the characteristics of responding and nonresponding districts indicate potential bias (see Technical appendix, Section 6).

Source: Survey responses on questions 5.3a-5.3h of the District Preschool Special Education Coordinator Survey and questions 4.2a-4.2h of the State Section 619 Coordinator Survey.







## Section 5: Eligibility for special education and characteristics of children identified

Table 5.1. Eligibility criteria for developmental delay or other early childhood disability classification by state, 2014-2015 school year

Eligibility criteria	Number of states	List of states
Quantitative criteria used (any)	43	AK, AL, AR, AZ, CO, CT, DC, DE, FL, GA, HI, ID, IN, KY, LA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, WA, WI, WV, WY
Delay measured in standard deviation units	39	AK, AL, AR, AZ, CO, CT, DC, DE, FL, GA, HI, ID, IN, KY, LA, ME, MN, MO, MS, MT, NC, ND, NE, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, WA, WI, WY
>2 SD in one area or $\geq 1.5$ SD in two areas	2	AZ, UT
2 SD in one area or $\geq 1.5$ SD in two areas	24	AK, AL, AR, CT, DE, FL, GA, ID, IN, KY, ME, MO, MT, NC, ND, NY, OH, OK, RI, SC, SD, TN, VT, WA
2 SD in one area or 1 to 1.3 SD in two areas	2	NE, NV
2 SD in one area only	2	DC, NM
1.75 SD in one area or 1.5 SD in two areas	1	WY
1.5 SD in two areas only	4	MN, MS, OR, WI
1.5 SD in one area only	4	CO, HI, LA, PA
Percentage delay for age	19	AK, AL, DE, FL, ID, LA, MD, MI, MS, NC, ND, NJ, NM, NY, PA, RI, TN, VT, WV
50% in one area only	1	MI
40% in one area or 25% in two areas	2	TN, VT
25-33% in one area or 20-25% in two areas	8	AK, AL, FL, ID, NC, ND, NJ, NY
25% in two areas only	2	MS, WV
25-30% in one area only	6	DE, LA, MD, NM, PA, RI
Do not specify quantitative criteria	8	CA, IA, IL, KS, MA, NH, TX, VA
Number of states (includes DC)	51	

SD = standard deviation.

Note: Among states that use quantitative criteria, they define eligibility by the number of standard deviations from the norm in one or more developmental areas on a test and/or by specifying the percentage delay for age. As of the 2014-2015 school year, 15 states allowed eligibility to be defined using either standard deviations or percentage delays for age: AK, AL, DE, FL, ID, LA, MS, NC, ND, NM, NY, PA, RI, TN, VT. Some states use a different term than developmental delay to refer to developmental disabilities in young children (e.g., non-categorical delay in North Dakota).

Source: Publicly available information from state websites and Danaher (2011).





## Section 5: Eligibility for special education and characteristics of children identified

Table 5.3. Percentage of children ages 3 through 5 with disabilities by race and ethnicity, 2013-2014 school year

Race-ethnicity category	All disabilities	Autism	Developmental delay	Speech or language impairment
White	54	45	54	56
Black or African American	14	15	18	11
Hispanic or Latino	23	28	20	25
Asian	3	7	3	3
Other race or ethnicity	5	5	5	5
Number of children ages 3 through 5 with disabilities	730,000	62,000	276,000	316,000

Note: Data were not available for the state of Wyoming.

Source: State-reported counts of children served under IDEA Part B for the 2013-2014 school year, accessed through *EDFacts*, rounded to the nearest 1,000.

## Section 5: Eligibility for special education and characteristics of children identified

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Table 5.4. Percentage of children ages 3 through 5 with disabilities by language proficiency status, 2013-2014 school year

English language proficiency category	Percentage of children ages 3 through 5 with disabilities
Limited English Proficient	8
Not Limited English Proficient	92
Number of children ages 3 through 5 with disabilities	730,000

Note: Data were not available for the state of Wyoming.

Source: State-reported counts of children served under IDEA Part B for the 2013-2014 school year, accessed through ED*Facts*, rounded to the nearest 1,000.

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## Section 5: Eligibility for special education and characteristics of children identified

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Table 5.5. Percentage of children ages 3 through 5 with disabilities by gender, 2013-2014 school year

Gender category	Percentage of children ages 3 through 5 with disabilities
Male	70
Female	30
Number of children ages 3 through 5 with disabilities	730,000

Note: Data were not available for the state of Wyoming.

Source: State-reported counts of children served under IDEA Part B for the 2013-2014 school year, accessed through *EDFacts*, rounded to the nearest 1,000.

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## Section 5: Eligibility for special education and characteristics of children identified

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Table 5.6. Percentage of children ages 3 through 5 with disabilities by age, 2013-2014 school year

Age category	Percentage of children ages 3 through 5 with disabilities
Age 3	23
Age 4	35
Age 5	42
Number of children ages 3 through 5 with disabilities	730,000

Note: Data were not available for the state of Wyoming.

Source: State-reported counts of children served under IDEA Part B for the 2013-2014 school year, accessed through *EDFacts*, rounded to the nearest 1,000.

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## TECHNICAL APPENDIX

# Technical appendix

This technical appendix provides details about the design and methods used in the study. This information includes the purpose of the study, the states and sample of districts examined in the study, where the data came from and how they were collected, and statistical procedures.

## 1. Purpose of the study

Each year more than 750,000 children ages 3 through 5 receive special education and related services through the Individuals with Disabilities Education Act (IDEA; U.S. Department of Education [ED] 2016). Policymakers have long recognized that early identification and appropriate services and supports are key to improving educational outcomes for children with disabilities. In 1975, Congress passed landmark legislation now known as the Individuals with Disabilities Education Act (IDEA) to guarantee that children with disabilities have access to a free appropriate public education. Under IDEA, eligible children are entitled to receive the special education and related services they need to progress academically, guided by an individualized educational program (IEP). IDEA also requires that districts serve children with disabilities in the least restrictive environment. This often means serving them in general education classrooms alongside peers without disabilities, referred to as inclusive classrooms or inclusion. To ensure these children are being adequately served, policymakers need information on the preschool programs and the staff providing them with services.

The purpose of this study is to gather information on how states and school districts across the nation are serving children ages 3 through 5 with disabilities. The study is part of the broader Evaluation of Preschool Special Education Practices and is sponsored by the U.S. Department of Education's Institute of Education Sciences (IES). The study was designed to address the following questions: (1) How are preschool programs serving these children structured? (2) How are states and districts implementing inclusion? (3) What curricula and interventions exist to support instruction? and (4) What teacher certifications are required and what professional development is offered to teachers? To address these questions, the study collected survey data from 50 states and the District of Columbia, as well as from a nationally representative set of 1,055 school districts during the 2014-2015 school year. The study also obtained extant data from ED's *EDFacts* and Common Core of Data (CCD) databases.

## 2. Sampling

The study surveyed all 50 states and the District Columbia and a nationally representative sample of school districts.

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The target population for the state survey consisted of the state Part B Section 619 coordinators in all 50 states and the District of Columbia. The objective of the sample design was to select a census of these 51 state-level coordinators.

The target population for the district survey consisted of preschool special education coordinators for the approximately 8,300 public school districts that served at least 10 children ages 3 to 5 with disabilities during the 2012-2013 school year. These districts represented 97 percent of all children ages 3 to 5 with disabilities in the United States in that school year. The objective of the sample design was to select a stratified nationally representative sample of 1,200 school districts from among those in the sample frame.

The study team derived the district sampling frame from the 2012-2013 CCD. The 2012-2013 CCD data included approximately 18,240 public elementary and secondary school districts. From these districts, the frame was restricted to the 8,313 districts that served at least 10 children ages 3 to 5 with disabilities, as indicated by 2012-2013 *EDFacts* data. This restriction excluded districts that did not serve early elementary grades and minimized the potential that a very small district, sampled based on the number of students served in 2012-2013, might by chance have no children ages 3 to 5 with disabilities in 2014-2015 when the study data were collected.

The study team stratified districts in the sample frame into large-, medium-, and small-district strata, measured by their number of children ages 3 to 5 with disabilities. The large-district stratum contained the 215 largest districts in the United States that collectively served 30 percent of children ages 3 to 5 with disabilities. The medium-district stratum contained the 957 next-largest districts that in total also served 30 percent of these children. The small-district stratum contained the remaining 7,141 districts that served the remaining 40 percent of these children.

The sampling procedures differed across the three district-size strata. The study team selected all the large districts. For the medium- and small-district strata, the study team took two additional steps to ensure that sampled districts looked like the overall populations of these districts. First, districts were further stratified based on census region (Northeast, South, Midwest, and West) and district-wide race-ethnicity (above 40 percent black, Hispanic, or other). Second, districts were sorted within strata by urbanicity (city, suburb, town/rural) and the percentage of students eligible for free or reduced-price lunch. The study team then randomly selected 50 percent of the medium-sized districts and 7 percent of the small districts, using the additional stratification variables to select districts in proportion to population totals. The selected sample included 1,200 school districts across the three district-size strata.



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## 3. Data sources

The study collected data from five sources. The primary sources of data are surveys administered to state Part B Section 619 coordinators and district preschool special education coordinators. The other data sources are extant information from *EDFacts* and CCD databases and from state statutes, websites, and state department of education publications. Table 1 summarizes the information collected from each source and how the data were used. Additional details about each data source are included after the table. The study data will be available as an IES restricted-use data set.

**Table 1. Data sources and types of information collected**

Data source	Type of information collected	How the data were used
State Section 619 coordinator survey	<ul style="list-style-type: none"> <li>• Structure of special education programs</li> <li>• Barriers to inclusion</li> <li>• Curricula and interventions adopted</li> <li>• How decisions to adopt curricula and interventions are made</li> <li>• Resources available to support instruction</li> </ul>	Descriptive analyses
District preschool special education coordinator survey	<ul style="list-style-type: none"> <li>• Structure of special education programs</li> <li>• Classroom characteristics</li> <li>• Barriers to inclusion</li> <li>• Curricula and interventions adopted</li> <li>• How decisions to adopt curricula and interventions are made</li> <li>• Staff qualifications</li> <li>• Resources available to support instruction</li> </ul>	Descriptive analyses
EDFacts	<ul style="list-style-type: none"> <li>• IDEA child counts</li> <li>• Characteristics of children ages 3 through 5 with disabilities</li> <li>• Qualifications of teachers and related service staff who work with children ages 3 through 5 with disabilities</li> </ul>	Sampling, background information, subgroup analyses
Common Core of Data	<ul style="list-style-type: none"> <li>• District characteristics, including urbanicity and district size</li> </ul>	Subgroup analyses
State statutes, websites, and publications	<ul style="list-style-type: none"> <li>• State eligibility criteria for special education and related services based on having a developmental delay</li> </ul>	Background information

Notes: State and district survey data were collected during the 2014-2015 school year. The study used *EDFacts* data from 2012-2013 for sampling and from 2013-2014 for background information and subgroup analyses. The study also collected information on state eligibility criteria for IDEA services as of the 2014-2015 school year.

**Survey of state Part B Section 619 coordinators.** The state survey included 26 questions on the following topics for the 2014-2015 school year:

- The structure of programs serving children ages 3 through 5 with disabilities
- Barriers to including children ages 3 through 5 with disabilities in inclusive classrooms
- State involvement in choosing curricula and interventions to teach language/literacy and social-emotional/behavioral skills to children ages 3 through 5 with disabilities

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- How decisions about curricula and interventions for children ages 3 through 5 with disabilities are made
- The resources, including professional development, that states make available to support the instruction of children ages 3 through 5 with disabilities

**Survey of district preschool special education coordinators.** The survey included 66 questions on the topics below for the 2014-2015 school year. Most questions in the survey asked about district-based programs rather than community-based or home-based programs.

- The structure of programs serving children ages 3 through 5 with disabilities
- Characteristics of classrooms serving children ages 3 through 5 with disabilities
- Barriers to including children ages 3 through 5 with disabilities in inclusive classrooms
- The curricula and interventions that districts have adopted to foster the language/literacy and social-emotional/behavioral skills of children ages 3 through 5 with disabilities
- How decisions about curricula and interventions for children ages 3 through 5 with disabilities are made
- The qualifications staff need to work with children ages 3 through 5 with disabilities
- The resources, including professional development, that are available to support the instruction of children ages 3 through 5 with disabilities

**EDFacts and CCD data.** The study team obtained 2013-2014 district-level restricted-use data from the IDEA 070, 089, 099, and 112 data files maintained by ED's *EDFacts* initiative and publicly available 2013-2014 district-level data from ED's CCD Elementary/Secondary Information System. The *EDFacts* data provided information on the number of children ages 3 to 5 with disabilities in each district by age; disability; and educational environment (home, residential facility, separate classroom, separate school, service provider location, services in regular early childhood program, or services in locations other than regular early childhood programs). The CCD data provided information on the number of students in each district by grade, race-ethnicity, language proficiency status, special education status, and eligibility for the free or reduced-price lunch programs and on district urbanicity. The *EDFacts* and CCD data also included geographic information. The study used the district *EDFacts* and CCD data to construct subgroups of districts based on urbanicity

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(urban, suburban, town or rural); size (small, medium, large); and whether special education rates are above or below the U.S. median for autism, developmental delay, speech or language impairments, and overall. More details on constructed variables are available on p. 98. The study team collected district-level *EDFacts* data from 2012 to 2013, which were only used to determine the study sample.

The study also used information from publicly available, state-level *EDFacts* data to report nationwide characteristics of children ages 3 through 5 with disabilities and of the teachers and staff who work with them. The study team obtained publicly available data on the number of children ages 3 through 5 with disabilities in each state by age, disability category, gender, race-ethnicity, and language proficiency status. The study team also obtained data on the number of full-time-equivalent special education teachers in each state and the number of other staff who deliver related services to children ages 3 through 5 with disabilities. The team obtained data on the numbers of teachers and other staff overall, by their service category, and by whether they were highly qualified teachers or fully certified/licensed staff.

**State statutes, websites, and state department of education publications.** The study reviewed state statutes, websites, and state department of education publications to explore statutory differences in states' eligibility criteria for developmental delays that were in place in 2015. IDEA provides broad definitions for 13 disability categories. States differ, however, in the specific quantitative and qualitative criteria they use to determine eligibility under these definitions. The definition of developmental delays, the second most common disability category among children ages 3 through 5, is left entirely to states to define.

### 4. Data collection for the state and district surveys

#### Procedures

The study administered the state and district surveys in spring and summer 2015.<sup>1</sup> Table 2 summarizes the survey modes and completion times; more detail is provided in the section that follows.

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<sup>1</sup> The Office of Management and Budget control number to conduct the surveys is 1850-0916.

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Table 2. Mode of the state and district surveys and approximate completion time

Survey	Mode	Time to complete (approximate)
State Section 619 coordinator survey	Editable PDF form (electronic)	30 minutes
District preschool special education coordinator survey	Web survey	60 minutes

**Survey of Part B Section 619 state coordinators.** The study team emailed the state survey to the IDEA Part B Section 619 coordinator in each state and the District of Columbia (51 total surveys). The study team identified the state Part B Section 619 coordinators based on a list of the coordinators maintained by the Early Childhood Technical Assistance Center and published on the organization’s website. The survey was emailed as an editable PDF form designed to take about 30 minutes to complete the 26 questions. The survey instructions requested that Part B Section 619 coordinators email the completed survey back to the study team.

**Survey of district-level preschool special education coordinators.** The study team emailed the district survey to the relevant staff member in each of the 1,200 sampled school districts. The email provided instructions to complete the survey through a web survey platform. The survey was designed to take about 60 minutes to complete the 66 questions. Respondents did not need to complete the survey in one sitting; they could save what they had finished and return to it later.

The study refers to the district survey respondents as district preschool special education coordinators, although their exact job titles varied. In addition, some respondents worked for regional entities that coordinated special education and related services on behalf of districts. To identify respondents, the study team first asked state Part B Section 619 coordinators to list the appropriate individuals for each sampled district in their state. For any districts where the state coordinator did not name a contact, the study team searched state and district websites to identify an appropriate respondent. The survey asked respondents if they could report on school district-based programs serving children ages 3 through 5 in the sample district and, if not, to name an alternative contact who could. In those latter cases, the study team attempted to survey the alternative contact instead. For 87 percent of the sampled districts, the intended respondents were district staff members. In 13 percent of the districts, the intended respondents were staff from a regional entity that coordinated preschool special education programs for several districts and responded on behalf of the sampled district. Some of the regional staff completed separate surveys for multiple sampled districts.

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**Quality assurance for survey responses.** The study team took a series of steps to minimize any confusion for respondents regarding item wording or survey instructions and to maximize the quality of the data collected. The study team pretested the surveys with nine respondents. Based on feedback from those respondents, the study team revised the surveys before fielding them. The district survey included warnings for respondents when they entered inconsistent or potentially inaccurate responses while completing the survey. The study team reviewed the first 50 responses to the district survey and all 51 responses to the state survey to check that the survey skip logic was working correctly, respondents were providing consistent responses, and the district survey web program was working properly. The study team did not find any issues with the survey skip logic or the web program. The study team followed up with respondents by phone to clarify issues, such as when respondents answered similar questions inconsistently or when respondents who represented a regional entity appeared to provide data for the region rather than for a district.

### Response rates

For the state and district surveys, the study calculated weighted and unweighted unit-level (overall survey) response rates and item-level response rates.

#### *Unit response rates*

The study used different criteria to determine unit-level responses on the state and district surveys.

**Survey of state Part B Section 619 coordinators.** The study defined unit respondents on the state survey to be any state Section 619 coordinator who returned the survey and answered at least one question. All 51 state Section 619 coordinators responded, so the unweighted and weighted unit response rates were 100 percent. The weighted unit response rate was calculated using the *fin\_wgt\_dist* weight (see Section 5).

**Survey of district preschool special education coordinators.** For the district survey, unit respondents needed to indicate in the survey that they could respond for the sampled district and complete at least one item in all sections of the survey. The study team marked district surveys as incomplete when respondents indicated that they could not respond specifically for the sampled districts unless they identified another contact who, in turn, completed the survey. Partially completed district

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surveys were marked as incomplete for the purposes of calculating the unit response rate for the district survey.

For the district survey, the unit response rate was calculated in three steps (Table 3). The first step was to determine the response rate to questions A and B in the instrument, which asked whether respondents could provide information for the sampled district specifically. The second step was to determine the completion rate among those indicating that they could provide information for the sampled district. In the third step, the study team determined the overall district survey unit response rate as the product of the response rates in the first two steps. Of the 1,077 districts that answered questions A and B and indicated they could respond for the sampled district, 1,055 completed all sections of the survey. The unweighted and weighted district survey unit response rates were both 91 percent. The weighted unit response rate was calculated using the *fin\_wgt\_dist* weight (see Section 5).

**Table 3. Response rate calculations for the district survey**

Response rate to Question A, among eligible districts			Completion rate among those who responded for the sampled district			Unit response rate	
Sampled and eligible <sup>a</sup>	Responded to Question A	Response rate to Question A	Responded for sampled district	Completed surveys	Completion rate	Unweighted	Weighted
1,198	1,116	93%	1,077	1,055	98%	91%	91%

<sup>a</sup>Two of the 1,200 sampled districts had merged with another district by the time the survey was fielded. These two cases were treated as ineligible.

### *Item response rates*

The study also calculated weighted item-level response rates. To determine the weighted item-level response rates, the study team divided the weighted number of respondents with valid data for each survey item by the weighted number of unit-level respondents, excluding respondents for whom that survey item was not applicable or legitimately skipped. The study team used the *fin\_wgt\_dist* weight to calculate the weighted numbers of cases. The weighted item-level response rates varied from 37 to 100 percent for district survey items (including 7 of 66 survey items with item response rates below 85 percent) and 90 to 100 percent for state survey items.

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## 5. Weighting

The study did not use weights for state data because the survey was completed by the universe of state coordinators (all 50 states and the District of Columbia).

For the district data, the study team created two weight variables. The first weight variable, *fin\_wgt\_dist*, which is used in most of the district analyses in the tables, provides representative estimates of mean values for the school districts in the sample frame. The second weight variable, *fin\_wgt\_stu*, is scaled to represent the children in the 8,313 public school districts in the nation serving at least 10 children ages 3 to 5 with disabilities in 2012-2013. This weight provides representative estimates of mean values for children ages 3 to 5 with disabilities in the districts included in the sample frame.

The two weights account for the probabilities of school district selection and unit nonresponse as follows:

- The study team first calculated and adjusted the inverse of districts' probability of selection, accounting for the different selection probabilities in each stratum. To address differential patterns of unit nonresponse, the study team adjusted the inverse of districts' probability of selection by accounting for differences in unit response rates based on several characteristics from the 2012-2013 *EDFacts* and CCD data. These characteristics included district size, district-wide race-ethnicity, the number of children ages 3 to 5 with disabilities, the percentage of students with an individualized education program (IEP), the percentage of students who were English learners or limited English proficient, and the percentage of students eligible for the free or reduced-price lunch programs. The nonresponse-adjusted inverse of districts' probability of selection was then post-stratified to population totals using 2012-2013 *EDFacts* and CCD data on district size, region, and district-wide race-ethnicity. This weight was named *fin\_wgt\_dist*.
- The study team then scaled the *fin\_wgt\_dist* weight to represent the children in the 8,313 public school districts in the nation serving at least 10 children ages 3 to 5 with disabilities in 2012-2013. This weight was named *fin\_wgt\_stu*.

## 6. Nonresponse bias analysis

The National Center for Education Statistics standards recommend conducting a nonresponse bias analysis when unit or item response rates are less than 85 percent. The unit response rates for both the district and state surveys, as well as item response rates on the state survey, exceeded 85 percent. However, item response rates for 7 of the 66 district survey questions were below 85 percent. As a result, the

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study team conducted an item nonresponse bias analysis for the 53 items making up those seven survey questions. In most cases, these items asked respondents to provide information about various categories of classrooms or staff members. The seven survey questions are as follows:

- Question 4.3: Number of schools in the district with various numbers of general education (inclusive) classrooms that include children ages 3 to 5 with disabilities
- Question 4.4: Various ways that children are assigned to different classrooms when schools in the district have more than one general education (inclusive) classroom that includes children ages 3 to 5 with disabilities
- Question 4.6: Average number of general education (inclusive) classrooms with various concentrations of children ages 3 to 5 with disabilities in each school in the district
- Question 4.9: Number of schools in the district with various numbers of special education classrooms serving children ages 3 to 5 with disabilities
- Question 5.3: Whether various topics were included in professional development or training sessions focused on working with preschool children with disabilities during the 2014-2015 school year
- Question 6.3: Numbers of preschool general education (inclusive) classroom teachers, preschool special education teachers, and preschool-related service personnel in the district who work with children ages 3 to 5 with disabilities and have various credentials, certifications, and licenses
- Question 6.4: Numbers of preschool general education classroom teachers, preschool special education teachers, and preschool-related service personnel in the district who work with children ages 3 to 5 with disabilities and have various educational attainments (bachelor's degree or master's degree), at least three years of experience in a school, or fluency in multiple languages

To assess the potential for item nonresponse bias, the study team compared differences in the weighted average characteristics of responding and nonresponding districts for each of the 53 district survey items. The study team conducted t-tests for each item to assess whether the weighted average characteristics of responding and nonresponding districts differed by statistically significant margins and estimated the size of the potential bias.

Of the 53 survey items with item response rates below 85 percent, the study team found evidence of potential bias for 51 survey items. However, the study team can



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only examine the *potential* for nonresponse bias because there is no way to know how nonresponding districts would have responded to the survey items to determine actual bias. Readers should cautiously interpret estimates based on the seven district survey questions listed above. The tables with findings based on those survey questions include a note about potential bias. The study restricted-use file documentation provides more information on the item nonresponse bias analysis.

### 7. Imputation and the handling of missing data

The study did not impute values for missing data.

### 8. Statistical procedures and variance estimation

The study presents national or nationally representative averages based on the surveys, ED *Facts*, and CCD data. Study analysis procedures differed by the level of data and type of analysis as described below:

1. **State data.** The tables present only unweighted averages of state data because the averages are based on information from every state in the nation.
  2. **District data.** The tables present weighted averages of district data and standard errors adjusted for nonresponse. The sample design involved stratification and different district selection rates across groups of districts. The study team used Stata statistical software and analysis procedures that account for the stratified design. For the analyses calculating representative estimates of mean values for school districts, the study team used the *fin\_wgt\_dist* weight and the strata variable. For the analyses calculating representative estimates of mean values for children ages 3 to 5 with disabilities in the districts, the study team used the *fin\_wgt\_stu* weight and the strata variable.
- **Subgroup analyses.** For some variables in the district survey, the study presents separate findings for subgroups based on school district characteristics. The subgroups are based on district urbanicity; size; and higher or lower (above or below the U.S. median) rates of special education, autism, developmental delay, and speech or language impairments (see Section A.9 for more detail). The findings from the subgroup analyses are supported by tests the study team conducted for statistically significant differences ( $p < .05$ ) in the weighted averages of district survey responses across subgroups, using an adjusted Wald test. The test statistic between estimates for different subgroups can be computed by using the following formula:

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$$F = \frac{(\mu_1 - \mu_0)^2}{\text{var}(\mu_1) + \text{var}(\mu_0)}$$

In the formula,  $\mu_1$  and  $\mu_0$  are estimates of the means for the two groups being compared;  $\text{var}(\mu_1)$  and  $\text{var}(\mu_0)$  are the variances of the two means. Whether the test statistic is considered statistically significant is determined by comparing it with published tables of critical values. The study did not make statistical adjustments for multiple comparisons.

To compensate for the study's stratified design, the study team used Stata statistical software and analysis procedures to conduct the Wald tests and computed variance estimates through a Taylor series approximation using the district analysis weight (*fin\_wgt\_dist*) and strata variable.

### 9. Constructed variables from extant data that are used in the analysis

Although most of the variables analyzed in the tables come directly from responses to survey questions, we also constructed several variables based on extant data. Definitions for the constructed variables are shown below. The notes in the tables provide more information on these and other variables used in the analysis.

**District urbanicity.** This variable indicates whether the district is in an urban, suburban, or town or rural area based on the urban centric locale codes in the Common Core of Data for 2013-2014. The study categorized codes 11-City: Large, 12-City: Mid-size, and 13-City: Small as urban; 21-Suburb: Large, 22-Suburb: Mid-size, and 23-Suburb: Small as suburban; and 31-Town: Fringe, 32-Town: Distant, 33-Town: Remote, 41-Rural: Fringe, 42-Rural: Distant, and 43-Rural: Remote as town or rural.

**District size in elementary grades.** This variable categorizes districts as small, medium, or large based on the average number of students in each grade from prekindergarten through fifth grade. Using 2013-2014 ED*Facts* data, the study team calculated the total number of students in prekindergarten through fifth grade and divided by the number of grades served. The study team then calculated the 25th, 50th, and 75th percentiles of this measure nationwide, using the *fin\_wgt\_dist* weight described in Section 5. Districts were assigned the following size categories: districts at or below the 25th percentile were labeled small, districts between the 25th and 75th percentiles were labeled medium, and districts above the 75th percentile were labeled large.

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**Special education rate.** This variable categorizes districts by whether the percentage of preschool children ages 3 through 5 with disabilities who receive special education and related services according to an IEP was above or below the national median.

Using 2013–2014 data from the 089 IDEA data file in *EDFacts* and CCD, the study calculated the total number of students ages 3 through 5 with any disability and divided that by the total number of students in prekindergarten and kindergarten. The study then calculated the national median of this measure using the *fin\_wgt\_dist* weight described in section A.5. Districts at or above the median were labeled above (shown as “higher” [above the U.S. median] in tables) and districts below the median were labeled below (shown as “lower” [below the U.S. median] in tables).

**District autism rate.** This variable categorizes districts by whether the percentage of preschool students with autism was above or below the national median. The study used 2013–2014 data from the 089 IDEA data file in *EDFacts* and the Common Core of Data to calculate the total number of students ages 3 through 5 with autism and divided that by the total number of students in prekindergarten and kindergarten.

The study then calculated the national median of this measure using the *fin\_wgt\_dist* weight described in Section A.5. Districts at or above the median were labeled above (shown as “higher” [above the U.S. median] in tables) and districts below the median were labeled below (shown as “lower” [below the U.S. median] in tables).

**District developmental delay rate.** This variable categorizes districts by whether the percentage of students in preschool and kindergarten with developmental delays was above or below the national median. The study used 2013–2014 data from the 089 IDEA data file in *EDFacts* and the Common Core of Data to calculate the total number of students ages 3 through 5 with developmental delay and divided that by the total number of students in prekindergarten and kindergarten. The study then calculated the national median of this measure using the first analysis weight described in Section A.5. Districts at or above the median were labeled above (shown as “higher” [above the U.S. median] in tables) and districts below the median were labeled below (shown as “lower” [below the U.S. median] in tables).

**District speech or language impairment rate.** This variable categorizes districts by whether the percentage of preschool students with speech or language impairments was above or below the national median. The study used 2013–2014 data from the 089 IDEA data file in *EDFacts* and the Common Core of Data to calculate the total number of students ages 3 through 5 with speech or language impairments and divided that by the total number of students in prekindergarten and kindergarten. The study then calculated the national median of this measure by using the *fin\_wgt\_dist* weight

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described in section 5. Districts at or above (shown as “higher” [above the U.S. median] in tables) the median were labeled above and districts below the median were labeled below (shown as “lower” [below the U.S. median] in tables).