

# Teacher Shortages in New York State: New Teachers' Certification Pathways, Certification Areas, District of Employment, and Retention in the Same District

REL 2022-109  
U.S. DEPARTMENT OF EDUCATION

*A Publication of the National Center for Education Evaluation and Regional Assistance at IES*



# Teacher Shortages in New York State: New Teachers' Certification Pathways, Certification Areas, District of Employment, and Retention in the Same District

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November 2021

New York State is experiencing teacher shortages in specific subject areas. One way to address these shortages is through the certification and placement of new teachers. This study explored the pathways through which new teachers between 2015/16 and 2017/18 earned certificates, their certification areas, and their subsequent placement and retention in districts across the state, particularly high-need districts. While the majority of new teachers earned certificates through the traditional in-state pathway, this varied somewhat by certification area. The proportion of teachers who earned certificates through the individual evaluation pathway was higher for the shortage certification area of career and technical education than for other certification areas. The most frequent certification area was the shortage certification area of special education, while the shortage certification areas of career and technical education and bilingual special education were among the least frequent. New York City district schools employed new teachers who earned certificates through the alternative in-state pathway at a higher rate than other types of high-need districts (rural, large city—not New York City, and other urban/suburban) as well as average- and low-need districts. New teachers employed in high-need districts had higher rates of retention in the same district for a second year than new teachers employed in average- and low-need districts. Just 5 percent of new teachers in New York State were uncertified.

## Why this study?

Across the country, educators and policymakers are concerned about teacher shortages, particularly in hard-to-staff subject areas and school districts (Gais, Backstrom, Malatras, & Park, 2018; U.S. Department of Education, n.d.; Viadero, 2018). Reduced access to fully certified and experienced teachers can negatively impact student achievement (Cardichon et al., 2020), and high teacher turnover can be costly, given the substantial resources that many districts allocate to new teacher training. New York State has faced geographically widespread and persistent teacher shortages (shortages in at least two of the state's three broad geographic reporting locales—New York City Public Schools, the Big Four [Buffalo Public Schools, Rochester City School District, Syracuse City School District, and Yonkers Public Schools], and the rest of the state—in 2015/16, 2016/17, and 2017/18) in several subject areas. Those subject areas include bilingual education, bilingual special education, career and technical education, English language arts, health education, library media specialist, literacy, mathematics, science, and special education (U.S. Department of Education, n.d.).<sup>1</sup>

There are several ways to address these shortages, including the certification of new teachers and the additional certification of experienced teachers. To provide a picture of the populations of teachers who might fill positions in these shortage areas and suggest potential ways to resolve persistent shortages, the Regional Educational Laboratory Northeast & Islands, in collaboration with the

For additional information—including technical methods, supporting analyses, and other analyses—access the report appendixes at <https://go.usa.gov/xecdM>.

<sup>1</sup> The New York State shortage areas that are reported to the U.S. Department of Education for a given school year are typically based on data from two school years earlier. For example, the 2017/18 shortage areas are based on 2015/16 data. The shortage areas referenced in this study were reported as 2017/18, 2018/19, and 2019/20 shortage areas on the U.S. Department of Education website and represent shortages that occurred in the 2015/16, 2016/17, and 2017/18 school years.

New York State Education Department (NYSED), has prepared a report on each of these groups of teachers. The current report covers new teachers in New York State (those with less than one year of teaching experience in New York State public schools), and the companion report covers experienced teachers (those with at least one year of teaching experience in New York State public schools) who pursued additional certificates (see Lemieux, Zweig, Shakman, O’Dwyer, & Schilacci, 2021).

Like many states, New York State encourages qualified people from various education backgrounds to teach by providing multiple pathways to teacher certification (see box 1 for definitions of key terms). NYSED wants to better understand the certification pathways that new teachers pursue and the areas in which new teachers seek certification. In particular, NYSED wants to understand the relationships among certification pathways, certification areas, employment in high-need districts, and second- and third-year retention in the same district. NYSED can use this information to consider certification pathways or requirements and in creating or modifying incentive programs to increase the number of qualified candidates, particularly in shortage subject areas.

This study examined the pathways through which new teachers (teachers who began teaching in New York State in the 2015/16, 2016/17, and 2017/18 school years) earned certificates, the number and percentage of new teachers who earned certificates through each pathway by certification area, the districts in which new teachers were employed, and the rates at which new teachers were retained in the same district. NYSED was particularly interested in patterns in certification pathways of new teachers because of recent changes to the certification pathways and requirements, including the introduction of new content specialty tests beginning in 2014.

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### Box 1. Key terms

**Certificate.** A credential that authorizes an individual to teach in a given subject and grade level in New York State public schools. In this report, the term “certificate” refers to both certificates and certificate extensions (see appendix A for additional information on extensions).<sup>1</sup>

**Certification areas.** The 18 areas in which teachers in New York State earned certificates (see appendix A for a definition of teacher). The dataset contained 597 past and current certificate titles, which indicate the subject and grade level the teacher is certified to teach. The certificate titles were combined into 18 broad certification areas related to teaching for the analyses. For any given certification area, there were between 2 and 218 certificate titles. Each teacher can have multiple certificates in a single certification area as well as in more than one certification area. The study team counted teachers in a certification area if they had earned at least one certificate in that area. Throughout the report, the study team categorized certification areas into the following two types:

- **Shortage certification areas.** Ten certification areas that are related to shortage subject areas (referred to throughout the report as shortage areas) in New York State. NYSED does not report shortages related to certification areas but rather related to course assignment areas in which full-time equivalent teaching positions (FTEs) in the subject area are greater than 5 percent of total FTEs in the subject area (New York State Education Department, personal communication, December 30, 2016). Shortage FTEs are filled by teachers who did not possess state certification for teaching assignments. This study examined certification areas related to shortage areas, and these are referred to as “shortage certification areas” throughout the report. The 10 shortage certification areas are bilingual education, bilingual special education,<sup>2</sup> career and technical education, English language arts, health education, library media specialist, literacy, mathematics, science, and special education. Special education<sup>3</sup> includes the following New York State certification titles: students with disabilities, students with disabilities and content area, blind and visually impaired, deaf and hard of hearing, gifted education, severe or multiple disabilities,<sup>4</sup> and speech and language disabilities.
- **Nonshortage certification areas.** Eight certification areas that are related to subject areas that were not experiencing widespread and persistent shortages. These certification areas were not related to subject areas that experienced a shortage in at least two of the three broad geographic reporting locales (New York City Public Schools, the Big Four [Buffalo Public Schools, Rochester City School District, Syracuse City School District, and Yonkers Public Schools], and the rest of the state) or in all three years studied (2015/16, 2016/17, and 2017/18). The nonshortage

certification areas are arts, English to speakers of other languages, language other than English,<sup>5</sup> social studies, physical education, childhood education (which spans grades 1–6), early childhood education (which spans birth–grade 2), and other teaching certification areas.<sup>6</sup>

**Certification pathways.** There are several pathways by which teachers in New York State earn certificates. Each teacher can have multiple certificates in one or more pathways. The study team included a teacher in a pathway if the teacher had earned at least one certificate in that pathway. A small number of teachers in the dataset had no certificate; they are not included in any pathway and are included in the results as a separate category. The five pathways are:

- **Traditional in-state pathway.** This pathway is for candidates who complete a New York State-registered teacher preparation program that includes college-supervised clinical experience(s) during which the candidate is under the direct supervision of a certified teacher who has official responsibility for the classroom. Only New York State institutions of higher education are authorized to offer registered teacher preparation programs.
- **Alternative in-state pathway.** This pathway is for candidates who are enrolled in a New York State-registered alternative teacher preparation program. While completing the program, candidates apply for and earn a Transitional B or C teaching certificate and complete a college-supervised placement as a teacher of record in a partnering school. Partnering schools agree to mentor, support, and employ the candidates throughout their program. In this study, all new teachers who were enrolled in this pathway were identified as certified, as they are considered certified by New York State.
- **Out-of-state program pathway.** This pathway is available for candidates who complete a teacher preparation program in another U.S. state or territory that is substantially equivalent to a New York State-registered teacher preparation program and leads to certification in the title of the New York State certificate sought in the jurisdiction in which the institution of higher education is located (New York State Education Department, n.d.a).<sup>7</sup>
- **Individual evaluation pathway.** This pathway is available for candidates who do not meet the requirements for the traditional in-state, alternative in-state, and out-of-state program pathways. They can apply for certification through this pathway by providing transcripts or, in the case of career and technical education certificates, evidence of prior education, credentials, and/or work experience. NYSED’s level of effort to review certificate applications in this pathway is higher than in other pathways (New York State Education Department, personal communication, September 1, 2020; see appendix A for more information).<sup>8</sup>
- **Certificate progression pathway.** This pathway is for teachers who hold or held a valid New York State entry-level certificate and seek to progress to an advanced-level certificate (New York State Education Department, n.d.a).

**Need designation.** A measure of a district’s ability to meet the needs of its students with local resources.<sup>9</sup> NYSED calculated this measure by dividing a district’s estimated poverty percentage by its Combined Wealth Ratio.<sup>10</sup> The Combined Wealth Ratio was a measure of a district’s fiscal capacity and was based equally on property wealth per pupil and income wealth per pupil compared to the statewide average. (See appendix A for details.)

There are six need designations. The high-need designations are New York City district schools, large city—not New York City, urban/suburban, and rural. The two other designations are average need and low need (New York State Education Department, n.d.b). Each district was assigned only one need designation. Teachers may teach in more than one district at the same time, each with a different need designation. Need designation data are reported at the district level, with the exception of teachers employed in charter schools. Charter schools are not included in the need designations in New York State, but for completeness they are included as a separate category.

**New teacher in New York State.** A prekindergarten–grade 12 classroom teacher, educational technology specialist, library media specialist, or literacy specialist with less than one year of experience teaching in New York State public schools.<sup>11</sup> Administrators, pupil personnel service professionals such as school psychologists and school social workers, and supplemental school personnel such as teacher aides and teaching assistants are not included in this definition.

**Retention in the same district.** The percentage of teachers who were retained, or the rate of retention, in the same district for a second year or a third year. NYSED was interested in retention at the district level rather than the state level because of the substantial resources that districts invest in new teachers. New teachers who left teaching but stayed in the same district in a nonteaching role in a subsequent year were treated as not retained in the calculations for this study. Charter schools



were excluded from the retention analysis because the unit of analysis differs between charter schools (school) and the other need designation categories (district).

#### Notes

1. There is one annotation: severe or multiple disabilities. An annotation is a type of certificate that is not freestanding and is always attached to a base certificate. The annotation alone does not authorize an individual to teach in the particular subject area but indicates expertise in the defined area. No teachers in the sample received the annotation without earning a specified special education certificate as well.
2. There is not a bilingual special education certificate, but bilingual special education is a shortage area. In this study teachers were counted as having earned a certificate in bilingual special education if they had at least one certificate in bilingual education and at least one certificate in special education (excluding gifted education because the shortage area of bilingual special education does not pertain to those with teaching assignments related to gifted education).
3. Special education includes certificates in multiple special education subject areas, some of which NYSED does not report to the U.S. Department of Education in this specificity when computing data on shortages. The special education shortage area is based on courses taught by teachers who hold Special Education or Students with Disabilities certificate titles, rather than specialized certificates in the area of special education, such as Blind and Visually Impaired and Deaf and Hard of Hearing.
4. Severe or multiple disabilities is an annotation.
5. NYSED recently changed “language other than English” to “world language other than English.” However, because this report references historical data, it retains the older terminology.
6. The study team used the same certification areas in this report and in the companion report on experienced teachers, with the exception of the administration certification area, which is omitted in this report. Very few new teachers seek an administration certificate with their first teaching certificate, whereas it is much more common among experienced teachers to earn an administration certificate as an additional certificate.
7. There is another out-of-state pathway for candidates who have at least three years of acceptable teaching experience in public schools in another U.S. state or territory within the past seven years and hold a valid certificate in that state or territory that is equivalent to the title of the New York State certificate sought. These candidates were not included in this study because they are not considered new teachers.
8. When reviewing the certificate application, NYSED staff evaluate each requirement individually, including coursework listed on transcripts. Teachers can use this pathway when they have completed acceptable coursework over time at various institutions in and out of state or when they are ineligible for other pathways (New York State Education Department, personal communication, September 1, 2020).
9. New York State refers to this measure as “need/resource capacity” because it measures need relative to resources.
10. The Combined Wealth Ratio was calculated as follows:  $(0.5 \times \text{the pupil wealth ratio}) + (0.5 \times \text{the alternate pupil wealth ratio})$ . The Pupil Wealth Ratio equaled the actual value of property in 1995 divided by a weighted pupil count. The Alternate Pupil Wealth Ratio equaled the district’s 1994 adjusted gross income divided by a weighted pupil count. The weighted pupil count was based on the adjusted average daily attendance of K–12 students in the district plus weightings for students with special education needs, students with disabilities, and secondary school students; half-day kindergarten students were weighted at 0.5.
11. The total years of teaching variable in the Basic Education Data System Personnel Master File data determined teachers’ experience in New York State. NYSED defined the roles that are considered a teacher. A REL Northeast & Islands companion report (see Lemieux et al., 2021) examines certification pathways and certification areas for experienced teachers in New York State. This study uses a snapshot of teacher data from the first Wednesday in October each year (New York State Education Department, 2019).

## Research questions

The study team addressed the following questions about public school teachers with less than one year of experience teaching in New York State in 2015/16, 2016/17, and 2017/18:

1. Through which certification pathways did they earn their first certificates?
2. In which certification areas did they earn their first certificates?
  - a. By certification area, which pathways did they use?
3. What is their district of employment’s need designation and what, if any, relationships exist among certification pathways, certification areas, and district need designation?
4. To what extent were they retained in the district, and what were the certification pathways and certification areas of those who were retained?<sup>2</sup>

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<sup>2</sup> New teachers employed by charter schools were not included in the analysis for research question 4 because it focused on retention at the district level.

Box 2 summarizes the data sources, sample, methodology, and limitations, and appendix A provides additional information.

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## Box 2. Data sources, sample, methodology, and limitations

**Data sources.** The study used data from the New York State Education Department’s (NYSED’s) TEACH system and Basic Education Data System Personnel Master File. The TEACH system is the platform through which individuals apply for certification. It maintains data on all certificate holders, including certificate titles, certificate issue dates, and certification pathways. The Basic Education Data System Personnel Master File contains annual data on teachers, such as the number of years of teaching experience in New York State, school and district assignments, region, and district need designation (see table A2 in appendix A for a list of data elements and their sources). Each teacher has a unique identification number that links them in the TEACH system and the Basic Education Data System Personnel Master File.

**Sample.** The sample consisted of 22,424 unique new teachers in New York State from three school years: 2015/16, 2016/17, and 2017/18. Individuals with more than one role were considered a teacher if they had at least one teaching role. Across the sample, 1,173 teachers were uncertified—that is, they taught in New York State public schools, including a charter school, but did not hold a valid certificate documented in the TEACH system. Teachers could earn multiple certificates, for example in different certification areas or grade levels (see table A3 in appendix A for the number of certificates in each certification area). The study team counted teachers one time for each certification area in which they earned at least one certificate. Uncertified teachers were counted one time. Certificates could be earned through different pathways, though a teacher could use only one pathway per certificate. Additionally, region and need designation data were missing for 3 percent of the sample. Teachers with missing region and need designation data remained in the sample, so their certification pathway and certification areas were included. For these reasons the numbers in figures and tables throughout the report do not sum to the 22,424 unique teachers in the sample, nor do the percentages sum to 100 (see the notes in figures and tables for further explanation). Because of these variations in the number of certificates earned, pathways used, and districts in which teachers in the sample were employed, each research question had a different sample size (see table A4 in appendix A for a description of each sample).

**Methodology.** The study team calculated the number and percentage of new teachers in New York State who earned certificates through each certification pathway. Certificates that were expired, revoked, surrendered, or suspended were not included in the analyses. Each certification pathway was calculated as a binary variable—yes or no—for each type of pathway regardless of how many certificates a teacher earned through that pathway. Teachers could earn certificates through more than one pathway and in more than one certification area. For example, a teacher who earned one certificate through the traditional in-state pathway and two certificates through the individual evaluation pathway received a 1 for the traditional in-state pathway variable, a 1 for the individual evaluation pathway variable, and a 0 for each other pathway variable.

The study team calculated the number and the percentage of new teachers who:

- Earned at least one certificate through each certification pathway (research question 1).
- Earned at least one certificate in a certification area by certification area (research question 2) and in each certification area by pathway (research question 2a).
- Were employed in districts with each need designation (research question 3).
- Were retained in the same district for a second year and a third year (research question 4).

The study team also analyzed the above characteristics by certification pathway. The analysis of retention in the same district included only new teachers from the 2015/16 and 2016/17 school years because at the time of the study no data were available to calculate third-year retention rates for new teachers from the 2017/18 school year. Teachers employed in charter schools were also excluded from the retention analysis (see appendix A).

The report highlights differences of more than 5 percentage points as substantive (see appendix A).

**Limitations.** A primary limitation of this study is that it was not possible to distinguish novice teachers whose first teaching job was in New York State from teachers who had experience teaching out of state and had a new teaching job in New York State. The Basic Education Data System questionnaire asks about teaching experience only in New York State, so some

teachers designated as “new” might have been new to teaching in New York State but not new to the teaching profession. Had these two groups been analyzed separately, different results might have been observed. In addition, the “new teacher in New York State” designation is based on a teacher-reported measure and could include errors.

Although data allowed teacher placement to be examined by district, the data for this study did not include teachers’ specific course assignments. As a result, the study could not analyze the extent to which new teachers taught in their certification area. Shortages might be higher than the findings suggest if many teachers with certificates in a shortage area could not easily be placed in that area. For example, a teacher might earn certificates related to two shortage areas but can teach in only one of them, or a teacher might prefer to not teach in a shortage area despite having earned a certificate related to that area. This report, therefore, documents the pool of teachers with certificates related to shortage areas—not whether they were actually assigned to courses in those areas. This study and its companion study provide New York State with a more comprehensive picture of the potential pool of candidates to address the shortages. Additional research is needed to understand the match between the number of new teachers earning certificates in areas related to shortage areas and the number of full-time equivalents or positions available in those areas.

This descriptive study cannot support causal inferences about the relationships among certification pathways, certification areas, and employment location.

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## Findings

The findings in this section address the research questions in order. The first finding relates to research question 1 on the pathways through which new teachers earned certificates. The second and third findings address research question 2 on the certification areas of new teachers, with particular focus on the shortage areas as well as on the pathways through which teachers earned certificates in each certification area. The remaining findings relate to research questions 3 and 4 and examine placement by need designation; retention in the same district; and patterns among certification pathway, certification area, and retention.

### *The majority of new teachers earned certificates through the traditional in-state pathway*

About 73 percent of new teachers earned certificates through the traditional in-state pathway, and 23 percent did so through the individual evaluation pathway (table 1). The alternative in-state pathway (15 percent) and out-of-state program pathway (7 percent) were used less frequently. The percentages of new teachers who used these four certification pathways were substantively different. A small percentage of teachers (2 percent) earned certificates through the certificate progression pathway. These teachers are included in all the analyses because the data included all new teachers in New York State without distinguishing between those who were new to the teaching profession and those who had teaching experience in another state. Because this report focuses on the certification pathways of teachers new to the profession of teaching, this pathway is not discussed elsewhere. About 5 percent of new teachers were uncertified. Teachers can earn multiple certificates through multiple pathways, so the sum of these percentages exceeds 100.

**Table 1. Number and percentage of new teachers who earned certificates through each pathway in New York State, 2015/16–2017/18**

Certification pathway	Number of new teachers	Percent of new teachers
Traditional in-state pathway	16,280	73
Individual evaluation pathway	5,130	23
Alternative in-state pathway	3,313	15
Out-of-state program pathway	1,492	7
Certificate progression pathway	525	2
Uncertified teachers	1,173	5

Note: The sample consisted of 22,424 unique new teachers in New York State in 2015/16–2017/18. The sum of the values in the second column is 27,913 and the sum of the values in the third column exceeds 100 because some teachers earned multiple certificates through multiple pathways (16,070 earned certificates through one pathway, 4,752 earned certificates through two pathways, 378 earned certificates through three pathways, and 8 earned certificates through four pathways). In addition, the table excludes 43 new teachers who earned certificates in nonteaching areas but had teaching assignments between 2015/16 and 2017/18.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system.

***The most frequent certification area for new teachers was the shortage certification area of special education, while the shortage certification areas of career and technical education and bilingual special education were among the least frequent***

New teachers earned certificates most frequently in the shortage certification area of special education (40 percent, which was substantively higher than all other shortage certification areas; table 2; see also table B2 in appendix B). In contrast, new teachers earned certificates least frequently in the shortage certification areas of career and technical education, bilingual special education, and library media specialist (1 percent each). In nonshortage certification areas new teachers earned certificates most frequently in childhood education (38 percent) and early childhood education (17 percent).<sup>3</sup> About 1–8 percent of new teachers earned certificates in each of the remaining shortage and nonshortage certification areas. About 44 percent of new teachers earned certificates in multiple certification areas.

<sup>3</sup> Childhood education spans grades 1–6, and early child education spans birth–grade 2.



**Table 2. Number and percentage of new teachers who earned certificates in each certification area in New York State, by certification area shortage status, 2015/16–2017/18**

Certification area	Number of new teachers	Percent of new teachers
<b>Shortage certification areas<sup>a</sup></b>		
Special education <sup>b</sup> : students with disabilities, students with disabilities with content area, blind and visually impaired, deaf and hard of hearing, gifted education, severe or multiple disabilities, <sup>c</sup> speech and language disabilities	9,036	40
English language arts	1,699	8
Mathematics	1,564	7
Literacy	1,480	7
Science: biology, chemistry, earth science, general science, physics	1,358	6
Bilingual education	619	3
Health education	353	2
Career and technical education	312	1
Bilingual special education <sup>d</sup> : bilingual education and at least one of the special education certificates except for gifted education	303	1
Library media specialist	131	1
<b>Nonshortage certification areas</b>		
Childhood education	8,535	38
Early childhood education	3,823	17
English to speakers of other languages	1,495	7
Social studies	1,495	7
Arts: dance, music, theater, visual arts	1,352	6
Physical education	841	4
Language other than English	543	2
Other certification areas <sup>e</sup> : agriculture, business and marketing, educational technology specialist, family and consumer sciences, generalist in middle childhood, and technology education	626	3
Uncertified	1,173	5

Note: The sample consisted of 22,424 unique new teachers in New York State in 2015/16–2017/18. The sum of the values in the second column, including uncertified teachers, is 36,738. The sum of the values in the third column exceeds 100 because some teachers earned multiple certificates in multiple certification areas (11,270 earned certificates in one area, 6,300 earned certificates in two areas, 2,737 earned certificates in three areas, 685 earned certificates in four areas, 119 earned certificates in five certification areas, 21 earned certificates in six certification areas, 1 earned certificates in seven certification areas, and 2 earned certificates in eight certification areas); 1,173 teachers were uncertified; 45 teachers held certificates that were denied, disapproved, expired, pending information, revoked, surrendered, suspended, or withdrawn during the school year during which the teacher began teaching in New York State; and 71 teachers earned certificates in a certification area that was not related to classroom teaching (such as administration).

a. Shortage certification areas are certification areas that are related to subject areas for which the New York State Education Department reported shortages in at least two of the state's three broad geographic reporting locales—New York City Public Schools, the Big Four (Buffalo Public Schools, Rochester City School District, Syracuse City School District, and Yonkers Public Schools), and the rest of the state—in 2015/16, 2016/17, and 2017/18.

b. Special education includes certificates in multiple special education subject areas, some of which the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. The special education shortage area is based on courses taught by teachers who hold Special Education or Students with Disabilities certificate titles, rather than specialized certificates in the area of special education, such as Blind and Visually Impaired and Deaf and Hard of Hearing.

c. Severe or multiple disabilities is an annotation on a certificate, not a certificate in and of itself.

d. There is not a bilingual special education certificate, but bilingual special education is a shortage area. In this study teachers were counted as having earned a certificate in bilingual special education if they had earned at least one certificate in bilingual education and at least one certificate in special education (excluding gifted education because the shortage area of bilingual special education does not pertain to those with teaching assignments related to gifted education).

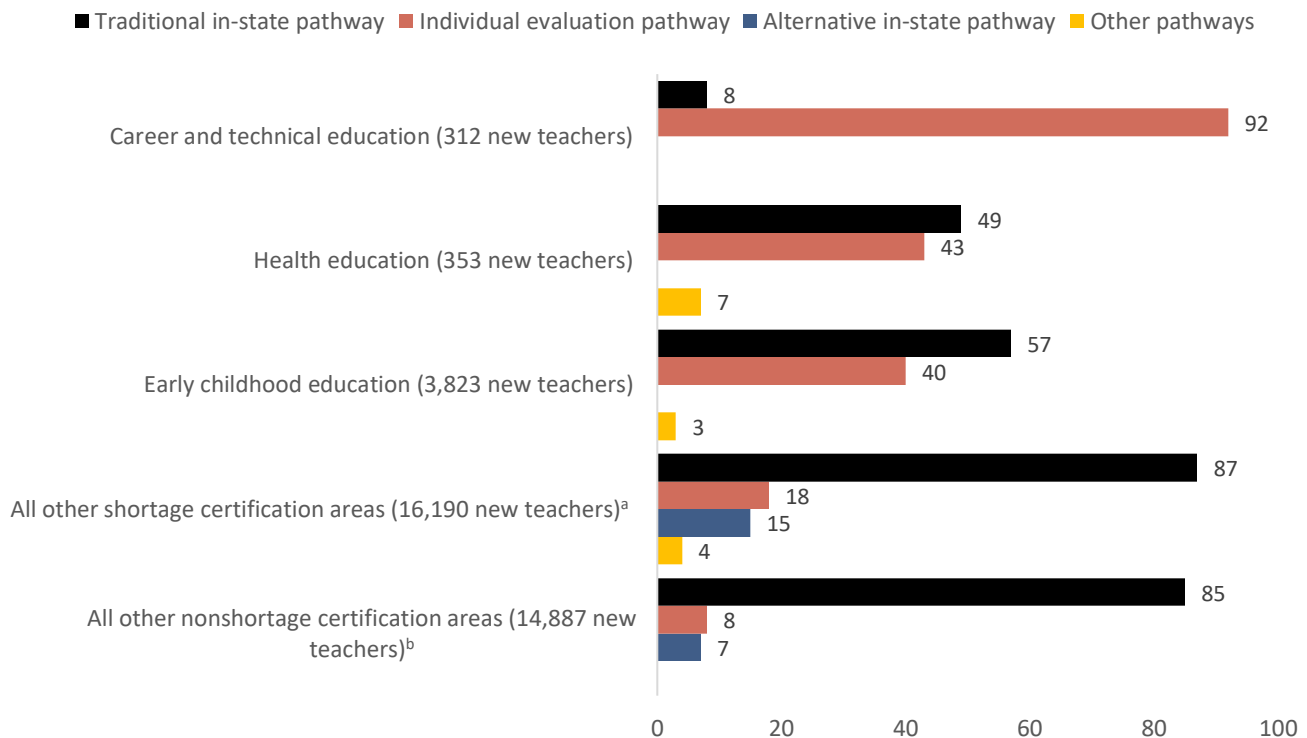
e. “Other certification areas” includes certificates related to subject areas that the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. However, teachers could be certified in those areas and fill subject-area shortages by teaching in those areas. For example, a Technology Education certificate holder can teach certain career and technical education courses that cross multiple subject areas. Fewer than 2 percent of teachers had earned certificates in each certification area within the other certification areas category. Source: Authors’ analyses of 2015–18 data from NYSED’s TEACH system and Basic Education Data System Personnel Master File.

***The proportion of new teachers who earned certificates through the individual evaluation pathway was higher for career and technical education than for other certification areas***

While only 23 percent of all new teachers earned certificates through the individual evaluation pathway, 92 percent of teachers who earned certificates in the shortage area of career and technical education used this pathway (figure 1; see also table B3 in appendix B). The proportion of new teachers who earned certificates in career and technical education through the individual education pathway was substantively higher than the proportion who earned certificates in other areas. This might reflect the fact that only 3 of the approximately 97 New York State education preparation institutions<sup>4</sup> offer programs in career and technical education, whereas the individual education pathway for career and technical education certificates has multiple combinations of education background, credentials, and work experience that allow teachers to earn a certificate (personal correspondence with NYSED, September 1, 2020).

**Figure 1. The proportion of teachers who earned certificates through the individual evaluation pathway was higher for the shortage certification area of career and technical education than for other certification areas, 2015/16–2017/18**

*Percent of new teachers who earned certificates through each pathway, by certification area*



Note: The sample consisted of 22,424 unique new teachers in New York State in 2015/16–2017/18. The numbers of new teachers in the category labels on the vertical axis sum to 35,565, and the percentages of new teachers who used each pathway for all other shortage certification areas and all other nonshortage certification areas exceed 100 because some teachers earned multiple certificates in multiple areas through multiple pathways. Teachers were counted only once per certification area, even if they earned multiple certificates in that area, but they were counted for each pathway through which they

<sup>4</sup> The number of New York State institutions of higher education with educator preparation programs between 2015/16 and 2017/18 ranged from 96 to 98; as of fall 2021, there are 91.

earned a certificate. In addition, there were 1,173 uncertified teachers in the sample. Shortage certification areas are certification areas that are related to subject areas for which the New York State Education Department (NYSED) reported shortages in at least two of the state's three broad geographic reporting locales—New York City Public Schools, the Big Four (Buffalo Public Schools, Rochester City School District, Syracuse City School District, and Yonkers Public Schools), and the rest of the state—in 2015/16, 2016/17, and 2017/18.

a. Includes bilingual education, bilingual special education, English language arts, library media specialist, literacy, math, science, and special education. Some 13,813 unique teachers earned certificates in at least one of these areas, and 2,057 unique teachers earned certificates in two to four of them.

b. Includes arts, childhood education, English to speakers of other languages, language other than English, social studies, physical education, and other certification areas. Some 13,728 unique teachers earned certificates in at least one of these areas, and 3,822 unique teachers earned certificates in two to five of them.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.

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About 43 percent of new teachers who earned certificates in health education, a shortage area, and 40 percent who earned certificates in early childhood education, a nonshortage area, used the individual evaluation pathway (see figure 1 and table B3 in appendix B). This might be the case because these certificates are often additional certificates that a teacher earns in conjunction with another certificate, such as health education with physical education or early childhood education with childhood education. In contrast, only 18 percent of teachers who earned certificates in other shortage areas and 8 percent of teachers who earned certificates in other nonshortage areas used the individual evaluation pathway.

### ***More than half of all new teachers were employed in New York City district schools or in charter schools***

The percentages of new teachers employed in districts with each need designation across the state differed from districts' shares of statewide student enrollment. New teachers were overrepresented in New York City district schools, which accounted for 50 percent of new teachers but only 36 percent of statewide student enrollment, and in charter schools,<sup>5</sup> which accounted for 16 percent of new teachers but only 5 percent of statewide student enrollment (figure 2). For both charter schools and New York City district schools, the difference between the share of new teachers employed and the share of statewide student enrollment was substantive.

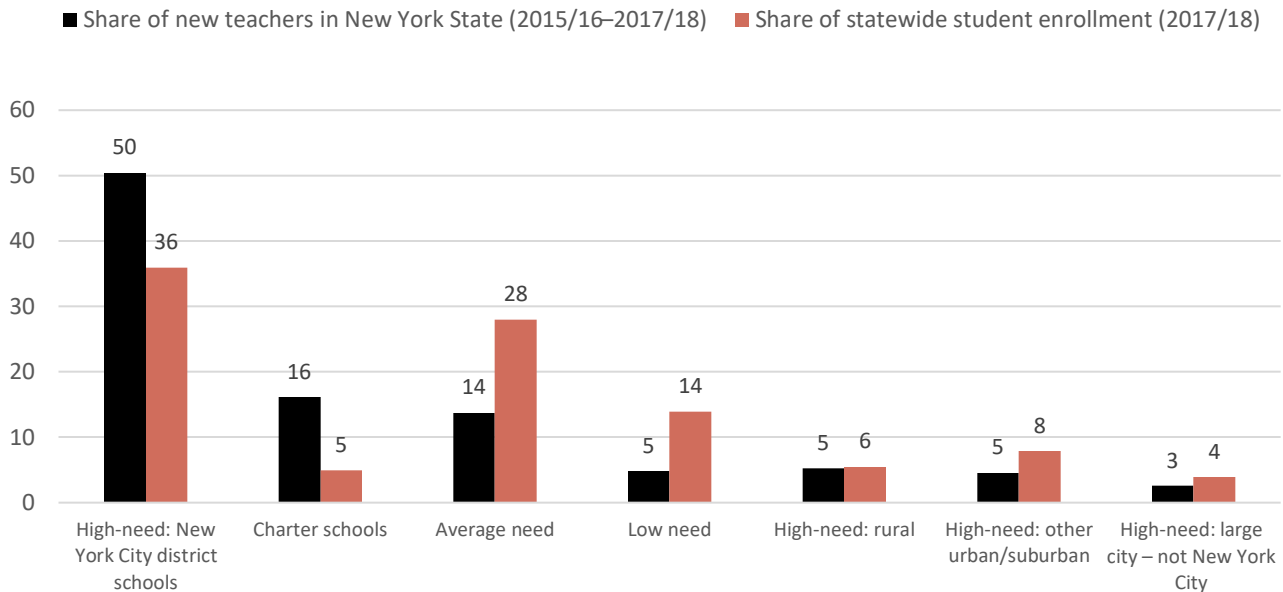
In contrast, for most other need designations new teachers were underrepresented relative to the share of statewide student enrollment. Average-need schools accounted for only 14 percent of new teachers but 28 percent of statewide student enrollment, and low-need schools accounted for only 5 percent of new teachers but 14 percent of statewide student enrollment (see figure 2). For both of these need designations, the difference between the share of new teachers employed and the share of statewide student enrollment was substantive. This pattern of underrepresentation was also true of new teachers in other high-need urban/suburban districts (5 percent of new teachers and 8 percent of statewide student enrollment) and in high-need large city districts other than New York City district schools (3 percent of new teachers and 4 percent of statewide student enrollment; see figure 2). The difference between the share of new teachers employed and the share of statewide student enrollment did not reach the threshold for a substantive difference, however, for other high-need urban/suburban districts or high-need large city districts.

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<sup>5</sup> The state does not assign need designations to charter schools.

**Figure 2. New teachers were overrepresented relative to the share of statewide student enrollment in New York City district schools and in charter schools and were underrepresented in average- and low-need districts, 2015/16–2017/18**

Percent



Note: The sample consisted of 22,424 unique new teachers in New York State in 2015/16–2017/18. The figure presents data on 21,840 teachers because 511 teachers were missing needs designation data; 142 teachers worked in or for Boards of Cooperative Educational Services (BOCES), which do not have a need designation; and 69 teachers were employed in two separate districts with different need designations (and were thus counted twice). Percentages do not sum to 100 because of missing cases, BOCES teachers, and rounding.

Source: Authors’ analyses of 2015–18 data on new teachers from the New York State Education Department’s Basic Education Data System Personnel Master File and 2017/18 data on student enrollment from the New York State Education Department (2017b, student enrollment).

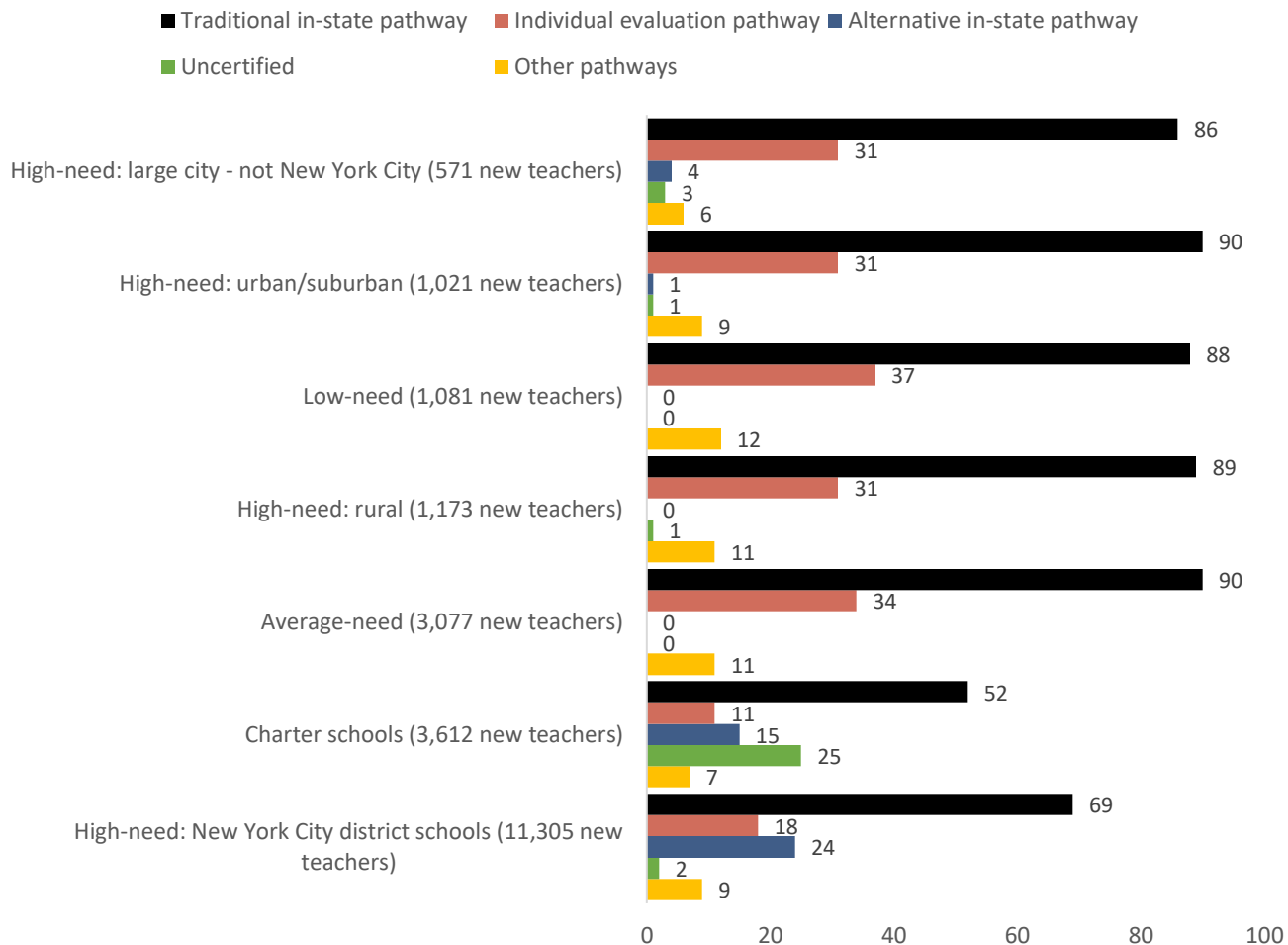
***The percentages of new teachers who earned certificates through the alternative in-state pathway were higher in New York City district schools and in charter schools than in other need designations***

About 24 percent of new teachers in New York City district schools and 15 percent of new teachers in charter schools earned certificates through the alternative in-state pathway, which in both cases was substantively higher than in other need designations (figure 3). In fact, 98 percent of all teachers who earned certificates through the alternative in-state pathway were employed by either New York City district schools or a charter school. In contrast, other need designations more frequently employed new teachers who earned certificates through the traditional in-state pathway and the individual evaluation pathway.

Whereas 75 percent of new teachers employed in charter schools were certified, the percentage of uncertified new teachers was substantively higher in charter schools (25 percent) than in any other need designation (see figure 3). About 79 percent of uncertified teachers were employed in charter schools. While 5 percent of all new teachers were uncertified, this means that 4 percent of all new teachers were uncertified and employed in charter schools. Charter schools can legally employ uncertified teachers who have the appropriate background experience under certain conditions (New York State Education Department, 2020). This finding is consistent with national data indicating that charter schools employ higher percentages of uncertified teachers (U.S. Department of Education, 2016).

**Figure 3. New York City district schools and charter schools employed a higher percentage of new teachers who earned certificates through the alternative in-state pathway than any other need designation, 2015/16–2017/18**

*Percent of new teachers who earned certificates through each pathway, by need designation*



Note: The sample consisted of 22,424 unique new teachers in New York State in 2015/16–2017/18. The numbers of new teachers in the category labels of the vertical axis sum to 21,840 because 511 teachers were missing need designation data; 142 teachers worked in or for Boards of Cooperative Educational Services, which do not have a need designation; and 69 teachers were employed in two separate districts with different need designations (and were thus counted twice). The sum of the percentages for each need designation exceeds 100 because some teachers earned multiple certificates through multiple pathways.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.

***The majority of new teachers in 2015/16 and 2016/17 were retained in the same district for a second and third year***

About 76 percent of the 12,414 new teachers in 2015/16 and 2016/17, not including those employed in charter schools, were retained in the same district for a second year. Approximately 63 percent were retained in the same district for a third year. New teachers in 2017/18 were not included because at the time of the study, no data were available to calculate their third-year retention rates. Teachers employed in charter schools were also not included in the retention analysis (see appendix A).<sup>6</sup>

<sup>6</sup> Retention rates at the school level are lower than at the district level because a district is a much larger unit, with many schools to which a teacher can transfer and still count as retained. Therefore, charter school retention rates are not comparable to district retention rates.

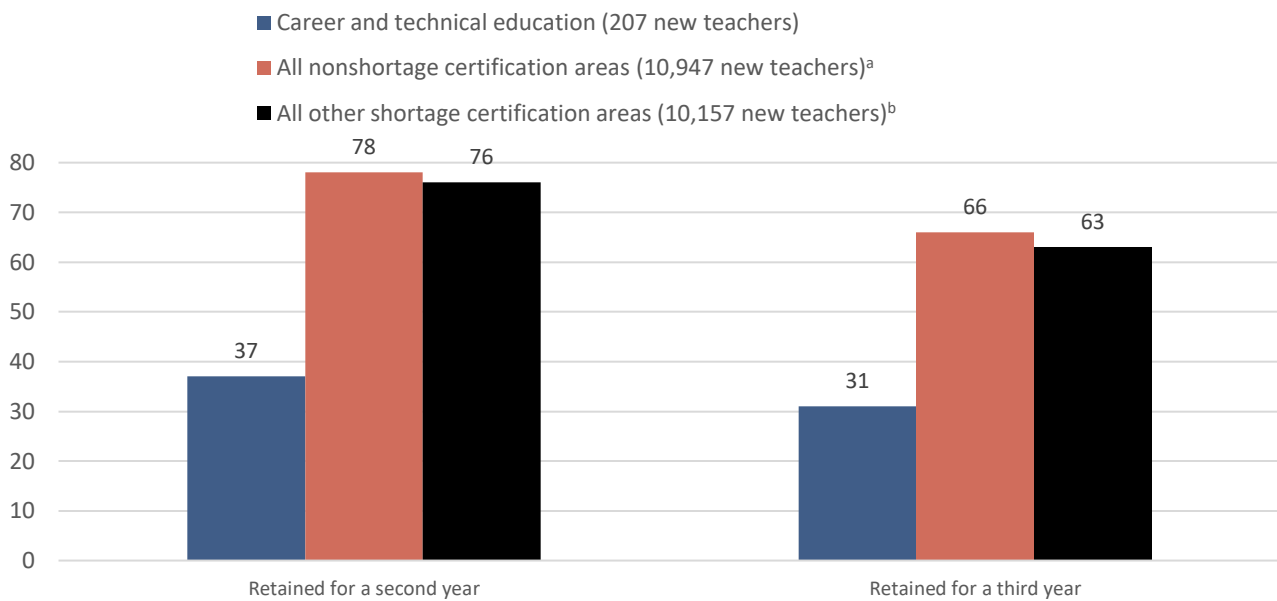


**The rate of retention in the same district was lowest for new teachers who earned certificates in the shortage area of career and technical education**

The retention rate for new teachers was similar across most certification areas. However, new teachers who earned certificates in career and technical education in specific certificate titles were retained in the same districts at substantively lower rates than teachers who earned certificates in other areas. About 37 percent of teachers who earned certificates in career and technical education in specific certificate titles were retained in the same district for a second year, and 31 percent were retained for a third year (figure 4; see also table B8 in appendix B). In contrast, the retention rates for teachers with certificates in other areas ranged from 65 percent to 82 percent for a second year and from 53 percent to 68 percent for a third year (see table B8 in appendix B).

**Figure 4. Second- and third-year rates of retention in the same district were lowest for the shortage certification area of career and technical education in specific certificate titles, new teachers in 2015/16 and 2016/17**

*Percent of new teachers retained in the same district, by certification area*



Note: The sample consisted of 12,414 unique new teachers in New York State in 2015/16 and 2016/17, excluding those employed in charter schools. The numbers of new teachers in the legend sum to 21,311 because some teachers earned multiple certificates in multiple certification areas and were thus counted more than once in the all nonshortage certification areas category and the all other shortage certification areas category. In addition, 133 teachers were uncertified, and 35 teachers had certificates that were denied, disapproved, expired, pending information, revoked, surrendered, suspended, or withdrawn, or were not related to classroom teaching. Rate of retention in the same district refers to teachers who were retained in the same district with a teaching assignment for a second year and a third year. The numerator for each year is the number of teachers who were retained in the same district with a teaching assignment. The denominator is the number of teachers from the previous year. New teachers employed in charter schools were excluded because the retention analysis focused on retention at the district level rather than at the school level.

a. Includes arts, childhood education, early childhood education, English to speakers of other languages, language other than English, social studies, physical education, and other certification areas.

b. Includes bilingual education, bilingual special education, English language arts, health education, library media specialist, literacy, math, science, and special education.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH System and Basic Education Data System Personnel Master File.

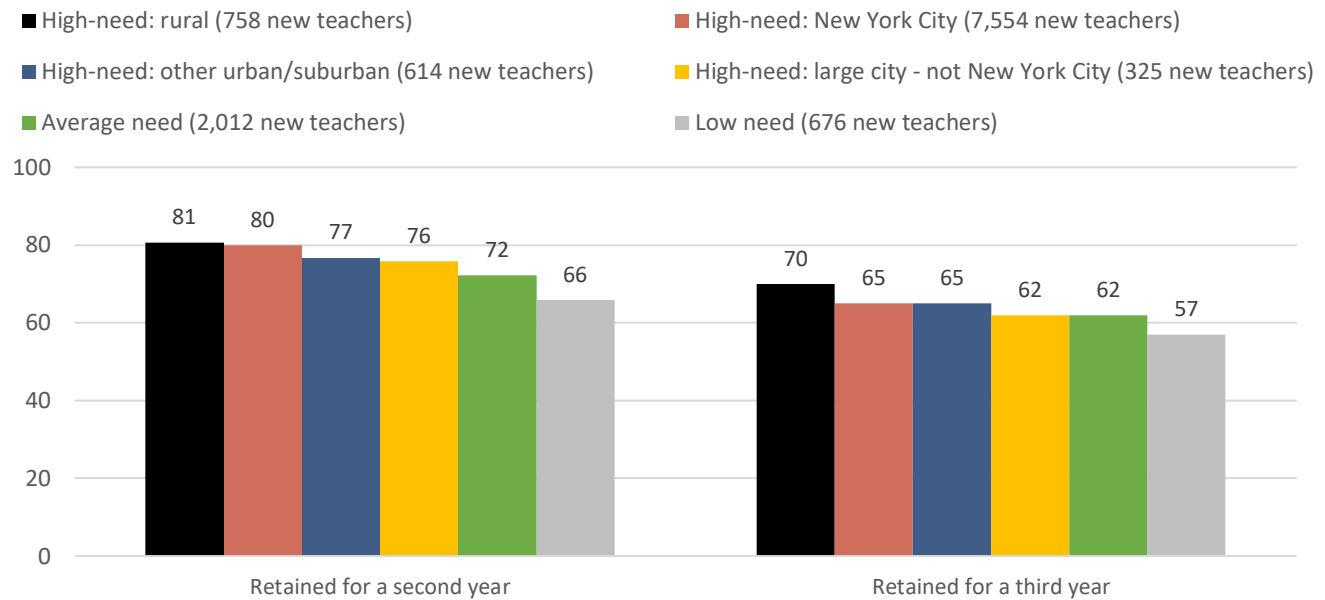
**New teachers employed in high-need districts had higher rates of retention in the same district than new teachers employed in average- and low-need districts**

Second-year rates of retention in the same district were higher for new teachers employed in all four types of high-need districts than for teachers employed in average- and low-need districts. The second-year retention rate was highest in high-need rural districts and in New York City district schools: 81 and 80 percent, respectively,

which is substantively higher than the rates in average-need districts (72 percent) and low-need districts (66 percent; figure 5). It is important to note that this study examines retention in the same district, and there may be more movement across schools within larger districts because there are more schools for teachers to transfer to or be reassigned to within the district. The third-year retention rate was highest in high-need rural districts: 70 percent, which is substantively higher than the rates in high-need large city districts other than New York City (62 percent), average-need districts (62 percent), and low-need districts (57 percent).

**Figure 5. New teachers employed in high-need districts had higher second- and third-year rates of retention in the same district than new teachers employed in average- and low-need districts, new teachers in 2015/16 and 2016/17**

*Percent of new teachers retained in the same district*



Note: The sample consisted of 12,414 unique new teachers in New York State in 2015/16 and 2016/17, excluding those employed in charter schools. The numbers of new teachers in the legend sum to 11,939 because 315 teachers were missing need designation data; 87 teachers worked in or for Boards of Cooperative Educational Services (BOCES), which do not have a need designation; 77 teachers did not have one of the specified need designations; and 4 teachers were employed in two separate districts with different need designations (and were thus counted twice). Rate of retention in the same district refers to teachers who were retained in the same district with a teaching assignment for a second year and a third year. The numerator for each year is the number of teachers who were retained in the same district with a teaching assignment. The denominator is the number of teachers from the previous year. New teachers employed in charter schools were excluded because the retention analysis focused on retention at the district level rather than at the school level.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's Basic Education Data System Personnel Master File.

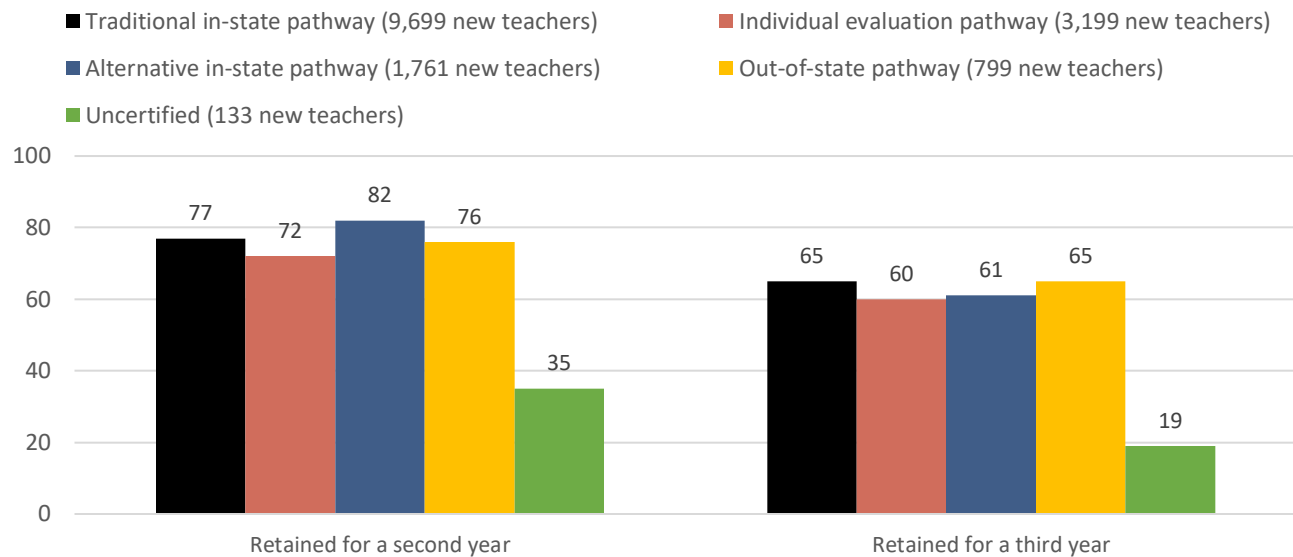
***The small share of new teachers who were uncertified had lower rates of retention in the same district than new teachers who earned certificates through any pathway***

The small share of new teachers who were uncertified (1 percent, excluding charter schools) had substantively lower rates of retention in the same district than teachers who earned certificates through any pathway. Only 35 percent of uncertified teachers were retained in the same district for a second year, and only 19 percent were retained for a third year (figure 6). Both of those rates are more than 40 percentage points lower than the rates for certified new teachers. New teachers who earned certificates, regardless of pathway, had similar second- and third-year retention rates, though the difference in the second-year rate between new teachers who earned a certificate through the individual evaluation pathway (72 percent) and new teachers who earned a certificate through the alternative in-state pathway (82 percent) was above the 5 percentage point threshold for substantive differences. The retention analysis focuses on districts, which cannot legally employ uncertified teachers under New York State Education Law, whereas charter schools are permitted to hire a limited number of uncertified

teachers (New York State Education Department, personal communication, February 5, 2021). Therefore, retention rates are likely higher for uncertified teachers in charter schools than for uncertified teachers in district schools.

**Figure 6. New teachers who earned certificates, regardless of pathway, had similar second- and third-year rates of retention in the same district, while uncertified teachers had substantively lower rates, new teachers in 2015/16 and 2016/17**

*Percent of new teachers retained in the same district*



Note: The sample consisted of 12,414 unique new teachers in New York State in 2015/16 and 2016/17, excluding those employed in charter schools. The numbers of new teachers in the legend sum to 15,964 new teachers because some teachers earned multiple certificates through multiple pathways and are thus counted more than once. In addition, 25 teachers had certificates that were denied, disapproved, expired, pending information, revoked, surrendered, suspended, or withdrawn, or were not related to classroom teaching. Rate of retention in the same district refers to teachers who were retained in the same district with a teaching assignment for a second year and a third year. The numerator for each year is the number of teachers who were retained in the same district with a teaching assignment. The denominator is the number of teachers from the previous year. New teachers employed in charter schools were excluded because the retention analysis focused on retention at the district level rather than at the school level.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.

## Implications

The study findings suggest five main implications for NYSED as it seeks to increase the number of qualified teacher candidates, particularly in shortage areas and high-need districts (New York State Education Department, 2017a). State policymakers outside New York State can also use the findings to inform their own research on shortages and certification pathways.

***The New York State Education Department could further investigate the career trajectories of new teachers, with an emphasis on the extent to which new teachers are filling positions in shortage areas and remaining in those positions***

That special education remains a shortage area in 2020/21 despite more new teachers earning certificates in that area than in any other during the study period suggests that additional research is needed on whether these teachers are hired into positions in special education and stay in them. This study could not investigate new teachers' placement at the subject or classroom level and thus cannot shed light on the extent to which new teachers filled positions in the shortage areas in which they earned certificates. In light of the persistence of many of the shortage areas, it is possible that there is a pool of potential new teachers with appropriate certification who are not filling these positions. Further investigation might also reveal that new teachers earn certificates and

fill positions in shortage areas but that the need for teachers with certificates in shortage areas is simply too great to be filled by new teachers alone.

***The New York State Education Department might want to investigate new or modified ways to encourage or incentivize prospective teachers to earn certificates in shortage areas, particularly shortage areas that attract few prospective teachers***

NYSED and teacher preparation programs could investigate whether creating or modifying targeted recruitment strategies or incentives increases prospective teachers' awareness of and interest in teaching in shortage areas—particularly in areas in which fewer candidates earn certificates, such as career and technical education or bilingual special education. Modifications to the requirements for the individual evaluation pathway, alternative in-state pathway, and out-of-state program pathway or to how requirements and incentives are communicated might be needed to increase the pool of qualified candidates who can fill some shortage areas. NYSED might also consider encouraging prospective teachers from other states who have earned certificates in shortage areas to teach in New York State.

***The New York State Education Department might want to encourage collaboration between districts and higher education to address persistent shortage areas***

Effective communication is needed between districts and institutions of higher education with teacher preparation programs, which prepare the majority of the state's new teachers. Districts could share information with teacher preparation programs about projected needs, as well as interest in and resources for hiring and retaining new teachers, particularly in shortage areas. Teacher preparation programs could pass that information to potential and current teacher education candidates so they know where there are needs and how they can pursue certificates in areas in which they are likely to find employment and in which incentives might be available. One potentially useful strategy is to ensure that teacher recruitment materials provide the certification titles that align with shortage areas.

***The New York State Education Department could investigate the experiences of new teachers who earned certificates in career and technical education to identify ways to increase retention***

Specific certificate titles in career and technical education are the only certificates that are earned predominantly through the individual education pathway—that is, without completing a formal teacher preparation program. Career and technical education is also the certification area with the lowest rate of retention in the second and third years. These findings might be due to the nature of career and technical education or to the fact that few traditional programs in New York State lead to certification in career and technical education in specific certificate titles. Teachers with specific certificate titles in this area might also need additional supports, such as professional learning, mentoring, or coaching, that may encourage career and technical education teachers to remain in their districts. Further research is needed to inform potential solutions.

***The New York State Education Department might want to further investigate the placement and retention of new teachers by need designation***

Contextual factors, incentive programs, and labor market conditions influence where teachers teach and whether they stay, and future research could investigate factors related to placement and retention of new teachers, with particular focus on variations in induction programs and supports by both need designation and course assignment. Possible topics for exploration include why low-need districts had lower second-year retention rates than all four types of high-need districts and lower third-year retention rates than high-need rural districts and why New York City district schools and charter schools employed more new teachers relative to their share of statewide student enrollment than other districts. The results of this research could be shared to help districts improve teacher retention, particularly in shortage areas and high-need designations.

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November 2021

This report was prepared for the Institute of Education Sciences (IES) under Contract ED-IES-17-C-0008 by the Regional Educational Laboratory Northeast & Islands administered by Education Development Center. The content of the publication does not necessarily reflect the views or policies of IES or of the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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