Examining the Effectiveness of a Special Eduation Residency Program in Increasing the Recruitment and Retention of Teachers in Urban Schools

Nancy Burstein, Sue Sears, & Anne Wilcoxen

Abstract

This study examined the long-term impact of a special education residency program in high-need urban schools on the recruitment, program completion, and hiring and retention of graduates. Findings from this study, expanding research to special education teacher preparation, are consistent with a growing body of research that suggests that a well-designed and well-implemented teacher residency program can have great promise in recruiting and retaining effective teachers for hard-to-staff schools. However, findings also indicate significant challenges in implementing residency programs and evaluating their effectiveness. We discuss the implications of these findings for special education residency programs and teacher preparation overall.

Nancy Burstein and Sue Sears are professors in the Department of Special Education of the Michael D. Eisner College of Education at California State University Northridge and Anne Wilcoxen is a professor emerita in the School of Education at Mount Saint Mary's University, Los Angeles, California. Email addresses: nancy.burstein@csun.edu, sue.sears@csun.edu, & annewilcoxen@yahoo.com

Introduction

There are serious inequities in communities regarding the preparation of their teachers. Poor urban and rural communities of color (Darling-Hammond, 2004; Peske & Haycock, 2006; Zeichner, 2010) have chronic teacher shortages that result in the hiring of underprepared teachers, disproportionately impacting the education of lower-income students and students of color (Berry & Shields, 2017; Goldring et al., 2014; Ingersoll et al., 2014). Many of these teachers have little or no preparation when they begin teaching and frequently enter the teaching force through one of the "fast-track" or early-entry programs (Podolsky et al., 2019; Podolsky et al., 2017; Zeichner, 2010). However, studies have found that certified beginning teachers from university preservice programs produce stronger achievement gains and are more likely to remain in the profession than beginners who are uncertified or alternatively certified (Darling-Hammond, 2010; Ingersoll et al., 2014).

Despite the benefits of a certified teacher, fewer candidates are entering traditional teacher preparation programs, as evidenced by a 35% drop in university enrollment between 2009 and 2014 nationwide (Berry & Shields, 2017). As a result, the number of teachers hired on substandard credentials and permits has increased dramatically to address teacher shortages (Behrstock-Sherratt, 2016; Podolsky et al., 2017). These underprepared teachers leave the profession at 3 times the rate of credentialed teachers and with an estimated replacement cost per teacher of up to $18,000 (Carroll, 2007; Ingersoll et al., 2014; Carver-Thomas & Darling-Hammond, 2017). Moreover, teacher attrition is highest in schools serving low-income students and those of color (DeMoss, 2018; Goldring et al., 2014; Sutcher et al., 2016), with more than 20% of teachers leaving these schools each year and more than 45% leaving over 5 years (Center for Mental Health in Schools, 2012; Papay et al., 2017). These conditions deprive high-need schools of a stable and experienced teaching force and negatively impact student achievement (Ronfeldt et al., 2013). As Darling-Hammond noted (2010), "retaining teachers is a far greater problem in the United States than recruiting new ones and also is a key to solving teacher shortages and improving teacher effectiveness" (p. 5).

Teacher Shortages in Special Education

One of the greatest teacher shortage areas is special education, particularly in urban, high-poverty areas with chronic teacher shortages reported for more than 2 decades (Cross, 2017). In a national assessment of Individuals With Disabilities Education Act implementation, most states identified the shortages in special education as the most severe among all teaching fields, with 90% of high-poverty schools in the United States struggling to find qualified special education teachers (U.S. Department of Education, 2015). Given these conditions, the hiring of underprepared special education teachers has reached unprecedented propor-

tions. In California, for example, 64% of new special education teacher hires hold substandard credentials (Carver-Thomas & Darling-Hammond, 2017).

With declining enrollment in teacher preparation programs and attrition rates disproportionately higher in special education than reported for teachers overall (13% vs. 8%), statistics confirm that the pool of special education teachers is shrinking (Sutcher et al., 2016). As Sutcher et al. noted, "it is striking that the field that serves the most vulnerable students . . . is increasingly populated by underprepared teachers" (p. 11). In sum, the acute teacher shortage in special education and large percentage of untrained teachers not only result in inadequate services for students with disabilities but also increase the likelihood that these teachers, who work with the most demanding students in some of the most demanding communities, will leave the profession.

To address the challenge of teacher shortages in urban areas, educators are increasingly turning to teacher residency programs, with some promising findings (Berry et al., 2008; Guha et al., 2016; National Center for Educational Evaluation and Regional Assistance, 2015; Silva et al., 2014; Thorpe, 2014). Specifically, research has suggested that teacher residency programs recruit over twice the number of candidates of color (45%) in comparison to the percentage (19%) recruited nationally (Guha et al., 2017). With almost half of all residents preparing for teaching in high-shortage subjects like math and science, and in bilingual and special education, residencies have potential to address teacher shortages in high-need areas (National Center for Teacher Residencies, 2016). Studies have also suggested that retention rates of residency graduates, reported as 80%–90% after 3 years and 70%–80% after 5 years, are higher than those typically reported in urban schools (Guha et al., 2016).

Teacher Residency Programs: Theoretical Model

Teacher residency programs are based on a medical residency model. Teacher candidates are provided opportunities to practice specific pedagogy in high-need schools, alongside an accomplished mentor, and take coursework that is closely aligned with their clinical experience (Grossman, 2010; National Council for Accreditation of Teacher Education, 2010; Silva et al., 2014). Consistent with other education reform efforts, this model emphasizes the importance of program coherence, in which teacher preparation is organized around an explicit and shared vision of effective teaching. As Berry et al. (2008) described, teacher residency programs provide teaching candidates with "both the underlying theories of effective teaching and a year-long, in school 'residency' in which they practice and hone what they are learning alongside an effective veteran teacher in an urban classroom" (p. 11).

Traditional models of teacher preparation have historically focused on theory and academic knowledge, with either limited or disconnected opportunities throughout the program to apply that knowledge in practice. Instead, practice typically occurs

at the end of the program, with too infrequent communication between the university program and the school-based or cooperating teacher, who may not have adequate training or be sufficiently financially compensated for their work. Early-entry or alternative-certification routes hire teachers with little or no preparation who learn to teach while on the job; these programs may provide limited theoretical grounding, offer few opportunities to learn from a mentor teacher, and tend to privilege practitioner over academic knowledge. Residency models, it has been suggested, have the potential to occupy a "third space" in teacher education (Zeichner, 2010). This "third space" or hybrid model brings together academic and practitioner knowledge as well as local school districts and campus-based teacher preparation programs.

Although residency programs differ, the residency model adheres to common design principles that distinguish it from both traditional and alternative routes to certification (Berry et al., 2008; Guha et al., 2016). First, with a commitment to clinically based preparation, residency programs typically extend student teaching to a yearlong apprenticeship (Silva et al., 2014). Placement is alongside a trained mentor with an average of 10 years of experience (Silva et al., 2014). Second, residencies explicitly address a long-standing challenge to teacher education, the gap between theory and practice (Zeichner, 2010). With shared responsibility for teacher preparation, residency mentors and university faculty have opportunities to exchange information and expertise, learning from one another. Third, residency programs are designed to build strong partnerships among institutions of higher education and local school districts, recruiting and placing candidates in response to district hiring needs and preparing them in the communities and schools in which they will eventually work (Guha et al., 2016). Finally, residents are rigorously selected, participate as part of a cohort, and are provided financial assistance in exchange for a commitment to teach in partner districts, with supported induction (Berry et al., 2008; Papay et al., 2012).

Purpose of the Present Study

Research has suggested that teacher residency programs show promise in helping districts meet staffing needs and diversify and retain their workforce in high-need schools (Guha et al., 2016; Silva et al., 2015). However, although residency programs may include special education participants, little if any research has examined the specific effect of a special education teacher residency program. Therefore our goal with this study was to expand research on residency programs to include special education teacher preparation. We describe a residency program based on the aforementioned principles and discuss findings from an evaluation study focused on candidate recruitment, program completion, and hiring and retention of graduates in high-need urban schools. The evaluation questions guiding this study were as follows:

Question 1: To what extent does the residency program increase the re-

cruitment of special education candidates of color committed to teaching in high-need schools?

Question 2: To what extent does the residency program increase candidates' completion of a special education credential?

Question 3: To what extent does the residency program increase district hiring of credentialed special education teachers in high-need schools?

Question 4: To what extent does the residency program increase retention of special education teachers in high-need schools?

Method

Setting

This study was conducted at a university in collaboration with a school district located within a large urban area in southern California. The university, part of the largest statewide system of public 4-year institutions in the country, serves a diverse student body, with 45% of its more than 38,000 students from traditionally underserved groups. As one of the biggest producers in the state, graduating 302 teacher candidates in 2017–2018, the university is a major supplier of teachers for the partner district. During 2016–2017, the district's enrollment numbered more than 600,000 K–12 pupils, and of those, approximately 4% (26,000) received special education services. Across the district, 26% of pupils were English learners and 84% qualified for free or reduced-priced lunch. The ethnic composition of the district was primarily Latino (74%), with other ethnic group percentages being White (9.80%), African American (8.40%), Asian (6.00%), Pacific Islander (0.40%), and American Indian/Alaskan Native (0.02%).

The university's Department of Special Education, in which the residency program was housed, offers credentials in four specialization areas: mild/moderate disabilities (MM), moderate/severe disabilities (MS), deaf and hard of hearing (DHH), and early childhood special education (ECSE). Candidates pursue a credential in one of four credential program pathways: an accelerated 1-year, cohort-based, full-time graduate program; a 2-year intern program designed for on-the-job teachers; a traditional pathway (flexible scheduling for part- or full-time graduate students); and an undergraduate, integrated teacher education program. Between 2010 and 2015, the department added a fifth pathway, the residency program. During this time period, the traditional program was the largest, serving 40% of the 549 candidates, followed by the intern and residency programs at 23% each; the smallest were the accelerated (9%) and undergraduate (5%) programs. The majority of the candidates (58%) were pursuing a credential in MM, a specialization significantly larger than ECSE (18%), DHH (13%), and MS (11%).

Special Education Residency Program

Funded by a 5-year grant from the U.S. Department of Education, and offered between the academic years of 2010–2011 and 2014–2015, the residency program examined in this article was designed as a combined 2-year special education credential/master's program in one of the four specialization areas offered in the Department of Special Education (MM, MS, DHH, ECSE). During the first year, candidates completed coursework and a two-semester apprenticeship in a high-need school, earning a special education credential and obtaining a teaching position in the partner district. In the second program year, these new teachers received support through an induction program and completed remaining courses for the master's degree. The program emphasized the importance of clinically based preparation (National Council for Accreditation of Teacher Education, 2010) and was built on the principles of a residency model as identified by Berry et al. (2008) and shown in Table 1.

Principle 1:
Strong Partnership Among Institutions of Higher Education and School Districts

The university and the district collaborated on all aspects of the residency program. A senior district special educator on detached service was assigned to work full-time on the project as the district liaison. She was an active participant in screening applications and selecting residents, recruiting and training mentor

Table 1
Guiding Principles of a Residency Program and Their Implementation

Residency principle	*Special education residency program*
Strong district–higher education institution partnership	Partnership between the university and a large urban school district
Progression through the program as part of a rigorously selected cohort	Rigorous selection of a diverse special education cohort with program progression facilitated through financial incentives and academic and collaborative support
Full-year teaching alongside an experienced, trained mentor	Two-semester apprenticeship with selected special education teachers in high-need schools prepared as mentor teachers
Tightly aligned education theory and classroom practice	Coursework integrated with classroom practice through professional development with mentors, administrators, and faculty
Ongoing mentoring and support for graduates	Support for graduates through an induction program that includes mentor support and completion of advanced coursework for the master's degree

teachers, facilitating professional development activities, coordinating district recruitment and hiring activities, and, finally, supporting graduates during the induction phase of the program.

The residency program's management team met frequently with district and school administrators to review recruitment and hiring data, to track teacher retention, and to coordinate program activities with district initiatives. For example, residents and mentors collected and analyzed district student achievement results to inform practice, a district priority, and the university student teaching evaluation was revised to better align with the district evaluation.

Principle 2:
Candidate Progression Through the Program
as a Part of a Rigorously Selected and Supported Cohort

The program goal was to recruit 125 candidates, 25 each year of the 5-year grant. In addition to university admission requirements (e.g., minimum undergraduate grade point average [GPA] of 2.76, passage of basic skills and subject matter exams, 45 field experience hours, recommendations, personal essay), all applicants were screened using a residency application and an individual interview. Those approved through this process participated in a group interview, conducted by university and district personnel and unique to the residency program. Applicants were rated on items related to their potential for success in the program, including an understanding of and familiarity with the cultures and languages of the communities they would be serving and their experience working with K–12 students of color.

Candidates progressed through the program in a cohort of approximately 25. The cohort experience was supported by initial and ongoing advisement to ensure that residents enrolled in preselected courses with multiple opportunities to collaborate. In addition to shared coursework, a cohort-based professional community of learners was supported in professional development activities for resident, mentor, and administrator site teams. Final program evaluation ratings and exit interviews indicated that residents highly valued the cohort experience and continued to support one another during their first years of teaching.

Principle 3:
Apprenticeship Alongside an Experienced, Trained Mentor Teacher

A rigorous recruitment process for selection of mentor teachers was developed in the initial years of the project, which included an application, administrator recommendation, and classroom observation by program staff. Selection criteria included a teaching credential in an appropriate special education specialization area, a minimum of 3 years of teaching experience, and demonstrated excellence in teaching. Seventy-nine highly qualified mentors were recruited for the project, including six former residents in the final years of the grant. Mentors had an aver-

age of 13 years of teaching experience, 61% had a master's degree, and 47% were teachers of color. They attended trainings that included detailed fieldwork expectations and assignment guidelines, information on coaching, and the use of a rubric to evaluate and provide feedback on resident performance. In addition, site teams comprising mentors, administrators, and residents participated in monthly literacy professional development activities.

Mentor ratings of the mentoring experience were overwhelmingly positive, with 97% of the respondents reporting that the residency experience had a positive impact on their teaching practice. The quality of the mentorship was also evidenced by resident perceptions of their fieldwork experience; 97% of the residents indicated that their fieldwork experience was valuable, reporting that their mentor frequently observed their teaching, met with them, and offered suggestions and advice about their teaching.

Principle 4:
Tightly Aligned Theory and Classroom Practice

Residency faculty meetings, attended by all course instructors in the program, were established in Year 2 of the project to ensure coverage of essential content, to eliminate redundancies across courses and course assignments, and to strengthen connections between coursework and field experiences. Course syllabi were examined for the extent to which they included application assignments (e.g., observation, lesson plans, field-based practice). Where application assignments were minimal, they were added. Individual faculty interviews indicated that collaboration around course assignments was one of the most gratifying program activities, and a retrospective review of syllabi found an increase in the number of application assignments from 30 in 2010 to 42 in 2014. The success of these efforts was also documented on formative program evaluations survey ratings of coursework satisfaction and interview data. While 76% of residents across all 5 years were "satisfied" or "very satisfied" with their coursework, only 43% of Cohort 3 residents were satisfied with coursework. Interview data indicated that closer articulation of coursework assignments with the fieldwork experience was needed. Following the previously described faculty activities, coursework satisfaction ratings rose to 100% for Cohort 4 and 70% for Cohort 5.

Professional development activities for faculty and school site teams of residents, mentors, and administrators were provided to further integrate coursework with classroom practice. Monthly workshops focused on collecting and interpreting a battery of language and literacy progress monitoring assessments and developing an Action Plan Project designed to improve English/language arts outcomes of K–12 students. Findings from the Action Plan Project were showcased in poster sessions at an annual professional development institute.

Principle 5:
Mentoring and Support for Program Completers
During Their First Years of Teaching

In Years 1–4, all residency completers participated in an induction program, through either the district or the university; 95% of the residents elected to participate in the university program. The university program included a rigorously selected, paid special education support provider for each student, with activities coordinated by the residency program's district liaison. The district liaison was critical to the success of the induction experience, working closely with the district to ensure the timely assignment and training of an appropriate special education support provider. Residents reported that their support providers were in regular contact (92%), worked with them to identify teaching challenges and possible solutions (92%), shared lesson plans and instructional activities (87%), and gave them useful feedback on their teaching (90%).

Induction coursework focused on residents' immediate teaching challenges. Program evaluation findings indicated that residents found coursework applied to their teaching assignment (84%), provided opportunities to discuss individual concerns (83%), provided guidance on effective teaching practices (79%), and encouraged reflection and refinement of practice (86%).

A comprehensive Residency Program Evaluation Survey was administered at the end of each project year to all stakeholders—residents, mentors, administrators, and faculty. Survey items were directly related to the principles of an effective residency program, including the apprenticeship experience, mentor training, and the alignment of coursework and fieldwork experiences. These surveys, along with transcripts of focus group interviews and project-specific documents and records, were reviewed on a regular basis and used to inform program improvement efforts. Taken together, these data, when combined with the descriptions of program activities detailed earlier, demonstrate that program implementation adhered to the principles of residency programs. Findings aggregated across all 5 years confirmed that the cohorts supported a professional community of practitioners, residents valued their fieldwork experiences, mentors appreciated program trainings, coursework was aligned with field experiences, and induction supported the development of new teachers. Interviews with district administrators yielded comments suggesting that they were more likely to hire residency graduates than other applicants and that the collaboration with the university was highly valued.

Residency Participants

A cohort of approximately 25 special education candidates was recruited each year through university and district outreach (website, flyers, word of mouth). Advertising for the residency program focused on its significant financial incentives reflecting a "living wage," the accelerated 1-year cohort-based features of the

credential program, and completion of a master's degree in an additional year while teaching. During the 5-year grant period (2010–2015), a total of 125 residents were recruited; the majority were pursuing a credential in MM (65%), followed by ECSE (17%), DHH (13%), and MS (5%). The distribution of the 125 residents across specializations was relatively consistent with that of the department. Residents were paid a monthly stipend and were required to sign a service obligation agreeing to work in the district for 3 years or return the stipend or partial stipend, prorated on years employed as a teacher in the district.

Description of Research Processes and Key Findings

Recruitment and Program Completion

Recruitment and admission data were analyzed to determine whether demographic characteristics of candidates in the residency program and their completion of the program differed from other program pathways.

Procedures

University admission data for credential candidates admitted between academic years 2010–2011 and 2014–2015 were disaggregated by credential pathway (residency vs. other). Demographic variables examined included ethnicity (non-White vs. White); gender; age; undergraduate GPA; and type of admission, whether regular or exceptional—exceptional admits do not meet one or more admission requirements, typically undergraduate GPA or all sections of a required exam. Candidates' undergraduate institution of higher education (IHE) was also examined. Undergraduate IHEs were categorized as the public IHE in this study, other California public IHEs within the same system, California public research IHEs, California private IHEs, and IHEs outside California and outside the United States. Program completion variables included completion status (exited, completed, continuing), program duration (number of semesters to program completion), and exit GPA. These data were initially collected in 2015–2016. However, because many of the candidates in other pathways were still completing the program, completion data were also collected in spring 2019, more accurately capturing program duration and completion for these candidates.

Results

Recruitment. Between 2010 and 2015, a total of 549 credential candidates were admitted to the special education program, 125 to the residency pathway, and 424 to other program pathways. Candidate demographics and statistical comparisons of the two candidate groups are presented in Tables 2 and 3. As shown in Table 2, chi-square tests of independence revealed that the residency program pathway recruited significantly more candidates (51% vs. 40%) from non-White

groups and admitted marginally fewer (7% vs. 13%) exceptional admission candidates. There was a significant effect for undergraduate IHE, $x^2(5) = 13.533$, $p = 0.189$. Post hoc pairwise comparisons using Bonferroni adjusted .05 alpha levels of .002 per test (.05/5) revealed that candidates admitted to the residency program were significantly more likely to be recruited from public research IHEs than were candidates admitted to other pathways (20% vs. 9%, respectively). No differences were found for gender; 82% of the total admitted were female in both groups.

Table 2
Chi-Square Results for Categorical Demographic Variables for Residency and Other Pathway-Admitted Candidates

Demographic variable	Residency		Other		x2(1)	p
	n	*%*	*n*	*%*		
Ethnic background						
Non-White	64	51	168	40	5.30	0.031
White	64	49	256	60		
Admission status						
Exceptional	9	7	57	13	3.56	0.059
Regular	116	93	367	87		
Gender						
Female	103	82	349	82	0.001	0.980
Male	22	18	75	18		
Undergraduate IHE[a]						
Public IHE in study	57	46	215	51	1.10	0.294
Similar CA public IHEs	16	13	48	12	0.14	0.705
CA public research	25	20	38	9	11.58	0.001
CA private	16	13	75	18	1.67	0.196
Outside CA	11	9	42	10	0.14	0.710
Outside USA	0	0	4	1		

Note. N = 549, 125 residency and 424 other. CA = California. IHE = institute of higher education.
[a] Post hoc pairwise comparisons using Bonferroni adjusted .05 alpha levels of .002 per test (.05/5).

Table 3
Means, Standard Deviations, and Test of Significance for Age and Undergraduate Grade Point Average of Residency and Other Pathway-Admitted Candidates

Demographic variable	Residency	Other	t(547)	p	95% CI
Age (years)	29.10 (6.42)	32.43 (9.37)	−4.546	0.000	[−4.772, −1.888]
Undergraduate GPA	3.21 (0.53)	3.14 (0.54)	1.239	0.216	[−0.39, 0.175]

Note. $N = 549$, 125 residency and 424 other. Standard deviations are in parentheses.
CI = confidence interval. GPA = grade point average.

Age and GPA comparisons are presented in Table 3. Residency candidates, compared to candidates from other pathways, were significantly younger. Finally, there were no significant differences for mean undergraduate GPA between residents ($M = 3.21$) and candidates from other pathways ($M = 3.14$).

Program Completion. Of the 125 residents, 121 completed the program. Comparison data on program completion status of residency and other program pathway candidates are presented in Table 4. The residency program pathway was found to be statistically different from other program pathways. Compared to candidates in other program pathways, residents were more likely to complete and obtain a preliminary credential (97% vs. 74%) and less likely to exit or withdraw from the program (3% vs. 24%). Moreover, the residency pathway was statistically different from other pathways for program duration. Specifically, as shown in Table 4, 94% of the residents completed the program in two semesters, whereas most candidates in other program pathways took three to four semesters (37%) or five to six semesters (35%) to complete their programs. Finally, there were significant differences in exit GPA between the two groups, $t(432) = 5.16$, $p < .001$. The exit GPA for the residency program was higher ($M = 3.82$, $SD = 0.22$) compared to other program pathways ($M = 3.68$, $SD = 0.25$).

Hiring and Retention of Residency Teachers

District data were analyzed to examine the extent to which the program increased the hiring and retention of special education teachers in high-need schools.

Table 4
Chi-Square Results for Program Completion Status and Duration
for Residency and Other Pathway-Admitted Candidates

Variable	Residency n	%	Other n	%	x2	p
Program completion status[a]					(2, 549) = 30.84	0.000
Continuing	0	0	7	2		
Exited	4	3	104	24		
Preliminary credential	121	97	313	74		
Duration in program[b] (semesters)					(3, 434) = 250.16	0.000
2	114	94	41	13		
3–4	4	3	117	37		
5–6	2	2	110	35		
≥7	1	1	45	14		

[a] $N = 549$, 125 residency and 424 other. [b] $N = 434$, 121 residency and 313 other.

Procedures

Hiring and retention data were collected from the district's Office of Human Resources for 2011–2015. These data included individual teacher hire date; date of departure, if applicable; and hiring classification. The hiring classifications were as follows:

preliminary credential: teachers who hold a preliminary credential and are eligible for permanent status after 2 years of successful teaching

intern credential: teachers who hold a 2-year intern credential and are enrolled in a university or district teacher preparation program, earning the preliminary credential while on the job as the teacher of record

temporary contract: teachers without a preliminary or intern credential serving in interim or short-term assignments with options for contract renewal

provisional contract: teachers assigned for a short-term basis but not eligible for contract renewal

With the exception of those hired with a provisional contract, the employment status of all 2011–2015 hires was tracked to compare the retention of residents with that of other hires.

Results

Hiring. The district hired 1,680 new special education teachers from 2011 through 2015 with the following employment classifications: teachers with a preliminary credential, university and district interns without a preliminary credential, and teachers on temporary or provisional contracts without a preliminary credential. New hires with a preliminary credential included 114 (94%) of the 121 program completers in the residency program; the 7 residency completers not hired were in the DHH specialization, where fewer district positions were available.

The number and percentage of teachers in each hiring classification, presented in Table 5, show that 42% ($n = 708$) of the new special education teacher hires completed a preliminary credential program. Of the 1,680 new hires, 7% ($n = 114$) were from the residency program and 35% (n = 594) were from nonresidency programs. The other 972 teachers (58%) were hired as interns or held temporary/ provisional contracts. Taken together, the data indicate that while the residency program contributed to the hiring of special education teachers with a preliminary credential, the majority of district new hires were not fully certified as special education teachers.

Retention. Retention data were available for 1,424 contracted new special education teachers hired between 2011 and 2015. The initial hires included 708 teachers with a preliminary credential (114 residents and 594 nonresidents), 603 with an intern credential (389 university interns and 214 district interns), and 113 on a

temporary contract. Not included were 256 teachers initially hired for 1 year on a provisional contract without renewal options.

Percentages for 6 years of retention data by employment classification are shown in Figure 1. Findings indicate that the percentage of residency teachers retained in the district was consistently higher each year than percentages for other teachers over the 6-year period. For example, percentages of 6-year retention data reveal that teachers from the residency program had the highest long-term retention rates (75%), followed by district interns (70%), nonresidency teachers with a preliminary credential (67%), university interns (64%), and initial-hire temporary contract teachers (60%).

To test for significance of teacher retention, a Kaplan–Meier methods chi-square survival analysis was performed by employment classification group. Results are presented in Table 6. Over a 6-year period, retention rates were significantly higher for residency teachers than for nonresidency teachers with a preliminary credential.

Table 5
Number and Percentage of District New Hires, 2011–2015, by Classification

| Hiring classification	n	%
Preliminary credential	708	42
Residency	114	7
Nonresidency	594	35
Nonpreliminary credential	972	58
University interns	389	23
District interns	214	13
Temporary contract	113	7
Provisional contract	256	15

Note. $N = 1,680$.

Table 6
Kaplan–Meier Methods Chi-Square Survival Analysis for Teacher Retention, by Classification

Credential	1. $x2$	p	2. $x2$	p	3. $x2$	p	4. $x2$	p
1. Resident	–	–						
2. Preliminary nonresident	5.033	0.025	–	–				
3. University intern	1.869	0.172	2.458	0.117	–	–		
4. District intern	0.068	0.795	6.870	0.009	1.832	0.176	–	–
5. Temporary contract	11.045	0.001	3.773	0.052	8.656	0.003	13.223	0.000

However, there was no significant difference between the retention rates of the residency teachers and university or district interns. When compared to nonresidency preliminary teachers, retention rates were significantly higher for district interns but not for university interns. Teachers with an initial temporary contract demonstrated the lowest retention rates, significantly lower when compared to residency and to university and district intern teachers and marginally lower when compared to nonresidency preliminary credentialed teachers.

Figure 1
Percentage of District New Hires, 2011-2015, Retained, by Credential Category
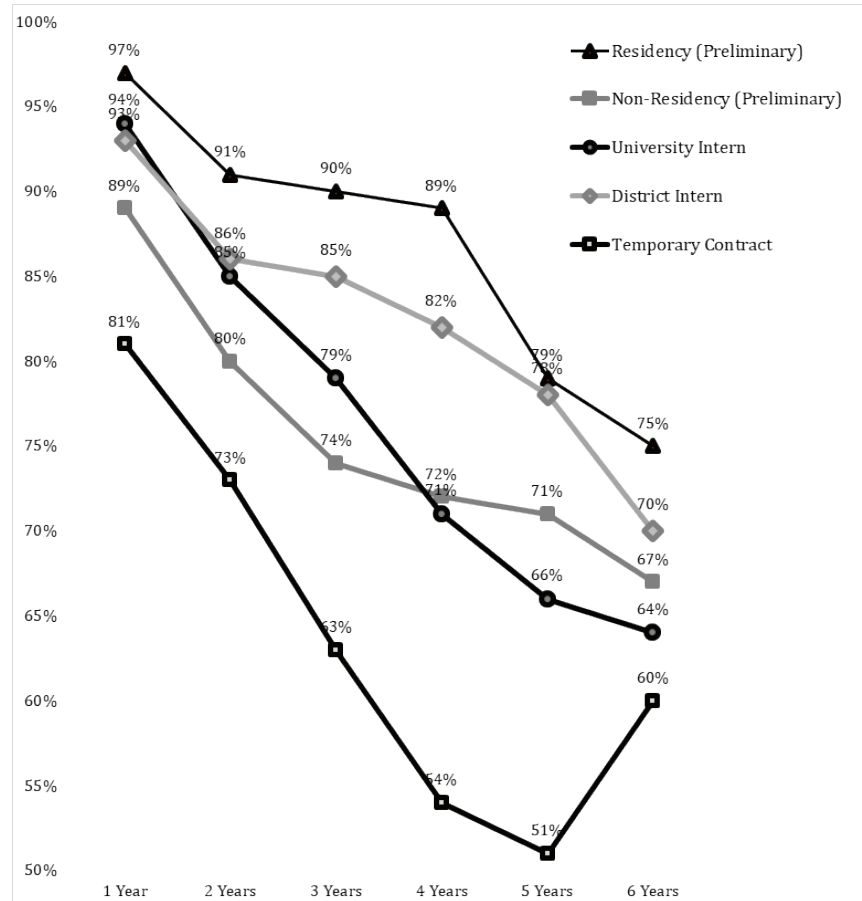
Discussion

The primary purpose of this study was to examine the long-term impact of a special education residency program on the recruitment, program completion, and hiring and retention of graduates for high-need urban schools.

Recruitment and Program Completion

Findings from this study indicate that over the grant period of 5 years, the residency program was successful in meeting its goal to recruit 125 resident teacher candidates. Of these, more than half (51%) were candidates of color, a significantly higher percentage than for candidates in other program pathways (40%). The residency program selected fewer exceptional admission candidates and a higher percentage of graduates from in-state public research institutions.

The demographic differences in the residency program as compared to other program pathways may reflect robust recruitment efforts and the rigorous candidate selection process. While evaluation findings showed that many of the advertised program features, including an accelerated 1-year program, a cohort-based model, and the emphasis on clinical practice with a mentor teacher, attracted candidates to the program, resident stipends supporting tuition and other living expenses were the most significant factor. As Myers et al. (2020) noted, residency programs are at a disadvantage to intern programs because interns receive a teacher's salary. Work opportunities are also available to traditional candidates, who typically attend school part-time and are usually able to maintain employment until student teaching. However, the residency program became an attractive and viable option for candidates, given grant funds that supported tuition and other living expenses.

The selection process involved reviewing application materials and conducting interviews (individual and group) with applicants rated on their academic and experiential backgrounds. Candidates with strong academic records and experiences with diverse communities were rated highly in the selection process, possibly enhancing a diverse pool of participants who showed promise in teaching urban students of color. The study's results, which focused exclusively on special education teacher preparation, are consistent with a growing number of studies that indicate that residency programs are successful in providing a more diverse workforce (Guha et al., 2016).

Program completion results indicated that candidates in the residency program earned a significantly higher GPA than did candidates in other program pathways and were more likely to complete the residency program, with only 2% withdrawing in comparison to 23%. Additionally, residents completed the program in two semesters, whereas other pathway candidates needed three to six semesters. These findings suggest that despite the accelerated pace and demanding curriculum, almost all residents successfully completed the program. It may be that the rigorous selection of promising candidates and the stipend facilitated program completion. However,

it may also be that the program design, which adhered to the residency model's principles, contributed to program completion. Program evaluation findings revealed that the program overall supported a professional community of practitioners working together to support and guide residents in the program. Residents highly valued the cohort experience and support provided by their colleagues, mentor teachers, and university faculty.

One of the most challenging residency model principles to implement, according to program evaluation data, was the effort *to tightly align coursework with classroom practice*. Ratings on program alignment varied by year, and alignment was valued when successful. For example, mentors appreciated knowing explicitly about course requirements, timelines, and how they could assist candidates in implementing assignments through classroom practice. The more connected and coordinated they were, the more highly they rated the program. These findings suggest that although challenging to implement, linkages between coursework and classroom practice enhance program implementation. Although little research has compared program completion of residency programs to other program pathways, our findings are consistent with studies that suggest the importance of the model's principles in supporting residents through a demanding year of study (Guha et al., 2016).

Hiring and Retention

Of the 125 participants in the residency program, 121 (96%) obtained a special education credential, and of those, 114 (94%) were employed in the district, contributing to the supply of new teachers. However, while residency program graduates and a small percentage of other new hires in the district completed requirements for a preliminary credential, the majority of new hires (58%) comprised underprepared teachers pursuing a credential as university or district interns or holding temporary or provisional contracts. These findings reflect the promise and current limitations of residency programs in providing a pipeline of qualified teachers for high-need urban schools.

Of the 114 resident completers hired in the district, the percentage of residency teachers retained was consistently higher each year than for other teachers, even after their 3-year service obligation ended. When tested for significance, retention rates were found to be significantly lower for teachers with a temporary contract than for other teachers. These findings are supported by research indicating that underprepared teachers with substandard credentials are more likely to leave the profession than other teachers (Carver-Thomas & Darling-Hammond, 2017). We also found that retention rates of nonresidency teachers with a preliminary credential were significantly lower than for residency teachers and district interns. These results were unexpected, because researchers have found that teachers with certification are more likely to be retained than those in alternative-certification or "fast-track" programs (Darling-Hammond, 2010; Ingersoll et al., 2014; Podolsky et al., 2019).

The high retention rates for district interns in this study may reflect the recruitment strategies and program supports provided through the district. District intern programs typically recruit candidates from the communities they serve. In this particular district, a Career Ladder program is offered for paraprofessionals, many of whom live and work in the district; the district recruits these paraprofessionals, and also substitute teachers and others, into its intern program. Though the district intern program may contribute to a pipeline of promising community-based teachers and stability in the district, interns learn to teach while on the job, unlike residents, who enter the profession fully prepared to serve students with special needs.

The high retention rates for residents, as suggested by Guha et al. (2016), may be attributable to the residency program's design: careful selection of residents and mentor teachers, program quality with an emphasis on classroom practice tightly integrated with curriculum, and residents' commitment to teach in return for financial and induction support. It may also be that the district partnership during preservice facilitated the transition of new teachers into the district; residents were already knowledgeable about district initiatives, curricular priorities, and the teacher evaluation system. Finally, the residents' 1-year apprenticeship with students similar to those they would serve may have contributed to their retention as teachers. These results are supported by Goldhaber et al. (2017), who found that teachers are more effective in teaching in schools with demographics similar to the schools where they were trained.

Taken together, findings suggest that the residency program contributed to teacher retention, given the selection process and initial and ongoing preparation and support. Residents were selected on the basis of their commitment to and promise for teaching in high-need schools; they were provided clinically based preparation in these schools prior to entering the teaching field and were offered support through a special education support provider during their first years of teaching.

Limitations of the Study

As discussed, findings suggest that a special education residency program can successfully impact the recruitment, program completion, and retention of special education teachers in high-need urban schools. However, this evaluation effort had two major limitations.

First, it is not possible, given the design of this study, to disentangle the multifaceted and complex relationships among the features of the residency program and their subsequent impact on outcomes. For example, we cannot attribute the high rate of program completion to the rigorous selection process or to other plausible factors, such as the cohort model and the stipend. Similarly, high retention rates may be linked to multiple program features, including the yearlong apprenticeship in the district in which the residents were working, and a preparation program that aimed to tightly align coursework and field experiences. In sum, the inability to

isolate the relative contributions of individual program features to reported outcomes limits the interpretation of findings.

Second, in this evaluation, we do not report results of teacher evaluations or student achievement outcomes, commonly found in teacher education research as measures of quality of teacher preparation. Efforts to do so were initiated but fraught with insurmountable challenges, ultimately yielding examination beyond the scope of this study. Although the residency program worked to align its evaluation form with that of the district, the district evaluation form was more generic and did not include items related to those practices known to be effective for students with disabilities, for example, direct, explicit, and systematic instruction. In addition, upon review, there was lack of variability among district teacher evaluation ratings. This was not completely unexpected, as teachers receiving anything below satisfactory were not retained.

The challenges associated with the collection and analyses of special education student achievement data were consistent with those discussed in the research literature (Noell et al., 2014). The use of district individualized education plan goals or progress monitoring measures lacked standardization, while formal measures were not sensitive enough to capture student gains. Further complicating the process was that the special education teacher of record was not always the one delivering instruction, which often included more than one professional; therefore it was not possible to attribute student outcomes to any one specific teacher or, by extension, any single teacher preparation program.

Implications for Teacher Preparation

Residency programs are designed to attract a new pool of talented and diverse teacher candidates, preparing them for success and retention in high-need urban schools. A comprehensive examination of the teacher residency program in the current study indicated that program implementation adhering to the guiding principles of the residency model enhanced the recruitment and retention of special education teachers. Despite a demanding year of study, residents rated the program highly and were significantly more likely to complete the program compared to other special education credential candidates. Moreover, retention rates were higher for residents than for all other new teacher hires. These results are consistent with a growing body of research that suggests that a well-designed and well-implemented teacher residency program shows great promise in recruiting and retaining effective teachers for hard-to-staff schools (Guha et al., 2016). Importantly, the current study expands the research to special education. In this section, we discuss three implications drawn from this study: investing in residency programs, implementing residency programs, and evaluating residency programs.

Investing in Residency Programs

Findings from the current study suggest that residency programs have potential in addressing teacher shortages in special education, but only, as researchers have emphasized, with significant expansion and program support (e.g., DeMoss et al., 2017). First, as our study suggests, without expansion, residency programs may have little impact, particularly in large, urban school districts experiencing acute teacher shortages. Although our findings reflect the promise of residency programs in providing a pipeline of qualified teachers for high-need schools, residency graduates were only a small percentage of other new hires in the district, with the majority of new hires comprising underprepared teachers.

Second, our findings suggest that considerable investment is needed to support programmatic features of residency programs. For example, in this program, funding was allocated to support candidates financially and academically, facilitate the selection and training of mentors, and provide a coherent and coordinated program of study. Unlike other countries that have dedicated considerable public funding to support aspiring teachers as they learn their craft, historically few programs in the United States have had substantial public resources committed to residency programs (Polakow-Suransky et al., 2016).

Recently, however, investment in residency programs throughout the United States has been growing. Educators are advocating for policies to establish grants, scholarships, and tuition forgiveness programs in exchange for teaching in high-need schools (National Center for Teacher Residencies, 2017), and these advocacy efforts are succeeding. For example, in 2019, California approved $50 million to support district–university partnership residency programs that prepare special education teachers and another $25 million for science and math teachers. At local levels, some districts have reallocated funding from their budgets to cover resident stipends or supplement externally funded stipends by employing residents as substitute teachers, paraprofessionals, and tutors (DeMoss et al., 2017). Given these efforts, we may be moving toward residency programs that could, as DeMoss et al. recommended, "be part of every district and preparation program's efforts to strengthen and stabilize our teaching force" (p. 3). With financial investment and innovative reforms, the implementation and expansion of residency programs has the potential to address the inequities in public education and the persistent shortages of fully credentialed teachers in special education.

Implementing Residency Programs

Residency programs are designed with a set of guiding principles to address many of the limitations of traditional and alternative routes to teacher preparation. However, although residency programs have grown in popularity and are rapidly expanding, it is unclear whether these programs adhere to the model's defining principles and are implemented with fidelity. Guha et al. (2016) cautioned that

a teacher residency program can contribute to teacher recruitment, preparation, and retention, but "neglecting any of the elements of the residency model could jeopardize the success of the model" (p. 17).

In the current study, findings suggest that implementation of the guiding principles contributed to the effectiveness of this residency program and, because outcomes were viewed as favorable, also informed other program pathways at the university. For example, traditional programs have become more clinically based, with an increased emphasis placed on mentor teacher selection and professional development. Clearly many of the defining elements of a residency program, designed to address concerns about teacher preparation, may contribute to the quality of other teacher preparation programs, blurring the lines between program pathways. Given these complexities, comparing programs (e.g., traditional, alternative, residency) may be less informative than comparing the extent to which effective teacher preparation elements are embedded within a program. As Goldhaber (2019) emphasized, the success or failure of teacher preparation programs depends on learning more about the elements in a program that constitute effective teacher candidate education.

Evaluating Teacher Residency Programs

In evaluating teacher residency programs, Goldhaber (2019) recommended creating systematic feedback loops that connect the experiences of teacher candidates in their teacher preparation programs to teacher outcomes (see also Libetti & King, 2016). Studies are beginning to emerge that focus on the connections between teacher outcomes and more specific elements of teacher preparation programs. For example, Ronfeldt (2014) found that candidates completing more methods coursework and practice teaching have higher retention rates. Boyd et al. (2009) found that teachers tend to be more effective when their student teaching has been well supervised and aligned with methods coursework. However, little research, if any, has investigated these links for special education teacher preparation.

In addition to defining elements of a program for evaluation purposes, researchers have emphasized the importance of outcome data in examining program effectiveness. However, tracking teacher outcome data is time consuming, costly, and particularly complex if teachers are employed in multiple districts. Moreover, as we learned in the current study, outcomes-based research has significant limitations, including the validity and reliability of teacher performance measures and student achievement data, a particular concern in measuring student gains in special education. The current study's initial efforts to use student achievement data to document program effectiveness were abandoned, as the challenges that emerged were considerable and perhaps explain why very few studies, with the notable exception of Feng and Sass (2013), have investigated the relationship between special education teacher preparation, teacher effectiveness, and student outcomes.

Two implications for evaluating the effectiveness of residency and other

teacher preparation programs have emerged from the current study. First, program evaluations must consider collecting data on specific features of programs rather than only their generic elements, such as fieldwork (traditional program) or apprenticeship (residency program), for example, the indicators of a quality clinical experience that are implemented. Then, in collaboration with districts, teacher preparation programs need to create systems that link these qualities to particular outcomes, such as program completers' retention. These kinds of systematic efforts are important if we are to address a second implication—the need to engage in more comprehensive exanimation of relationships between teacher preparation and teacher quality.

Evidence from this study suggests that a special education teacher residency program increases recruitment, program completion, and teacher retention, thereby addressing teacher shortages, a critically important outcome in special education. But our data do not provide evidence that teacher residency programs produce more effective special education teachers, as measured by district evaluations or student performance. Doing so requires the refinement of special education teacher evaluations and more acceptable assessment of performance outcomes for students with special needs. This research is extremely challenging to conduct and will require resources that extend beyond one program or university. But it is more than worth the effort and the commitment if we, as teacher educators, are to improve special education teacher preparation programs and outcomes for students with special needs.

Acknowledgment

References

Behrstock-Sherratt, E. (2016). *Creating coherence in the teacher shortage debate: What policy leaders should know and do*. American Institutes for Research, Education Policy Center. https://www.air.org/sites/default/files/downloads/report/Creating-Coherence-Teacher-Shortage-Debate-June-2016.pdf

Berry, B., Montgomery, C., Curtis, R., Hernandez, W., Wurtzel, J., & Snyder, J. (2008, August). *Creating and sustaining urban teacher residencies: A new way to recruit, prepare, and retain effective teachers in high-needs districts*. Aspen Institute/Center for Teaching Quality. https://www.aspeninstitute.org/publications/creating-sustaining-urban-teacher-residencies-new-way-recruit-prepare-retain-effective/

Berry, B., & Shields, P. M. (2017). Solving the teacher shortage: Revisiting the lessons we've learned. *Phi Delta Kappa, 98*(8), 8–17. https://doi.org/10.1177/0031721717708289

Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wycko, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis, 31*(4), 416–440. https://doi.org/10.3102/0162373709353129

Carroll, T. G. (2007). *Policy brief: The high cost of teacher turnover* (ED498001). ERIC. https://files.eric.ed.gov/fulltext/ED498001.pdf

Carver-Thomas, D., & Darling-Hammond, L. (2017). *Teacher turnover: Why it matters and*

what we can do about it (Learning Policy Brief). Learning Policy Institute. https://doi.org/10.54300/454.278

Center for Mental Health in Schools. (2012). *Improving teacher retention, performance, and student outcomes*. http://smhp.psych.ucla.edu/pdfdocs/newteach.pdf

Cross, F. (2017). *Teacher shortage areas: Nationwide listings 1990–1991 through 2017–2018*. https://www2.ed.gov/about/offices/list/ope/pol/ateachershortageareasreport2017-18.pdf

Darling-Hammond, L. (2004). Standards, accountability and school reform. *Teachers College Record, 106*(6), 1047–1085. https://doi.org/10.1111/j.1467-9620.2004.00372.x

Darling-Hammond, L. (2010). *Recognizing and developing effective teaching: What policy makers should know and do* (Policy Brief). ACTE/NEA. http://www.nea.org/assets/docs/HE/Effective_Teaching_-_Linda_Darling-Hammond.pdf

DeMoss, K. (2018, April). *Following the money: Exploring residency funding through the lens of economics*. Bank Street College, Ready to Teach. https://educate.bankstreet.edu/cgi/viewcontent.cgi?article=1016&context=faculty-staff

DeMoss, K., Bottamini, G., Fallon, B., Mansukhani, D., Mills, G., & Thomases, J. (2017, September). *Clearing the path: Redesigning teacher preparation for the public good*. Bank Street College, Sustainable Funding Project. https://d2mguk73h8xisw.cloudfront.net/media/filer_public/filer_public/2017/09/28/clearing_the_path_1248.pdf

Feng, L., & Sass, T. R. (2013). What makes special-education teachers special? Teacher training and achievement of students with disabilities. *Economics of Education Review, 36*(C), 122–134. https://doi.org/10.1016/j.econedurev.2013.06.006

Goldhaber, D. (2019). Evidence-based teacher preparation: Policy context and what we know. *Journal of Teacher Education, 70*(2), 90–101. https://doi.org/10.1177/0022487118800712

Goldhaber, D., Krieg, J. M., & Theobald, R. (2017). Does the match matter? Exploring whether student teaching experiences affect teacher effectiveness. *American Educational Research, 54*(2), 325–359. https://doi.org/10.3102/0002831217690516

Goldring, R., Taie, S., Riddles, M., & Owens, C. (2014). *Teacher attrition and mobility: Results from the 2012–13 Teacher Follow-Up Survey*. National Center for Education Statistics. https://nces.ed.gov/pubs2014/2014077.pdf

Grossman, P. (2010, May). *Learning to practice: The design of clinical experience in teacher preparation* (Policy Brief). AACTE/NEA. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=edc5959bbf4a415fe73bfa4233bad1b77f463d29

Guha, R., Hyler, M. E., & Darling-Hammond, L. (2016). *The teacher residency: An innovative model for preparing teachers*. Learning Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/Teacher_Residency_Innovative_Model_Preparing_Teachers_REPORT.pdf

Guha, R., Hyler, M. E., & Darling-Hammond, L. (2017). The teacher residency: A practical path to recruitment and retention. *American Educator, 41*(1), 31–34, 44. https://www.aft.org/sites/default/files/ae_spring2017guha_hyler_and_darling-hammond.pdf

Ingersoll, R., Merrill, L., & May, H. (2014). *What are the effects of teacher education and preparation on beginning teacher attrition?* (Report No. RR-82). Consortium for Policy Research in Education, University of Pennsylvania. https://www.cpre.org/sites/default/files/researchreport/2018_prepeffects2014.pdf

Libetti, A., & King, M. S. (2016, October). *A new agenda: Research to build a better teacher preparation program*. Bellwether Education Partners. https://bellwether.org/publications/new-agenda-research-build-better-teacher-preparation-program/

Myers, J. A., Gilbert, K., & Sindelar, P. (2020). Does alternative route certification meet the requirements of IDEA Assurance 14? A policy analysis. *Teacher Education and Special*

Education, 43(4), 332–342. https://doi.org/10.1177/0888406420912374

National Center for Educational Evaluation and Regional Assistance. (2015, August). *New findings on the retention of novice teachers from teaching residency programs* (Evaluation Brief). https://ies.ed.gov/ncee/pubs/20154015/

National Center for Teacher Residencies. (2016, July). *2015 network impact overview* (Research Brief). https://nctresidencies.org/resource/nctr-2015-network-impact-overview/

National Center for Teacher Residencies. (2017, July). *Recommendations for state support for effective teacher residencies.* https://nctresidencies.org/wp-content/uploads/2021/02/Recommendations-for-State-Support-of-Effective-Teacher-Residencies.pdf

National Council for Accreditation of Teacher Education. (2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers.* http://caepnet.org/~/media/Files/caep/accreditation-resources/blue-ribbon-panel.pdf

Noell, G. H., Brownell, M. T., Buzick, H. M., & Jones, N. D. (2014). *Using educator effectiveness measures to improve educator preparation programs and student outcomes* (Document No. LS-1). University of Florida, Collaboration for Effective Educator, Development, Accountability, and Reform Center. https://ceedar.education.ufl.edu/wp-content/uploads/2014/09/LS-1_FINAL_08-27-14.pdf

Papay, J. P., Bacher-Hicks, A., Page, L. C., & Marinell, W. H. (2017). The challenge of teacher retention in urban schools: Evidence of variation from a cross-site analysis. *Educational Researcher, 46*(8), 434–448. https://doi.org/10.3102/0013189X17735812

Papay, J., West, M., Fullerton, J., & Thomas, K. (2012). Does an urban teacher residency increase student achievement? Early evidence from Boston. *Educational Evaluation and Policy Analysis, 34*(4), 413–434. https://doi.org/10.3102/0162373712454328

Peske, H. G., & Haycock, K. (2006). *Closing the gaps across the achievement spectrum.* Education Trust.

Podolsky, A., Darling-Hammond, L., Doss, C., & Reardon, S. (2019, May). *California's positive outliers: Districts beating the odds* (Research Brief). Learning Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/Positive_Outliers_Quantitative_BRIEF.pdf

Podolsky, A., Kini, T., Bishop, J., & Darling-Hammond, L. (2017). Sticky schools: How to find and keep teachers in the classroom. *Phi Delta Kappan, 98*(8), 19–25. https://doi.org/10.1177/0031721717708290

Polakow-Suransky, S., Thomases, J., & Demoss, K. (2016, July 8). Train teachers like doctors. *New York Times.* https://www.nytimes.com/2016/07/08/opinion/train-teachers-like-doctors.html

Ronfeldt, M. (2014). Does pre-service preparation matter? Examining an old question in new ways. *Teachers College Record, 116*(10), 1–46. https://doi.org/10.1177/016146811411601002

Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal, 50*(1), 4–36. https://doi.org/10.3102/0002831212463813

Silva, T., McKie, A., & Gleason, P. (2015). *New findings on the retention of novice teachers from teaching residency programs.* National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences. https://ies.ed.gov/ncee/pubs/20154015/pdf/20154015.pdf

Silva, T., McKie, A., Knechtel, V., Gleason, P., & Makowsky, L. (2014). *Teaching residency programs: A multisite look at a new model to prepare teachers for high-need schools.* National Center for Education Evaluation and Regional Assistance, Institute for Edu-

cation Sciences. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=NCEE20154002

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). *A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S.* Learning Policy Institute. https://doi.org/10.54300/247.242

Thorpe, R. (2014). Residency: Can it transform teaching the way it did medicine? *Kappan, 92*(1), 36–40. https://doi.org/10.1177/0031721714547860

U.S. Department of Education. (2015). *Public school teacher autonomy in the classroom across school years 2003–04, 2007–08, and 2011–12*. Institute for Education Sciences. https://nces.ed.gov/pubs2015/2015089.pdf

Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college- and university-based teacher education. *Journal of Teacher Education, 61*(1–2), 89–99. https://doi.org/10.1177/0022487109347671