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# Growing Teachers from Within

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Implementation, Impact, and Cost of an Alternative  
Teacher Preparation Program in Three Urban  
School Districts



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## Preface

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This study was undertaken by RAND Education and Labor, a division of the RAND Corporation that conducts research on early childhood through postsecondary education programs, workforce development, and programs and policies affecting workers, entrepreneurship, and financial literacy and decisionmaking. TNTP (formerly The New Teacher Project) sponsored the report, with funding through a U.S. Department of Education Supporting Effective Educator Development (SEED) grant program, grant number U367D150008. TNTP is committed to ending educational inequities by promoting the recruitment, training, and retention of high-quality teachers and school leaders. SEED has funded TNTP to implement the Teacher Effectiveness and Certification (TEACH) initiative in three urban school districts. Through TEACH, TNTP works with school districts to develop a within-district process to recruit, prepare, and certify teacher candidates, as well as hire and support them in their first year. To support this work, the RAND Corporation conducted an evaluation of TEACH. As part of the evaluation, RAND investigated each district program's implementation and costs, the effects of TEACH on the recruitment and retention of teachers, and the relative performance of those teachers. This is the final report for that evaluation.

The authors would like to acknowledge the following people for their contributions to this work. First, our thanks to Serafina Lanna, Katie Whipkey, and Naomi Hale, who made considerable contributions to the data collection and analysis for this work at RAND. Second, thanks to TNTP for support and input over the course of this research. We would especially like to thank Cassandra Coddington for her regular guidance and feedback, as well as Ellie Leahy, Bailey Cato Czupryk, Genine Blue, and Camilo Gonzalez. We would also like to thank the TNTP staff in each of the three participating districts who were so collaborative and helpful in providing us with data and advice related to our analysis, including Caitlin Deschenes-Desmond, Jessica Dirks, Heather Barondess, and Erin Martin. We couldn't have done our work without your help! We would also like to thank the numerous staff in each of the three districts (not named here, in the interest of district anonymity) who answered so many questions and provided data to us on a regular basis to enable us to complete our work. We also would like to thank the reviewers of this report—Min Sun and Jonathan Schweig—for their helpful input, which made this report much stronger. This document benefitted substantively from quality assurance feedback from Fatih Unlu and expert editing from Samantha Bennett. Any flaws that remain are solely the authors' responsibility.

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# Contents

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<b>Preface</b> .....	iii
<b>Figures and Tables</b> .....	vi
<b>Summary</b> .....	vii
<b>Abbreviations</b> .....	x
<b>CHAPTER ONE</b>	
<b>Introduction</b> .....	1
Objectives and Methods .....	4
Research Questions for This Report .....	4
Implementation Data Sources and Analysis .....	5
Impact Data Sources and Analysis .....	5
Cost Data Sources and Analysis .....	7
Organization of This Report .....	7
<b>CHAPTER TWO</b>	
<b>Implementation of TEACH</b> .....	8
Recruitment and Selection .....	10
Pre-Service Training .....	13
Hiring .....	15
First Year Supports .....	17
Evaluation .....	19
Program Sustainability .....	20
<b>CHAPTER THREE</b>	
<b>Impact of TEACH</b> .....	23
Contributions to Districts' Teacher Recruitment .....	23
Achievement Outcomes for Students of TEACH Teachers .....	26
District Evaluation Outcomes for TEACH Teachers .....	28
Retention Outcomes for TEACH Teachers .....	31
Summary of Impact Findings .....	32

<b>CHAPTER FOUR</b>	
<b>Cost of TEACH</b> .....	35
Overall Cost of TEACH .....	37
Cost of Personnel and Nonpersonnel Time to Operate TEACH .....	40
Cost of Different Elements of TEACH .....	42
Summary of Cost of TEACH .....	45
<b>CHAPTER FIVE</b>	
<b>Conclusions and Implications</b> .....	48
Overview of Findings About TEACH .....	48
Implications for Policy and Practice .....	50
<b>References</b> .....	53

## Figures and Tables

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### Figures

1.1.	Key Dimensions of TEACH Programs .....	3
3.1.	Proportion and Demographics of Teach Candidates and Other First-Year Teachers, by District .....	24
3.2.	Certifications and Roles of TEACH Candidates and Other First-Year Teachers, by District .....	25
3.3.	TEACH Student Achievement Gains Relative to Students of Comparison Second-Year Teachers, Overall and by District.....	27
3.4.	TEACH Student Achievement Gains Relative to Students of Comparison First-Year Teachers, Overall and by District.....	28
3.5.	Difference in TEACH District Evaluation Scores Relative to Comparison Second-Year Teachers.....	30
3.6.	Difference in TEACH District Evaluation Scores Relative to Scores of Comparison First-Year Teachers.....	31
3.7.	Difference in TEACH Within-District Second-Year Retention Rates Relative to Comparison Teachers' Rates, Overall and for Individual Districts.....	32
3.8.	Difference in TEACH Within-District First-Year Retention Rates Relative to Comparison Teachers' Rates, Overall and for Individual Districts.....	33
4.1.	Per-Hire Costs for TEACH, by District and Year.....	39
4.2.	Average Annual Personnel and Nonpersonnel Per-Hire Cost, by District.....	41
4.3.	Annual FTE District and TNTP Staff Working on TEACH in Each District .....	42
4.4.	Average Annual Personnel Per-Hire Cost, by Districts, by Components .....	42
4.5.	Per-Hire Costs for Coaching, by District and Year.....	44

### Tables

1.1.	Summary of TEACH Cohorts Included in Comparative Performance Analyses in Each District .....	6
2.1.	TEACH Initiative Recruitment and Hiring Data, by Program .....	9
3.1.	Characteristics of the District Teacher Evaluation Measures Considered in This Analysis .....	29
4.1.	Overall TEACH Average Annual and Per-Hire Costs .....	37
4.2.	Average Annual Personnel and Nonpersonnel Cost.....	40
4.3.	Average Annual FTE Staff Working on TEACH in Each District .....	41
4.4.	Costs for Each Component of the TEACH Program.....	44

## Summary

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This report provides a comprehensive look at the TEACH (Teacher Effectiveness and Certification) program, an innovative alternative teacher preparation pathway designed to support district teacher recruitment and specifically to address teacher shortages in particular hard-to-staff roles (e.g., special education; bilingual and English as a second language education; and science, technology, engineering, and mathematics subjects) faced by numerous school districts across the United States. To address these shortages and improve teacher quality and retention, TEACH was developed as a collaboration between TNTP and school district staff to be a within-district certification option for interested teaching candidates. By operating within a district, TEACH is able to target specific district hiring needs *and* to deliver uniform teacher preparation and induction supports designed to produce high-quality teaching candidates.

After discussing the teacher shortage dilemmas many school districts face, the authors of this report provide an overview of the TEACH program implemented in three large urban school districts between 2015–2016 and 2018–2019 with funding from a U.S. Department of Education Supporting Effective Educator Development (SEED) grant. We then discuss the methods the RAND team employed to study the TEACH program, followed by findings on

- how the program was implemented in each district, including factors that may have supported or hindered program success
- the impact of the program on teacher recruitment and on novice teacher job performance and retention
- costs of the program and how those costs compare with those of other alternative preparation routes.

While our investigation identified some challenges related to the alignment and transparency of TEACH program communication and supports, our results also indicated that the TEACH program accomplished many of its goals. Specifically, the program contributed substantially to the overall supply of teachers in areas the districts had designated as hard-to-staff—and it provided more racially diverse teachers—in each district. In addition, TEACH candidates were at least initially more effective at raising student achievement in mathematics. Findings are outlined in more detail in the Key Findings box.

## Key Findings

### *Implementation of TEACH*

Transparent and effective communication between the TEACH program staff and teaching candidates defined candidates' experience. Those who had negative perceptions of the program often referred to confusion about program timelines and/or expectations.

Structures, processes, and policies in all three districts were not necessarily designed to support a teacher preparation program. Collaboration between TNTP and district staff was key to ensuring that the TEACH program served its purpose but also fit with districts' needs and infrastructure.

Training and supports for TEACH candidates were not always cohesive. For example, candidates viewed their online coursework as disjointed from their practice opportunities and other supports.

### *Impact of TEACH*

The TEACH program contributed substantially to the supply of teachers in participating districts, particularly in roles that were considered by districts to be hard-to-staff roles. TEACH teachers were also more racially diverse. They remained teaching in the district at rates comparable to those of other new teachers in their first three years.

Achievement gains in mathematics were significantly higher for students of TEACH teacher candidates in their first year, relative to students of comparable first-year teachers, in each district. In English Language Arts (ELA), first-year results were directionally positive but not statistically significant. Among TEACH teachers observed in their second year, after they had fully completed the program, results were directionally similar but not statistically significant in both mathematics and ELA.

In one district, TEACH teachers had significantly lower district evaluation ratings in their first year. By their second year, TEACH teacher evaluation ratings were not significantly nor substantively different from those of other teachers.

### *Cost of TEACH*

In its first three years, the average cost per TEACH hire was somewhat higher than available estimates for similar alternative teacher preparation programs operating within or in collaboration with school districts. However, the range of TEACH costs varied widely across the three districts and likely included large start-up costs. Districts whose programs were larger in scale or that had more preexisting infrastructure to build on had substantially lower per-hire costs.

Costs of district and TNTP staff time made up the majority of TEACH program costs, with the equivalent of about 17 full-time staff in total working in TEACH in each district per year, on average.

Pre-service training and coaching costs made up 40 to 50 percent of all TEACH costs across districts, although the cost of pre-service training and coaching varied considerably from one district to another.



## **Key Takeaways We Identified for Policy and Practice**

- Within-district alternative certification pathways are a viable way for large districts to attract new applicants and recruit diverse candidates to fill critical teaching positions.
- Districts and teacher preparation collaborators for within-district teacher preparation programs may maximize success if they provide support for their teacher candidates to take licensure exams and build in adequate advance time to align programs with district priorities and make recruitment and communication plans.
- Given the cost burdens of within-district teacher preparation programs, federal and state policymakers might consider ways to fund such partnerships, particularly in districts experiencing shortages or for consortiums of smaller districts that might not be able to fund such an endeavor on their own.

## Abbreviations

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CRT	culturally responsive teaching
ELA	English Language Arts
ELL	English language learners
ESL	English as a second language
FTE	full-time equivalent
IEP	individualized education plan
PST	pre-service training
SEED	Supporting Effective Educator Development
STEM	science, technology, engineering, and mathematics
TEACH	Teacher Effectiveness and Certification
TLAC	<i>Teach Like a Champion</i>

## Introduction

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In many states and school districts, teacher shortages are at near-crisis levels. Sutcher, Darling-Hammond, and Carver-Thomas (2019) estimated a shortage of approximately 100,000 teachers annually, with shortages concentrated in special education and science, technology, engineering, and mathematics (STEM) subjects, states including California and Arizona, and high-poverty, high-minority schools. As recently as the 2018–2019 school year, nearly all states reported shortages in special education teachers, and the great majority reported shortages of mathematics, science, and bilingual educators (Berry and Shields, 2017; U.S. Department of Education, Office of Postsecondary Education, 2020).

Scholars have honed in on several major reasons for teacher shortages. First, with increasing student enrollments and growth in types of course offerings in many school contexts, demand for teachers has been growing in recent years (Sutcher, Darling-Hammond, and Carver-Thomas, 2016; Sutcher, Darling-Hammond, and Carver-Thomas, 2019). Yet, at the same time, the supply of teachers is shrinking, as tracked through declining enrollments in teacher preparation programs and lower rates of reentry for those who have left the profession (Sutcher, Darling-Hammond, and Carver-Thomas, 2019; Castro et al., 2018). Teacher supply, as measured by the number of positions not filled by fully certified teachers, is particularly low in high-poverty and urban schools (Dee and Goldhaber, 2017). In addition, the population of teachers who choose to stay in schools over time—and particularly in high-poverty schools serving high-needs students—is decreasing every year (Carver-Thomas and Darling-Hammond, 2019). In fact, Carver-Thomas and Darling-Hammond (2019) have documented that teacher turnover—which they defined as those who leave the teaching profession, as well as those who opt to move to a different school—is 50-percent higher than average in Title I schools, 90-percent higher in the top 25 percent of schools serving students of color, and 80-percent higher for special education teachers. Research suggests that factors influencing teacher attrition include teachers’ perceptions of inadequate compensation, lack of adequate preparation, insufficient mentoring and support, and poor teaching conditions (Sutcher, Darling-Hammond, and Carver-Thomas, 2016).

Beyond the need for teachers to fill districts’ hard-to-staff subjects and positions in high-needs schools, many have noted the need for more teachers who match the ethnicity of the students they serve, especially given research that students of color achieve at higher levels if they are taught by teachers sharing a similar ethnic background (Egalite, Kisida, and Winters, 2015; Gershenson et al., 2018; Dee, 2005). While the numbers of minority teachers have grown in recent years, particularly for Latinx and Asian teachers, turnover is higher among minority teachers than for white teachers (Ingersoll, 2015; Carver-Thomas and Darling-Hammond, 2019; Sun, 2018).

Addressing these teacher shortages could potentially go a long way in supporting students. Many studies have noted the detrimental effects of teacher shortages and low teacher retention. Struggles with teacher shortages have led many districts to hire untrained teachers and substitutes, to assign teachers out of field, to cancel courses, or to increase class sizes (Podolsky and Sutchter, 2016). Teacher turnover is associated with negative effects that are concentrated in lower-achieving schools, as they face both the net loss of teacher experience and negative disruption effects of turnover (Hanushek, Rivkin, and Schiman, 2016; Ronfeldt, Loeb, and Wyckoff, 2013). These challenges can reinforce each other, since a reliance on temporary substitutes or on new hires who are less likely to remain in teaching than experienced teachers can contribute to more frequent disruptions for students.

School districts themselves have begun pioneering innovative solutions for addressing their teacher shortages. Instead of relying on traditional preparation programs to feed them candidates they need for hard-to-staff positions, many school systems have begun to build their own teacher preparation programs in partnership with other institutions or organizations. In some cases, districts have worked with higher education institutions to coordinate student teacher or residency programs, particularly those that feed into high-needs fields. Others have created pathways for noninstructional district staff or even high school students to enter the teaching profession (Podolsky and Sutchter, 2016; Espinoza et al., 2018; Guha, Hyler, and Darling-Hammond, 2016; Cole, 2017). By preparing teachers from within, school systems may be able to recruit diverse candidates in specific areas of need, and they can provide district-specific training that can help teachers more easily adjust to the structures, processes, and policies of a given school after they are hired. Yet, little research exists on the quality and cost of such programs, and—in particular—whether those programs yield effective teachers who are hired and stay in the school district where they were trained.

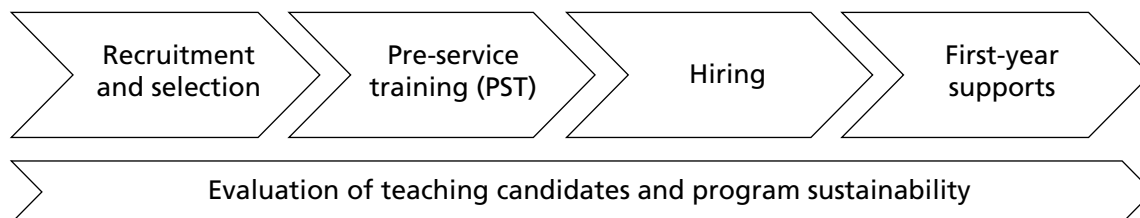
This report examines one such alternative teacher preparation program developed in partnership with three urban school districts: TNTP's Teacher Effectiveness and Certification (TEACH) program.<sup>1</sup> The TEACH program is intended to help districts develop a sustainable, in-house model for teacher preparation that can enable districts to fill hard-to-staff teaching positions and also to provide customizable, local training and classroom experiences to support teachers to be successful. For this project, TNTP collaborated with each district to develop and support the program over a three-year period, with ownership of the program transitioning fully to the district at the end of that period. TEACH in these districts was funded by a grant from the U.S. Department of Education's Supporting Effective Education Development (SEED) grant program.

While each of the three programs was uniquely tailored to its district context over time, there were some common dimensions across programs that we discuss in this report (see Figure 1.1); these included (1) recruitment and selection, (2) pre-service training (PST), (3) hiring into school year positions, (4) on-the-job support, (5) candidate evaluation, and (6) program sustainability. It should be noted that, before beginning implementation, the TNTP and district teams had done a considerable amount of planning, which is not included in this report nor shown in the figure. Our reporting here begins at the recruitment and selection stage, when the programs first reached out to potential candidates to be trained for and fill positions that each district designated as *hard to staff*, including positions in bilingual educa-

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<sup>1</sup> TNTP originally stood for The New Teacher Project.

**Figure 1.1**  
**Key Dimensions of TEACH Programs**



NOTE: Recruitment and selection typically occurred within the six- to nine-month window prior to PST. PST typically occurred over a five- to six-week period in the summer of each year in Districts A and C. District B also had a summer training in the first two years of the project, but it additionally held a school-year training in years one to three. Hiring could occur during or after teachers completed the PST.

tion, special education, and STEM, for which districts across the United States have typically experienced shortages. Each program had a set of recruitment and selection goals, including the number of applications to be received and the number of applicants to be accepted into the program. Two districts—Districts A and C—also had the explicit goal of recruiting a diverse teacher workforce, including teachers of color.

They reached out to potential applicants via a variety of strategies, such as online advertisements and in-person outreach. Once an applicant had filled out the required paperwork, program staff screened the applicants for those they felt were most likely to be successful teaching in their communities. The next phase of the program was PST. The trainings occurred during the summer, and all comprised three central activities: field experience in a summer school classroom, in-person training sessions with the candidate cohort, and online modules. At the end of PST, candidates had to pass a performance bar that took into account multiple measures of their work during the summer, including observations of their teaching and other components, such as professionalism. This was the first of two performance bars that candidates had to pass to complete their respective programs. During their PST, candidates began to look for classroom positions, which was the next phase: hiring. The programs provided support to candidates in the form of resume feedback, mock interviews, and/or connecting them with principals, but ultimately, finding a position was the responsibility of the candidates. Once teachers were hired and started teaching in classrooms, the program provided first-year supports, including instructional coaching, in-person cohort meetings, and online training modules. Toward the end of the year, candidates were evaluated a second time. Passing this performance check, which included observations from throughout the year, completion of online coursework, and/or student survey results, was necessary to complete the program and move toward certification. These evaluations were conducted in addition to evaluations the schools and districts required. The final component of the program that we address in this report is program sustainability. The intention of each program was to build capacity for districts to manage these processes on their own, once the grant ended and TNTTP transitioned out.

This report summarizes findings from a comprehensive evaluation of the TEACH program conducted by researchers at the RAND Corporation. We specifically share findings in regard to (1) how the program was implemented in each school district, including factors that may have supported or hindered program success in each of the dimensions outlined in Figure 1.1; (2) the impact of the program on teacher recruitment and on novice teacher job performance and retention; and (3) the costs of the program and how these costs compare with

other similar teacher preparation programs. We begin in the following section by providing an overview of our research objectives, data, and methodology.

## Objectives and Methods

This report provides a comprehensive look at the TEACH program in three urban school districts by inspecting the program from multiple angles. First, we examine how the program was undertaken and implemented in these districts, and we consider what lessons we can learn from the implementation that might be applicable to the development of similar programs. Second, we examine the impact of the program, both in terms of the numbers and characteristics of teachers hired through the program and in terms of measures of the performance of TEACH teachers in comparison to other newly hired teachers. Third, we examine the cost of the program and its cost-effectiveness relative to other programs.

The implementation data collection and analyses focused on the first two cohorts of candidates trained through the TEACH program in each district. The cost study took into account the first three years of TEACH program implementation in each district. For Districts A and B, implementation took place from the 2015–2016 school year through 2017–2018. For District C, implementation took place from 2016–2017 through 2018–2019, although a small amount of program planning also took place in 2015–2016. The years of data included in the impact analyses are detailed later in this chapter, in Table 1.1.

## Research Questions for This Report

For the implementation study, we asked the following questions:

- How were the TEACH preparation programs implemented across the three partner districts, particularly in the areas of: (1) recruitment and selection, (2) PST, (3) hiring, (4) first-year supports, (5) candidate evaluation, and (6) program sustainability?
- What lessons can we learn from implementation of the TEACH programs that may be applicable to the development and execution of similar programs in the future?

For the impact study, we asked these questions:

- How many teachers were hired through TEACH in each district, and what were their job roles and characteristics?
- How did the achievement gains for students of TEACH teachers compare with those for students of other new teachers in the same district?
- How did TEACH teachers perform on district evaluation ratings compared with other new teachers?
- How did the rate of TEACH teacher retention in the district compare with retention rates for other new teachers?

For the cost study, we asked these questions:

- What were the annual average costs of TEACH overall and per TEACH teacher hired in each district?
- What were the costs of district and TNTP staff time to develop and run the TEACH program?
- What were the costs of developing and running various components of the TEACH program, including recruitment, PST, hiring, and support of teachers?
- How does the cost of TEACH compare with the costs of other teacher preparation programs overall—and given the benefits of TEACH?

Each study employed data collection and analysis methods appropriate to our research questions. The technical appendix for this report, available online at [www.rand.org/pubs/research\\_reports/RRA256-1](http://www.rand.org/pubs/research_reports/RRA256-1), provides much more detailed information on our methods.

### **Implementation Data Sources and Analysis**

The primary data sources for the implementation portion of this research were interviews and focus groups, observations, and collected documents. In each of the three districts, we interviewed a sample of teaching candidates in the first two cohorts of TEACH in each district, principals, and key TNTP and district staff supporting those cohorts. We observed training sessions during the TEACH programs' pre-service training and collected documents from interviewees throughout. Documents included handouts from summer training, the welcome packets that candidates received upon entering the program, and TNTP *stepbacks*, which were internally distributed reflections on program progress. We analyzed interview and observation notes and transcripts in the qualitative software Dedoose. We qualitatively coded these documents according to themes related to our implementation measures, as documented in Appendix A. We analyzed coding to extract themes regarding areas of success and concerns that were shared across programs and examined our coding to determine when a unique issue in a single program was mentioned by multiple interviewees. We confirmed findings by reviewing multiple interviewees' input, as well as by looking across documents and observation notes.

### **Impact Data Sources and Analysis**

The primary sources of data for the impact study were administrative records from each district. These records included the characteristics and course assignments of all students and teachers in each district and in each year in the study. For teachers, available data included their demographic characteristics, their job assignments, the areas they were certified to teach, and the courses and students that they taught. For students, the data included their demographic characteristics and their performance on standardized achievement exams.

Using data on new teacher hires, we documented the contribution of the TEACH program to the teacher recruitment pipeline in each district and in each year. This provided us insight into the extent to which TEACH contributed to the supply of new teachers in each district. We also specifically examined available data on the characteristics of TEACH hires in

comparison to all other district hires, with a focus on characteristics relevant to districts' goals around teacher diversity and teachers' ability to fill hard-to-staff areas. These characteristics included teachers' race, teachers' certification to teach in Bilingual Education or Special Education classrooms, whether teachers had an emergency certification, and whether the teachers taught mathematics courses.

To understand the relative performance of TEACH teachers, we compared performance outcomes of TEACH teachers to other new teachers hired in the same school year in each district. Specifically, we compared the student achievement gains of students taught by TEACH teachers to those of similar students taught by other new teachers. However, student achievement outcomes of this type could be analyzed for teachers in only two of the three districts in our study, and only for teachers of grades 4 through 8 who taught English language arts (ELA) or mathematics courses; this group represented only 31 percent of all TEACH teacher candidates included in this analysis.<sup>2</sup> We separately evaluated teacher performance by comparing TEACH teachers with comparable new teachers in each district in terms of the scores they received on the formal district performance evaluations that a large majority of teachers received. Finally, we compared the rate at which TEACH teachers remained teaching in the district with that of other new teachers hired in the same year.<sup>3</sup>

In our comparative analyses, our primary outcome of interest was the performance of TEACH teachers as of their second year in teaching, after they had received all of the program supports and had passed their program performance screens. However, we also evaluated outcomes for TEACH participants in their first year as “candidate teachers,” when they were still in the midst of receiving TEACH supports. As shown in Table 1.1, analyses of first-year teachers were also useful because they allowed us to include additional cohorts of TEACH teachers in our analyses.

For student achievement and teacher retention outcomes that were comparable across districts, we pooled results across districts as our primary test of impact to better understand the overall average TEACH effect across district contexts. We also explored results separately for

**Table 1.1**  
**Summary of TEACH Cohorts Included in Comparative Performance Analyses in Each District**

	District A	District B	District C
Included in analyses of second-year outcomes	Cohort 1 (second year: 2017–2018)	Cohort 1 (2017–2018) and 2 (2018–2019)	Cohort 1 (2018–2019)
Included in analyses of first-year outcomes	Cohorts 1 (2016–2017) and 2 (2017–2018)	Cohorts 1 (2016–2017), 2 (2017–2018), and 3 (2018–2019)	Cohorts 1 (2017–2018) and 2 (2018–2019)

NOTE: The first- and second-year outcomes are the same time frame in Districts A and B. The outcomes in District C are one year later because the program began one year later there. Due to evaluation project budget limitations, we were able to collect and analyze administrative data from the only first two years of the program in District A. District A was not included in comparative analyses of student achievement outcomes owing to limitations in data linking teachers and students.

<sup>2</sup> Any student taught by a teacher in a tested subject contributed to the measure of that teacher's student achievement gains, even if the student was also taught by other teachers in the same subject area.

<sup>3</sup> Districts prioritized filling districtwide areas of need with respect to teacher certifications. Moreover, because the types of specialist teachers TEACH hired are, in some district contexts, intentionally asked to change schools to address shifting needs over time, we focused on district-level retention, rather than within-school retention, as the most appropriate retention outcome to evaluate the program.



each district. For analyses of teacher evaluation ratings, we considered results for each district separately, given that different district evaluation systems focus on different aspects of teacher performance.

### **Cost Data Sources and Analysis**

The sources of data for the cost study included expenditure and staff effort reports from TNTP, data from districts about staff involved in TEACH and their salaries, and interviews with TNTP and district staff to clarify tasks undertaken by staff and how they related to TEACH. Cost study was analyzed to calculate overall annual average and per TEACH teacher hire costs, as well as numbers of staff required for TEACH work across and in each district. All cost estimates were adjusted to account for cost of living and inflation.

### **Organization of This Report**

The remainder of this report is organized into four chapters. In Chapter Two, we summarize our findings in regard to how the program was implemented. In Chapter Three, we discuss the impact of the program in terms of teachers hired and their characteristics. In Chapter Four, we summarize the findings on the cost of the program. In Chapter Five, we conclude with a discussion around the import of our findings, including implications and recommendations for research and practice.

## Implementation of TEACH

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In this chapter, we provide findings regarding implementation of the TNTP TEACH programs in three large, urban U.S. school districts. The districts varied in size, but each served between 50,000 and 175,000 students who attended between 100 and 250 schools. Each of the districts' student populations was majority nonwhite, and a majority of students in each district were eligible for free or reduced price lunch.

A few circumstances related to the programs in each district should be acknowledged from the outset, as these circumstances are likely related to how programs were implemented. First, the program in District C began one year after the programs in Districts A and B. Thus, the cohorts occurred one year later in District C than they did in Districts A and B. This may have allowed the TEACH program staff in District C to learn from the trial and error of Districts A and B in their first years, as we heard in some interviews. Second, the context for program implementation was unique in District B, where the SEED funds and TNTP support were used to turn around an existing alternative teacher pipeline program, rather than initiate such a program from the ground up, as was the case in Districts A and C. District B's program included a summer cohort of candidates, as well as a smaller cohort of candidates who underwent training in the fall, once the school year began. Our implementation research focused on the summer cohort in District B, as it aligned with the timing of the cohorts in District A and District C. Lastly, the programs differed in size; as is clear in Table 2.1, they were designed to support differing numbers of teaching candidates, which may have influenced their implementation in conjunction with myriad other contextual factors. The implementation portion of this report addresses only the first two cohorts of teachers, those in program years one and two. We note other variables that differed between the three programs when applicable in the findings below.

Table 2.1 identifies the number of participants at each of four phases of the recruitment and hiring process for the TEACH programs. The number of applications submitted indicates the total number of people who completed applications for each program in a given year.

Data for the implementation portion of this report were collected via six research activities:

1. interviews with TNTP and district staff
2. focus groups with teaching candidates during their PST experience
3. observations of PST training sessions
4. phone interviews with teaching candidates in the spring of their first year in the classroom
5. phone interviews with principals who hired program teaching candidates, also in the spring of the candidates' first year in the classroom
6. document collection from program staff.

For a detailed look at our implementation study methods, see Appendix A.

**Table 2.1**  
**TEACH Initiative Recruitment and Hiring Data, by Program**

	Program Year One	Program Year Two	Program Year Three
	2016–2017	2017–2018	2018–2019
<b>District A Program</b>			
Applications submitted to TEACH	392	189	254
Offers extended for TEACH PST	127	115	104
Offers accepted to attend TEACH PST	86	104	74
Teaching candidates hired as first-year teachers	22	22	17
<b>District B Program</b>	<b>2016–2017</b>	<b>2017–2018</b>	<b>2018–2019</b>
Applications submitted to TEACH	1,655	1,704	705
Offers extended for TEACH PST	540	393	251
Offers accepted to attend TEACH PST	320	349	213
Teaching candidates hired as first-year teachers	117	117	103
<b>District C Program</b>	<b>2017–2018</b>	<b>2018–2019</b>	<b>2019–2020</b>
Applications submitted to TEACH	834	503	417
Offers extended for TEACH PST	193	214	148
Offers accepted to attend TEACH PST	144	163	124
Teaching candidates hired as first-year teachers	88	84	60

NOTE: District B totals include the numbers of candidates in recruitment and hiring stages for both the summer and fall/spring cohorts.

Across districts, there was a large drop in numbers between applications received and offers extended. This was by plan, according to interviewees; one TNTTP staff member told us, “We cast a pretty wide net there with the belief that our screening process will weed out the people that we think aren’t right.” Screening and selection occurred in multiple phases; districts and their TNTTP partners first conducted prescreening. They vetted applications using a rubric and identified whether applicants met essential criteria (e.g., a four-year college degree). Applicants who passed this pre-screening were invited to a phone interview. If they were accepted to the next round of selection, they were invited to an in-person interview day with the program, at which point the district and TNTTP teams made decisions about whether or not to extend an offer.

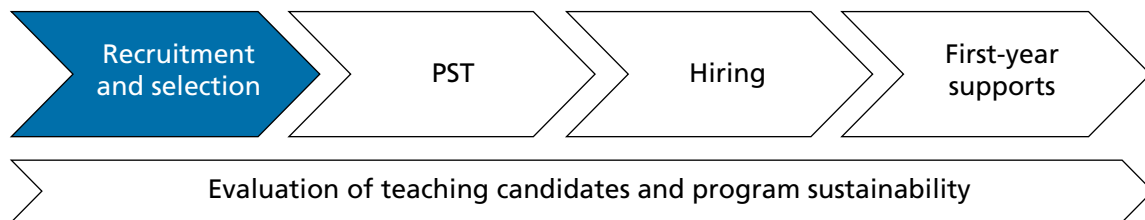
Another notable point in Table 2.1 is the decline in applicants that District B experienced between years two and three, likely because of a change in program requirements for applicants during this time in response to state policy: In the third year, applicants were required to pass teacher licensure assessments *before* they were eligible to apply to the program. Previously in District B—and throughout the period of our study in Districts A and C—applicants could apply to the programs with the expectation that they had more time to pass state assessments once training began.

Once applications were submitted, the programs implemented a selection process, screening out the majority of applicants prior to the next stage of extending offers. In all programs,

there was a notable decrease in candidates between the time when an applicant accepted an offer to attend the TEACH program and when a candidate was hired into a classroom position. The decrease occurred at three points: First, some candidates who accepted their offer did not begin PST and therefore exited the program. Some program staff referred to the phase between selection and PST as the *cultivation* period, when they worked to maintain contact with candidates, building buy-in to and knowledge of the program. Second, some candidates began PST, and either exited of their own volition or were screened out by the program at some point during training. Third, some candidates completed PST, passing the programs' evaluation bars, but then were not hired into teaching positions. We discuss more about these phases in the remainder of the implementation section.

The TEACH programs unfold through six primary components of implementation: (1) recruitment and selection, (2) PST, (3) hiring into school year positions, (4) on-the-job support, (5) evaluation, and (6) program sustainability. For each of these components, we highlight the most salient successes and challenges, both across the three districts and in individual programs, when notable. We also include considerations for district and program staff members interested in developing similar programs, highlighted in text boxes for each stage of implementation.

## Recruitment and Selection



Candidate recruitment targets varied among districts, but the overarching goal was the same for all three: Recruit a diverse set of teachers for high-needs subject areas (e.g., special education, English as a second language [ESL]) to participate in PST and then be hired as first-year teachers.<sup>1</sup> Before beginning recruitment for each cohort, the districts worked with TNTP to predict how many teachers would be needed in the upcoming school year, and in which subject areas; these projections were influenced by the district's experiences in hiring in previous years, as well as known vacancies. District A initially targeted recruitment for mathematics and science teachers, ESL teachers, and special education teachers, as well as teachers who could teach in bilingual classrooms. Districts B and C both initially targeted special education teachers, elementary education teachers, and bilingual teachers. Throughout the course of our research, recruitment targets evolved based on district needs.

An additional goal of the programs was to recruit a more diverse teaching population than was currently in their district schools. In our interviews, staff in Districts A and C explic-

<sup>1</sup> TEACH candidates were not explicitly steered by the districts to teach in specific hard-to-staff schools. However, by pursuing certification in hard-to-staff areas, they contributed to addressing shortages where they arose districtwide.

itly noted the goal of recruiting a diverse pool of teaching candidates who would better mirror the demographic characteristics of their students than the general teaching population did. District B agreed that a diverse teacher workforce was an important goal but was focused on generally recruiting more teachers.

Districts A and C had an additional goal of recruiting local candidates: “We’re looking for diverse candidates who have ties to the district: Who have been students, who have worked in the district, people from the community who are looking to give back. I would say that’s the main focus.” This was cited as being especially important in District C, which had a particularly high cost of living and where it could be an additional challenge to bring in and retain teaching candidates new to the area; if recruits were already local, the chance that they would remain in the city was predicted to be greater. Recruitment strategies included online recruitment (e.g., job postings on social media or sites like Indeed.com), personalized communication (e.g., follow up phone calls or emails), and in-person informational events. Selection processes generally included both interviews (by phone and in person) and performance tasks (e.g., lesson modeling). We discuss takeaways related to recruitment and selection next, highlighting lessons learned through the three districts’ experiences.

*Candidates in all three districts were drawn to the program because they perceived it as an efficient, affordable, and accessible path toward a career in teaching.* When asked about what attracted them to the TNTP program in their respective districts originally, candidates cited several program features: (1) the timeline—the accelerated nature of the program meant that candidates could be in their own classroom more quickly than traditional teacher preparation pathways; (2) the low financial burden—the program was viewed as more affordable than other teacher preparation programs, in part because candidates did not have to take out school loans to participate and because as a first-year teacher they would have a salary as they continued working toward their teaching credential; (3) first-year supports—candidates were looking for the level of coaching and mentoring support advertised by the programs in their districts; and (4) district access—candidates explained that they were attracted to the fact that these preparation programs were housed within districts where they knew they wanted to teach. That candidates were drawn to these features suggests that the TEACH programs were successful in tapping into a pool of potential teachers who may have found other pathways to teaching less accessible. As one candidate stated, “I’ve tried many other routes to get the credential and had so many hurdles.”

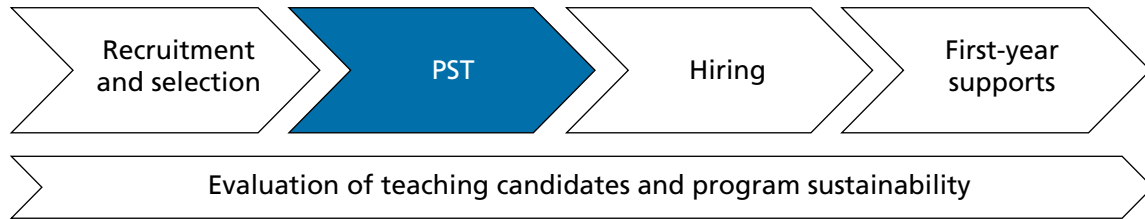
*Clear communication of timelines and expectations during the recruitment and onboarding phase was critical in setting the tone for candidates’ experience of the program.* In our interviews and focus groups, stakeholders across all three districts emphasized the importance of providing applicants with transparent and accessible information regarding program expectations and timelines. Each district experienced challenges in this area, particularly in the first year, when district and TNTP staff were working on a short timeline to get their programs off the ground. As a program leader in one district explained, “This year, when [candidates] were admitted to the program, they did have a lot of blind spots for what to expect during the summer and school year. . . . Ideally they would know when they sign up.” After year one of implementation, each district took steps to refine communication procedures during recruitment and selection, and they were more explicit about what candidates could expect throughout PST and hiring. For example, TNTP staff in District B credited a shift toward an online recruitment model where applicants had direct access to online information at every step of the

recruitment and onboarding process. This, one staff member explained, helped cut down on the number of questions candidates had throughout the recruitment experience.

*State certification test requirements complicated recruitment timelines.* In most states, prior to being hired, new teachers are required to pass one or more state certification tests. This was the case in two of the districts involved in this research, where program candidates were required to take and pass these tests prior to starting their first year of teaching. These testing requirements posed a considerable challenge for many trainees and limited the number of trainees who were able to complete the TEACH program in each district. Training participants in these districts reported in the first year that they did not have enough time after learning of their acceptance into the program to prepare to pass the state teacher certification tests for their subject areas. TNTP and district staff noted that the state certification tests were difficult, and the failure rate for these tests was high. In District B, for example, one staff member reported that about 50 percent of those who had enrolled in the pre-service program in year one had to drop out when they failed their state certification tests. Similarly, in year two, staff in District A estimated that about half of the applicants who had been accepted into the program later left due to difficulties with the state certification test. Interviewees in all three districts felt that state certification tests had a disproportionately negative impact on candidates of color as well as candidates for whom English is a second language. As one program staff member stated, “State law requires teachers to pass tests that number one, are not indicative of their classroom performance, and number two, are racist and biased against people of color and people who are second language English learners.” These concerns about state certification testing comport with literature on the subject: Research has shown that the teachers of color disproportionately fail teacher licensure assessments when compared with their white peers (Goldhaber and Hansen, 2010). In response to the challenges surfaced by state certification tests, some districts did place more emphasis on test preparation supports for candidates after the first year (e.g., requiring that candidates take a practice test, linking candidates to resources, providing testing guides, tapping into district test prep resources).

*The recruitment and selection process required substantial capacity and could be a barrier to long-term program sustainability if not integrated into existing district structures.* During year one of implementation, staff in Districts A and B indicated that candidate recruitment required a great deal of time, while, in District C, staff felt district-led recruitment and selection was a major success of the initiative from early on. Recruitment efforts were intended to generate large applicant pools to start with, and additional resources were needed to sort, select, and enroll candidates into the program. As a TNTP staff member from one program explained, “the amount of time [we] spent on the road, on the phone, in the field, developing marketing and materials for the sessions and things they were hosting were taking a huge amount of time and resources.” In the first year in both Districts A and B, TNTP staff primarily led recruitment and screened candidates throughout the spring. Staff in both districts communicated some concern about their capacity to sustain that level of staffing for recruitment once they were no longer supported by the SEED grant. One of these districts, as described previously, shifted toward an online recruitment model in year two that focused on social media efforts. This was viewed by interviewees as a resource-efficient addition to the in-person recruitment strategies that were already in place. District C staff absorbed recruitment and selection responsibilities early the process, with TNTP guidance in the first year; when TNTP was slated to exit the district after the grant, the district committed to bringing one more staff member on board, at least in part to serve the recruitment and selection of the program.

## Pre-Service Training



The programs' PST occurred during the summer and lasted between five and six weeks.<sup>2</sup> PST comprised three primary components: field experience in which candidates had time teaching students during the districts' typical summer school programming, in-person training for teaching candidates, and online coursework. Half of the candidates' days were typically spent teaching summer school students and observing a cooperating teacher-of-record leading the classroom. During the other half of the working day they were in training sessions, learning

### Key Takeaways for Policy and Practice: PST

- If using traditional summer school classrooms for training, identify ways they may fall short in preparing teachers. Either make adjustments early or compensate for shortcomings in other areas of training (e.g., discuss ways that classroom management might be different with 25 students versus ten).
- Include training content specific to candidates' certification areas.
- Maximize opportunities for informal cohort interactions.

among other cohort members. The online coursework was completed in the evenings, or when they could find time during the day. In all districts, year one PST was intended to be run primarily by TNTP staff members, supported by district staff. In year two, the programs planned for PST responsibilities to shift to the district, and TNTP would play an advising role. This shift happened to different degrees across the districts. In this section, we highlight some of the key themes that emerged from data collection

about PST.

*Candidates found classroom practice to be a valuable element of their training, but summer school structures—short school days and fewer students—limited the applicability of their experience.* During the two years of our implementation research, all three programs used their districts' existing summer school programming to support the field experience portion of training. Interviewees questioned the degree to which the candidates' training was relevant and sufficient preparation for the needs of the districts and their students. For instance, interviewees often reported that they did not feel the structure of summer school provided realistic practice to prepare them for the school year: Summer school days were shorter and candidates taught for only a portion of those days, the class sizes were smaller than typical school-year classrooms, and often the curricular expectations for the summer could be either lax or unclear. One trainee reported, "To me, this is practice but not real practice. I started out only

<sup>2</sup> District B also included a fall PST for a smaller cohort of teachers; the practicum aspect of PST took place during the school year. This may have allowed the candidates to get a more realistic picture of what a school day looked like in reality, though the in-classroom portion of training was shorter, at two versus five weeks.

having three students; now I have four. So everything I'm being taught about classroom management doesn't really apply to my [school year] class setting." Additionally, there was a subset of teaching candidates in all three programs who were placed in summer classrooms that did not match their intended certification area; for example, one candidate who had been hired for a high school physics position in the fall taught a third-grade classroom during the summer. Despite these challenges, candidates commonly reported that their time in front of students was one of the most valuable dimensions of their PST experience. One candidate said, "The actual summer work that we did being placed in the school, being actually in the classroom, that was extremely helpful, even though it wasn't the population I was going to be dealing with."

*Cooperating teachers in summer school classrooms affected candidates' PST experiences—for better or worse.* According to candidates, their experience with their cooperating teachers—who were the primary teacher of record in candidates' assigned classrooms—was central to how they experienced PST. Cooperating teachers were existing district teachers who had opted to teach summer school but did not necessarily know that they would be supporting a teaching candidate. One candidate who had positive reviews of his field experience told us, "I got lucky because I had a co-teacher who let me do as much or as little as I felt comfortable with, so I kind of, toward the end of the program, was running most of the class on my own." In all three programs, though, a large portion of candidate interviewees reported difficulties associated with cooperating teachers. Cooperating teachers reportedly varied in their level of qualification, offered varying degrees of support to candidates, and sometimes gave candidates teaching suggestions that were counter to the training that they were concurrently receiving from the programs. One staff member reported, "Some of the lead teachers' relationships with the fellows may not be as strong as they could be. Maybe because there is a disconnect between what fellows are learning is good instruction and what they see the lead teacher doing."

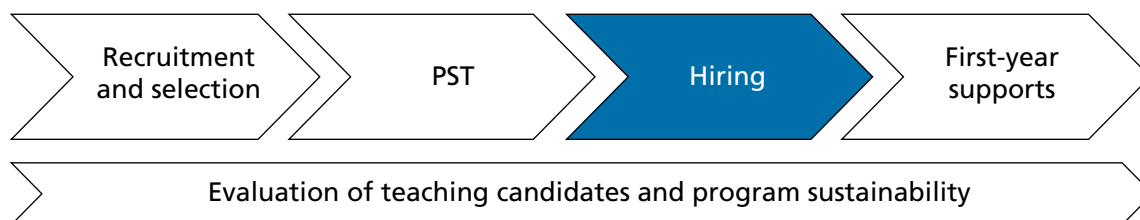
*Program staff regularly revised PST training, aligning TNTP-created content with district priorities while ensuring candidates were equipped with the information they needed to become first-year teachers.* In the first year, PST in all programs focused on strategies rooted in Doug Lemov's *Teach Like a Champion* (TLAC; Lemov, 2010). However, leaders in Districts A and C felt that TLAC was out of sync with their approach to instruction and classroom management. After the first summer, one TNTP staff member in District A told us, "We realized a fundamental mistake we made on the launch, which was that our frame was basically [to] launch TNTP's teaching fellows program and make modifications to fit within [the district], rather than start with a blank piece of paper." The team went back to the drawing board after the first training to "co-construct" what the content of the training would look like moving forward. In the case of District A, this required lessening their focus on TLAC and increasing attention to culturally responsive teaching (CRT), a districtwide priority. The training in District C received similar pushback, although district leaders may have learned from District A's experience in the prior year and benefitted from additional time to co-construct curricula given their delayed start—they tried to anticipate such issues where possible. One TNTP staff member working in District C reported, "So TNTP was [typically] bringing the program to a district and implementing it, whereas on this project, we're bringing a blueprint of what we know about running this program, but we're creating a program for the district that they will then own and run." In contrast, those with whom we spoke—both district and TNTP staff—in District B did not bring up concerns about TLAC or TEACH program content.



In the second year of the TEACH program, staff in Districts A and C both reported doing considerable work to revamp the TEACH program to fit district needs, and staff in both districts reported the content of PST was better fitted to meet those needs in the second year of the program. At the same time, interviewees reported that there were some remaining gaps. For instance, some candidates were preparing to enter classrooms as ESL or special education teachers but did not feel that their training covered the specialized content necessary for those roles. One candidate told us, “It is highly annoying that the special educators are not given any sort of resources or information on how to do an IEP [individualized education plan] or how to work with special-need students, how to organize our paperwork, what needs to be completed first.” This challenge highlights the difficulty of prioritizing content for an abbreviated timeline.

*The cohort model was viewed as a strength of all three programs.* The cohort model, in which candidates worked and learned together during the summer and met up several times during the school year, was seen as a positive dimension of the training in all programs. One candidate said, “At the little school that we were all interning at, we’d all get there early and talk, and then when we got out, we would meet up at this spot before we went into the afternoon session, and talk about our day.” Candidates felt that debriefing with their peers was a core source of support during the busy and sometimes stressful training. PST staff also commented on the beneficial support that these informal networks offered candidates. One reported, “We had Fellows in one central location for their training in the afternoon; it really allowed them to work together and be cohesive.” These networks engendered a sense that “We’re all in it together” and reinforced camaraderie and peer learning.

## Hiring



A key benchmark of program progress in all three districts was ensuring that candidates who passed PST requirements were hired into a first-year teaching position that fit with their area of certification before the start of the school year. In all three districts, the ultimate onus for finding job placement was on the candidates themselves. However, while the programs did not “place” candidates in open positions, each district provided some support toward candidates’ efforts to get hired. This support included directly contacting principals and ensuring that program graduates attended various events where principals would be present, including district job fairs and new-teacher events. In year two, District C stationed a human resources staff person at PST to answer candidates’ questions. We heard reports of program staff inviting principals to observe PST, sending lists of candidates to principals, conducting mock interviews with candidates, and helping with resume writing. Principals in all three districts had

### Key Takeaways for Policy and Practice: Hiring Candidates into Teaching Positions

- Communicate with candidates early and often about what the hiring process will look like.
- Be transparent with candidates about how the program will and will not support candidate placement.
- Consider contingency planning for how to support teachers who are not hired into their anticipated certification areas.
- Begin building principal awareness and buy-in of the program before hiring begins.
- If possible, build a program timeline that allows for early hiring, ideally beginning well before the start of the school year.

hiring autonomy, meaning that principals were the ones who made hiring decisions for their schools.<sup>3</sup> With this context in mind, takeaways regarding the hiring process are described below.

*A large majority of candidates who completed summer training were hired as first-year teachers.* In each district, most (if not all) teachers who passed PST and the required certification tests were hired as full-time teachers or, in some cases, as long-term substitute teachers. This was considered a significant success by staff in all three districts and a promising sign that the programs were indeed producing candidates in areas of high need. As one District A staff member stated, “We are giving principals a product they need in these hard-to-staff subject areas.” In Districts A and C, however, they also acknowledged that they were not always successful in ensuring that those placements were optimal fits for each candidate. In one district, for example, some special

education candidates were hired into classrooms with students identified as having severe emotional disturbances rather than the mild-moderate disabilities the candidates had expected to teach. In another district, some candidates who had been trained in special education were hired into classrooms without any special education students, which hindered their ability to meet requirements for certification as special education teachers.

*Hiring was a source of anxiety for candidates, who often felt that program support during the process could be stronger.* Candidates in all three districts were worried that they would not find a job placement before the start of the school year. Hiring was, as one staff member described it, “a panic point” for candidates. The limited program support was unexpected for some who felt that the risk of not being hired into a teaching position was higher than they had understood before beginning the program. In District B, some candidates had entered into the program under the misunderstanding that they would be guaranteed a teaching position in the district. In District C, a candidate explained, “We’ve been told very overly optimistically that we’ll get placed, but until you get placed that suspense is high. Principals are rejecting us already saying they’re going with another candidate. It’s not as encouraging as it was originally.”

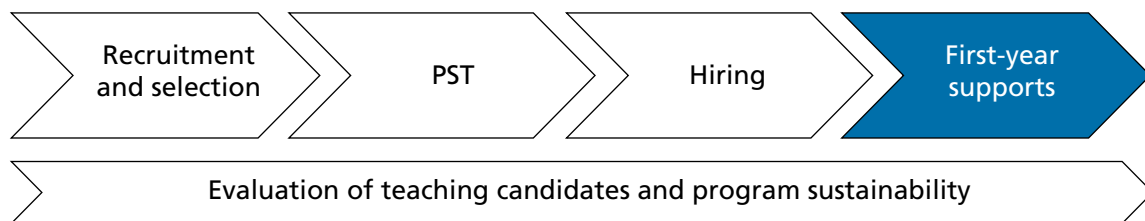
*Aligning school hiring timelines with program recruitment and training timelines was a challenge.* Timing issues regarding the hiring process came up in all three districts. One significant barrier to the hiring process was that the bulk of typical district hiring for the following year occurred in the January–March time frame, meaning that principals were looking for teachers before the TEACH PST had begun. Though candidates in some districts could be identified by principals to undertake the PST with the expectation that they would be hired after they completed it (e.g., paraprofessionals in particular schools), encouraging this earlier hiring opened up the logistical challenge of what to do if the candidates whom principals wished to hire ended up not being on track to complete PST, or if they did not pass the required certi-

<sup>3</sup> Though principals generally had hiring autonomy, District B did, in some cases, bypass the formal hiring process to fill specific vacancies. This was particularly true for candidates who were not already hired at the start of the school year.

fication tests. An additional timing challenge was the burden placed on candidates to actively seek a teaching job during the summer, which was a time when some of them already felt overwhelmed by the demands of PST.

*Principal awareness and buy-in of the program was perceived as a critical element of the hiring process.* Given that principals held hiring power, interviewees in all three districts were acutely aware of how important principal knowledge of and buy-in to the program was. To gain that principal buy-in, program staff strived to familiarize principals with each program and to assure them of the program’s ability to produce effective teachers: For their part, principals we interviewed in all three districts expressed mixed opinions about the quality of the teachers coming out of their respective preparation programs. Most often, principals were neutral about the program—stating that their experience with candidates coming out of the program was “hit or miss” or that they would look at program candidates on equal ground with any other candidates in the hiring pool. As one principal—who had a positive experience with the teachers hired out of the program—stated, “I mean, to me the program matters. Yes. But it’s the person that matters most.”

## First-Year Supports



After a TEACH candidate was hired, the programs provided three primary forms of school-year support to candidates: (1) one-on-one coaching, (2) in-person group sessions, and (3) online learning modules. The coaches were expected to visit the teaching candidates in

their classrooms and work with them individually to improve practice. The in-person group sessions took place on evenings or weekends and were often informed by the needs coaches observed in candidates’ classrooms. Finally, the online modules included content that the teachers needed to obtain certification. These supports were differently implemented—and differently received by candidates—in the three programs, as we describe below.

### Key Takeaways for Policy and Practice: First-Year Program Supports for Teaching Candidates

- Consider common baseline expectations for the approach and frequency of coaching that teaching candidates will receive during their first year in the classroom.
- Make online modules applicable to teachers’ work in classrooms and link them to other supports, such as coaching and in-person sessions.
- Emphasize cohort connections in in-person training.

*The majority of candidate interviewees in all three programs felt that time spent with coaches was beneficial to their development as teachers.* In interviews, the large majority of candidates were approving of their coaching experience; they explained that coaches had helped them reflect on their practice,

pointed them toward useful resources, and often offered them reassurance as they learned to be comfortable in their classrooms. One candidate told us, “I would think that a part [of my lesson] went horribly, and [my coach] would say no, this didn’t go as badly as you thought, but maybe here’s some areas of refinement.” Coaches also helped keep candidates on track with their other program responsibilities (e.g., deadlines for taking assessments, reminders about online coursework) and were readily accessible; in one instance, a District B candidate told us, “If I had any type of problem, any kind of question, if I had a bad teaching day where I felt like I couldn’t get everybody engaged, I could message [my coach] and she would come if I felt like I needed her to be there. An excellent coach!” Another candidate said of her coach, “She was very responsive and very personable and helped me get through this year with some of my sanity.”

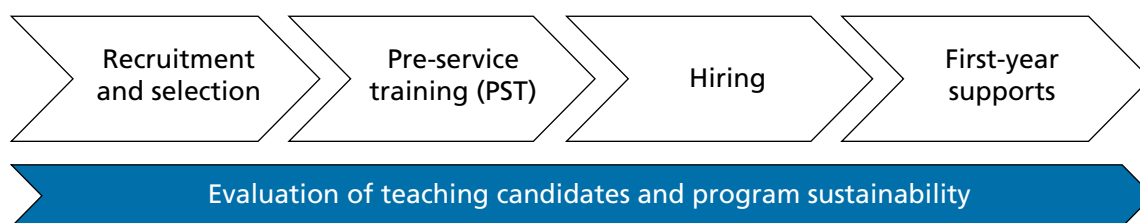
*Candidates received varied coaching supports—even within the same district—depending on the coach to whom they were assigned.* While most interviewees appreciated the coaching that they received, their comments also suggested that the nature, frequency, and perceived quality of the coaching varied somewhat. In District A, for example, coaches reported in the first year that they had attended training on standard coaching practices to employ with candidates, but during interviews in year two, interviewees (both coaches and program staff) explained that coaches did not share a common model. Each was instead working ad hoc, using tools and techniques from past coaching experiences. In all programs, coaching frequency and general availability of coaches to candidates was affected by the weight of coaches’ workloads, which varied by district and even within districts and could include large coaching caseloads and other job responsibilities, such as planning and delivering professional development.

*Online modules filled a requirement for candidates seeking certification, but most candidates had a hard time connecting the modules to their practice.* TNTTP had a model for online modules in which teachers would take courses throughout the school year and complete assignments either in general education or related to a specific area of certification (e.g., special education). The large majority of interviewed candidates across programs described the modules in negative terms, such as “a burden,” “a waste of time,” or “overwhelming.” One candidate told us, “The modules are not very helpful, and I’ll be 100 percent honest, I just click through them.” Interviewed candidates from all programs reported a disconnect between the online modules and the other kinds of supports, such as coaching and in-person training, that candidates received. Several candidates from across programs appreciated the content of the modules but stated that the information came too late for them; in particular, special education teachers wanted more support in topics like writing IEPs before the school year began. One candidate explained, “I wish that I could have collected or got a little bit of special education experience or what was expected of me in that area while I was doing my summer training instead of having special education modules while I was working.” The programs worked to refine the online modules and their delivery over time to better meet candidate needs. For example, toward the end of the second year in the program, the District C team began holding live online sessions based on the modules, which added interaction; some District C candidates stated that they felt the coursework was more engaging as a result of this change.

*In-person support sessions provided a valued opportunity for cohort interaction and learning but could be labor intensive for program staff.* All programs offered in-person development sessions spread throughout the year for cohort members. In-person sessions received positive reviews from almost all teaching candidates we interviewed; they felt that the sessions provided time to reconnect with their cohort members and deepen camaraderie. One candidate

reported, “The experience of going in and talking to all the other fellows who were feeling the same way [I was] was helpful.” Program leaders in Districts A and C strove to make the sessions responsive to candidate needs; the content was directly based on coaches’ and program leaders’ observations of what candidates needed to work on. A candidate in District C claimed that, “Saturday trainings, definitely, were very useful. I always walked away with learning something that I could put to use right away.” The District B program offered monthly content-specific training to its first cohort of candidates, in the 2016–2017 school year, but phased out the trainings in year two, given a reduction in its staffing. Candidates that we interviewed felt this was a loss and would have liked to have more in-person touchpoints. District B was not alone in staffing concerns; in District C, one program leader told us that she did not think the district had the capacity to continue these in-person support sessions on its own once TNTP had exited the program. To make them more manageable, the District C team cut down from six sessions in the first year to four in the second year.

## Evaluation



In addition to ongoing supports, each of the three districts had two quality checkpoints for its trainees: One occurred at the end of PST, and the other occurred at the end of the candidates’ first year of teaching. Observations conducted by program coaches over several times during

### Key Takeaways for Policy and Practice: Evaluation of Teaching Candidates

- Clarify the degree to which performance bars are intended to identify and remove underperforming teachers, and follow through in using performance screens for that purpose.
- Align district and program evaluation rubrics so that candidates are striving towards meeting a consistent set of quality measures. Note that this does not mean that district and program evaluators must, or even should, communicate their respective evaluation results with each other.
- Take steps to ensure that observation scores are consistent across evaluators.

PST and during the school year were the primary data source for these performance evaluations. Programs in each district had rubrics through which coaches recorded observation data. End-of-year evaluations could also take into account completion of online coursework, student surveys, feedback from the principal at each trainee’s school, and successful passage of state certification tests. End-of-year evaluations implemented by the programs happened separately from, and in addition to, teacher evaluations done by the districts or schools themselves. Key takeaways regarding the evaluation process in each district are described below.

*Interviewees offered mixed reviews about whether performance screens were consistent measures of teacher effectiveness. Some interviewees, TNTP*

staff in particular, felt that performance bars were an essential component of ensuring the quality of teacher candidates in classrooms. Furthermore, in District B, where the preparation program had existed prior to TNTP's involvement, we heard feedback that the addition of the performance bar component marked an important shift in mindset away from recruiting quantities of teachers toward recruiting quality. However, while some interviewees praised the impact of the performance screens, we also heard concerns across districts about whether the performance bar was rigorous, discerning, or consistent enough. In one district, interviewees explained that their performance screens separated program participants into three categories: green meant the participant would pass, red meant the participant would not, and yellow was an in-between category. In year one, all participants in the yellow category passed the performance screen, but then several struggled and/or left the classroom during their first year of teaching. Interviewees in Districts A and C also expressed concerns about whether scoring was consistent or normed across coaches: "You don't want Coach A to say this person is ready and recommend them, but Coach B has a fellow that's doing much better but says they're not ready." In the second year of our research, one district had taken steps to address these concerns. It split the four observations that went into candidates' end-of-year screen so that two of the observations were completed by each candidate's assigned coach, and two were completed by a "blind evaluator" who was not the candidate's coach—this strategy was viewed by several interviewees as a notable improvement to the evaluation process. One candidate explained, "I liked having a different person's perspective, just to kind of give me a more well-rounded view on how I'm doing and just a different perspective also on different feedback."

*The programs varied in the degree to which their evaluations aligned with those of partner school districts.* Each of the three districts used different strategies when it came to aligning district and program observation tools. The program in District C used the TNTP Core rubric, which was entirely separate from the evaluation tool used by the district and schools. The program in District A had started using the TNTP Core rubric in year one but by year two was using the rubric the state required of all certifying bodies. In District B, the program moved in year two to adopt the same rubric as was used in the district at large but chose to focus on only a subset of domains from that rubric. This district also trained program coaches and school administrators on the evaluation tool at the same time, in an effort to further increase alignment between the evaluation scores teachers received from the program and from their school administrators. Interviewees—trainees and principals included—consistently acknowledged that the program and school or district evaluation systems were totally separate from one another. For some, this caused concern around potential misalignment between the two systems, as well as the burden that having multiple evaluations could place on teachers during their first year of teaching.

## **Program Sustainability**

In broad terms, these programs were designed so that TNTP would introduce the program in each district, support implementation and capacity-building to sustain the program, and then gradually transition out of the district as the grant concluded in three years. Sustainability of the program, following TNTP's departure, was therefore a key focus of the joint work between TNTP and its district partners. Because each district context was unique, challenges to and enablers of sustainability in each program varied, but with some common themes. Key

### Key Takeaways for Policy and Practice: Program Sustainability

- If one partner organization will transition out of the program, plan early and explicitly for this process.
- Identify which staff members will take on specific responsibilities.
- Calculate the number of teaching candidates necessary for financial sustainability once grant funding ends, and prioritize concrete plans to meet these goals.

takeaways regarding program sustainability in each district are described below.

*Interviewees from all three programs expressed concerns about the extent to which district staff had capacity to fill gaps left as TNTP staff transitioned out of each district.* In District A, program staff hoped to spread responsibilities across existing departments; for instance, the human resources staff would take on recruiting work for the program. A TNTP staff member in District A explained this approach, saying, “If everything lives and dies on one person, you’re covered as long as that one person is here. If that one person leaves, and in a district there’s always turnover, there’s got to be broad buy-in by all departments in the district if it’s going to remain.”

However, some interviewees questioned whether those existing staff members would have the bandwidth to take on new program responsibilities in addition to their existing workload. This challenge was exacerbated in District B by frequent staff turnover. A TNTP interviewee said of the staffing changes in District B, “We’ve had a lot of turnover in leadership, so while we did invest a lot in the positions, there are now new individuals, and it’s challenging in the sense that we’d need to reinvest them.” Some felt the lack of institutional knowledge caused by this turnover threatened the sustainability of the program. Finally, program staff in District C worried that while they had the capacity to manage TNTP’s work, they might not have the depth of expertise of TNTP staff. For instance, TNTP conducted data analysis to inform programmatic decisions, such as what certification areas they should be hiring for, what were their highest leverage recruiting strategies, and in which areas teaching candidates were struggling and excelling. The district staff worried that they did not have the “data chops” to take on this important work on their own.

*While staff in District C felt confident in their ability to financially sustain the program, staff in Districts A and B were unsure about their programs’ long-term viability once support from the grant ended.* Districts A and B faced practical challenges related to sustaining the work of their programs in the absence of the funding and technological resources they had been receiving as an element of their work with TNTP. For example, district staff working on the District A program were concerned about how they would continue their recruiting and training practices when the grant ended, because TNTP was using some proprietary technology that the district could not afford to subscribe to on its own. At the close of our research, the district team was investigating how to transfer practices over to the district’s existing technology platforms, if at all. In District B, financial sustainability of the program was a concern from the beginning. In the first year, district staff told us that they would need over 200 teaching candidates to enroll in the training for the program to financially break even; “We [need to] get to a place where we’re sustainable as a program; we just don’t have enough [candidates] right now to financially support ourselves. . . . We’ve been charging all these things, and we’re not making the money to support them.” The program in District C did not express the same financial concerns as

staff members neared the end of the grant period, potentially because some portion of a corporate donation to the district had been earmarked to support their work.<sup>4</sup>

### **Limitations of Implementation Analyses**

We largely relied on interview data in this portion of the report. We sought to confirm and fill in interviewee reports with data, from other interviewees, documents, or observations. However, we recognize that interviews are a form of self-report and rooted in perceptions. We also recognize that sampling is a limitation: While we were able, in most cases, to speak with all TNTP staff involved in a program on site, and most or all of the involved district staff, we logistically could sample only a smaller group of the teaching candidates and principals who hired them. It should also be noted that at each stage of qualitative data collection, the candidates we invited to participate in focus groups and interviews were those who had persisted in the program to date. In other words, we did not seek interviews with candidates who had dropped out of, or been removed from, their respective programs. This may have added bias to the perspectives we heard. Lastly, these findings—along with findings on impact and cost that we share in subsequent chapters of this report—are necessarily limited to the experiences of those in the three districts that were part of this project and may not generalize to other districts.

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<sup>4</sup> This donation was allocated in the year after our research concluded, so we do not have data about how the award affected the program.



## Impact of TEACH

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In this section, we describe the impacts of TEACH. We measured the impact of the program in participating districts in two ways. First, because TEACH recruited individuals who would generally have not been able to enter teaching through traditional pathways, the program contributed to the supply of new teachers qualified to teach in the highest-need roles identified by the participating districts. We gauged the extent of this impact by describing the numbers and characteristics of candidates recruited through the program and/or the subjects that they taught, with comparisons to non-TEACH hiring in each district in the same period.

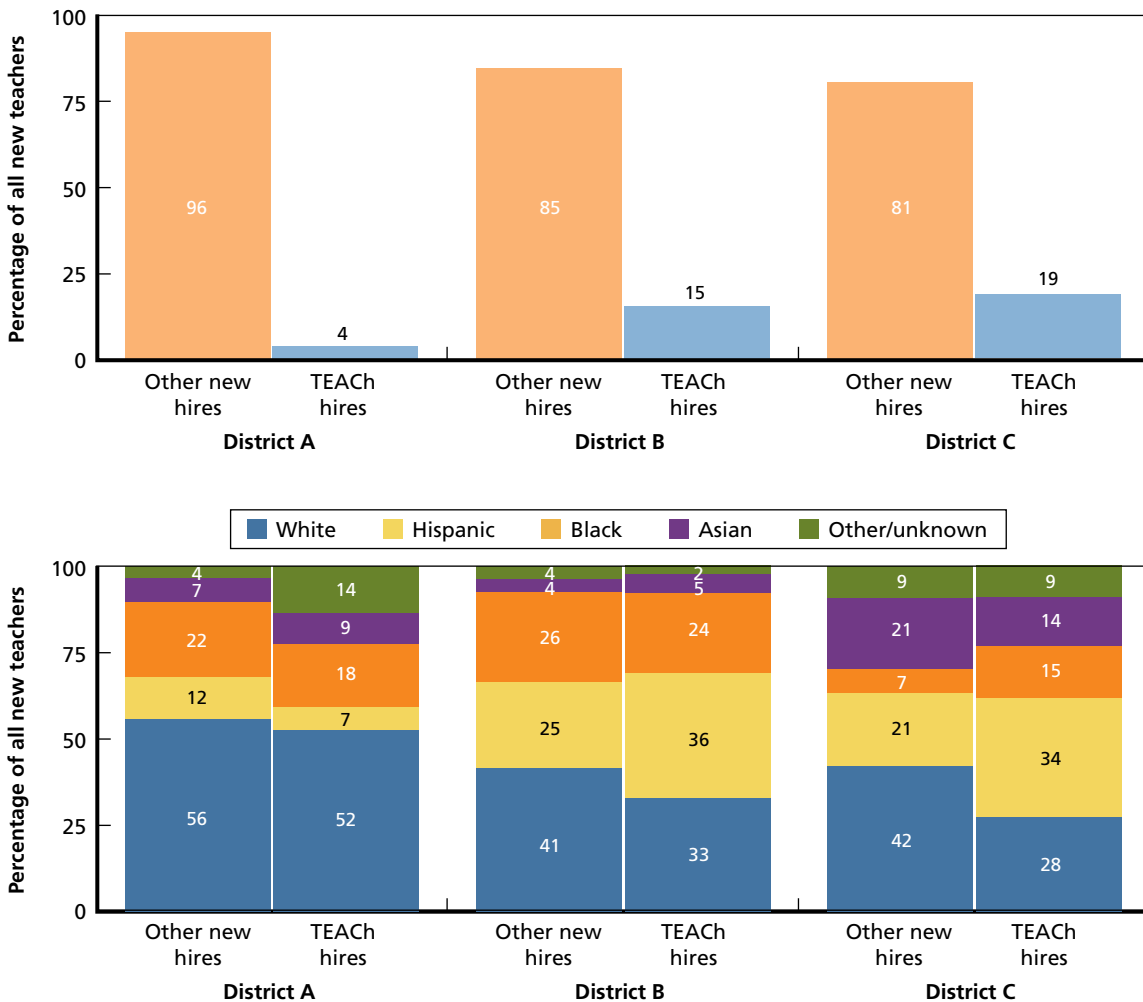
Second, the program aimed to prepare and support new teachers to be highly effective and to remain in teaching. To examine this aspect of the program, we compared the performance of newly hired TEACH candidates to that of other newly hired teachers working in similar circumstances within each district. We considered multiple relevant outcomes, including student achievement gains, district evaluations of teachers, and teacher retention in the district. We focused on outcomes in TEACH teachers' second year of teaching to be the best test of the program's impacts, given that TEACH provided supports intended to improve teaching all the way through each candidate's first year of teaching. Thus, second-year outcomes reflect the relative performance of teachers in the year after they completed the entire TEACH program.<sup>1</sup> However, we also examined relative performance in candidates' first year of teaching, because this could tell us about their performance while they were still actively receiving TEACH supports. First-year analyses also included additional TEACH cohorts, and this larger sample improved our statistical power to detect differences between TEACH candidates and comparison teachers. Unfortunately, the span of this study did not allow us to compare the longer-term performance of TEACH teachers beyond their second year in most of the districts.

### Contributions to Districts' Teacher Recruitment

*TEACH contributed a substantial portion of all new hires in two of the three districts.* Figure 3.1 details the relative proportions of both TEACH and other new teachers hired in each district. Overall, for the cohorts included in our analytic sample, TEACH supplied around 13 percent of all teachers hired across grades K–12 in the three districts. In Districts B and C, the TEACH program represented a sizable portion of all new district hires, at 15 percent and 19 percent, respectively. The TEACH program was much smaller in District A, representing around 5 percent of new hires.

The proportion of district schools that received a TEACH hire varied. In District A, approximately 25 percent of schools hired a TEACH teacher candidate at some point during

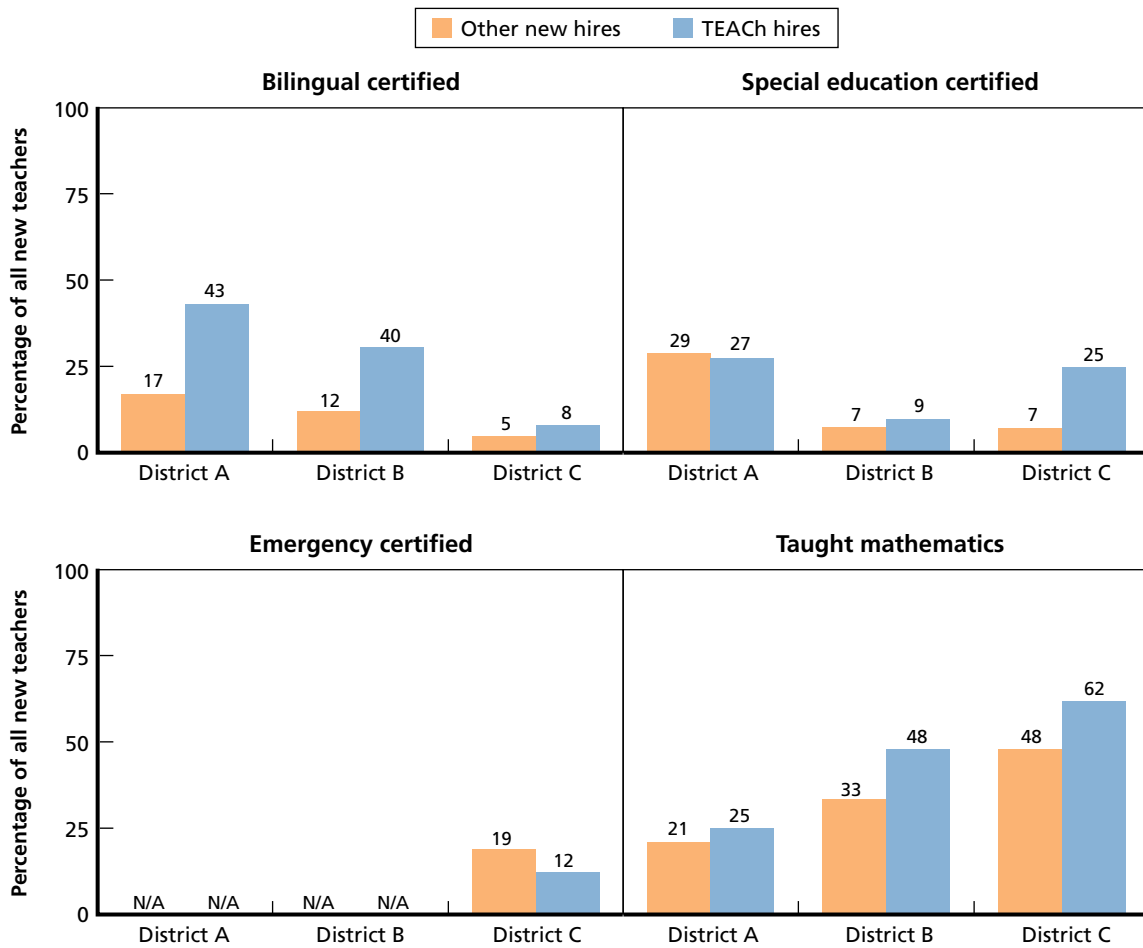
**Figure 3.1**  
**Proportion and Demographics of TEACH Candidates and Other First-Year Teachers, by District**



the study period. In District B, this figure was 66 percent of schools. In District C, 59 percent of schools hired a TEACH teacher candidate during the study period. Around 44 percent of TEACH teacher candidates were hired alongside a fellow candidate teacher from the same cohort in the same school. Additional detail on these and other recruitment outcomes are provided in the technical appendix.

*TEACH contributed to districts' teacher diversity goals.* One goal of TEACH was to recruit a more diverse teacher workforce. In the two districts with the most TEACH hires, Districts B and C, TEACH candidates were less likely to be white than other new teachers and more likely to be Hispanic than other new teachers. In District C, TEACH candidates were also more likely to be black than other new teachers. (See Figure 3.2.) In District A, a substantial proportion of TEACH candidates opted not to specify their race, which made it difficult to determine the extent of any differences in racial composition in that district. It is apparent, however, that in District A, TEACH teachers were not substantially less likely to be white, in spite of that district's goal of hiring racially diverse teachers.

**Figure 3.2**  
**Certifications and Roles of TEACH Candidates and Other First-Year Teachers, by District**



*TEACH new hires were more likely to teach—and be certified to teach—in high-needs areas.* By design, the TEACH program in each district prepared candidates to fill positions of greatest need in each district. As shown in Figure 3.2, TEACH candidates were substantially more likely than other new teachers to be identified in district administrative records as certified in bilingual instruction for English language learners (ELL) in all three districts. They were more likely to be listed as certified to teach special education in two districts, particularly in District C. TEACH candidates also were substantially more likely to teach mathematics courses in two of the three districts. Further, as detailed in the technical appendix’s Table B.2, TEACH candidates were more likely to teach special education and ELL students in their classrooms. Finally, in the one district where data on emergency certified teacher status was available, TEACH candidates were less likely to be teaching with an emergency certification. This indicates that TEACH candidates in this district more often worked in roles (e.g., special education instruction) for which they were either certified or on an identified path to certification and therefore did not need an emergency waiver.

Although teacher recruitment goals varied by district and over time, we are not aware of any detailed district records of specific targets for teachers of different certification areas,

although it is possible that districts kept such records. Broadly speaking, however, there is evidence that some districts may have been more successful at using TEACH to differentially recruit the types of teachers they had initially prioritized. In particular, District C appeared to rely heavily on TEACH to hire teachers certified to teach special education. Specifically, 25 percent of TEACH candidates hired as new teachers were certified in special education versus just 7 percent of the pool of other new teacher hires. District B did not rely as heavily on TEACH to hire teachers of that type, in spite of that being a priority area in both districts. Districts A and B relied heavily on TEACH to hire teachers certified to teach in bilingual education classrooms, consistent with their priorities, while District C was only slightly more likely to rely on TEACH to hire teachers of that type. All three districts were somewhat more likely to hire mathematics teachers through TEACH, but this was an explicit goal only in District A. Of course, it is possible that districts did not hire teachers in target areas because they could not identify many teachers interested in pursuing certifications in those areas in the initial recruitment stage. See the technical appendix's Table B.1 for more details on these hiring trends.

*It is unclear how TEACH may have influenced overall trends in teacher hiring in each district.* We examined historical data provided by the districts in regard to the numbers and characteristics of new teachers hired for up to two years before and in the years after the TEACH program began. However, the numbers and characteristics of new hires in districts varied substantially from year to year, likely due to factors unrelated to TEACH. This made it difficult to infer whether the start of TEACH was associated with any clear changes in hiring patterns in districts. In addition, we examined some historical data on job vacancies, job fill rates, and job applicants provided by districts, but these records were generally incomplete. As a consequence, we were not able to rigorously evaluate the extent to which TEACH may have driven changes in the overall supply of teacher candidates in each district or districts' overall success in filling vacancies.

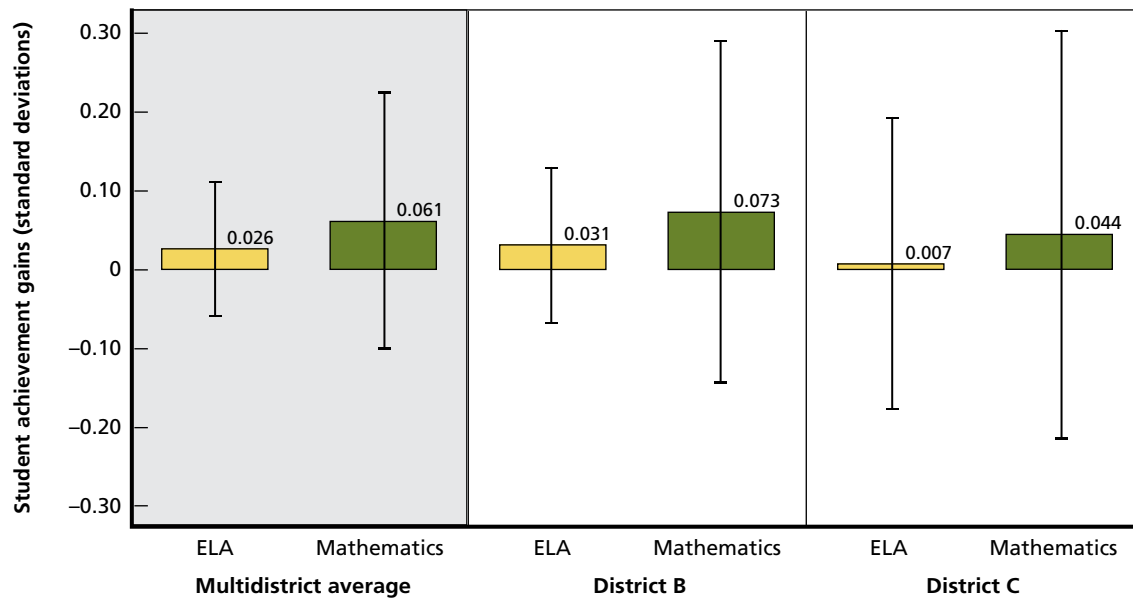
## Achievement Outcomes for Students of TEACH Teachers

To evaluate TEACH teachers' contributions to student achievement, we compared the achievement gains made by students of TEACH teachers to those of comparable students of comparable teachers hired in the same incoming cohort in each district. Due to district data limitations, this analysis was possible only in Districts B and C. Overall, we identified some evidence that either the selection and recruitment screens, the training and induction supports teachers received, or both, may have contributed to higher teacher performance relative to comparison new teachers.

*Second-year TEACH teachers' student achievement gains in Districts B and C were not significantly different from those of other teachers.* Figure 3.3 shows our estimates of the difference in achievement gains between TEACH teachers' students in their second year in Districts B and C and the students of other second-year teachers in each district. These analyses were based on results from two TEACH cohorts in District B and one cohort in District C, where we could observe second-year teachers' outcomes.<sup>2</sup>

Overall, in each district and in our multidistrict average, we did not identify a statistically significant difference in achievement outcomes in either ELA or mathematics in TEACH teachers' second year on the job. Estimates of the TEACH effect were directionally positive in

**Figure 3.3**  
**TEACH Student Achievement Gains Relative to Students of Comparison Second-Year Teachers,**  
**Overall and by District**



NOTE: \* =  $p < 0.05$ . Additional details on the cohorts and samples included in this figure are provided in Table B.3 in the technical appendix.

both subjects. However, our sample size and corresponding statistical power to detect effects was limited, as suggested by the wide confidence intervals around those estimates (Figure 3.4).

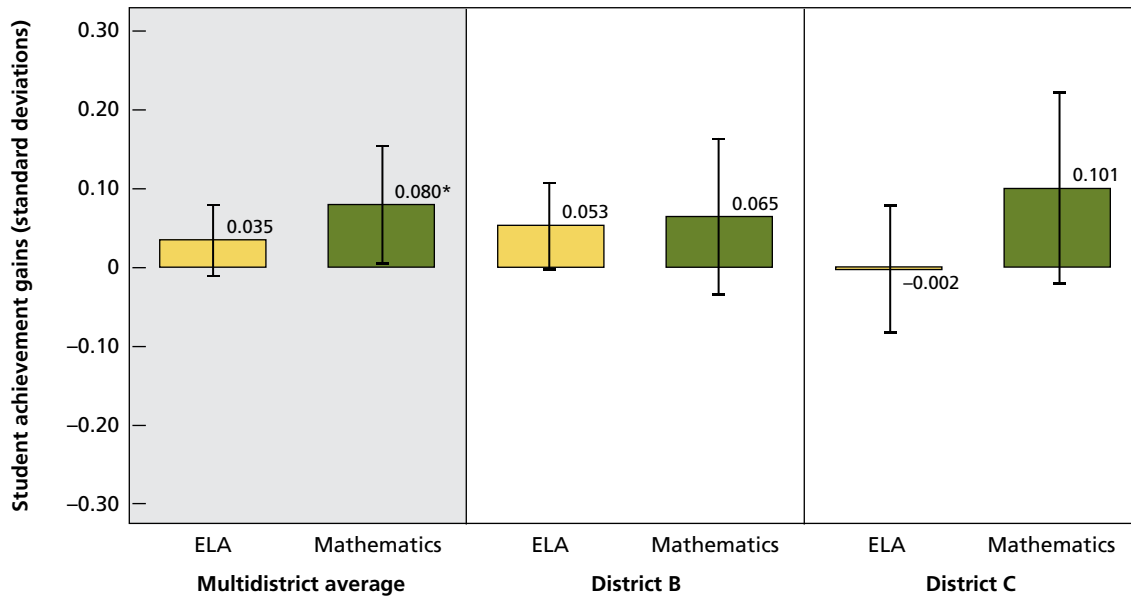
*First-year TEACH candidates' student achievement gains were significantly higher in mathematics than comparison teachers.* When analyzing first-year teacher outcomes, we were able to include a larger sample of teachers—three cohorts of TEACH candidates from District B and two cohorts from District C. Pooled results across the two districts, shown in Figure 3.4, indicate a small, statistically significant positive difference in TEACH students' mathematics achievement gains. While none of the individual district-specific effect estimates were statistically significant at traditional thresholds ( $p < 0.05$ ), effect estimates for ELA achievement in District B and for mathematics achievement in District C were each close to significant ( $p < 0.1$ ) and consistent with the pooled results.

On average across both districts, the estimated size of the first-year TEACH candidate advantage in mathematics was equivalent to raising the median student's achievement rank from the 50th percentile to the 53rd percentile in one school year. Cross-district average results in ELA were directionally positive but not statistically significant. Overall, estimates of the TEACH difference for first-year TEACH candidates were only slightly larger than those for second-year TEACH teachers, but our sample in the first-year analysis was much larger, and the resulting confidence intervals around our estimates was correspondingly more narrow.<sup>3</sup>

*In the one district where we could observe teachers in their third year, effect estimates were directionally positive and similar to estimates from their first and second year.* For one TEACH

<sup>3</sup> Consistent with prior research, absolute levels of teacher performance for both TEACH and comparison teachers were somewhat higher, on average, in teachers' second year on the job relative to their first.

**Figure 3.4**  
**TEACH Student Achievement Gains Relative to Students of Comparison First-Year Teachers, Overall and by District**



NOTE: \* =  $p < 0.05$ . Additional details on the cohorts and samples included in this figure are provided in Table B.4 in the technical appendix.

cohort from District B, we were able to evaluate effects on student achievement in teachers' third year on the job. These and other individual cohort-by-year effect estimates are provided in the technical appendix's Table B.9. For teachers from this cohort, effect estimates were large and directionally positive in all three years, and estimated effect sizes were similar in their third year to those in years one and two. These results provide additional indication that TEACH effects on student achievement were similar across teachers' first few years on the job.

### District Evaluation Outcomes for TEACH Teachers

Formal district evaluations of teachers were the second type of outcome measure that we used to evaluate the relative performance of TEACH teachers. Because district evaluations were conducted for teachers across all grade levels and subjects, we had more complete coverage of TEACH and comparison teachers when considering evaluation outcomes. Overall, we found some evidence that TEACH teacher candidate evaluation ratings were lower initially, but no differences were apparent among teachers after they had completed the program and were in their second year of teaching.

*District evaluation measures varied substantially across contexts.* Each of the districts participating in this study had distinct evaluation systems for teachers. The foci of their evaluations differed, as did the portion of teachers who received evaluations in each year. As a result, we considered each district's evaluation measure as a district-specific outcome domain and did not calculate an average cross-district TEACH effect.

Characteristics of the separate evaluation systems are summarized in Table 3.1. In Districts A and B, all teachers were evaluated annually, while, in District C, evaluations varied in frequency at the discretion of principals; most teachers received an evaluation sometime within their first two years on the job. All of the evaluation ratings incorporated principals' observations and discretionary ratings. However, District B was unique in that its ratings also incorporated districtwide standardized measures of student learning and data from student surveys. Ratings in all three districts reflected a fairly normal distribution across evaluation scores. However, ratings in Districts A and C were somewhat positively skewed, with almost no teachers receiving the lowest possible evaluation rating score and the highest proportion of scores being in the second-highest rating category. Additional details about the separate district evaluation systems and measures is provided in the technical appendix.

*Among second-year TEACH teachers, evaluation ratings were not significantly different from those of other teachers in any of the three districts.* In Figure 3.5, we provide our estimates of the difference in second-year TEACH teachers' evaluation ratings relative to comparison teachers. Because different districts' evaluation systems used different scales, our estimates for the TEACH difference are not directly comparable across districts. TEACH evaluation scores in teachers' second year were not significantly different from those of comparison teachers in any of the districts at traditional thresholds ( $p < 0.05$ ). However, differences in District A were negative and close to significant ( $p < 0.1$ ), though substantively small.

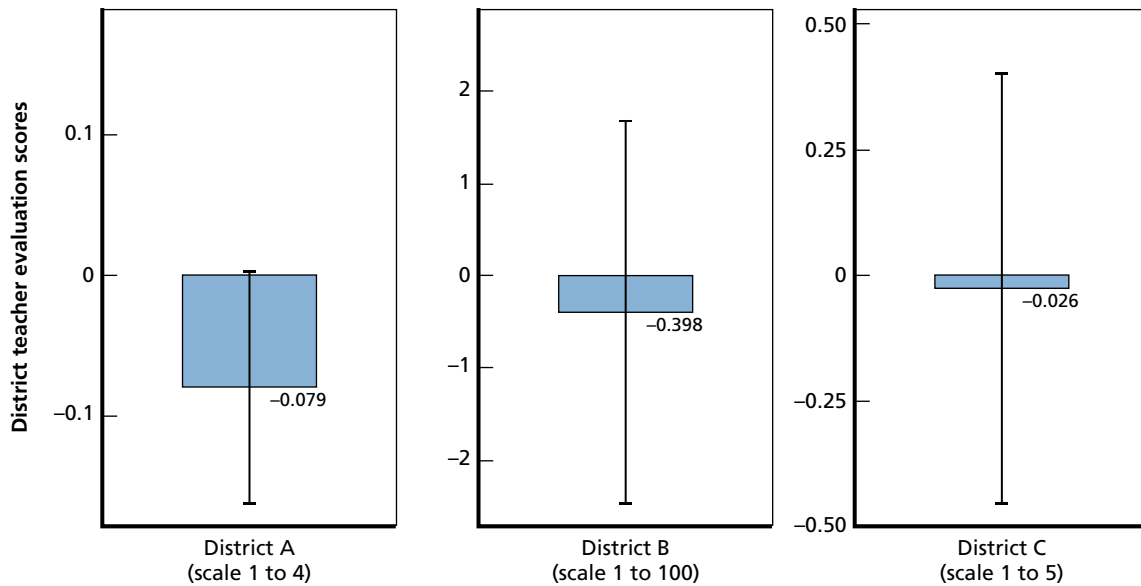
*In one district, first-year TEACH candidate evaluation ratings were significantly lower than those of other teachers.* In Figure 3.6, we provide estimates of TEACH differences in evaluation ratings among first-year teachers. Results differed somewhat from the results for second-year teachers. In particular, in District B, first-year evaluation ratings for TEACH candidates were significantly lower than those of comparison teachers, with ratings 1.5 points lower on a 100-point scale. The estimated difference in first-year evaluation ratings in this district was small,

**Table 3.1**  
**Characteristics of the District Teacher Evaluation Measures Considered in This Analysis**

	District A	District B	District C
Teachers evaluated	Almost all teachers, annually	Almost all teachers, annually	Around 45% evaluated in year 1 and around 82% ever evaluated as of year 2, with scope and timing at principals' discretion
Evaluation components			
Local principal observations and discretionary ratings	Yes	Yes	Yes
Districtwide student achievement or learning measures	No	Yes. Measures varied across grades and subjects.	No
Districtwide student surveys	No	Yes, in some grades and subjects.	No
Evaluation score scales	Scores ranged from 1 to 4.	Scores ranged from 1 to 100.	Scores ranged from 1 to 5.

NOTE: Although almost all teachers in District A were meant to receive annual evaluations, evaluation data were unavailable for some TEACH teachers working in district-affiliated charter networks. In District C, rates of teachers receiving evaluations within 1 year and within 2 years were almost identical for TEACH and other new teachers.

**Figure 3.5**  
**Difference in TEACH District Evaluation Scores Relative to Comparison Second-Year Teachers**



NOTE: \* =  $p < 0.05$ . \*\* =  $p < 0.01$ . \*\*\* =  $p < 0.001$ . Additional details on the cohorts and samples included in this figure are provided in Table B.5 in the technical appendix.

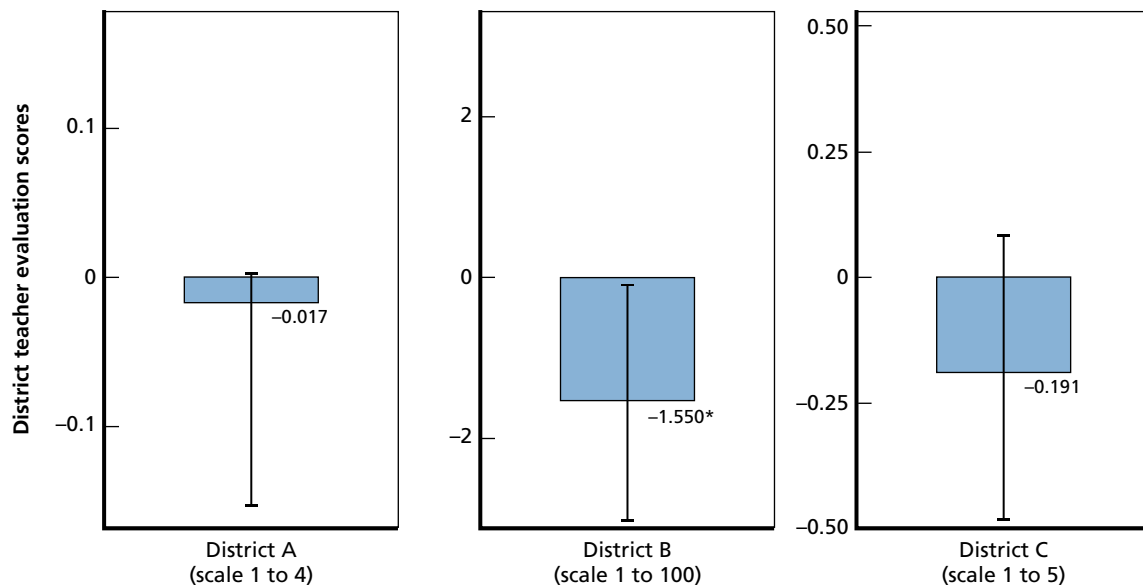
roughly equivalent to the difference between the median first-year teacher rated, who would rank in the 50th percentile, and the average TEACH candidate, ranking in the 48th percentile in this district.<sup>4</sup>

*Relative TEACH evaluation ratings in the first cohort in District B improved noticeably by teachers' third year on the job.* Finally, we also conducted an exploratory analysis of evaluation outcomes specifically for teachers in the first cohort in District B in which we could evaluate TEACH effects over three full school years, with results included in the technical appendix's Table B.9. Results for this cohort in its first and second year were broadly similar to the results for the overall sample of District B teachers. For this cohort, we found a directionally negative difference in TEACH evaluation ratings in their first year (about 2.7 points lower) and a smaller negative TEACH difference in their second year (about 1.7 points lower). However, by their third year, teachers in this cohort had estimated evaluation ratings 3.2 points higher than comparison teachers. This represented a substantial shift toward more positive evaluation ratings over time for this cohort. In absolute terms, both TEACH and comparison teachers' evaluation ratings improved with each additional year of experience, but TEACH teachers improved at a faster rate.

<sup>4</sup> As shown in the technical appendix's Table B.10, in District B there was no clear difference in evaluation ratings between teachers who taught in tested grades and subjects and teachers who did not. We also explored results from just the principal-discretionary component from District B's evaluation ratings, which was the largest component of the evaluations that was unrelated to student achievement outcomes. Results were very similar to our analysis of overall evaluation ratings in that district.



**Figure 3.6**  
**Difference in TEACH District Evaluation Scores Relative to Scores of Comparison First-Year Teachers**



NOTE: \* =  $p < 0.05$ . \*\* =  $p < 0.01$ . \*\*\* =  $p < 0.001$ . Additional details on the cohorts and samples included in this figure are provided in Table B.6 in the technical appendix.

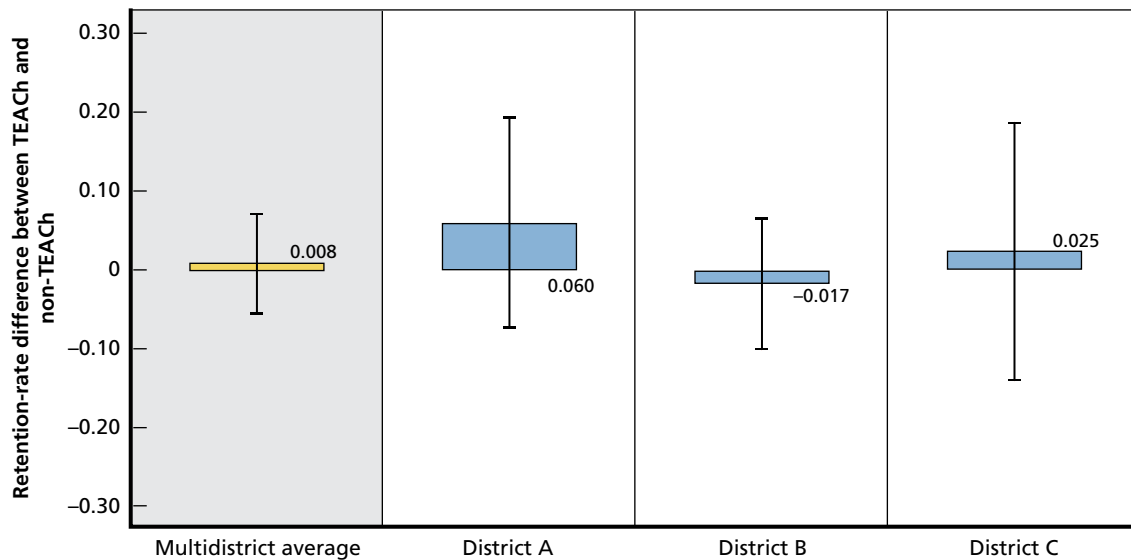
## Retention Outcomes for TEACH Teachers

Finally, we evaluated how long TEACH teachers remained teaching in their districts, in comparison to other newly hired teachers. TEACH's goal was to recruit teachers who stayed in teaching at least as long as teachers recruited and trained through traditional pipelines. At the same time, however, in its first year, TEACH also employed selective retention strategies, evaluating candidates' first-year performance and encouraging retention only for those who met the program performance standards. Thus, as with our other outcomes, our primary retention outcome of interest was retention after teachers' second year on the job, when all TEACH supports and systems had fully played out. Overall, we found no evidence that retention rates were any different for TEACH teachers than for comparison new teachers, in spite of the additional performance screens that TEACH employed at the end of teachers' first year on the job.

*TEACH within-district retention rates were comparable to those of other teachers.* Second-year retention results are shown in Figure 3.7. Overall, across the three districts, we found no significant difference in TEACH retention rates between their second and third years in each district relative to comparable teachers in comparable roles. Across all three districts, the estimated TEACH difference in year two retention was very close to zero, which indicated an overall TEACH retention rate that was comparable to that of other teachers, controlling for all other factors.

We also examined TEACH retention rates between candidates' first and second year in districts, with results shown in Figure 3.8. Overall, across the three districts, we again found no significant difference in retention rates for TEACH. Retention rates for first-year TEACH candidates in District B and District C were very similar to those of comparison teachers, but for District A retention rates were lower and close to significant ( $p < 0.1$ ), with an adjusted dif-

**Figure 3.7**  
**Difference in TEACH Within-District Second-Year Retention Rates Relative to Comparison Teachers' Rates, Overall and for Individual Districts**



NOTE: \* =  $p < 0.05$ . \*\* =  $p < 0.01$ . \*\*\* =  $p < 0.001$ . Additional details on the cohorts and samples included in this figure are provided in Table B.7 in the technical appendix.

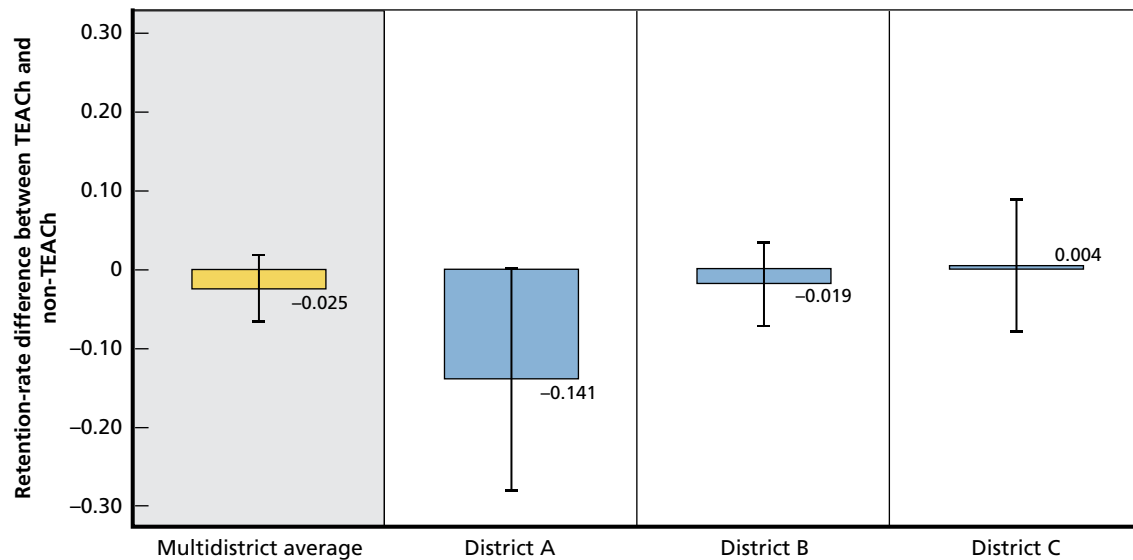
ference of 14 percentage points less likely to remain into their second year in the district. As mentioned above, we did not necessarily expect better retention for TEACH teachers after their first year of teaching, given that the TEACH program was designed to assess teachers at the end of their first year to determine whether they could continue into their second year.

### Summary of Impact Findings

Overall, the results of our impact analyses indicate that the TEACH program recruited a substantial number of teachers to hard-to-staff teaching jobs and that these teachers were more diverse than hires from other pathways into teaching. During their first two years on the job, these teachers remained in teaching at rates comparable to the rates for other new teachers. TEACH candidates in their first year on the job, who were in the midst of receiving TEACH supports, were somewhat more effective at improving student achievement outcomes than other new teachers. In their second year, TEACH teachers had directionally positive results, but the differences were not statistically significant. Finally, in one district TEACH candidates were somewhat less effective according to district evaluations during their first year on the job, but there was no difference as of TEACH teachers' second year on the job.

Individual district-specific analyses were generally less well powered to detect effects. Nevertheless, they can provide some indication as to potential heterogeneity in impacts across district sites. By and large, our results appear to be fairly comparable across districts. TEACH teachers' relative impacts on student achievement were directionally similar in the two districts, B and C, where we could analyze them. TEACH teachers' evaluation impacts were also

**Figure 3.8**  
**Difference in TEACH Within-District First-Year Retention Rates Relative to Comparison Teachers' Rates, Overall and for Individual Districts**



NOTE: \* =  $p < 0.05$ . \*\* =  $p < 0.01$ . \*\*\* =  $p < 0.001$ . Additional details on the cohorts and samples included in this figure are provided in Table B.8 in the technical appendix.

directionally similar across Districts B and C in each year, and results in District A did not differ to a significant or substantial degree. Similarly, there was no evidence of differences in TEACH teachers' retention across districts.

### Limitations

Our analyses of the impacts of TEACH have two broad types of limitations. First, our analyses may not fully reflect or be properly representative of potential program impacts. For example, we could not directly assess how TEACH's contributions to the supply of teachers in each district may have influenced the overall quality of new teachers entering the district, or the overall district instructional culture. In fact, positive impacts on the overall quality of new teachers hired by districts would work against us finding comparative performance advantages for TEACH teachers, because we cannot directly compare TEACH teachers to the teachers the district would have otherwise hired in the absence of TEACH. Another challenge was that our analyses of student achievement impacts was limited to teachers in tested grades and subjects, which may or may not be a reasonable proxy for all TEACH teachers. Third, district evaluation ratings were either solely or partially based on holistic evaluations by principals, which could introduce biases stemming from teachers' context or from raters (Whitehurst, Chingos, and Lindquist, 2014).<sup>5</sup> Fourth, all of our analyses, but especially our analyses of second-year teachers, have limited statistical power, and there is a reasonable chance that we failed to detect true differences in performance outcomes for TEACH teachers that were either small or moderate

in size. Finally, the scope of our analysis is limited to the initial stages of teachers' careers, and we do not know how results may differ for these teachers over the longer term.

A second broad category of limitations is that we cannot be sure that we identified a completely fair and equivalent comparison group for TEACH teachers for our comparative analyses. We used a rigorous "doubly robust" methodology when comparing teacher and student outcomes, weighting our comparison groups based on observable characteristics and controlling in our statistical models for any lingering differences between the groups. Nevertheless, it is entirely possible that TEACH teachers, their job placements, and their students could have differed in ways that we could not observe in administrative records, and this could have biased our results either positively or negatively. We discuss these and other limitations in greater detail in the technical appendix that accompanies this report.

## Cost of TEACH

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The implementation and impacts of the TEACH program are important considerations for any district that is considering an internal teacher preparation program to support teacher hiring and retention. However, the cost of these efforts is also a key decision point for districts. To provide the most useful cost information to districts and the organizations that may be supporting their teacher preparation and hiring efforts, we focused on the costs that would be borne by districts for all aspects of the TEACH program. Our data collection and analysis captured both the costs of the SEED grant awarded to TNTP and the difficult-to-measure costs represented by district staff who were not paid for by the SEED monies but supported implementation of TEACH in their districts.

The technical appendix for this report provides an overview of all the TEACH activities for which we captured cost data. Those activities took place within the following four main components of TEACH that we discuss in the cost section of this report:

- recruitment and selection for TEACH PST (e.g., development of plans for recruiting, actual recruitment, and screening)
- selection, hiring, and placement in teaching positions (e.g., selection and hiring of candidates into school-year teaching positions, interview and human resources processes, onboarding)
- pre-service and new-teacher training support and evaluation (e.g., PST and coaching delivery during summer, classes and coaching during the school year for new hires)
- systems and capacity for supporting the TEACH program (e.g., training for those who support TEACH candidates, managing and analyzing program data, managing staff and TEACH plans).

These cost components are slightly different from the key program components examined in the implementation portion of this analysis. Specifically, the costs for pre-service and school-year support and evaluation were all grouped into a single component for the cost analysis, given difficulties in separating out the time of staff who supported candidates both during PST and during the school year. In addition, the cost analysis also focused on the higher-level management and administration costs captured through the “systems and capacity” component, which was not the specific focus of the implementation analysis.

We do not account for the costs borne by program participants in these estimates for two main reasons. First, this cost analysis is focused on costs borne by school districts. Second, the stipends and scholarships provided to participants to cover tuition costs were not tracked carefully as part of this analysis. We have this information about tuition and stipends: Teacher can-

didates in Districts A and C were charged \$5,000 in tuition, whereas District B teachers were charged \$3,600 plus an additional \$1,500 during the school year. In all districts, tuition was mostly paid through payroll deductions and only for teachers who were hired in the district, although District B also required that teachers pay a small up front pre-service fee of \$300. In District A, each teacher also received a \$1,000 stipend to participate in the summer training. In District B, stipends were not provided, although salary advances were provided to TEACH program teachers who were hired in District B in year one upon completion of their PST; salary advances were not continued in subsequent years of the program. In District C, teachers received a stipend that was estimated at \$750 per teacher for participation in the PST in the first year of the program, no stipend in the second year, and a stipend of \$1,000 per teacher funded by a grant from an external partner in the third year.

Beyond the exclusion of costs borne by participants in our cost estimates, two important additional caveats should be noted up front. First, our focus on the program costs in the first three years of implementation is likely to yield higher cost estimates than if we were to evaluate the same program at full maturity. This is because certain costs (TNTP staff support, for instance) were allocated during the startup period but not intended to be sustained. Specifically, in each district, TNTP staff were planned and funded through the U.S. Department of Education to be in place for three years but gradually transition the program to be completely run by district staff, which would likely reduce costs in year four and beyond. Because TNTP staff frequently played key TEACH implementation roles all the way through the third year, it was not possible to accurately parse out the start-up costs from the enduring costs. Thus, we did not categorize TNTP staff time as start-up time. Indeed, given programmatic shifts in each district from years one to three, we did not categorize any specific costs as start-up costs, although the first year might be regarded much more as a start-up and planning year than years two and three.

Second, and relatedly, District B costs may represent fewer start-up costs than those in Districts A and C because—as noted in the implementation chapter of this report—SEED monies in District B were used to revise and improve an existing alternative teacher preparation pipeline in the district. For this reason, it is likely that District B had more infrastructure, processes, and routines in place to support TEACH than the other districts. This pattern supports our hypothesis that the costs of the program will decline as it matures.

We present costs in terms of average annual estimates in each district or by-year estimates for years one through three in each district. We also present costs according to one cost driver: the number of TEACH candidates hired in each district. This cost driver is a reasonable one to focus on because the TEACH program supports candidates from the time that they are in PST and throughout the first year they are hired as teachers. They formally complete the TEACH program after they have completed their first year of teaching, including the coaching and evaluation they received throughout the year. Thus, the per-hire costs represent the costs that would be borne by the district for all TEACH activities, per TEACH candidate the district hires and supports throughout their first year.

The remainder of this cost findings chapter is organized according to the research questions we asked in regard to program cost:

- What were the annual average costs of TEACH overall and per TEACH candidate hired in each district?

- What were the costs of district and TNTP staff time to develop and run the TEACH program?
- What were the costs of developing and running various components of the TEACH program, including recruitment, pre-service preparation, hiring, and support of candidates?
- How does the cost of TEACH compare to the costs of other teacher preparation programs, overall and given the benefits of TEACH?

## Overall Cost of TEACH

*On average, the annual cost of TEACH was about \$38,000 per TEACH hire, but that number masks considerable variation across districts.* Taking into account all TEACH activities, our cost analysis indicates an overall average cost of about \$5.4 million for each district that took on the TEACH program, or about \$1.8 million per year, which equated with an average of \$38,000 per TEACH candidate hired each year (see Table 4.1). Importantly, the average per-hire costs varied considerably from district to district. As we discuss later in this chapter, there are two main reasons for these variances.

First, TNTP allocated at least some grant resources to each district that were not connected to the size of each program. For example, TNTP provided roughly similar numbers of core staff—aside from coaches—in years one to three to support program planning, pre-service instruction, and online modules provided to candidates during the school year. Many of these were likely fixed costs that would not be expected to vary with the numbers of candidates recruited, trained, and hired. However, as a result, the per-hire costs were much larger in some districts that recruited and trained lower numbers of teachers. For example, while District B had the highest overall cost, it also reported the most TEACH hires, which led to an average annual per-hire cost of about \$18,000. On the other hand, while District A had the lowest overall costs, it hired just 20 candidates per year, on average, thus leading to a very high cost of more than \$70,000 per TEACH hire.

These data suggest potential cost efficiencies associated with larger programs, which makes sense given all the necessary baseline work to plan TEACH, deliver the TEACH PST—regardless of the number of trainees—and coaching, and support trainees throughout the year. These findings might suggest that TEACH is a more viable and cost-effective option for dis-

**Table 4.1**  
Overall TEACH Average Annual and Per-Hire Costs

	Overall Cost (\$)	Annual Average Cost (\$)	Average Annual Number of TEACH Hires	Annual Average Per-Hire Cost (\$)
District A	4,393,166	1,464,389	20	70,833
District B	6,107,329	2,035,776	112	18,046
District C	5,838,070	1,946,024	77	25,508
Average across districts	5,446,189	1,815,396	70	38,129

NOTE: The annual average per-hire cost was first calculated as the average per-hire costs within each year for each district, based on the number of hires and the average annual cost in that year, and then averaged over the three study years. Thus, the per-hire costs cannot be calculated through the annual averages in this table.

tricts that are aiming to hire as many as 100 candidates or more through their program. That said, it is impossible to know whether the grant resources could have been allocated differently to account for these cost efficiencies up front.

Second, variation in costs was also likely connected to somewhat differing costs for some activities across districts and differences in the average number of coaches and district staff contributing to TEACH. For example, as noted in the implementation chapter of this report, District B's TEACH program was a revision of an existing pipeline program. Costs in District B may have been lower than those in Districts A and C for that reason as much as because they trained more teachers. It is also possible that District B costs are a better representation of what it might take to sustain TEACH over time, given that by year three, staff in District B had taken over most aspects of the TEACH program.

*TEACH costs are higher compared with cost data we have for other existing alternative and traditional teacher preparation programs, although program costs can be calculated in a wide range of ways.* While little research exists on the costs of alternative teacher training programs like TEACH, available data suggest that, in its first three years, TEACH was likely somewhat more expensive than many other forms of teacher preparation. For example, Sindelar et al. (2012) examined the costs of alternative routes for special education teacher preparation for 31 alternative preparation programs across the United States, programs potentially comparable to TEACH (which focused on preparing special education teachers and other certification areas). Furthermore, Sindelar et al. used similar cost estimation methods to the ones used in this analysis, including interviewing staff to determine costs of personnel time. According to Sindelar et al. (2012), costs per program completer ranged from \$5,567 for local programs that were independent of a university and relied just on district employees to \$14,522 for internship programs that were designed to support certification of uncertified special education teachers in a given district. Given that Sindelar's data were collected in 2007, we could take into account inflation to report these costs in 2017–2018 dollars (the second year for TEACH in Districts A and B), which would yield a cost of \$6,742 for local programs and \$17,587 for internship programs. The internship costs estimated by Sindelar et al. (2012) are thus roughly similar to the costs in District B, although Sindelar's cost estimate for local programs is considerably lower. All that said, we do not know enough about whether the programs in Sindelar's analysis were similar to TEACH and, particularly, whether they included yearlong coaching support, which is rare for alternative teacher preparation programs.

Other existing research has found somewhat comparable costs for teacher preparation to those we calculated for TEACH. For example, Rice and Brent (2002)—who estimated costs of alternative teacher certification for Peace Corps volunteers—estimated costs at anywhere from about \$7,000 to \$49,000, depending on the institution. However, they examined a wide variety of programs, including many that are similar to traditional teacher preparation. Walsh and Jacobs (2007) estimated that alternative certification could cost anywhere from nothing to up to \$30,000 for a given participant. However, their analysis included total costs borne by teacher candidates and costs of operating programs. As noted earlier, we did not account for tuition in our cost estimates, although TEACH had relatively low tuition rates compared with other programs (roughly \$5,000 per teacher, as noted earlier), which were typically paid through payroll deductions if teacher candidates were hired (but not paid if a teacher was not hired).

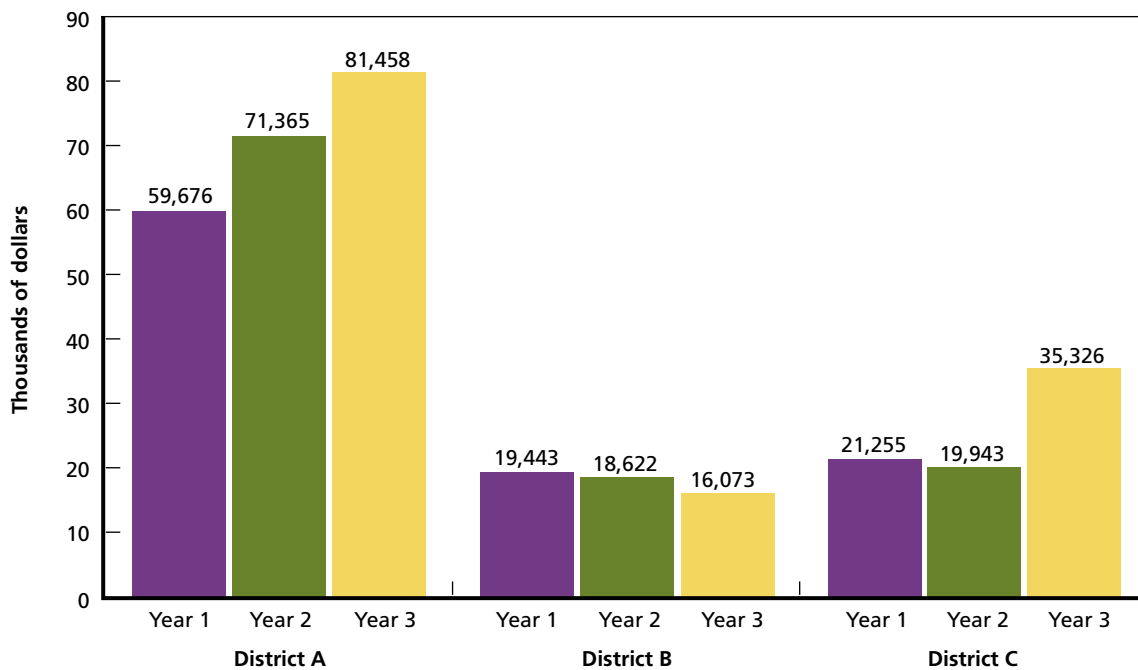
*Per hire costs increased somewhat in two districts over time but remained stable in the third district.* One might imagine that year-to-year costs could change with a program like TEACH,



with costs being higher in year one particularly, given potential start-up costs. However, as noted in Figure 4.1, costs actually increased somewhat in Districts A and C. These changes in costs over time can be explained in several ways. First, of course, shifts in district activities and priorities could influence costs. As noted in the implementation section of this report, districts pivoted based on lessons from the first year of implementation, including providing more clear communication to enrollees and teaching candidates, offering more support to help candidates pass licensure exams, and revamping PST to align better with district needs. All of these shifts carry costs in terms of staff time, which could offset any cost efficiencies gained after the first year. Second, the per-hire costs might have increased somewhat because of the decrease in candidates supported by the TEACH programs in those districts, which likely had fixed costs that did not decrease with the number of candidates being supported. Specifically, the number of candidates hired in District A went from 22 in years one and two to 17 in year three, whereas the number of candidates hired in District C went from 88 and 84, respectively, in years one and two to 60 in year three. In District B, the number of candidates hired went down slightly too, from 117 in years one and two to 103 in year three. However, this fluctuation in the number of candidates being trained may have had less impact on cost per trainee because the number of candidates was much higher in District B compared with the other districts to begin with, which may have spread out any high fixed costs.

A third potential reason for changes in costs was that TNTTP aimed to spend down the SEED grant funding in the third year in each district by supporting the evolving needs of districts’ TEACH program in any way it could. While it is impossible to track the spending

**Figure 4.1**  
Per-Hire Costs for TEACH, by District and Year



NOTE: As a reminder, the per-hire costs varied mainly because TNTTP allocated similar grant resources to each district (aside from coaches), although districts had differing recruitment and hiring goals. Average annual number of TEACH hires in Districts A, B, and C were, respectively, 20, 112, and 77.

choices made by TNTTP that were directly connected to the need to spend down grant funds, these choices likely led to some rise in costs in year three in some districts. We provide some additional information on the district-specific costs for various activities like recruitment that were part of TEACH later in this chapter.

## Cost of Personnel and Nonpersonnel Time to Operate TEACH

*Costs of personnel time constituted the majority of cost for TEACH, although one district had a higher proportion of nonpersonnel costs than the other districts.* Perhaps unsurprisingly, the cost of district and TNTTP staff time was the most significant cost for TEACH across districts. As noted in Table 4.2, taking into account all costs, personnel constituted about three-quarters of those costs. However, taking into account differences in the allocation of personnel versus nonpersonnel costs and differences in the numbers of candidates hired in each district, the annual average personnel costs constituted closer to two-thirds (about 69 percent) of the costs.

As noted in Figure 4.2, one key difference among districts was that nonpersonnel costs made up a larger proportion of all costs in District A, mainly because travel costs for off-site staff and contractual costs in District A were roughly two times higher than costs in those categories for District C and five times higher than District B travel and contractual costs.

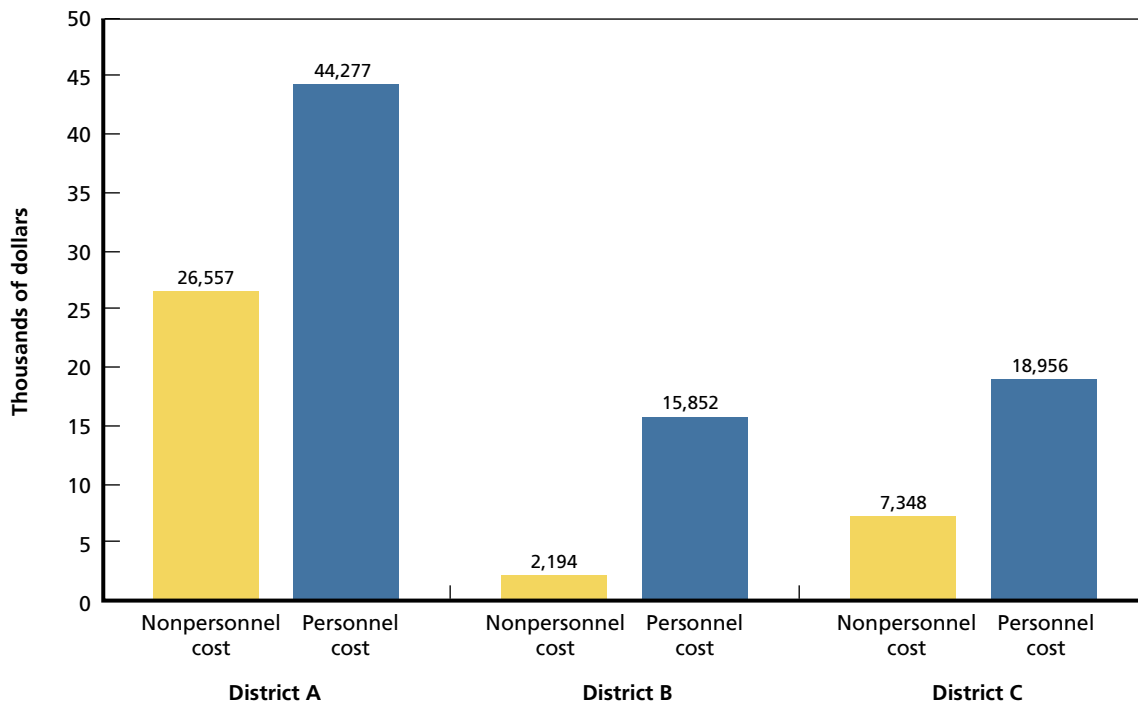
*The full-time equivalent (FTE) staff differences among districts were considerable and suggest cost efficiencies for larger programs that train more candidates.* Another way to think about personnel costs is to consider the number of FTE staff it took to operate TEACH in each district. Annually, the equivalent of about 17 full-time staff on average in each district was necessary to undertake all TEACH activities, including both district staff and TNTTP staff. Of those 17 staff, about six were TNTTP staff, on average each year, and about 11 were district staff. However, there were also two important differences in staff costs across districts.

First, while District A had half or fewer of the FTE staff compared with Districts B and C, the per-hire FTE staff was higher in District A, taking into account the many fewer TEACH candidates hired in that district (see Table 4.3). In all districts, a certain number of TNTTP TEACH staff may have been allocated at the beginning of the program to develop the program with district staff. While some staff within each district could be supported by SEED (e.g., staff to help with recruitment and coaching), the districts themselves were to identify salaried staff who could also contribute time to SEED and sustain the program after TNTTP departed at the end of the third year. It could be that some minimum number of staff is necessary to build and support TEACH in any district, and—thus—Districts B and C enjoyed cost efficiencies that were not possible in District A.

**Table 4.2**  
Average Annual Personnel and Nonpersonnel Cost

	Overall Costs (\$)	Annual Average Costs (\$)	Annual Average Per-Hire Costs (\$)
Nonpersonnel cost	4,125,884	458,432	11,767
Personnel cost	12,212,683	1,356,965	26,362
Total	16,338,567	1,815,396	38,129

**Figure 4.2**  
Average Annual Personnel and Nonpersonnel Per-Hire Cost, by District



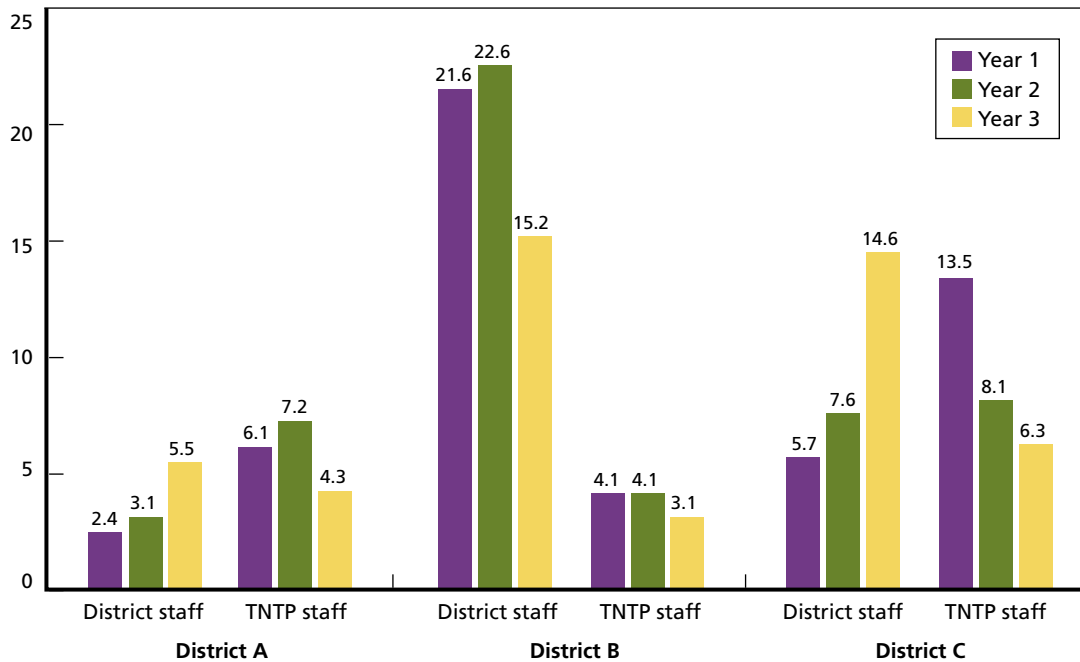
**Table 4.3**  
Average Annual FTE Staff Working on TEACH in Each District

	All FTEs	Per Hire FTE	TNTP Staff	District Staff
District A	9.56	0.48	5.87	3.69
District B	23.59	0.21	3.79	19.80
District C	18.57	0.25	9.29	9.28
Average	17.24	0.31	6.32	10.90

Second, in District B, many more district staff worked on the TEACH program than TNTP staff, especially as compared with the TNTP-to-district staff ratios in District A and C. In fact, in District C, the number of TNTP and district staff FTEs was exactly the same, whereas there were about two more TNTP FTE staff, on average annually, than district staff in District A. The high number of district staff in District B, relative to TNTP staff, is likely connected to the fact that TEACH was a revision of an existing District B program. Thus, District B was likely relying on some staff who had already been spending time on District B’s program before TNTP started supporting program revisions. While these ratios of TNTP to district staff may not affect the overall FTEs necessary to run TEACH in a district, they may have implications for the potential of each program to be sustained over time.

*TNTP staff time decreased somewhat in all districts over time, whereas district staff time increased in two districts.* As mentioned at the beginning of this section, TNTP staff were placed in what were assumed to be temporary roles in each district to develop and support

**Figure 4.3**  
**Annual FTE District and TNTP Staff Working on TEACH in Each District**



TEACH, and district staff were intended to gradually increase over time to support the program and sustain it after TNTP departed. As indicated by Figure 4.3, TNTP staff time did decrease in all districts from year one to year three. While district staff time increased in Districts A and C, it actually decreased in District B, which may be one plausible reason why TNTP staff time decreased less in District B from year two to year three than in the other districts. We do not have clear information about why district staff in District B decreased in year three, but readers should keep in mind that the TEACH program was a revision of an existing program. Thus, by year three, emerging cost efficiencies may have enabled reduction of district staff, whereas the other programs were adding district staff to support and sustain those programs beyond year three.

### Cost of Different Elements of TEACH

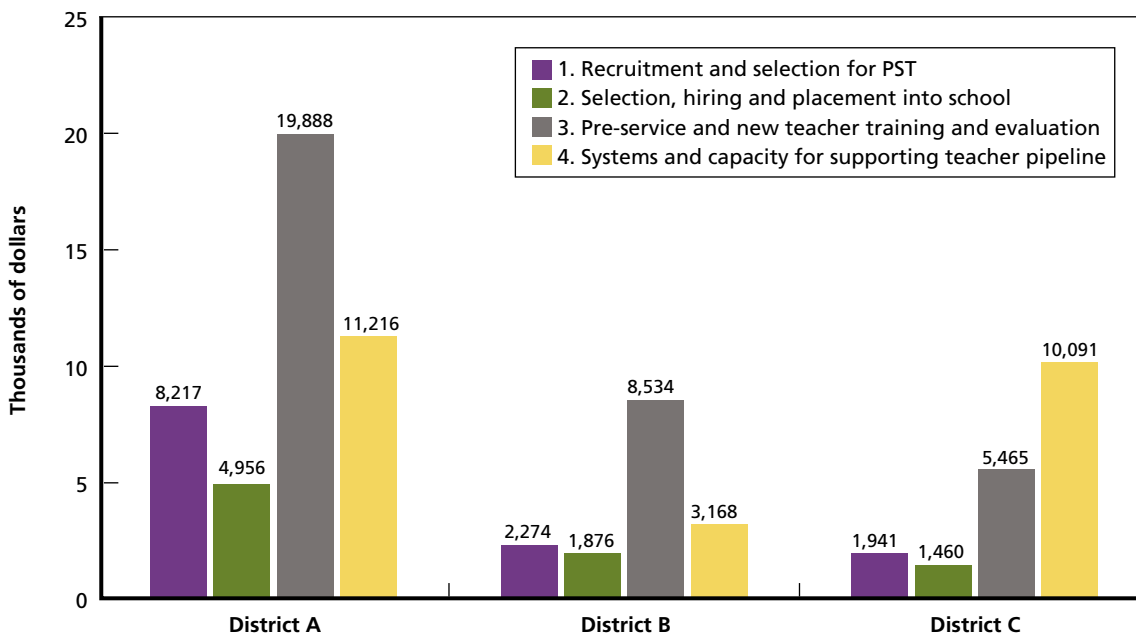
We also wanted to know more about the cost of individual components of TEACH. As noted at the beginning of this chapter, we collected cost data on the four main TEACH components: (1) recruitment and selection for TEACH PST; (2) selection, hiring, and placement in teaching positions; (3) pre-service and new-teacher training support; and (4) systems and capacity for supporting the TEACH program. The only cost data that we could portion out across components was personnel time, given that nonpersonnel time was typically for such costs as supplies and materials that were not clearly earmarked for a specific purpose, travel, etc. Thus, in this section, we consider only costs of personnel time for each component. Readers should keep in mind that the costs for selection, hiring, and placement into teaching positions include only the costs of district and TNTP staff to support selection and hiring of TEACH candidates

in particular, which included planning for TEACH candidate selection and hiring processes, outreach to school leaders, and events to connect TEACH candidates with schools. The costs of school staff time—including school staff and committee time in interviewing and choosing candidates—could not be determined through the cost data collection for this study, which included access only to information about district staff time and salaries.

*Costs of delivering pre-service and new-teacher training and evaluation were by far the highest costs, followed by systems and capacity to support TEACH.* In fact, the delivery of pre-service and new-teacher training made up 44 percent of TEACH personnel costs. However, the costs for overseeing and managing the program (“systems and capacity”) also took up 32 percent of the costs. These costs make sense, as program delivery and support for new candidates requires a fair number of personnel and time, as do the personnel that oversee all elements of TEACH and worked closely with the district to support TEACH. It may be that these systems and capacity costs will decrease over time, especially as TNTP leaves each district and turns the management of TEACH over to district staff. However, the first three years of the program required collaboration among TNTP and district staff, which may have led to higher systems and capacity costs.

As noted in Figure 4.4, there were some similar trends in by-component costs in each district but some key differences in terms of how costs were allocated. First, costs for selection, hiring, and placement into schools were always the lowest cost in each district, which corresponds with the more limited TEACH work in this area. Similarly, recruitment and selection into the TEACH program was the component with the second-to-lowest cost in every district. On the other hand, we observed several key differences among districts. First, while the per-hire costs in District A were higher than costs in the other districts for every component, the costs for the fourth component—systems and capacity for supporting the TEACH pipeline—were more similar in Districts A and C. The higher costs of this fourth component

**Figure 4.4**  
Average Annual Personnel Per-Hire Cost, by Districts, by Components

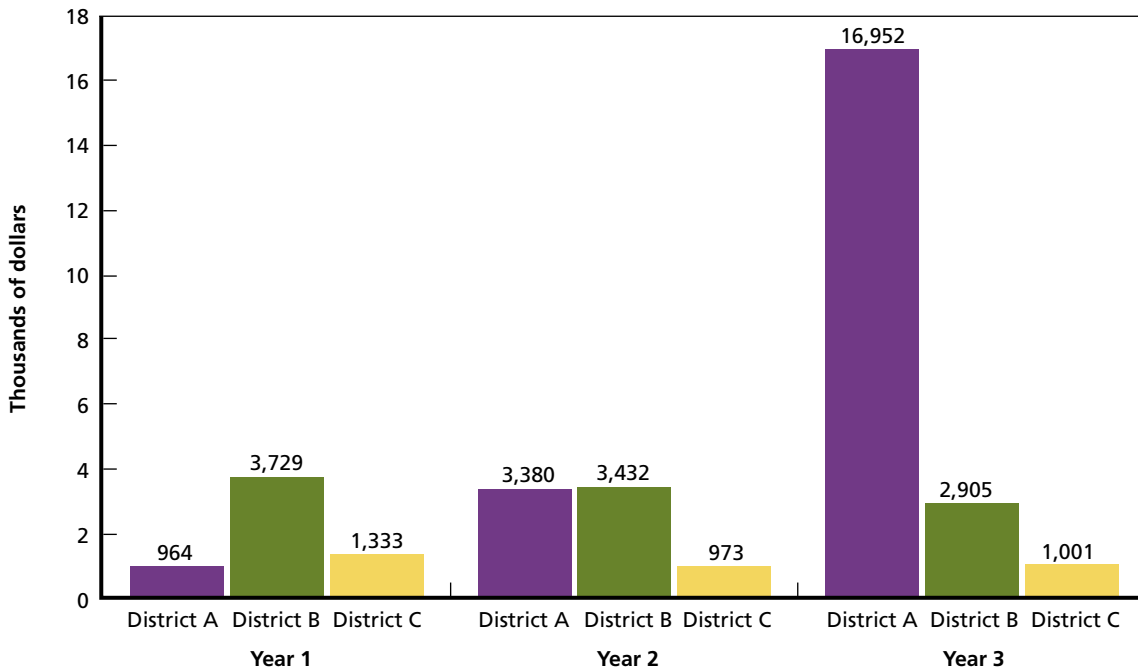


in Districts A and C make sense, given that District B likely already had some capacity to support the pipeline beforehand because TEACH was a revision of an existing program. But this finding also suggests that there may be some fixed systems and capacity costs for new programs that cannot be shifted, regardless of the size of a program. Second, District C was the only district where the costs of the third component—PST and support for new teachers—was lower than the costs for the systems and capacity component. Furthermore, the per-hire costs for pre-service and new-teacher training were lowest in District C compared with the other districts. We are not sure how to explain the lower costs for pre-service in District C, except to say that District C relied on many fewer personnel for training and new-teacher support than the other districts. That said, coaching is one of the key costs for TEACH during the course of a typical school year, given that coaches support all new TEACH hires.

**Table 4.4**  
Costs for Each Component of the TEACH Program

	Overall Costs (\$)	Annual Average Costs (\$)	Annual Average Per-Hire Costs (\$)
Recruitment and selection for PST	1,714,792	190,532	4,144
Selection, hiring, and placement into school	1,257,980	139,776	2,764
Pre-service and new-teacher training and evaluation	5,347,189	594,132	11,296
Systems and capacity for supporting teacher pipeline	3,892,721	432,525	8,158
<b>Total</b>	<b>12,212,683</b>	<b>1,356,965</b>	<b>26,362</b>

**Figure 4.5**  
Per-Hire Costs for Coaching, by District and Year



The program's component costs are broken down in Table 4.4. Next, we briefly consider the costs of coaching.

*Coaching costs constituted a substantial proportion of the pre-service and new-teacher support costs in some but not all districts.* The costs of coaching varied considerably across districts and made up variable proportions of pre-service and new-teacher training costs (see Figure 4.5). That said, coaches in each district sometimes also spent time on other TEACH activities beyond coaching, which made it difficult to estimate just the costs of coaching. In addition, we had to rely on different methods to compute the coaching costs in District A compared with Districts B and C. Specifically, in Districts B and C, district and TNTP staff provided us with information about the percentage of time that each of their coaches spent coaching new TEACH hires over the course of a school year. We could use that information to calculate the cost of coaching time in Districts B and C. However, in District A, while we had information about who did the coaching, we did not have information about whether those coaches might have spent their time on other activities beyond coaching. Thus, we took into account the full cost of coaching personnel in District A. To make matters more complicated, the coaching staff in District A expanded considerably from just one coach in years one and two to three coaches in year three. Thus, District A coaching costs are likely overestimated, particularly in year three.

According to our data, coaching took up varying proportions of the pre-service and new-teacher support costs. On average, coaching covered roughly 35 percent of the costs of pre-service and new-teacher support in District A, a little more than 61 percent of the costs in District B, and just 13 percent of the costs in District C. One reason for this may be that coaching arrangements in the districts were quite different. In District A, as noted, there was just one coach in years one and two, whereas TNTP hired three coaches in year three, despite the slight drop in the number of new TEACH hires. The need to spend down grant funding in year three may have been connected to TNTP's choice to hire three coaches in year three. District B, on the other hand, relied on an already-existing pool of district coaches to coach TEACH hires along with all other first-year teachers, whereas District C relied on both TNTP and district staff to coach in early program years but then transitioned to just relying on district staff.

## Summary of Cost of TEACH

In sum, our cost analysis suggested that TEACH may be somewhat more expensive than other similar programs. However, cost data for other alternative training programs is limited, computed in varying ways, and represents costs from programs operating a decade or more before this research. In addition, the variability in TEACH costs across the districts in our analysis suggest that it is more appropriate to note a potential range of costs for TEACH, depending on the district context. In District B, where TEACH was a revision of an existing program and conducted at a larger scale, costs were considerably lower (around \$18,000 per candidate hire) than in the other districts and especially District A. Furthermore, District A's high costs (over \$70,000 per TEACH hire) were likely exacerbated by the low number of TEACH hires each year relative to other programs. As we have noted, these data suggest potential cost efficiencies for larger programs that train and hire more candidates, although the limited sample size of three districts makes it difficult to draw clear conclusions on cost efficiencies. In addition, targets for grant funding in each year may have led to inflated spending that

is not necessarily related to realistic long-term costs for programs like this. As we noted earlier, TNTP had funding from SEED to spend down in year three and wanted to use it to support district efforts, although some of that spending may not have been essential. Thus, cost estimates for programs like this may be better derived from cost data collection in the years after grant funding has been spent. Lastly, regardless of grant funding, the cost of personnel time is a major consideration for districts that wish to take on similar programs. TNTP and district staff time made up the majority of the costs, and these costs were particularly concentrated in regard to the time it takes to train and support TEACH candidates during PST and throughout the school year.

### Limitations

There are challenges with collecting any self-reported data on costs and how staff allocated their time. Specifically, the personnel data were gathered retrospectively, sometimes one to two years after activities had been undertaken. On the other hand, staff were reasonably confident in allocating time to specific activities at the component level, given that some staff positions typically focus on a single component (e.g., coaches typically spend time only on support and training components and not on hiring components).

A second limitation is that, while these cost estimates provide a useful overview of what it may take for districts to create these teacher pipelines, they may not capture all the costs that could be associated with these pipelines. For example, if the districts contracted with other consultants to support the TEACH work beyond what was supported through the SEED grant, those costs would not be captured. In addition, this report does not capture the cost of time (i.e., the opportunity cost) for TEACH candidates, who spent considerable time attending trainings associated with their preparation and new-teacher support in their first program year, as well as forgoing summer employment that they might have otherwise had. Instead, this report focuses on the costs borne by school districts for starting up, running, and supporting the TEACH program. Some programs also offered trainees stipends for their participation in the summer PST. Given the variation in how programs provided these stipends and the years in which they did so, we do not include them in the overall costs. In addition, our analysis may not adequately capture the costs for technology in which the districts may have invested to track and support TEACH candidates.

As mentioned earlier in this chapter, TEACH program costs may not be completely comparable across districts. In particular, District B's TEACH program had been operating, albeit in a somewhat different form, before TNTP worked with District B to revise that program. Thus, District B costs might not be comparable to those in other districts. In addition, while TEACH programs in all districts included the same basic components and activities, the programs emphasized these activities in different ways, depending on their context, and may have dealt with different challenges that affected TEACH costs, which we do not describe in detail in this report.

Lastly, our analyses did not generate any estimates of cost effectiveness, which could potentially help districts determine whether to adopt the TEACH program. We did not include cost effectiveness estimates for several reasons. First, a main goal of the TEACH program was to attract a more diverse teacher workforce in hard-to-staff areas, not necessarily increase student achievement. Second, because the first three years of the program that we tracked were dependent on grant funding, our cost estimates do not capture the long-term costs of TEACH, which would be important to include in any cost effectiveness analyses. Third, while we have



some estimates of the cost of various alternative teacher preparation pathway programs, we have no cost effectiveness data for these other programs that would allow readers to compare the relative cost effectiveness of TEACH to other programs.

## Conclusions and Implications

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### Overview of Findings About TEACH

The TEACH program is at the vanguard of nationwide efforts to address teacher shortages through an alternative teacher certification pathway within school systems. The program's goals are ambitious and multifaceted, aimed at developing and operating within-district alternative certification programs, recruiting a diverse group of teachers who might otherwise not have gone into the profession, filling roles that are among the most challenging for districts to fill, ensuring high standards for teachers' performance, and retaining those teachers in the profession. In addition, in these districts, TNTTP sought to establish TEACH as a sustainable district-run program over time. Our results indicate some implementation challenges that districts should keep in mind, should they consider undertaking similar programs. At the same time, TEACH was successful in contributing substantially to the overall supply of teachers in each district, as well as the supply of racially diverse teachers. TEACH met these goals while not lowering teacher effectiveness or retention. The range of program costs varied substantially across districts, and while average costs were estimated as considerably higher than for other alternative preparation program pathways, these costs were also estimated during the period that districts were receiving grant funding and TNTTP support for program start-up. Cost studies that estimate the long-term costs of TEACH would likely generate much lower estimates. We provide some more-detailed summary of our implementation, impact and cost findings in the following sections.

### Implementation Summary

Our implementation findings highlight areas in which the districts struggled to implement the programs as intended, and where they were successful. A few themes emerged across phases of the programs' implementation. First, transparent and intentional communication between the TEACH program staff and the teaching candidates defined candidates' experience. This emerged particularly in candidates' feedback about recruitment and selection, PST, and placement into teaching positions. Second, structures, processes, and policies in all three districts were not designed to support alternative teacher preparation programs; TNTTP and district staff continually collaborated in adjusting the program from the "blueprint" TNTTP brought to the needs of the district. Third, candidates reported that their training supports were sometimes disjointed; they greatly appreciated coaching and meeting in person with their cohort members but felt that online modules were less useful and disconnected from their other work. In terms of clear successes, teaching candidates whom we interviewed reported that the program appealed to them because it was less time-intensive and more affordable than many other

routes to certification; the programs, therefore, appear to have succeeded in removing some barriers to entry for teaching candidates.

### **Impact Summary**

Despite these implementation challenges, the results of our study indicate that TEACH accomplished many of its goals in the three districts that we examined, with no adverse impacts on student achievement or retention at least in the short term. In two of the three districts, the program contributed substantially to the overall supply of teachers, and these teachers were more racially diverse than other new hires. In all of the districts, TEACH filled hard-to-staff positions with teachers more likely to be certified or on a clear path to certification to teach in those areas. Specifically, a much higher percentage of TEACH candidates hired as new teachers in Districts A and B were certified to teach in bilingual classrooms relative to all new hires. In addition, District C appeared to rely heavily on TEACH to hire teachers certified to teach special education. All districts were also more likely to hire mathematics teachers through TEACH relative to other pathways. Thus, districts were successful in hiring teachers in one or more areas that they had initially identified as hard-to-staff areas.

TEACH candidates were at least initially more effective at raising student achievement in mathematics than other new hires, and effect estimates in ELA in year one and in both ELA and mathematics from teachers' second year were directionally positive. These results are consistent with the positive performance effects found among novice teachers trained in the Teaching Fellows program, a similar alternative pathway into teaching that was also run by TNTP (Clark et al., 2013). TEACH candidates remained teaching in their districts at similar rates as other novice teachers, a result that contrasts with studies of some prominent alternative pathways into teaching that have been associated with lower retention rates (Zhang and Zeller, 2016; Donaldson and Johnson, 2011).

We also examined differences in teacher evaluation scores in each district, although readers should keep in mind that the focus of these evaluations was likely different in each district. In addition, research literature suggests that teacher evaluation scores, which typically incorporate principal evaluation, are subject to bias and often inflated in high-stakes contexts (Whitehurst, Chingos, and Lindquist, 2014; Steinberg and Garrett, 2016; Grissom and Loeb, 2017). While, in one district, TEACH candidates were slightly lower-performing on district evaluations in their first year, in their second year, TEACH teachers who had completed the program performed about the same as other teachers in district evaluations.

### **Cost Summary**

In the areas of cost and sustainability, we found more mixed results in the near term but were not yet able to assess longer-term implications. At an average cost of \$38,000 per TEACH hire, TEACH was somewhat more expensive than what available research indicates regarding the costs of other similar programs. However, costs were highly variable across districts. This variability is partially due to differences in the programs themselves; one district's TEACH program was a revision of an existing program, whereas TEACH was new in the other two districts. In addition, one district recruited and trained many fewer candidates than the two other programs, which led to much higher per-hire costs in that district. Furthermore, the costs we estimated for the first three years of TEACH in each district likely included considerable start-up costs—including considerable grant funding, planning time, and TNTP staff—that would not continue over time. All that said, the costs in the district that revised its existing

program—rather than building a program from scratch—ranged from about \$19,000 in the first program year to about \$16,000 in the third program year, which might be a better representation of actual costs for sustaining such a program over time.

In addition to these findings on overall cost, we found that personnel time took up a large portion (about three-quarters) of TEACH costs, including costs for district time, and these costs were particularly high for supporting TEACH candidates through pre-service and school year training and coaching. We surmise that some baseline number of staff are likely necessary to set up a program like TEACH, which may suggest cost efficiencies for larger programs that may be able to train larger numbers of TEACH candidates with the similar numbers of staff as programs that train smaller numbers of candidates.

## Implications for Policy and Practice

Our findings have several potential implications for school systems across the United States that are experiencing teacher shortages, along with teacher preparation organizations and state and federal policymakers.

First, within-district alternative certification pathways are a viable way for large districts to attract new applicants and provide a pathway to recruit a diverse group of teaching candidates to fill critical teaching positions. According to our implementation research, the three programs in this study successfully mitigated barriers to entering the profession for the teaching population they sought to attract; candidates were interested in the programs because they were lower-cost than other options and required less time. These may be important factors for future programs to include. Further, our findings suggest that candidates trained through programs like TEACH can be as likely if not more likely to support student achievement and be retained over time. In large districts with teacher shortages in particular subjects, a program like TEACH that both increases the supply of job applicants and prepares those applicants to work in needed roles may be a useful tool.

Second, while our evaluation suggested that TEACH was a success in many respects, the program had challenges that we expect would remain for any similar district's teacher preparation partner collaborations. For instance, both this study and prior research (e.g., Taylor, Pelika, and Coons, 2017; Nettles et al., 2011) indicate that state teacher licensure assessments will likely be an obstacle for teaching candidates, which suggests programs should build in support for teachers to take and pass these exams. In addition, transparent and effective communication with candidates requires advanced planning that some of the programs in our study did not anticipate, which suggests both the need for more ample advanced planning time and a systematic process to ensure that many anticipated obstacles to implementation—such as the ones raised in this report for TEACH—are discussed as early as possible. Another common barrier to implementation is the alignment of the program with district priorities; TNTP essentially brought its blueprint for these programs to the districts, and a great deal of negotiation took place to help it fit the districts' structures and instructional priorities. Future partners and districts might learn from these experiences and begin building the program from an earlier stage, perhaps cocreating more of the content.

Third, within-district programs like TEACH place cost burdens on districts themselves, particularly in terms of the personnel it takes to run such programs. Given that such districts are also often struggling with overburdened budgets, these costs could make TEACH hard for

districts to take on. For these reasons, it could make sense for federal and state policymakers to consider ways to fund district–teacher preparation partnerships in larger districts experiencing teacher shortages. Such partnerships have been supported for several years in states including Louisiana, which could provide a model for other states (e.g., Hannan, Hamilton, and Kaufman, 2019).

Lastly, while these findings suggest TEACH and similar programs could improve teacher shortages in large district settings, they present considerable dilemmas for smaller school systems that could also be experiencing teacher shortages. Specifically, our data suggest that, while such programs could potentially be helpful to any district, there are likely baseline costs for a program such as TEACH that would make it impossible to sustain at a very small scale, to fill only a handful of teaching positions each year. It could make sense for federal and state policymakers to utilize data on teacher shortages in areas of sparse teacher preparation options to target school system consortiums or networks that could collectively benefit from programs similar to TEACH. For example, consortiums or networks of schools could regularly share data on their teacher shortages, as well as their context, to help shape both the focus and the content of alternative routes to teacher preparation. If a program were to be implemented in a consortium, we stress the importance of exploring financial viability. It may be prudent for a consortium to manage distinct portions of the program (e.g., targeted recruitment, selection, and PST) while local districts or schools manage others (e.g., first-year induction supports and evaluations).

### **Next Steps for Additional Research**

Our research highlights some key unknowns about the TEACH program and model that merit future study. In particular, while the program was designed to enhance the supply of teacher applicants to districts, we still know very little about how TEACH contributed to district-wide improvements in the overall quality of new teacher hires. Future research that is focused more squarely on changes over time in the overall teacher supply in participating districts (including any effects of the program on participants that were not immediately hired as teachers in the sponsor district) could help us to better understand the broader effects of TEACH’s recruitment and induction activities. That said, such research would require additional coordination and new forms of data collection in collaboration with local districts that were not in scope for this study. Separately, with respect to unknowns about the performance of TEACH teachers, previous research on TNTP’s Teaching Fellows program identified a comparative advantage at raising student achievement only in fellows’ first few years of teaching (Clark et al., 2013). As fellows became more experienced, their performance grew more similar to that of nonfellowship teachers. However, it is possible that TEACH’s unique selection, screening, and training supports could result in higher-performing teachers over the longer term as well, and this merits additional study.

We also know relatively little about the longer-term implications of a program such as TEACH, including whether districts will find it practical and affordable to maintain over time and how future teachers recruited by the program will perform and be retained on the job. Our evaluation did not extend beyond the period of the SEED grant to consider how the TEACH programs may have changed once they were independently run by the three districts. In addition, our research in three large urban school districts that adopted TEACH does not provide clear information about how such a program might be undertaken in smaller districts.

Lastly, this research could not provide insights about which components of the TEACH program may be most important for enhancing teacher performance. Future research on TEACH and other programs could help identify which components of alternative pipelines—whether recruitment and screening, the removal of barriers to entry, induction supports, performance evaluations and screens, or TNTP’s particular vision of effective teaching that underlies those components—may be most important for recruiting effective teachers to fill hard-to-staff roles.

## References

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Berry, Barnett, and Patrick M. Shields, "Solving the Teacher Shortage: Revisiting the Lessons We've Learned," *Phi Delta Kappan*, Vol. 98, No. 8, 2017, pp. 8–18.

Boyd, Donald, Pamela Grossman, Hamilton Lankford, Susanna Loeb, and James Wyckoff, "How Changes in Entry Requirements Alter the Teacher Workforce and Affect Student Achievement," *Education Finance and Policy*, Vol. 1, No. 2, 2006, pp. 176–216.

Castro, Andrene, Daniel J. Quinn, Edward Fuller, and Michael Barnes, "Policy Brief 2018-1: Addressing the Importance and Scale of the U.S. Teacher Shortage," *UCEA Policy Brief*, Vol. 1, 2018.

Carver-Thomas, Desiree, and Linda Darling-Hammond, "The Trouble with Teacher Turnover: How Teacher Attrition Affects Students and Schools," *Education Policy Analysis Archives*, Vol. 27, No. 36, April 2019.

Clark, Melissa A., Hanley S. Chiang, Tim Silva, Sheena McConnell, Kathy Sonnenfeld, Anastasia Erbe, and Michael Puma, *The Effectiveness of Secondary Math Teachers from Teach for America and the Teaching Fellows Programs*, Washington, D.C.: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education, 2013.

Clotfelter, Charles T., Helen F. Ladd, and Jacob L. Vigdor, "Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects," *Journal of Human Resources*, Vol. 45, No. 3, 2010, pp. 655–681.

Cole, Cynthia, "Colorado's Teacher Shortages: Attracting and Retaining Excellent Educators," Colorado Department of Higher Education, 2017.

Dee, Thomas S., "A Teacher Like Me: Does Race, Ethnicity, or Gender Matter?" *American Economic Review*, Vol. 95, No. 2, 2005, pp. 158–165.

Dee, Thomas S., and Dan Goldhaber, "Understanding and Addressing Teacher Shortages in the United States," Policy Proposal No. 2017-05, April 2017. As of January 30, 2020:  
[https://www.hamiltonproject.org/assets/files/understanding\\_and\\_addressing\\_teacher\\_shortages\\_in\\_us\\_pp.pdf](https://www.hamiltonproject.org/assets/files/understanding_and_addressing_teacher_shortages_in_us_pp.pdf)

Donaldson, Morgaen L., and Susan M. Johnson, "Teach for America Teachers: How Long Do They Teach? Why Do They Leave?" *Phi Delta Kappan*, Vol. 93, No. 2, October 2011, pp. 47–51.

Egalite, Anna J., Brian Kisida, and Marcus A. Winters, "Representation in the Classroom: The Effect of Own-Race Teachers on Student Achievement," *Economics of Education Review*, Vol. 45, 2015, pp. 44–52.

Espinoza, Daniel, Ryan Saunders, Tara Kini, and Linda Darling-Hammond, *Taking the Long View: State Efforts to Solve Teacher Shortages by Strengthening the Profession*, Palo Alto, Calif.: Learning Policy Institute, August 2018.

Gershenson, Seth, Cassandra M. D. Hart, Joshua Hyman, Constance Lindsay, and Nicholas W. Papageorge, *The Long-Run Impacts of Same-Race Teachers*, Cambridge, Mass.: National Bureau of Economic Research, NBER Working Paper No. 25254, 2018.

Goldhaber, Dan, and Michael Hansen, "Using Performance on the Job to Inform Teacher Tenure Decisions," *American Economic Review*, Vol. 100, No. 2, May 2010, pp. 250–255.

Grissom, Jason A., and Susanna Loeb, "Assessing Principals' Assessments: Subjective Evaluations of Teacher Effectiveness in Low- and High-Stakes Environments," *Education Finance and Policy*, Vol. 12, No. 3, June 2017, pp. 369–395.

Guha, Roneeta, Maria E. Hyler, and Linda Darling-Hammond, *The Teacher Residency: An Innovative Model for Preparing Teachers*, Palo Alto, Calif.: Learning Policy Institute, September 2016.

Hanushek, Eric A., Steven G. Rivkin, and Jeffrey C. Schiman, “Dynamic Effects of Teacher Turnover on the Quality of Instruction,” *Economics of Education Review*, Vol. 55, 2016, pp. 132–148.

Hannan, Maggie Q., Laura S. Hamilton, and Julia H. Kaufman, *Raising the Bar for Teacher Preparation: Early Signals on How Louisiana’s Education Policy Strategies Are Working Across the State*, Santa Monica, Calif.: RAND Corporation, 2019. As of September 2, 2020:  
[https://www.rand.org/pubs/research\\_reports/RR2303z3.html](https://www.rand.org/pubs/research_reports/RR2303z3.html)

Ingersoll, Richard, “What Do the National Data Tell Us About Minority Teacher Shortages?” in *The State of Teacher Diversity in American Education*, report, University of Pennsylvania Graduate School of Education, Philadelphia, Pa., 2015, pp. 13–22. As of September 2, 2020:  
[https://repository.upenn.edu/gse\\_pubs/541](https://repository.upenn.edu/gse_pubs/541)

Lemov, Doug, *Teach Like a Champion: 49 Techniques That Put Students on the Path to College*, 1st ed., San Francisco, Calif.: Jossey-Bass, 2010.

Nettles, Michael T., Linda H. Scatton, Jonathan H. Steinberg, and Linda L. Tyler, “Performance and Passing Rate Differences of African American and White Prospective Teachers on Praxis™ Examinations: A Joint Project of the National Education Association (NEA) and Educational Testing Service (ETS),” *ETS Research Report Series*, Vol. 1, 2011, pp. i–82.

Podolsky, Anne, and Leib Sutcher, “California Teacher Shortages: A Persistent Problem,” Learning Policy Institute and California School Boards Association, 2016. As of April 8, 2020:  
<https://learningpolicyinstitute.org/product/ca-teacher-shortage-persistent-problem-brief>

Rice, Jennifer King, and Brian O. Brent, “An Alternative Avenue to Teacher Certification: A Cost Analysis of the Pathways to Teaching Careers Program,” *Journal of Education Finance*, Vol. 27, No. 4, 2002, pp. 1029–1048.

Ronfeldt, Matthew, Susanna Loeb, and James Wyckoff, “How Teacher Turnover Harms Student Achievement,” *American Educational Research Journal*, Vol. 50, No. 1, 2013, pp. 4–36.

Sindelar, Paul T., James F. Dewey, Michael S. Rosenberg, Nancy L. Corbett, David Denslow, and Babik Lotfinia, “Cost Effectiveness of Alternative Route Special Education Teacher Preparation,” *Exceptional Children*, Vol. 79, No. 1, 2012, pp. 25–42.

Steinberg, Matthew P., and Rachel Garrett, “Classroom Composition and Measured Teacher Performance: What Do Teacher Observation Scores Really Measure?” *Educational Evaluation and Policy Analysis*, Vol. 38, No. 2, 2016, pp. 293–317.

Sun, Min, “Black Teachers’ Retention and Transfer Patterns in North Carolina: How Do Patterns Vary by Teacher Effectiveness, Subject, and School Conditions?” *AERA Open*, Vol. 4, No. 3, July–September 2018, pp. 1–23.

Sutcher, Leib, Linda Darling-Hammond, and Desiree Carver-Thomas, “A Coming Crisis in Teaching? Teacher Supply, Demand, and Shortages in the U.S.,” Palo Alto, Calif.: Learning Policy Institute, September 2016.

———, “Understanding Teacher Shortages: An Analysis of Teacher Supply and Demand in the United States,” *Education Policy Analysis Archives*, Vol. 27, No. 35, April 2019.

Taylor, Erika D., Stacey Pelika, and Andy Coons, “To What Extent Are Ethnic Minority Teacher Candidates Adversely Affected by High-Stakes Assessments?” National Education Association Research Brief, NBI No. 16, 2017.

U.S. Department of Education, Office of Postsecondary Education, “Teacher Shortage Areas,” webpage, last updated April 3, 2020. As of April 9, 2020:  
<https://www2.ed.gov/about/offices/list/ope/pol/tsa.html#list>

Walsh, Kate, and Sandi Jacobs, “Alternative Certification Isn’t Alternative,” Washington, D.C.: Thomas B. Fordham Institute, 2007. As of April 8, 2020:  
<https://files.eric.ed.gov/fulltext/ED498382.pdf>



Whitehurst, Grover J., Matthew M. Chingos, and Katharine M. Lindquist, *Evaluating Teachers with Classroom Observations: Lessons Learned in Four Districts*, Washington, D.C.: Brown Center on Education Policy at Brookings, May 2014.

Zhang, Guili, and Nancy Zeller, "A Longitudinal Investigation of the Relationship Between Teacher Preparation and Teacher Retention," *Teacher Education Quarterly*, Vol. 43, No. 2, 2016, pp. 73–92.