OPRE Report 2025-136

Evaluation of the Colorado Child Care Assistance Program Teacher Salary Increase Pilot

Building and Sustaining the Child Care and Early Education Workforce

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Overview

Child care and early education (CCEE) teachers work in one of the lowest-paid occupations nationwide, and they often rely on public assistance or second jobs to make ends meet. Low pay makes it challenging for child care centers to recruit and retain qualified professionals, which may affect the quality and continuity of care and education that young children receive.

The Colorado Department of Early Childhood (CDEC) created the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot (hereafter referred to as the pilot program) to address the issues of low pay and high turnover rates in the CCEE workforce in Colorado. The pilot program was designed to raise the salaries of lead and assistant teachers in center-based child care settings to be closer to a wage that meets the minimum standards of living in their counties. The pilot program provided each center with monthly payments—based on the number of participating lead and assistant teachers at the center and its county's cost of living—to fund salary increases for two years. MDRC, in collaboration with MEF Associates and Decision Information Resources, Inc., conducted an evaluation of the pilot program as part of the Building and Sustaining the Child Care and Early Education Workforce (BASE) project.

The evaluation used a randomized controlled design to examine the pilot program's implementation, impacts, and costs in 74 CCEE centers. Collectively, the evaluation findings suggest that the CCCAP Teacher Salary Increase Pilot could be a promising strategy for supporting the CCEE workforce.

The **implementation study** examined how the pilot program was implemented and how participating teachers and directors perceived the salary increase. It found the following:

- Participants were excited about the salary increase, but its long-term sustainability, given the pilot program's temporary nature and ongoing funding constraints, was a key concern.
- Program implementation was facilitated by several factors: (1) strong collaboration between State and external partners, particularly during the pilot program's design phase; (2) a simple program design that included a clear scale for the salary increase amounts across centers and teacher roles; and (3) direct communication from CDEC to centers during the application process.

The **impact study** examined the effect of salary increases on a wide range of outcomes approximately one year after the start of the pilot program (that is, the point of time referred to as Wave 1) and on a small subset of outcomes approximately two years after the start of the pilot program (that is, Wave 2):

- At Wave 1, there was a 7 percentage point difference between program and control group teachers in the primary outcome measure of teacher retention (from staffing reports completed by center directors). By Wave 2, there was a 3 percentage point difference in the primary outcome measure of retention. These differences are not statistically significant but are in the expected direction and large enough to be substantively meaningful, warranting further study. A secondary outcome measure of teacher retention (reported by teachers at Wave 1) showed that the salary increase led to a 10 percentage point increase in teacher retention that is statistically significant.
- The pilot program increased teachers' wages, as expected, but it did not increase their household incomes. However, teachers in the program group were less likely to have other sources of income, particularly income from a second job or child support.

- At Wave 1, teachers in the program group were more likely to report improvements in markers of economic well-being, fewer symptoms of depression, and less job stress. Teachers in the program group who remained in CCEE or education-related jobs reported more stable and better working conditions, greater job satisfaction, and stronger intentions to stay at their current centers than teachers in the control group who remained in CCEE or education-related jobs.

The **cost study** estimated the costs to participating centers of implementing the pilot program. The cost of administering the pilot program was relatively low, especially when compared with the estimated costs of teacher turnover.

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Acknowledgments

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Glossary

CHILD CARE AND EARLY EDUCATION (CCEE) refers to programs and the workforce that educate and care for children from birth to age 13. This term includes educators in centers and in home-based settings who care for infants, toddlers, and preschool- and school-aged children. "CCEE" refers to a larger age group than early care and education (ECE), which consists of services for young children only (for example, Head Start, public pre-K, and centers serving children from birth to age 5). ECE programs are included in the definition of CCEE.

CHILD CARE AND EARLY EDUCATION SETTING refers to the physical location (for example, a center, school, or home) where children receive care. Settings can include Head Start child care centers; community-based child care centers; licensed and license-exempt home-based child care settings that receive subsidies; and the home or location of relatives, neighbors, or other individuals who are paid to care for children.

COLORADO CHILD CARE ASSISTANCE PROGRAM (CCCAP) is funded by the federal Child Care and Development Fund and provides child care assistance to families with low incomes (with income thresholds that are determined by the state). To be eligible, one parent in the household must be working, searching for work, or in training or school. Families that are enrolled in the Colorado Works program (that is, Colorado's Temporary Assistance for Needy Families—or TANF—program) can also use CCCAP services.

COLORADO DEPARTMENT OF EARLY CHILDHOOD (CDEC) provides access to early childhood programs and support to children, families, and early care professionals in Colorado. CDEC created the CCCAP Teacher Salary Increase Pilot.

COMPENSATION STRATEGY refers to a strategy or initiative that seeks to increase the salaries or benefits (or both) of educators in the CCEE workforce.

EDUCATOR refers to both center directors and teachers.

FLOATER refers to staff members who assist as needed but are not assigned to a given classroom (similar to substitutes).

LIVABLE WAGE refers to a wage that meets the minimum standards of living in a county. A livable wage for a county is the hourly rate that an individual in a household must earn to support oneself and one's family, working full time, year-round. For the pilot program, CDEC chose to use a livable wage for one adult with no children.

PRIMARY OUTCOME refers to the outcomes that were preselected by the study team (also sometimes called confirmatory outcomes). They are the main objectives of the pilot program and outcomes for which a clear hypothesis is being tested. Selecting primary outcomes imposes discipline on the analysis, particularly when a study examines effects on a wide range of outcomes.

PROGRAM IMPLEMENTER refers to CDEC and vendor staff members who were associated with putting the pilot program in place.

SECONDARY OUTCOME refers to the outcomes that were not preselected by the study team to be primary outcomes (also sometimes called exploratory outcomes).

Executive Summary

Child care and early education (CCEE) teachers work in one of the lowest-paid occupations nationwide, and they often rely on public assistance or second jobs to make ends meet.[1] Low pay makes it challenging for child care centers to recruit and retain qualified professionals, which may affect the quality and continuity of care and education that young children receive.[2] One way to potentially address this issue is to increase teachers' salaries.

Although there is ample evidence suggesting that higher pay is associated with increased retention in CCEE settings, there is limited experimental evidence—based on randomized controlled trials—that higher pay *causes* higher retention or affects other outcomes, such as teacher recruitment, advancement, and economic well-being.[3] Further, there is little information on the costs of strategies that increase pay or benefits (referred to as compensation strategies in this report) or their implementation challenges.[4] Thus, more evidence is needed about the impact, implementation, and costs of compensation strategies.

To address pervasive issues in the CCEE workforce in Colorado—namely, low pay and high turnover rates—the Colorado Department of Early Childhood (CDEC) created the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot (hereafter referred to as the pilot program). The pilot program was

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[1]Caitlin McLean, Lea J. E. Austin, Anna Powell, Sophia Jaggi, Yoonjeon Kim, Jenna Knight, Silvia Muñoz, and Marisa Schlieber, *Early Childhood Workforce Index – 2024* (Center for the Study of Child Care Employment, University of California, Berkeley, 2024); Lea J. E. Austin, Bethany Edwards, Raúl Chávez, and Marcy Whitebook, *Racial Wage Gaps in Early Education Employment* (Center for the Study of Child Care Employment, 2019); Julie Vogtman, *Undervalued: A Brief History of Women's Care Work and Child Care Policy in the United States* (National Women's Law Center, 2017).

[2]Anna J. Markowitz, *Within-Year Teacher Turnover in Head Start and Children's School Readiness* (EdPolicyWorks, University of Virginia, 2019); Matthew Ronfeldt, Susanna Loeb, and James Wyckoff, "How Teacher Turnover Harms Student Achievement," *American Educational Research Journal* 50, 1 (2013): 4–36; Henry Tran and Adam Winsler, "Teacher and Center Stability and School Readiness Among Low-Income, Ethnically Diverse Children in Subsidized, Center-Based Child Care," *Children and Youth Services Review* 33, 11 (2011): 2,241–2,252.

[3]Meg Caven, Noman Khanani, Xinxin Zhang, and Caroline E. Parker, *Center- and Program-Level Factors Associated with Turnover in the Early Childhood Education Workforce* (U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast and Islands, 2021); Child Care Services Association, *Working in Early Care and Education in North Carolina* (Child Care Services Association, 2020); Michelle Maier and Sydney Roach, *What Do We Know About Building and Sustaining the Child Care and Early Education Workforce? Cross-Cutting Themes from a Literature Review, Environmental Scan, and Data Scan*, OPRE Report 2023-242 (Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2024); Hanna Melnick, Beth Meloy, Madelyn Gardner, Marjorie Wechsler, and Anna Maier, *Building an Early Learning System The Works: Next Steps for California* (Learning Policy Institute, 2018); Tracy Gebhart, Julianna Carlson, Phoebe Harris, and Dale Epstein, *Workforce Perceptions and Experiences with the Alabama Early Care and Education Salary Parity Policy* (Child Trends, 2020); Oregon Center for Career Development in Childhood Care, and Oregon Child Care Research Partnership, *Oregon Early Learning Workforce: Six Years Beyond Baseline Comparison of 2012 and 2018* (Portland State University and Oregon State University, 2019); Diana D. Schaack, Vi-Nhuan Le, and Jennifer Stedron, "When Fulfillment is Not Enough: Early Childhood Teacher Occupational Burnout and Turnover Intentions from a Job Demands and Resources Perspective," *Early Education and Development* 31, 7 (2020): 1,011–1,030; Casey J. Totenhagen, Stacy Ann Hawkins, Deborah M. Casper, Leslie A. Bosch, Kyle R. Hawkey, and Lynne M. Borden, "Retaining Early Childhood Education Workers: A Review of the Empirical Literature," *Journal of Research in Childhood Education* 30, 4 (2016): 585–599.

[4]This report uses the term "compensation strategies" to refer to strategies or initiatives that seek to increase the salaries or benefits of educators in the CCEE workforce (or both).

designed to raise the salaries of lead and assistant teachers in center-based child care settings to be closer to a livable wage—that is, a wage that meets the minimum standards of living in their counties.[5] The pilot program provided centers with monthly payments, based on the number of participating lead and assistant teachers and the county's cost of living, to fund salary increases.

MDRC, in collaboration with MEF Associates and Decision Information Resources, Inc., conducted an evaluation of the pilot program as part of the Building and Sustaining the Child Care and Early Education Workforce (BASE) project. The BASE project sought to increase knowledge and understanding in the CCEE field by documenting factors that drive workforce turnover and by building evidence on current strategies to recruit, advance, and retain a stable and qualified CCEE workforce. The evaluation of the pilot program examined its implementation, impacts, and costs. This report presents the evaluation's findings.

The CCCAP Teacher Salary Increase Pilot

In late fall 2022, CDEC invited CCEE centers to apply for pilot program participation if they met the following criteria:

1. At least 40 percent of the children they served (over the past year) received child care subsidies.
2. They were licensed centers that were not part of a school system.[6]
3. They had a quality rating and improvement system rating of 3 or higher (on a scale of 1 to 5).[7]

A total of 74 centers submitted applications. Given available funding, a lottery system (random assignment) was used to assign 30 percent of those centers to the program group, which received monthly funds for teacher salary increases. The remaining centers were assigned to the control group, which was not eligible for the funds. The pilot program began in January 2023 and funded salary increases in participating centers for two years, through December 2024.[8]

Within program group centers, teachers were eligible for the salary increase if they were lead or assistant teachers in infant, toddler, or preschool classrooms and worked at least 16 hours per week. The size of the wage increase varied by county—since each county had a different cost of living—and by teacher role, ranging from $3.00 to $5.50 more per hour for assistant teachers and $5.00 to $7.60 more per hour for lead teachers. Other staff members within the centers—directors and substitutes, for example—were not eligible. A total of 1,003 teachers met the eligibility criteria for the salary increase and comprised the evaluation sample: 314 teachers in the program group and 689 teachers in the control group.

[5]Throughout this report, the terms "salary" and "wage" are used interchangeably.
[6]Public school–based preschool programs and programs receiving Head Start funding were not eligible to participate in the pilot program, but Early Head Start-Child Care Partnership sites were eligible.
[7]Colorado's state quality rating and improvement system (QRIS) is called Colorado Shines. QRIS assigns quality ratings to early and school-age care and education programs. Providers are assessed in five areas: workforce qualifications, family partnerships, administration, learning environment, and child health.
[8]In December 2024, CDEC announced that it would have additional funding to extend the pilot program through June 30, 2025, and might extend the pilot program further (pending additional appropriations) to carefully plan program wind-down activities.

Evaluation Design and Data Sources

The evaluation of the pilot program comprised an implementation study, an impact study, and a cost study.

The **implementation study** used data from qualitative interviews to examine how the pilot program was implemented and how the participating teachers and directors perceived the salary increase.[9] Drawing on follow-up surveys, the implementation study also examined teachers' and directors' knowledge of and experiences with the pilot program.

The **impact study**, a randomized controlled trial, used survey and administrative data to examine the pilot program's impact on a wide range of outcomes—including teacher retention, teacher economic well-being and working conditions, staffing challenges, and center-level turnover and hiring—approximately one year after the start of the pilot program (that is, the point of time referred to as Wave 1) and on a small subset of outcomes approximately two years after the start of the pilot program (that is, Wave 2).

The **cost study** estimated the costs to participating centers of implementing the pilot program and compared these costs with potential center-level savings from reduced teacher turnover.

The evaluation of the pilot program relied on several data sources:

- **Baseline staffing reports completed by directors.** All 74 directors completed the baseline staffing report.
- **Baseline surveys.** Baseline surveys were fielded to directors and teachers within eligible centers from mid-November 2022 through mid-January 2023. Response rates were 51 percent for the teacher survey and 72 percent for the director survey.
- **Follow-up surveys (Wave 1 only).** Follow-up surveys were fielded to directors and teachers (who were employed by participating centers at baseline) from October 2023 through February 2024, 10 to 14 months after the start of the pilot program. Response rates were 66 percent for the teacher survey and 74 percent for the director survey.
- **Implementation interviews and cost workbooks (Wave 1 only).** Between October 2023 and January 2024—10 to 13 months after the pilot program started—the study team conducted implementation interviews with a subset of directors and teachers from centers that were assigned to the program group, as well as a subset of directors who chose not to apply for the pilot program. A subset of the program group directors who were interviewed—along with a subset of control group directors—were asked to complete information on program costs, with assistance from an interviewer. The study team also conducted interviews with CDEC and the vendor overseeing the application and funding distribution processes to better understand the design and implementation of the pilot program.
- **Follow-up staffing reports completed by directors (Wave 1 and 2).** These reports were completed by 89 percent of directors (66 of 74 directors) in November and December 2023 (11 to 12 months after the start of the pilot program) and by 81 percent of directors (60 of 74 directors) in January 2025 (25 months after the start of the pilot program).

[9]Throughout this report, "program implementer" refers to CDEC and vendor staff members.

- **Linked Information Network of Colorado (LINC).** This study uses administrative data from four sources that were connected through the LINC project:[10]
    - Professional Development Information System (PDIS) educator profiles (Wave 1 and 2)
    - quality rating and improvement system (QRIS) records (Wave 1 only)
    - quarterly unemployment insurance employment and wage records (Wave 1 and 2)
    - Supplemental Nutrition Assistance Program (SNAP) program data (Wave 1 only)

Summary of Implementation Study Findings

The implementation study examined aspects of pilot program implementation—participant reach and engagement, system and infrastructure, and context—as well as the perceptions and experiences of participating directors, teachers, and program implementers. The study found the following:

- The pilot program application and payment processes generally worked well and were easy to navigate.
- Directors and teachers were excited about participating.
- Implementation was facilitated by several factors: strong collaboration between State and external partners, particularly during the pilot program's design phase; a simple program design (for example, a clear scale for the salary increase amounts across centers and teacher roles); and direct communication from CDEC to centers during the application process.
- The long-term sustainability of the salary increase, given the pilot program's temporary nature and ongoing funding constraints, was a key concern of directors and teachers.
- Pilot program implementers described data and quality assurance challenges. For example, the vendor's existing database was not built to support a program that disbursed funds monthly and calculated funds at the teacher level. This issue required work-arounds to collect data outside of the vendor's system and manually enter data.
- Many directors mentioned pay parity concerns about increasing pay for teachers but not for staff members in other roles (such as administrative staff members, floaters, or substitutes).[11]

Summary of Impact Study Findings

The impact study examined the effects of the pilot program on a range of outcomes, including teacher retention; teachers' economic, mental, and physical well-being; teachers' perceptions of their working conditions; and center-level turnover, hiring, and staffing. To impose discipline on analyses, given the number of outcomes of interest, the study team selected two primary outcomes and associated measures: teachers' retention at the center that employed them at the beginning of the pilot program (measured by

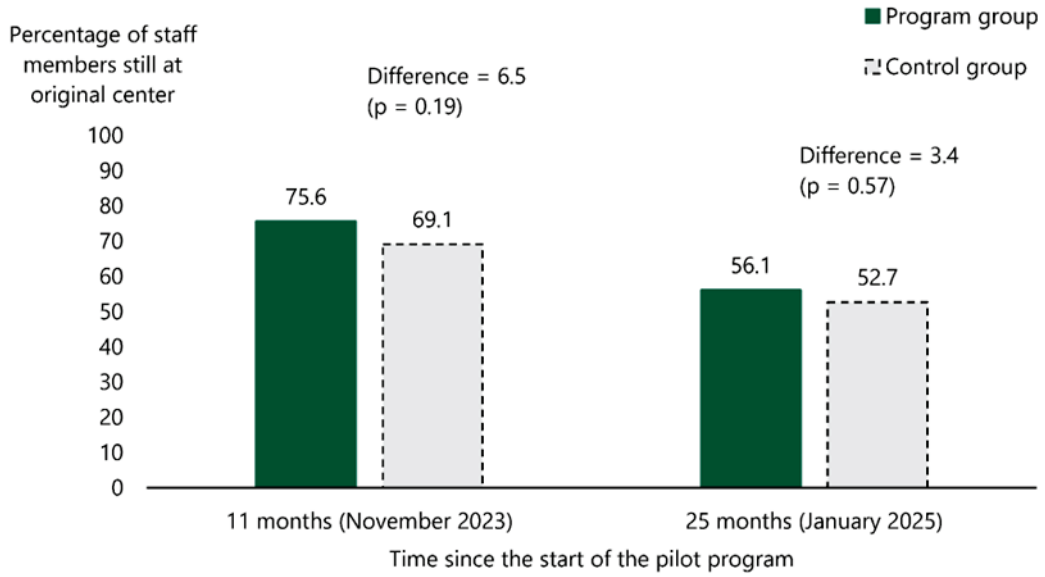
[10]The Linked Information Network of Colorado project is a collaborative based out of the Colorado Governor's Office of Information Technology. As part of the BASE study, data were obtained via the LINC project from CDEC, the Colorado Department of Labor and Employment, and the Colorado Department of Human Services Office of Economic Security.
[11]Floaters are staff members who assist as needed but are not assigned to a given classroom (similar to substitutes).

staffing reports that were completed by study directors about 11 to 12 months after the start of the study and again 25 months after the start of the study) and teachers' economic well-being (measured by teachers' household income as a percentage of the federal poverty line).[12] Primary outcomes were used to address the main research questions of the study. All other outcomes were considered secondary (or exploratory) outcomes. The impact analysis found the following:

- The pilot program did not lead to a statistically significant increase in the primary outcome measure of teacher retention, which was measured with staffing reports that were completed by directors at two points in time.[13] Seventy-six percent of teachers working at program group centers at the start of the pilot program were still working at those centers one year later (Wave 1) compared with 69 percent of teachers in control group centers. This difference is not statistically significant. By Wave 2, fewer teachers in both groups were still at their original centers: 56 percent of program group teachers compared with 53 percent of control group teachers. The difference of 3 percentage points is also not statistically significant. (See Figure ES.1.) Although not statistically significant, the increase in retention on this primary outcome measure is large enough to be substantively meaningful and may warrant further research. The salary increase led to a statistically significant 10 percentage point increase in the secondary outcome measure of teacher retention (measured approximately one year after the start of the pilot program); 89 percent of program group teachers reported that they were still employed by their original center compared with 78 percent of control group teachers.
- Program group teachers earned significantly higher wages than those in the control group. However, the pilot program did not lead to a statistically significant increase in household income at Wave 1. Teachers in the program group were less likely at Wave 1 to have other sources of income, particularly income from a second job or from child support, which may partially account for why program group teachers had higher wages but not overall household income.
- On average, teachers in the program group were more likely, at Wave 1, to report improvements in markers of economic well-being: fewer teachers worked two or more jobs, and teachers experienced less food insecurity, had fewer unpaid bills, and perceived that they had more financial security.
- Teachers in the program group reported experiencing fewer symptoms of depression and less job stress at Wave 1.
- Teachers in the program group who had remained in CCEE or education-related jobs at Wave 1 reported more stable and better working conditions, greater job satisfaction, and stronger intentions to stay at their current center than teachers in the control group who remained in CCEE or education-related jobs.
- The study team also examined the pilot program's effects on centers, although these analyses were exploratory given the small number of centers in the evaluation. Effects on teacher retention rates, teacher turnover rates, vacancies, and hires were in the expected direction but are not statistically significant. These findings warrant future research that is appropriately powered to detect center-level impacts.

[12]Because the team prespecified which outcomes were primary, adjustments for multiple comparisons were not made.
[13]A threshold of 10 percent (for example, a p-value < 0.10) is used throughout this report to determine statistical significance.

Figure ES.1 Retention at Original Center, as Measured at Wave 1 and Wave 2 Using Directors' Staffing Reports



SOURCE: MDRC calculations using data from the BASE follow-up staffing reports that were completed by directors.

NOTE: A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Summary of Cost Study Findings

The cost study examined the costs that participating centers incurred when implementing the pilot program and compared these costs with potential center-level savings from reduced turnover.[14] Findings showed the following:

- The costs to centers that were associated with administering the pilot program were minimal—approximately $200 per teacher—and could be attributed largely to the time directors spent applying to the pilot program.
- The estimated costs of turnover were substantial (in both the control and program groups) and were driven largely by director and staff time that was devoted to recruitment and hiring, training and onboarding, and vacancy coverage.

[14]It is important to note that this cost analysis does not consider the roughly $3 million per year used by CDEC to fund the salary increase. A full accounting of the costs and benefits of the pilot program, from the government's perspective, would require accounting for that cost and potential savings, in the short and long term. Savings might come from reduced public benefit receipt, increased access to child care for working families, and improved child outcomes.

Discussion and Implications for Future Research

There is currently very limited experimental evidence about the effects of workforce development strategies that focus on increasing teachers' compensation. This evaluation provides much-needed information on the effects of one such compensation strategy on teachers and centers. It is important to remember that the pilot program lasted for only two years, which probably affected how teachers and directors responded to it. Further, more rigorous research is needed to understand the short- and longer-term impacts of this kind of strategy on program operations; the experiences of children and families; and educators' turnover, well-being, and working conditions.[15] Due to funding limitations, the pilot program was limited to centers that had higher ratings of quality. Future implementation and impact research is needed to examine the effects of this pilot program in other types of centers.

Key Lessons Learned About Designing CCEE Compensation Strategies

The implementation study highlighted how collaboration between wide-ranging partners and adequate implementation and data systems were necessary for high-quality program design, implementation, and evaluation. Below are key lessons that the study team learned about implementing compensation workforce development strategies.

- **Eligibility criteria.** Directors and teachers were concerned that the salary increase did not apply to everyone in the center, even though all staff members earned low wages. This finding suggests that restricting the salary increase to certain staff members may lead to unintended consequences for the overall working environment. Also, teachers changed (or wanted to change) their role or the number of hours they worked to take advantage of the salary increase. These changes may have implications for the amount of funds needed for salary increases.
- **Education about potential benefits cliffs.** CDEC offered several resources to help teachers understand the potential loss in benefits, such as a webinar, handouts, and phone-based counseling services with local partners. About two-thirds of teachers reported using the handouts, and very few made use of the counseling services. Some teachers did lose public benefits as their wages increased, although the effects were small. This finding suggests that additional effort and outreach may be needed to help teachers understand and prepare for the potential loss of benefits.
- **Design of the program application and any data "asks."** Directors found the application and enrollment processes—as well as the monthly attestations—relatively easy to complete, which facilitated the pilot program's implementation.[16]
- **Implementation infrastructure.** Pilot program implementers said they had to use work-arounds to store and track monthly staff eligibility and payment disbursement in the way that was needed for the pilot program. Thus, the implementation study highlighted that, if this pilot program were to be

[15]The term "educators" is used in this report when referring to a group of both center directors and teachers. The terms "directors" and "teachers" are used when referring to one or the other, specifically.
[16]Monthly attestations were updates on staffing levels that program group directors were asked by CDEC to submit.

expanded, it would be critical to invest in a suitable database to track data at the teacher level and to disburse payments for smooth program implementation and data gathering.

Conclusion

The CCCAP Teacher Salary Increase Pilot may be a promising approach to increase teacher retention and economic well-being. The evaluation's encouraging findings led CDEC to continue its investment in salary increases for an additional six months (and potentially longer).

Chapter 1: Introduction

Child care and early education (CCEE) educators care for the youngest members of society, doing an essential and challenging job that allows parents to work or pursue higher education.[1] Yet these educators have one of the lowest-paid occupations nationwide.[2] Compared with U.S. workers in general, CCEE educators have higher poverty rates, are more likely to rely on public assistance, and are less likely to have health insurance.[3] Their relatively low pay may reflect society's undervaluation of work caring for young children and work done by women.[4] Low pay makes it challenging for child care centers to recruit and retain qualified professionals, which probably affects the quality and continuity of care and education that young children receive.[5]

To address CCEE teachers' lower pay and economic status in the state of Colorado, the Colorado Department of Early Childhood (CDEC) put into place the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot (referred to hereafter as the pilot program).[6] The pilot program was intended to raise the salaries of lead and assistant teachers in center-based child care settings by giving centers monthly payments—based on the number of participating lead and assistant teachers in the center and the county's cost of living—to fund salary increases.

MDRC, in collaboration with MEF Associates and Decision Information Resources, Inc., conducted an evaluation of the pilot program as part of the Building and Sustaining the Child Care and Early Education Workforce (BASE) project. The BASE project seeks to increase knowledge and understanding in the CCEE field by documenting factors that drive workforce turnover and by building evidence on current strategies to recruit, advance, and retain a stable and qualified CCEE workforce. (See Box 1.1 for more information.) The evaluation of the pilot program examined its implementation, impact, and costs. It used a randomized controlled trial design in which centers were randomly assigned to either a program group that participated in the pilot program or to a control group that did not participate. This report presents the evaluation's findings.

Low Compensation for Child Care and Early Education Educators

Even with generally low wages across the board in the CCEE field, the average wage for educators differs by type of care and funding source, age of the children cared for, and educator racial and ethnic background.[7] National data from 2023 show that child care workers have a median hourly wage of $14.60

[1]The term "educators" is used in the rest of this report when referring to both center directors and teachers. The terms "directors" and "teachers" are used when referring to one or the other specifically. McLean et al. (2024).
[2]Women and women of color are overrepresented within the child care and early education field. Coffey (2022); McLean et al. (2024).
[3]McLean, Austin, Whitebook, and Olson (2021); Austin, Edwards, Chávez, and Whitebook (2019); Vogtman (2017); Amadon, Maxfield, Gerson, and Keaton (2023).
[4]Lloyd et al. (2021).
[5]Markowitz (2019); Ronfeldt, Loeb, and Wyckoff (2013); Tran and Winsler (2011).
[6]CDEC conducted a similar pilot program for home-based settings in Colorado.
[7]Austin, Edwards, Chávez, and Whitebook (2019).

Box 1.1. The BASE Project

The Building and Sustaining the Child Care and Early Education Workforce (BASE) project aimed to increase knowledge and understanding in child care and early education (CCEE) by documenting factors that drive workforce turnover and by building evidence on current initiatives to recruit, advance, and retain a stable and qualified CCEE workforce. The BASE project comprised a literature review of the existing knowledge base on CCEE workforce retention and turnover; an environmental scan of strategies currently in use to build and sustain the workforce; a scan of existing data sources that could be used to address key questions about the workforce; a conceptual framework depicting factors related to entry, retention, recruitment, and advancement in CCEE and theory-of-change models guiding current strategies; a series of secondary analyses to address questions about how teachers acquire credentials and enter, stay in, and exit the CCEE field; and studies of two state-based workforce development strategies in center-based and home-based settings. BASE was led by MDRC in collaboration with MEF Associates and Decision Information Resources, Inc.

(which corresponds to a median annual wage of $30,370), whereas preschool teachers have a median hourly wage of $17.85 (and a median annual wage of $37,130).[8] Black educators earn less than their White peers in all CCEE settings. Moreover, Black and Hispanic educators tend to be concentrated in lower-skilled jobs (like assistant teachers and aides) and at lower-paying centers.[9]

State and federal policies have raised standards for the quality of children's care and the credentials and qualifications teachers need to provide that care. While these demands on the CCEE workforce continue to grow, there have not been commensurate improvements in wages, benefits, or other types of workplace support.[10]

Low compensation—coupled with the physically, emotionally, and mentally demanding nature of the job—makes it challenging for CCEE providers to recruit and retain qualified professionals.[11] As a result, CCEE providers tend to experience high rates of teacher turnover, with annual turnover rates ranging from 15 to 46 percent.[12] For example, analyses using the 2019 National Survey of Early Care and Education showed that 33 percent of center-based CCEE settings had high turnover rates, meaning these centers reported that more than 20 percent of their teachers who worked with young children (from newborns to 5-year-olds) left the center in the past 12 months.[13] Even higher turnover rates are documented for certain types of CCEE centers: for-profit centers (compared with nonprofit centers), centers that care for children who receive subsidies (compared with centers that do not), and centers that care for infants and toddlers

[8]The Occupational Employment Statistics survey defines child care workers as individuals (typically with a high school diploma or equivalent) who care for children under age 5 in child care centers, their own homes, or private households. Preschool teachers are defined as individuals (with at least an associate's degree) who care for children under age 5 in public and private schools or child care centers. U.S. Bureau of Labor Statistics (n.d.).
[9]Austin, Edwards, Chávez, and Whitebook (2019).
[10]Maier and Roach (2024).
[11]CMS Alliance to Modernize Healthcare (2019a); Grant, Jeon, and Buettner (2019); Melnick et al. (2018); Totenhagen et al. (2016).
[12]Bassok, Markowitz, Bellows, and Sadowski (2021); Bellows, Bassok, and Markowitz (2021); Child Care Services Association (2020); LeBoeuf, Perrin, and Kennedy (2020); Kwon et al. (2025); Oregon Center for Career Development in Childhood Care and Oregon Child Care Research Partnership (2019); Roberts, Gallagher, Sarver, and Daro (2018).
[13]Amadon, Lin, and Padilla (2023).

(compared with centers that care for children ages 3 to 5 years only).[14] High turnover probably reduces centers' payoff to investments in staff professional development, and it may reduce the quality and continuity of care that is provided to children.[15]

Addressing Low Compensation

There is growing interest among states and localities in enacting policies that increase the compensation of this essential workforce.[16] In 2021, the Office of the State Superintendent of Education in Washington, DC, began administering a fund financed by a tax on the district's highest earners. Its goal was to achieve pay parity between early educators in licensed child care programs and teachers in public schools.[17] That same year, the State of New Mexico began using wage supplement programs to provide raises to CCEE educators.[18] In 2022, San Francisco put in place an early childhood educator wage initiative to increase educator wages and improve working conditions.[19]

Although there is ample evidence suggesting that higher pay is associated with increased retention, there is limited experimental evidence based on randomized controlled trials that higher pay *causes* higher retention or that it affects other outcomes, such as recruitment, advancement, and teachers' economic well-being.[20] Causal evidence is available from an experimental evaluation of a wage supplement for CCEE teachers in Virginia that was launched in 2019. Teachers were offered a retention bonus of $1,500 as a one-time payment for remaining at their workplace for at least eight months. The offer of the bonus significantly reduced turnover among teachers in child care centers from 30 percent to 15 percent over the eight-month period.[21] Effects were larger for assistant teachers than for lead teachers, given their lower initial wages. This evaluation did not assess effects on other teacher outcomes (such as economic well-being) or center outcomes (like staffing arrangements). Further, there is little information on the costs of workforce development strategies that increase pay or benefits or on their implementation challenges.[22] Thus, this experimental study of the CCCAP Teacher Salary Increase Pilot provides much-needed evidence about the impact, implementation, and costs of this kind of compensation strategy.

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[14]In Colorado, infant classrooms serve children who are 6 weeks to 18 months of age, toddler classrooms serve children who are 12 to 36 months of age, and preschool classrooms serve children who are 2.5 to 7 years of age. See Amadon, Lin, and Padilla (2023).
[15]Markowitz (2019); Ronfeldt, Loeb, and Wyckoff (2013); Tran and Winsler (2011); Vogtman (2017).
[16]CMS Alliance to Modernize Healthcare (2019b); Dichter and LiBetti (2021); Burg (2023).
[17]Office of the State Superintendent of Education (n.d.).
[18]Dade, McLean, Muñoz, and Chávez (2024).
[19]San Francisco Human Services Agency (2022).
[20]Economic well-being includes having resources to meet basic needs like food, housing, health care, and education; achieve financial security; and plan for the future. Caven, Khanani, Zhang, and Parker (2021); Child Care Services Association (2020); Maier and Roach (2024); Melnick et al. (2018); Gebhart, Carlson, Harris, and Epstein (2020); Oregon Center for Career Development in Childhood Care and Oregon Child Care Research Partnership (2019); Schaack, Le, and Stedron (2020); Totenhagen et al. (2016).
[21]A related study examined the difference in retention when receiving a lump sum of $1,500 compared with three payments of $500 each and found that receiving payments more frequently had a slightly larger effect on teacher turnover at the end of eight months. See Bassok, Doromal, Michie, and Wong (2020).
[22]This report uses the term "compensation strategies" to refer to strategies or initiatives that seek to increase the salaries or benefits of educators in the CCEE workforce (or both).

The Context in Colorado

There are about 3,500 licensed facilities serving children younger than school age in Colorado. About 40 percent are home-based settings. Of the roughly 1,600 child care centers, about two-thirds have agreements in place with CCCAP, meaning that they have the ability to accept children whose families are receiving a child care subsidy and to be reimbursed for providing that care.[23] CCCAP, funded by the federal Child Care and Development Fund, provides child care assistance to families with low incomes (with income thresholds determined by the state).[24] In 2021, CCCAP only had enough funds to serve 8.6 percent of the children who were eligible to receive child care subsidies in Colorado, consistent with other states and with national estimates.[25]

The median hourly wage of a CCEE lead teacher in a center that had an agreement with CCCAP before the start of the pilot program was $18.50, which does not meet the standard for a living wage.[26] Accordingly, the poverty rate for CCEE educators in Colorado before the start of the pilot program in 2022 was 13 percent, which is substantially higher than the general workforce (6 percent) in the state and their K-8 counterparts (2 percent).[27]

The CCCAP Teacher Salary Increase Pilot

To address CCEE educators' low pay in Colorado, CDEC launched the pilot program.[28] It was designed to support CDEC's strategic goal to invest in Colorado's early childhood workforce.[29] The pilot program was intended to raise the salaries of CCEE teachers so they were closer to or equal to a livable wage—that is, a wage that met the minimum standards of living in their counties.[30]

In late fall 2022, CDEC invited CCEE centers to apply for pilot program participation if they met the following criteria:

1. At least 40 percent of the children they served (over the past year) received CCCAP subsidies.
2. They were licensed centers that were not part of a school system.[31]

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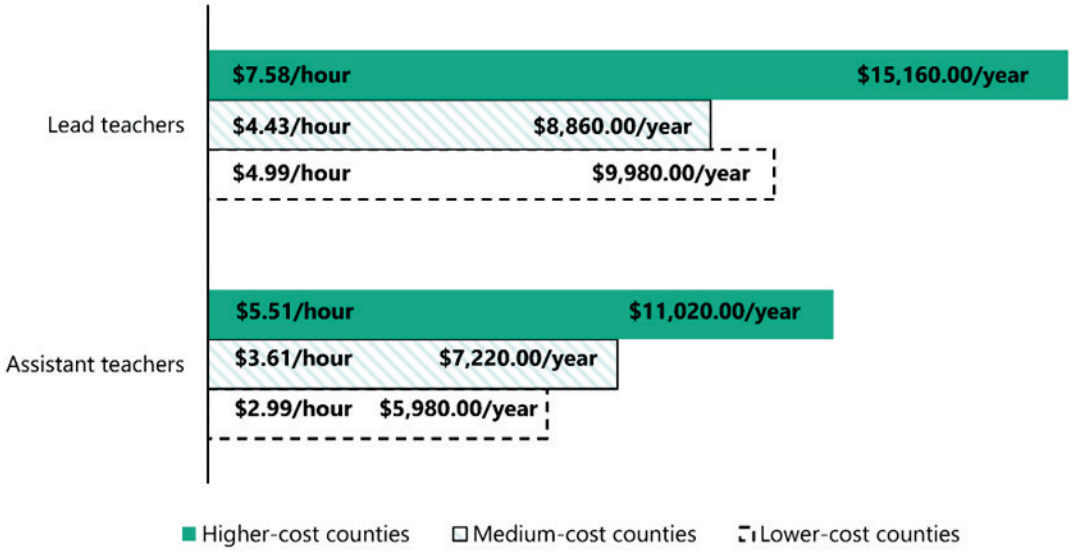
[23]State of Colorado (2025).
[24]To be eligible, one parent in the household must be working, searching for work, or in training or school. Families that are enrolled in the Colorado Works program (that is, Colorado's Temporary Assistance for Needy Families—or TANF—program) can also use CCCAP services.
[25]The Bell Policy Center (2023).
[26]See "CCCAP: Teacher Salary Increase" from Colorado Department of Early Childhood (n.d.).
[27]The poverty rate is the percentage of people in a population whose income falls below the poverty line: the amount set by the United States government to indicate the minimum amount of money a person or family needs to meet basic needs such as shelter and food. Center for the Study of Child Care Employment (n.d.).
[28]CDEC used the Child Care and Development Fund appropriations to launch the pilot program such that fluctuations in stimulus funding would not affect the timeline or implementation of the pilot program.
[29]See "Wildly Important Goals (WIGs): Fiscal Year 2023-24" from Colorado Department of Early Childhood (n.d).
[30]The minimum standards of living were determined using the Massachusetts Institute of Technology Living Wage Calculator. The livable wage for a county represents the hourly rate that an individual in a household must earn to support oneself and one's family, working full time, year-round. For the pilot program, CDEC chose to use a livable wage for one adult with no children, which was most feasible given available funds. Glasmeier (2025).
[31]Public school–based preschool programs and programs receiving Head Start or Early Head Start were not eligible to participate in the pilot program, but Early Head Start-Child Care Partnership sites were eligible.

3. They had a Colorado Shines rating of 3 or higher (on a scale of 1 to 5).[32]

A total of 122 centers were eligible for the pilot program, and 74 submitted applications. Given available funds, a lottery system (random assignment) was used to assign 22 centers to the program group, which received monthly funds to increase teacher salaries. The remaining 52 centers were assigned to the control group and were not eligible for the additional funds. The pilot program began in January 2023 and was intended to fund salary increases in program group centers for at least two years—through December 2024—for evaluation purposes.[33]

Each program group center received a monthly payment that was based on the number of participating teachers. Lead and assistant teachers were eligible for the salary increase if they worked in infant, toddler, or preschool classrooms for at least 16 hours per week. The wage increases varied by county—given the differing cost of living—and teacher role, ranging from $3.00 to $5.50 more per hour for assistant teachers and $5.00 to $7.60 more per hour for lead teachers. (See Figure 1.1 for more details.) Other staff members within the centers—including program administrators or directors, substitutes or floaters (staff members who assist as needed but are not assigned to a given classroom), traveling teachers, and content specialists—were not eligible to receive salary increases.

Figure 1.1. Increases in Teacher Wages and Yearly Pay, by County Cost of Living



(continued)

[32]Colorado Shines is Colorado's quality rating and improvement system (QRIS). QRIS sets and awards quality ratings to early and school-age care and education programs. According to Colorado Shines, Level 1 ratings mean a program is licensed by the state, meets basic health and safety standards, and is regularly monitored. Providers can stay at Level 1 indefinitely, but Colorado Shines provides support to all providers to improve their quality once they receive a rating. In 2022, about 55 percent of centers had ratings of 1 or 2. Providers with higher ratings (3 to 5) have been assessed in terms of their quality in five areas: workforce qualifications, family partnerships, administration, learning environment, and child health.

[33]In December 2024, CDEC announced that it would have additional funding to extend the pilot program through June 30, 2025, and would extend the program further, pending additional appropriations, to allow time to carefully plan program wind-down activities.

Figure 1.1 (continued)

SOURCE: Pilot program documents provided by the Colorado Department of Early Childhood (CDEC).

NOTE: Based on the Massachusetts Institute of Technology's Living Wage Calculator, three cost-of-living groups were created for one adult with no children: low, medium, and high. A low cost of living was one in which less than $17 an hour was needed to cover basic expenses, a medium cost of living was one in which $17 or more (but less than $20) was needed, and a high cost of living was one in which $20 an hour or more was needed.

Overview of This Report

The remainder of the report is organized as follows: Chapter 2 describes the evaluation design, data sources, and sample characteristics; Chapter 3 describes pilot program implementation; Chapter 4 presents impacts approximately one year after the start of the pilot program (the Wave 1 findings); Chapter 5 presents impacts approximately two years after the start of the pilot program (the Wave 2 findings); Chapter 6 presents the cost analysis; and Chapter 7 summarizes the findings and discusses implications.

Chapter 2: Evaluation Design and Sample Characteristics

The evaluation of the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot comprised three components:

- The **implementation study** examined the implementation of the pilot program and the perceptions and experiences of program implementers and participating teachers and directors.
- The **impact study** tracked participating centers, directors, and teachers to examine the pilot program's impact on a wide range of outcomes, including teacher retention, teacher economic well-being and working conditions, staffing challenges, and center-level turnover and hiring.
- The **cost study** estimated how much it costs participating centers to implement the pilot program and compared these costs with potential center-level savings from reduced teacher turnover.

Theory of Change

Figure 2.1 illustrates how the pilot program was expected to lead to improved outcomes for the center-based child care and early education (CCEE) workforce in Colorado. When teachers receive a pay raise, they may feel less financial strain and less need to work a second job, which may reduce their overall stress, improve their well-being, increase their job satisfaction, and increase the likelihood that they stay at their center and in the CCEE field more broadly. These changes may promote teachers' economic self-sufficiency (through reduced use of public benefits) and improve their perceptions of their working conditions. Centers that can offer higher salaries may be better able to attract and retain qualified educators, and center directors may be able to spend more time supporting teachers instead of addressing staffing challenges.

In line with this theory of change, the study team examined the impact of the pilot program on two primary outcomes of interest: teachers' retention at the center that employed them at the beginning of the pilot program and teachers' economic well-being. Both were key objectives of the pilot program and were outcomes for which a clear hypothesis was being tested. The study team also examined secondary outcomes for teachers, such as their job characteristics, mental and physical health and well-being, perceptions of their working conditions, and attachment to the CCEE field. Finally, the study team examined the impact of the pilot program on CCEE center outcomes, such as staffing and directors' reports of staffing and hiring challenges.

Figure 2.1. Theory of Change for the Teacher Salary Increase Pilot

Root causes of child care and early education (CCEE) workforce turnover

- There are insufficient resources and revenue to provide educators with wages that meet the cost of living and support upward economic mobility and advancement.
- Many qualified educators leave the CCEE field to find higher-paying jobs.
- High turnover limits the remaining educators' ability to provide high-quality care.

INPUTS

ACTIVITIES

OUTPUTS

SHORT-TERM OUTCOMES

LONG-TERM OUTCOMES

Pilot Program Implementer (Colorado Department of Early Childhood)

INPUTS	ACTIVITIES	OUTPUTS
▪ Funding ▪ Staff to oversee applications, support CCEE settings, and manage data systems ▪ Systems to track participants and process payments	▪ Marketing, recruitment, provision of technical assistance (TA) ▪ Development, screening, and verification of applications ▪ Issuing payments	▪ Up-to-date information about educators based on CCEE setting data

CCEE Settings

INPUTS	ACTIVITIES	OUTPUTS	SHORT-TERM OUTCOMES	LONG-TERM OUTCOMES
▪ Capacity and support to coordinate with educators, prepare application, etc. ▪ Capacity and systems to track staffing, process initiative payments, and provide increased wage payments to educators	▪ Application for pilot ▪ Engagement with marketing, recruitment, TA ▪ Monthly verification of educator employment ▪ Receiving and processing initiative payments ▪ Processing wage payments	▪ Increased resources for educators' wages	▪ Offer of higher wages to current and prospective educators ▪ Less turnover	▪ Better able to attract and retain qualified educators ▪ Able to spend less time addressing staffing challenges and more time supporting educators

CCEE Educators

INPUTS	ACTIVITIES	OUTPUTS	SHORT-TERM OUTCOMES	LONG-TERM OUTCOMES
▪ Capacity, time, interest, ability to understand, and motivation to prepare required application materials ▪ Sociodemographic, economic, and educational backgrounds	▪ Engagement with marketing and technical support, if offered ▪ Application for the increased wage payments ▪ Completion of required ongoing activities and submission of associated documentation, if needed	▪ Wage payments	▪ Relief from acute financial stress ▪ Remain employed at the CCEE setting ▪ Decreased likelihood of working multiple jobs ▪ Improved psychological well-being ▪ Increased attachment to the CCEE setting	▪ Less financial and material hardship ▪ Increased economic self-sufficiency ▪ Perception of improved working conditions and experiences in CCEE field ▪ Increased attachment to the CCEE field

Evaluation Design

In December 2022, 30 percent of centers (22 centers) that completed the required applications were randomly selected to receive funds for the salary increase (the program group). The remaining 70 percent (52 centers) were assigned to the control group and did not receive the funds. Because centers were assigned at random to the program or control group, the characteristics of the centers and teachers in the two research groups should not systematically differ.[1] In this type of design, any differences in outcomes observed over time between program and control group centers or program and control group teachers can be attributed to the salary increase. The study team assessed and compared outcomes for both groups approximately one year after the pilot program began (Wave 1), and again on a subset of outcomes approximately two years after the pilot program began (Wave 2).

Data Sources

The evaluation of the pilot program relied on several data sources, described below. More details about the data sources, response rates, and sample sizes by data source can be found in Appendix B. Figure 2.2 presents a timeline of data collection and pilot program activities.

Baseline Data Sources

- **Staffing reports completed by directors.** In the application to the pilot program, directors completed a baseline staffing report in which they listed the names of teachers who would be eligible for the salary increase if the center was assigned to the program group.[2] All 74 directors completed the baseline staffing report.
- **Surveys.** Baseline surveys were fielded to directors and teachers within eligible centers from mid-November 2022 through mid-January 2023.[3] The surveys collected information on demographic and professional credentials, job characteristics, center characteristics (for directors), income, economic well-being, job demands and supports, job stress, and job satisfaction. Response rates were 51 percent for the teacher survey and 72 percent for the director survey.[4]

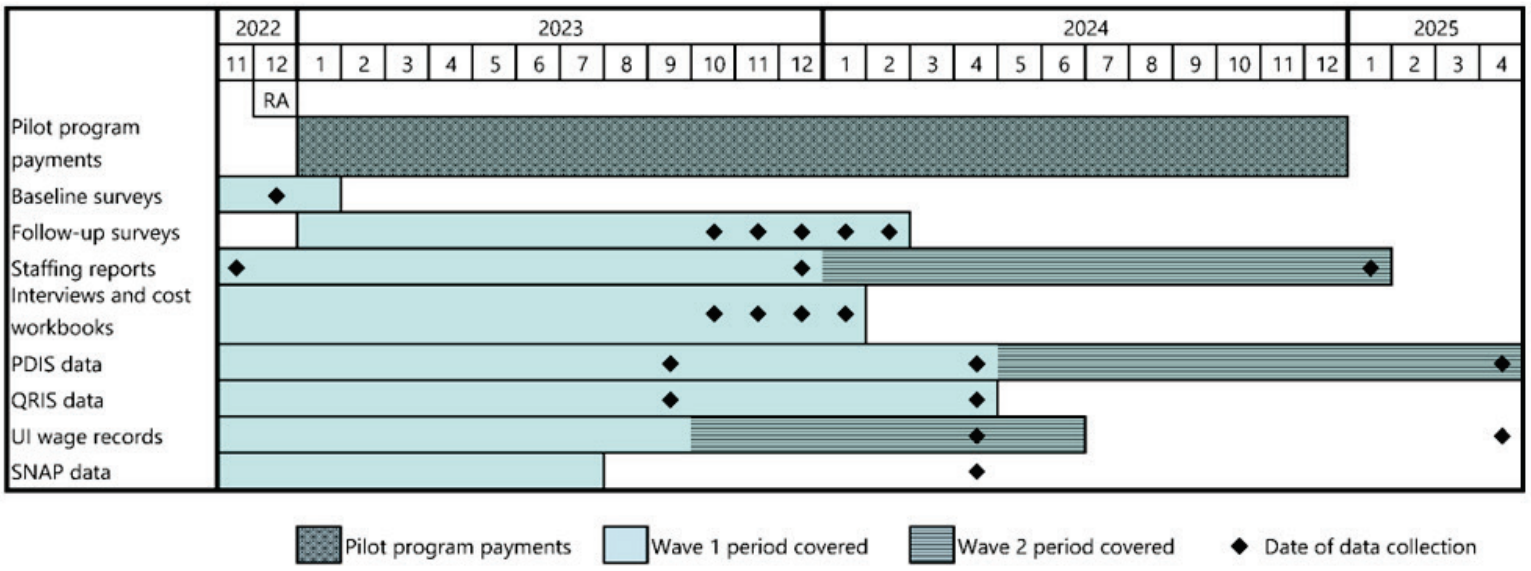
[1]As described in Appendix A, a statistical test was conducted to assess whether the program and control groups systemically differed based on a range of baseline characteristics. Specifically, program group status was regressed on the set of baseline characteristics presented in Table A.3, and the overall model was assessed for statistical significance. The findings indicated that the groups did not differ ($p = 0.73$).

[2]Throughout this report, "staffing report" refers to information about staffing levels that was collected from both program and control group centers in November 2022 and November and December 2023. Similar information was collected from program group centers on a monthly basis; these monthly updates on staffing levels are called attestations.

[3]The surveys were in the field for a few weeks after directors and teachers had probably heard about the results of random assignment. This situation means that some directors and teachers could have known whether they were in the program or control group when they were completing their baseline survey, which may have affected how they responded. The baseline survey data do not include a time stamp to allow the study team to drop responses after mid-December to see whether this scenario was the case.

[4]See Appendix B for more information.

Figure 2.2. Timeline of Data Collection and Pilot Program Activities



NOTES: RA = random assignment; PDIS = Professional Development Information System; QRIS = quality rating and improvement system; UI = unemployment insurance; SNAP = Supplemental Nutrition Assistance Program.

Wave 1 Data Sources

- **Surveys.** Follow-up surveys were fielded to directors and teachers from October 2023 through February 2024, 10 to 14 months after the start of the pilot program. The follow-up surveys collected similar information as the baseline surveys, as well as information on physical and mental health and additional measures of job demands and supports, job satisfaction, and job stress. Response rates were 66 percent for the teacher survey and 74 percent for the director survey.[5]
- **Implementation interviews and cost workbooks.** Between October 2023 and January 2024—10 to 13 months after the pilot program started—the study team conducted implementation interviews with a subset of directors and teachers from centers that were assigned to the program group, as well as a subset of directors who chose not to apply for the pilot program. A subset of the program group directors who were interviewed—along with a subset of control group directors—were asked to complete information on program costs with assistance from an interviewer. The study team also conducted interviews with CDEC and the vendor overseeing the application and funding distribution processes to better understand the design and implementation of the pilot program.
- **Staffing reports completed by directors.** In November and December 2023 (11 to 12 months after the start of the pilot program), directors were sent the list of teachers that they had submitted in their application. Directors were asked whether each teacher was still at the center and, if not, when the teacher had left. Directors also provided information about the number of new hires since

[5]See Appendix E for a response analysis of the teacher survey, indicating that findings from the survey sample are unbiased and generally representative of the full sample.

December 2022 and the current number of unfilled positions. Staffing reports were completed by 89 percent of directors (66 of the 74 directors).

- **Linked Information Network of Colorado (LINC).** This study used administrative data at Wave 1 from four sources that were connected through the LINC project:[6]
    - *Professional Development Information System (PDIS)* educator profiles include demographics, professional roles, employment status, and credential information. Data snapshots were provided for September 2022, September 2023, and April 2024 (4 months before the pilot program started, and 9 and 16 months after the pilot program began, respectively), covering employment status over the prior year and demographics and credentials through the point of the snapshot.
    - *Quality rating and improvement system (QRIS) records* cover selected characteristics of licensed providers, such as the maximum number of children the provider could care for (licensed capacity) and QRIS ratings covering the period from December 2017 through September 2023.
    - *Quarterly unemployment insurance employment and wage records* include earnings for each sample member in jobs covered by unemployment insurance from January 2010 through September 2023.
    - *Supplemental Nutrition Assistance Program (SNAP) program data* include monthly benefit amounts for each sample member from April 2016 through August 2023.

Wave 2 Data Sources

- **Staffing reports completed by directors.** In January 2025 (25 months after the start of the pilot program), directors were sent the list of teachers that they had submitted in their application and asked to indicate whether each teacher was still at the center and, if not, when the teacher had left. Directors also provided information about the number of new hires since December 2022 and the current number of unfilled positions.
- **Linked Information Network of Colorado (LINC).** This study used administrative data at Wave 2 from two sources that were connected through LINC:
    - *Professional Development Information System* included a Wave 2 snapshot obtained in April 2025, covering employment in the prior year.
    - *Quarterly unemployment insurance employment and wage records* included Wave 2 earnings for Quarter 4 of 2023 and Quarters 1 through 2 of 2024, or 10 to 18 months after the start of the pilot.

[6]The Linked Information Network of Colorado project is a collaborative based out of the Colorado Governor's Office of Information Technology. It is designed to support research and evaluation and integrates data from state and local agencies that include human services, health, labor and employment, higher education, housing, K-12 education, and criminal justice. As part of the Building and Sustaining the Child Care and Early Education Workforce (BASE) study, data were obtained via the LINC project from the Colorado Department of Early Childhood (CDEC), Colorado Department of Labor and Employment, and Colorado Department of Human Services Office of Economic Security.

Center Characteristics

Information on centers is available from the baseline directors' survey. As shown in Table 2.1, participating centers had been operating for an average of 16.1 years when the evaluation began. Over two-thirds (68.0 percent) of the centers were for-profit organizations, and a large majority (83.0 percent) operated during the full year. Average enrollment was about 72 children, and 58.0 percent of children attended full time.

Table 2.1. Center Characteristics: Full Sample

Characteristic	Mean
Years in operation at current address	16.1
Organization type (%)	
Nonprofit organization affiliated with larger agency	5.7
Nonprofit organization, not affiliated with larger agency	26.4
For-profit chain	5.7
For-profit individual	62.3
Schedule (%)	
Academic year only	1.9
Academic year, summer camp or programming	15.1
Year-round	83.0
Total number of children enrolled	72.0
Number of infants and toddlers	26.4
Number of preschool-aged children	31.0
Number of school-aged children	14.5
Number of children attending part time	17.6
Number of children attending full time	58.0
Funding source[a] (%)	
Colorado Child Care Assistance Program	100.0
Private pay from families	80.0
Child and Adult Care Food Program	78.2
Universal preschool	78.2
Local child care subsidy[b]	43.6
Head Start/Early Head Start	18.2
Colorado Preschool Program	14.5
Local preschool program	12.7
Nongovernment community organization[c]	9.1
Military	5.5
Sample size	
Baseline director survey	53
Follow-up director survey	55

SOURCES: MDRC calculations using data from the BASE baseline director survey. Calculations for funding sources come from the BASE follow-up director survey.

NOTES: Sample sizes vary because of missing values.

[a]On the follow-up survey, directors were asked to select the sources of all funds that the center was currently receiving.

[b]A local child care subsidy might come from, for example, a county department of human services.

[c]Examples of nongovernment community organizations are United Way, local charities, or religious organizations.

Information on center funding sources, collected on the directors' follow-up survey, is presented at the bottom of the table. As expected, all centers received funds from CCCAP. Most centers also reported receiving funds from private pay from families (80.0 percent), the Child and Adult Care Food Program (78.2 percent), and a universal preschool program (78.2 percent). Eighteen percent of centers reported receiving Head Start or Early Head Start funds.

Appendix A presents additional information on the participating centers. Appendix Table A.1 and Table A.2 show that the characteristics of the program and control group centers that were measured at or before study entry were similar. The appendix also shows that centers that participated in the evaluation were generally similar to centers that were eligible for the pilot program but did not apply, although the former group appeared to have higher licensed capacity (that is, they could serve more children) and appeared to have somewhat higher QRIS ratings. (See Appendix Table A.7.) Eligible centers, not surprisingly, appeared to have higher QRIS ratings than the broader population of centers and were licensed to serve more children on average. Eligible centers were also located in 18 of Colorado's 64 counties, with a higher concentration of eligible centers in the 5 counties with the largest populations.[7] Appendix Table A.8 shows background characteristics of directors in participating centers compared with directors from the broader population of centers in Colorado.

Teacher Characteristics

Among the 74 centers participating in the evaluation, a total of 1,003 teachers met the eligibility criteria for the salary increase and were included in the baseline sample: 314 teachers in the program group and 689 teachers in the control group.[8] As shown in Table 2.2, nearly all teachers in the evaluation were female (95.1 percent); 42.5 percent were Hispanic, 39.3 percent were non-Hispanic White, and 18.0 percent were non-Hispanic Black. On average, teachers were 38.8 years old at the start of the evaluation. The majority of teachers reported having "some college" or a higher education level, and about 25.6 percent had an associate's or bachelor's degree.

About one-half of the evaluation teachers were lead teachers (52.7 percent) and 37.2 percent were assistant teachers. Among teachers whose role is listed as "other," 54.0 percent were directors who probably also held teaching positions or were filling open teaching positions. About 44.6 percent of teachers only taught infants and toddlers, and 36.2 percent only taught preschool-aged children. When the evaluation started, teachers had been at their center for about five years, on average, and 16.3 percent held at least one other job. Appendix A provides additional information on participating teachers. Teachers reported receiving an average wage of $16 per hour (Appendix Table A.5), and 23.4 percent of teachers reported receiving SNAP benefits (Table A.6).

The equivalence of program and control group teachers at baseline was assessed using PDIS data, which showed that the program and control groups were similar across a range of characteristics, including demographic characteristics (although more control group teachers reported being Hispanic), credentials, job role of teachers, and ages of children served by centers. (See Appendix Table A.3).

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[7]Colorado Department of Local Affairs, State Demography Office (n.d.).

[8]Twenty-three of the individuals who were listed as teachers were also listed as directors in their center; these individuals are included in the "teacher" sample, given that they teach and would have received the salary increase if selected for the program group.

Table 2.2. Teacher Characteristics: Full Sample

Characteristic	Mean
Female (%)	95.1
Age (years)	38.8
Race (%)	
White	39.3
Black	18.0
Other	7.4
Hispanic (%)	42.5
Education level (%)	
High school diploma, GED, or less	34.1
Some college	40.1
Associate's degree	11.3
Bachelor's degree or higher	14.3
Role (%)	
Lead teacher	52.7
Assistant teacher	37.2
Other[a]	10.1
Ages of children in classroom (%)	
Infants and toddlers only	44.6
Preschool only	36.2
Both	9.3
Tenure at current center (years)	4.9
Currently holding more than one job (%)	16.3
Sample size	
Professional Development Information System sample	1,003
Survey sample	512

SOURCES: MDRC calculations using the Colorado Professional Development Information System (PDIS) covering September 2022 through September 2023 and the BASE baseline lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
Data on sex, age, race and ethnicity, and role come from the PDIS. The PDIS includes "Hispanic" as an option in the question on race but also asks a separate question about ethnicity. This table shows the percentage of respondents who selected "Hispanic" in response to the question about ethnicity.
Data on education level, ages of children served, tenure, and number of jobs held (one or more) come from the teacher baseline survey.
[a]Other roles include center directors and individuals with multiple roles like director/teacher.

Data from the teacher baseline survey showed equivalence between the program and control groups in demographic and other teacher characteristics at baseline, with very few exceptions. Two characteristics for which there were differences (ages of children taught in the classroom and the presence of another adult with earnings in the household) are included as control variables in the impact models to account for these differences. (See Appendix Table A.4 through Table A.6).

Teachers participating in the evaluation differed in some ways from the broader population of CCEE teachers in Colorado.[9] (See Appendix Table A.9.) A higher percentage of teachers in the evaluation sample are Black or Hispanic compared with the full population of teachers, and they have slightly lower levels of educational attainment. The higher education levels in the broader workforce may reflect, in part, the fact that the broader group includes teachers who work in school systems, which have higher education requirements.[10]

[9]Data on all teachers come from the Colorado Early Care and Education Workforce Data Dashboard. See Colorado Evaluation and Action Lab at the University of Denver (n.d.).
[10]Colorado Department of Education (2025).

Chapter 3: Implementation of the Teacher Salary Increase Pilot

The implementation study examined three overarching aspects of pilot program implementation—participant reach and engagement, system and infrastructure, and context—as well as the perceptions and experiences of participating directors, teachers, and program implementers. This chapter presents findings related to both the pilot program's application process and its implementation.

Summary of Findings

- The pilot program application and payment processes generally worked well and were easy to navigate.
- Directors and teachers were excited about participating.
- Implementation was facilitated by several factors: strong collaboration between State and external partners, particularly during the pilot program's design phase; a simple program design (for example, a clear scale for the salary increase amounts across centers and teacher roles); and direct communication from the Colorado Department of Early Childhood (CDEC) to centers during the application process.
- The long-term sustainability of the salary increase, given the pilot program's temporary nature and ongoing funding constraints, was a key concern of directors and teachers.
- Pilot program implementers described data and quality assurance challenges. For example, the vendor's existing database was not built to support a program that disbursed funds monthly and calculated funds at the teacher level. This issue required work-arounds to collect data outside of the vendor's system and manually enter data.
- Many directors mentioned pay parity concerns about increasing pay for teachers but not for staff members in other roles (such as administrative staff members, floaters, or substitutes).[1]

Methods and Research Questions

Between October 2023 and January 2024, the study team interviewed 10 directors, 13 lead teachers, and 8 assistant teachers from program group centers, as well as 3 directors who chose not to apply to the pilot program. The study team recruited interviewees from centers that represented a variety of geographic regions (areas with high, medium, and low cost of living), funding sources, and capacities. (See Appendix Tables B.2 through Table B.4.) The study team also conducted three interviews with staff members from CDEC and the vendor overseeing the application and funding distribution. More details on implementation study data collection and analysis methods can be found in Appendix B. Drawing on the follow-up surveys, the implementation study also incorporated teachers' and directors' knowledge of and experiences with

[1]Floaters are staff members who assist as needed but are not assigned to a given classroom (similar to substitutes).

the pilot program. Relevant survey results are described throughout the text of this chapter and are reported in full in Appendix Tables C.1 and C.2.

The implementation study research questions focused on four areas:

1. **Participant reach and engagement:** How did eligible centers and educators learn about and decide to apply to—or participate in—the pilot program? What challenges to or facilitators of participant reach and engagement did eligible centers and educators experience?
2. **System and infrastructure:** What system and infrastructure features influenced the design, launch, and ongoing implementation of the pilot program? What implementation challenges or facilitators did CDEC, its vendor, and program group directors and teachers experience?
3. **Context:** How did the local environment and the features of the centers affect the pilot program's implementation and viability?
4. **Implementation outcomes:** How was the pilot program experienced by centers and educators over time?

Implementation Study Findings

This section presents findings from the implementation study, first explaining the application process and the launch of the pilot program payments and then describing the implementation facilitators and challenges that directors, teachers, and program implementers experienced. The final section summarizes interviewees' recommendations for the design and implementation of compensation strategies.

The Application Process

In late fall 2022, CDEC invited all eligible centers to submit applications for the pilot program. CDEC's vendor collected two rounds of applications. First, eligible centers were asked to provide basic high-level program data, including their name, address, quality rating and improvement system (QRIS) rating, ages they served, licensed capacity, and the number of children they served who received Colorado Child Care Assistance Program (CCCAP) subsidies. They were also asked whether they were part of a multisite provider and for the director's contact information, race, and sex. The application document also gave directors additional information and an overview of the next steps for the pilot program. The vendor reviewed the first round of applications to confirm eligibility. Then the vendor sent directors a second application containing a list that was prepopulated with their classroom and teacher data, which the vendor had obtained using state administrative data from the Professional Development Information System (PDIS). Directors were asked to update the spreadsheet by removing teachers who had left and adding any new teachers. A total of 74 centers fully submitted the required applications. Upon submission of the second application, centers were randomly assigned to the program or control group.

Data from the follow-up survey indicate that almost all directors reported that they were aware of the pilot program in time for applications; 89.4 percent learned about the pilot program from emails, 2.1 percent from advertisements or fliers, and 8.5 percent by other means. The directors who were interviewed primarily learned about the pilot program by email, though many could not pinpoint the exact sender or source. Directors who did remember said the emails came from professional development and advocacy organizations in the region, such as Denver's Early Childhood Council, Joint Initiatives, or Alliance for Kids.

Almost all directors who were interviewed reported that the application was easy to complete and the timeline was manageable. In the survey, 47.1 percent of directors reported that they asked for help completing the pilot program application. In interviews, directors said they had sufficient information to complete the application and that CDEC was responsive to any questions they had. A few mentioned experiencing challenges during the application process, including administrative burden and a lack of technical assistance about how to plan for and communicate the short-term nature of the pilot program.

Directors' Decisions to Apply

Directors who were interviewed were excited when they first learned about the pilot program. In survey responses, 58.8 percent of directors reported that they thought the salary increases were large enough.[2] In interviews, all directors of pilot program centers said they were primarily excited for the opportunity to support teachers who were struggling financially. These directors discussed how underappreciated child care and early education (CCEE) staff members are in the industry, and that the ability to more fairly reward loyal and committed staff members was a big reason they decided to apply to the pilot program. One director said,

> Our employees are our most valuable resource. . . . The staff really is everything. So anything that I can do to increase their quality of life, anything I can do to make it a better working environment for the staff, I always try to take those opportunities.

Several directors explicitly said that they hoped the salary increases would improve the retention and recruitment efforts of qualified staff members.

Forty-eight directors chose not to apply. Three of those directors were interviewed, and their reasons for not applying were primarily related to the fact that the salary increase was only temporary. They were concerned that, at the end of the pilot program's two years, they would be caught in the extremely difficult position of seeking additional funds to continue the salary increase—funds they believed were nonexistent—or reducing teachers' wages to preprogram levels. In addition to those concerns, one director chose not to participate because the pilot program did not cover floaters or administrative staff members, and that director was concerned that the teacher salary increase would cause too large of a salary gap between teachers and other staff members at the center. Another director cited other factors, such as large expansion plans in the next year and the fact that the director's center was part of an organization with multiple centers and not all of them were eligible.

Teachers' Decisions to Opt In

After random assignment, CDEC sent an email notifying teachers at program group centers about the opportunity to receive the salary increase. Teachers were given a four-week window—spanning December 2022 to January 2023—in which they could opt to receive the first payment of the salary increase.[3] Participation was voluntary, and individual teachers at program group centers could opt in or out of the salary increase at any time. Information on how the salary increase might affect eligibility for various public benefits, such as the Supplemental Nutrition Assistance Program (SNAP), was provided to teachers via a

[2]The survey asked directors whether they thought the salary increase was "enough," which presumably refers to an increase adequate to address the issue of low wages, although they may have considered a range of factors when responding to this question.

[3]Although not part of the study sample, eligible teachers who were hired during the course of the pilot program were offered the higher salary and could similarly opt in or out.

prerecorded webinar. The webinar explained how benefits could change when individuals' earnings increased. In addition, CDEC distributed handouts to teachers that summarized this information for several hypothetical family profiles. Several Colorado workforce centers offered phone-based benefits counseling to teachers so they could discuss their individual situation before deciding whether to accept the salary increase.[4]

Almost all teachers who were interviewed said that they and their coworkers were excited when they learned about the pilot program. In the survey, 91.5 percent of teachers reported that they accepted the salary increase. In interviews, many teachers said low wages in the CCEE industry and a lack of appreciation for their work were persistent problems that made the salary increase particularly appealing and appreciated. Several teachers said that the pilot program made them feel more valued and "recognized for what we were doing." Many teachers who were interviewed described being unable to build savings or pay off loans before the pilot program, which influenced their decision to participate.

Most teachers talked about the recently increased cost of living and said their primary motivation for participating was a desire for a higher income and the increased financial security that would accompany it. One teacher talked about exiting the CCEE field multiple times throughout her career due to low pay, despite her passion for the work:

> I've been doing child care for almost 27 years, and there have been years that I couldn't work for child care. I had to go work in other places to get my bills paid, even though this is my passion and I always return to child care.

This teacher's financial need to work in other fields was not unique among the teachers who were interviewed. Two others said that, before the pilot program, they worked additional jobs in order to pay bills and other expenses.

While most teachers who were interviewed said that they had no reservations about taking the salary increase, a few teachers (specifically, single parents) did express concern about the potential loss of government benefits for what would only be a temporary increase in pay. They mentioned being worried about losing access to child care assistance, Medicaid, food stamps, and subsidized housing.

In the surveys, 90.4 percent of teachers reported that they felt they had enough information to make an informed decision about whether to accept the salary increase, and 79.4 percent reported that they had received guidance from their director about whether to opt in. In interviews, teachers reported receiving varying levels of support from their directors when deciding. Although some teachers would have appreciated more information, most said that conversations with their director were helpful and provided all the support they needed. Notably, very few teachers who responded to the survey reported making an appointment with the Colorado workforce centers to discuss benefits. None of the teachers who were interviewed knew that this help was available, and almost none of the directors who were interviewed were aware of it either.

Pilot Program Launch and Payments

CDEC partnered with a vendor to administer the pilot program applications, collect monthly updates on staff lists, provide technical support to directors, and distribute the funds for salary increases to program

[4]Workforce centers provide a variety of free services to assist employers and job seekers alike. See Colorado Department of Labor and Employment (n.d.).

group centers. To receive the monthly payments, directors at participating centers were required to fill out a form (the attestation) on a monthly basis that logged how many assistant and lead teachers had opted in that month. The vendor used the attestations to calculate the funds for each center.

The first payment was made to program group centers in January 2023. Directors were required to submit a list of eligible staff and their participation status by mid-January in order to receive payment at the end of the month. The funds were distributed to teachers in their first February paychecks. The pilot program was designed with a prepayment structure, rather than one of reimbursement, to help centers manage their cash flow. That is, centers received funds for salary increases based on their staffing in the prior month. CDEC staff interviewed said this design successfully prevented the increased burden on centers' budgets that would have occurred if centers had to front salary increases and apply for reimbursement. Centers increased lead and assistant teacher salaries based on the amount they received from CDEC. The salary increase was reflected in teachers' weekly, biweekly, or monthly paychecks.

Directors reported varying approaches for implementing the actual payment of salary increases. Most directors said that teachers' paystubs showed increased rates. However, one director said that her center separated the salary increase from regular wages on teacher paystubs so that it was clear which wages were attributed to the pilot program:

> We put [the salary increase] in as "additional wages" because it's not [center] payment, it's grant payment. We wanted that to be clear because when the grant goes away, we want their wages to reflect what [the center] was paying them. We didn't want them to be able to come back and say, "Why did you give me a pay cut?" I didn't; those were additional wages. That was grant funding.

Implementation Facilitators

Interviews with directors, teachers, and program implementers identified factors that facilitated the successful implementation of the pilot program.

Several factors that were built into the pilot program's design facilitated implementation, including wide-ranging collaboration, a simplified salary increase scale, and direct communication from CDEC. Interviewees from CDEC said the partnerships that were established and the collaboration that was fostered during the pilot program's design were integral to creating a high-quality program and implementation plan. A variety of partners brought a wide breadth and depth of personal experience, which meant there was substantial cumulative knowledge present at the design table. The key collaborators were CDEC, the MDRC study team, and the Colorado Evaluation and Action Lab; they solicited additional support as needed from CDEC's vendor, other state agencies (for example, the Colorado Department of Labor and Employment), and Colorado workforce centers.

Interviewees from CDEC and its vendor said that design decisions that prioritized simplification facilitated the implementation of the pilot program. For example, the final scale used for the pilot program's salary increases was not overly complex, which was helpful for setting up the disbursement mechanisms and was well-received by educators. In addition, CDEC staff members communicated directly with centers during the application process, rather than relying solely on the vendor; they said the improved clarity and responsiveness helped increase application rates.

Directors reported that the pilot program's monthly attestation and payment process worked well. In the survey, 60 percent of directors reported contacting the vendor "less than monthly" for help completing

staffing reports or paying wages; 40 percent of directors reported that they never needed to contact the vendor. Similarly, directors who were interviewed described implementation as straightforward and simple and reported that they did not find the attestations much of a burden. (Their average rating was 1.6 on a five-point scale, where 1 meant "not at all burdensome" and 5 meant "extremely burdensome.") Interviewees frequently said that the ease of completing the monthly attestations was an important facilitator to implementation. A director of a smaller center said that having fewer full-time staff members made the monthly attestation process even easier. All interviewed directors also said that the state promptly disbursed money to their centers, which eased their budgetary concerns: "They prepaid right away so there was always money in that particular account."

Overall, teachers who were interviewed described their experiences with the pilot program positively. Most of the teachers said that the amount and frequency of the salary increase matched what they were expecting. One teacher said, "We had really good information, really good resources to find out more information. I was surprised by how much my salary went up with it, so that was cool." Another teacher mentioned that the fact that the salary increase was incorporated into teachers' paychecks made participation in the pilot program simple.

The context of a challenging CCEE labor market in Colorado facilitated the implementation of the pilot program. Interviewees described the CCEE labor market in Colorado as facing challenges on both the supply side (teacher labor) and demand side (CCEE center employers). For teachers, consistent and satisfying employment in the CCEE industry was thwarted by challenges such as low wages, limited benefits in compensation packages, a perceived lack of societal respect for teachers in the field, and a rising cost of living. Directors found it difficult to recruit and retain teachers with appropriate qualifications, compete with other industries, and obtain adequate funding and revenue streams.

Thus, the pilot program was introduced to a CCEE landscape in which directors already wanted to provide higher wages for their teachers but were unable to because of limited funds. All interviewed directors said this existing desire encouraged their early interest and participation in the pilot program. One director explicitly said that paying staff members a livable wage was a struggle without supplemental grant funds:

> I feel like where I can't, in my budget, meet that living wage and be competitive with Walmart or McDonald's down the street, [the pilot program] has given me an option to do that for them . . . I mean, our economy is crazy. It's hard to live right now in our state, and I feel like this [pilot program] is a step for us. I am very, very grateful for that.

Similarly, despite grappling with low wages and the increasing cost of living, many teachers who were interviewed said that their deep passion for working in the CCEE industry was a reason why they had tried to stay in the field full or part time. One teacher said,

> All the time I'm hearing, "Why did you become a teacher? They don't get paid that much; their salaries aren't very high." And it's true, but I always tell people it's not about the money. It's about what you're doing and who you're teaching and what they become. Because we are teaching our next generation of kids.

Some other teachers who were interviewed agreed with this sentiment and highlighted that their belief in the intrinsic value of their work is what first drew them to the CCEE field. Higher wages may enable them to remain in their positions and may entice new generations of teachers to enter the field.

Implementation Challenges

Interviews with directors, teachers, and program implementers identified implementation challenges and highlighted areas for improvement.

The way directors advertised the salary increase in job postings may have influenced teacher recruitment. Many directors who were interviewed said they struggled to decide how to advertise the salary increase when recruiting new teachers. One director said that an additional concern was whether prospective candidates would be eligible for the salary increase (based on the number of hours they worked). This director said,

> Part of my challenge . . . is do I post what their wage is with the grant, or do I post what I pay? Because what happens when the grant goes away? Can I guarantee I can pay them an additional $7 an hour? Are they even going to work enough hours to get it?

As a result, directors developed different approaches to messaging and hiring. Some directors did not share information about the salary increase until they were ready to extend a job offer, while others advertised the salary increase in the job posting. The directors' different approaches could have reduced the pilot program's impact on recruitment outcomes.

It was challenging to navigate teacher eligibility. Some directors who were interviewed said that the salary increase prompted some teachers to request changes to their schedule (the number of hours they worked each week) or to their role, which in turn made it difficult to balance teachers' workloads and distribute salary increases. Teachers were required to work at least 16 hours per week to be eligible for the salary increase, and their role (that is, lead or assistant teacher) determined how much their salary would increase. Some teachers wanted to work more hours or to be promoted from assistant to lead teacher to take advantage of the larger salary increase that was offered to lead teachers. Other teachers wanted to reduce the hours they worked, since the salary increase would allow them to maintain the same amount in their weekly paycheck.

A few teachers who were interviewed said that it was challenging to navigate and overcome eligibility constraints. One teacher described how long it took to become eligible for the pilot program because she was working part time and did not have enough hours. She said,

> I kept asking for more hours so that way I could take advantage of the program. It took a good four months of me making less than what everybody was making for me to finally be able to get more hours. That was kind of difficult.

Another teacher said that she only needed to attain one certification to meet the requirements to be a lead teacher at her center, which she completed. However, the center only gave promotions once a year, during annual reviews, so she had to wait many months after completing her certification before she was promoted to lead teacher and could begin receiving the higher salary increase.

Directors discussed how ongoing funding constraints negatively affected sustainability planning for the end of the pilot program. To be eligible for the pilot program, CCEE centers were required to have at least 40 percent of their children receiving CCCAP subsidies at the time of application. For some program group centers, this proportion was much higher. A couple of directors who were interviewed mentioned that CCCAP funds were unresponsive to recent inflation rates, which meant centers were unable to adjust tuition with the ebbs and flows of the economy. One director said that, in contrast, "The private centers

went from charging $1,600 to $1,800 to charging $2,200 to $2,600. They can snap their fingers and say, 'Starting next month, this is our rate.'" Centers that were fully reliant on public funding streams were particularly affected by CCCAP funding constraints. Since CCCAP funding makes up a large proportion of their revenue stream and reimbursement rates are generally fixed, center budgets have suffered. A few directors discussed how, even with recent increases, the CCCAP tuition was insufficient.

Directors and teachers also discussed the expensive and strenuous burden of maintaining relevant qualifications and quality care ratings in order to access public funding sources. Interviewees said that wages have not kept up with teachers' educational and licensing requirements, which makes recruiting and hiring teachers an ongoing challenge for directors.

Given the funding constraints, CCEE centers lack the revenue to sustain salary increases after the pilot program ends. Thus, sustainability concerns (and worries that teachers will leave after their wages decrease) were at the top of most directors' minds throughout the pilot program period. One director said,

> Because if [the pilot program] doesn't continue, am I going to lose the staff? Am I going to try and pay them the same rate? Am I going to be able to afford it if I do keep them at the same rate? Because honestly, I don't think they're going to want to go back to what they used to get—especially now, since everything's more expensive.

At least four directors said they were actively considering strategies to keep the salary increase after the pilot program ended, but none had identified a solution at the time of the interviews. Teachers also expressed concern about the end of the pilot program. They feared that they would go back to lower pay and become overwhelmed by their expenses again, especially with the rising cost of living. Both teachers and directors acknowledged that teachers' previous wages were not competitive in the job market.

Pilot program implementers who were interviewed described data and quality assurance challenges. The pilot program's implementers faced data challenges. Two structural factors led to these data challenges. First, the PDIS teacher-level data were out of date and not well organized. The vendor used this database to prepopulate pilot program application forms with the list of existing teachers, with the intention of reducing the burden on directors. However, the data included teachers who had left more than six months before, missed newly hired teachers, and did not account for recent promotions. The application process required back-and-forth discussions to produce accurate teacher lists, and the applications took longer than expected to be processed.

Second, the pilot program was structured differently from other state grants. Instead of the typical process, in which centers are reimbursed for costs incurred, payments for this pilot program were calculated based on the number of teachers at each center (and their roles) and sent to CCEE centers the month before costs were incurred. Vendor staff members explained that this process had substantial implications for their database development and management, since it was not structured to store or track data and payments at the teacher level. Because this was a pilot program being implemented in a limited number of providers, vendor staff members used work-arounds to collect data outside of their system and hand-entered data. Pilot program implementers said that the development of a new and appropriately designed database could have mitigated such data collection and entry issues but also would have required large capital investment up front.

The CCEE industry was still recovering from the COVID-19 pandemic when the pilot program began. During the COVID-19 pandemic, many CCEE centers closed their doors and had to furlough or lay off staff. When asked about contextual factors that may influence implementation, interviewed directors said that hiring

increases found during the evaluation of the pilot program may have been due, in part, to the industry normalizing postpandemic (in addition to the salary increases).

Director and Program Implementer Recommendations for Implementing Compensation Strategies

During interviews, directors and program implementers made several recommendations for designing and implementing compensation strategies like the pilot program:

- Multiple directors recommended that future iterations of the pilot program, or any other salary increase programs, expand eligibility to include directors, floaters, and other administrative staff members. They said they were concerned that the focus only on teachers caused a wide gap in their centers' pay scale for other staff members compared with teachers. One director said that the salary increase actually made some of her lead teachers' annual salaries higher than her own.
- Pilot program implementers said that it would be vital to invest in a proper database for tracking monthly staff eligibility and payment disbursement if this pilot program is extended or expanded to include more centers. One interviewee suggested that it could make sense to model the payment disbursement system on tuition credit grant programs, where providers submit information in one month for services completed in the prior month. They thought this approach would be much more accurate and help avoid overpaying centers if a teacher leaves or opts out of the pilot program mid-month.
- Directors spoke at length about funding constraints, specifically those related to CCCAP reimbursement as a revenue source. CDEC staff members or other policymakers could support centers with technical assistance about how to diversify funding sources or increase attendance rates to ensure full CCCAP reimbursement payments or enact policies that provide centers with more funding and allow for greater spending flexibility.

Chapter 4: Effects of the Teacher Salary Increase Pilot at Wave 1

The impact study examined the effects of the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot on a wide range of outcomes in line with its underlying theory of change, including teacher retention; teachers' economic, mental, and physical well-being; teachers' perceptions of their working conditions; and center-level turnover, hiring, and staffing. This chapter details the impacts of the salary increase on these outcomes as of Wave 1 (approximately one year after the start of the pilot program).

Before conducting analyses, the study team selected two primary outcomes—teachers' retention at the center that employed them at the beginning of the pilot program (measured by staffing reports that were completed by study directors about 11 months after the start of the study) and teachers' economic well-being (measured by teachers' household income as a percentage of the federal poverty line).[1] Primary outcomes (also sometimes called confirmatory outcomes) are the main objectives of the pilot program and outcomes for which there is a clear hypothesis being tested (for example, increasing teachers' salaries at a center should increase their retention at that center). Selecting primary outcomes imposes discipline on the analysis, particularly when a study is examining effects on a wide range of outcomes.[2] All other outcomes that the study team examined—including teachers' material hardship, job characteristics, working conditions, and attachment to the child care and early education (CCEE) field—are considered secondary (also sometimes called exploratory outcomes).

Summary of Findings

- The pilot program did not lead to a statistically significant increase in the primary measure of teacher retention, measured with staffing reports completed by directors. Seventy-six percent of teachers working at program group centers at the start of the pilot program were still working at those centers one year later compared with 69.1 percent of teachers in control group centers. Although not statistically significant, an increase in retention of 7 percentage points in the primary outcome measure may be substantively meaningful and warrants further research. When examining the secondary outcome measure of teacher retention, measured with the follow-up teacher survey, the salary increase led to a 10 percentage point increase in teacher retention that is statistically significant; 88.8 percent of program group teachers reported that they were still employed at their original center, compared with 78.4 percent of control group teachers.
- Program group teachers earned significantly higher wages than those in the control group. However, the pilot program did not lead to a statistically significant increase in household income. Teachers in the program group were less likely to have other sources of income, particularly income from a second job or income from child support, which may partially account for why program group teachers had higher wages but not overall household income.

[1]See the preanalysis plan: Miller (2024).
[2]Because the team prespecified which outcomes were primary, adjustments for multiple comparisons were not made.

- On average, teachers in the program group were more likely to report improvements in markers of economic well-being: Fewer teachers worked two or more jobs, and teachers experienced less food insecurity, had fewer unpaid bills, and perceived that they had more financial security.
- Teachers in the program group reported experiencing fewer symptoms of depression and less job stress.
- Teachers in the program group who remained in CCEE or education-related jobs reported more stable and better working conditions, greater job satisfaction, and stronger intentions to stay at their current center than teachers in the control group who remained in CCEE or education-related jobs.
- The study team also examined the pilot program's effects on centers, although this analysis is exploratory given the small number of centers in the evaluation. Effects on teacher retention rates, teacher turnover rates, vacancies, and hires were in the expected direction but are not statistically significant. These findings warrant future research that is appropriately powered to detect center-level impacts.

Methods and Research Questions

The effects of the pilot program were estimated by comparing outcomes for teachers or centers in the program group with outcomes for teachers or centers in the control group. Differences in outcomes, or impacts, were estimated using a statistical model that indicates their level of statistical significance, or the strength of the evidence that the observed difference is a true program impact and not a difference due to chance. The level of significance is indicated by the p-value, or the probability that the observed difference is due to chance.

In what follows, differences that are statistically significant at the 10 percent level are discussed as program impacts. It is common in the evaluation field to use 5 percent as a threshold, which was also the threshold used in the preanalysis plan for this study. However, the final sample sizes obtained for the analysis were somewhat smaller than expected, providing less statistical power than anticipated to detect impacts. For that reason, a threshold of 10 percent (that is, a p-value < 0.10) is used throughout this report for determining statistical significance, and p-values are shown in the text if they meet this threshold. In addition, there is also growing recognition in evaluation research that the "strength of the evidence," as represented by the p-value, runs along a continuum and does not provide a yes/no answer for program impact.[3] Finally, effect sizes are presented to help interpret impacts on outcomes that are not in easily understood units of measurement—such as a scale score for job stress, for example. An effect size is the impact divided by the standard deviation of the outcome, and effect sizes for teacher outcomes above .50 are considered moderate to large in size. See Appendix D for more details on the impact analytic strategy.

All analyses examining the effects of the pilot program on *center* outcomes were considered secondary. These analyses were underpowered, meaning they were unlikely to detect statistically significant effects due to the small number of centers in the study.

[3]Amrhein, Greenland, and McShane (2019).

The following research questions guided the impact study:

Primary research questions

1. What is the effect of the offer of a salary increase on teachers' retention at their original center?
2. What is the effect of the offer of a salary increase on teachers' economic well-being?

Secondary research questions

1. What is the effect of a salary increase on other outcomes of interest, such as teachers' retention in the CCEE field, material hardship, physical and psychological well-being, perceptions of job demands and supports, job satisfaction, job characteristics, intent to turnover, professional development, and professional identity?
2. Does the effect of a salary increase vary between subgroups of teachers that are defined, for example, by role (lead or assistant teacher), initial wage, or sociodemographic characteristics?
3. What is the effect of a salary increase on CCEE centers' staffing configurations, staff retention, stability, and operations?

Impact Study Findings for Teacher Retention and Economic Well-Being

This section presents findings for the two primary outcomes that were targeted by the pilot program—teacher retention and teacher economic well-being. This section includes findings for both primary and secondary outcome measures that assessed these constructs. The subsequent section presents findings for other secondary outcomes. As noted above, differences that are statistically significant at the 10 percent level are denoted as program impacts.

Pilot Program Effects on Teacher Retention

The primary outcome measure to assess teacher retention comes from staffing reports that were completed by study directors about 11 months after the start of the study.

Data from these staffing reports indicate that 75.6 percent of teachers in the program group were still at their original center after 11 months compared with 69.1 percent of teachers in the control group. (See Table 4.1.) This difference in retention between program and control group teachers is not statistically significant with a p-value of 0.19, which may be due to insufficient power to detect an effect of this size.[4] An increase in retention of 7 percentage points is large enough to be substantively meaningful, however, and warrants further research.

Data from the staffing reports also show that teachers were employed by their original centers for an average of a little over 300 days, with no statistically significant difference between the program and control groups.

[4]The sample size for the staffing reports (815 teachers) provides the statistical power to detect an impact as statistically significant if it is 10 percentage points or larger.

Table 4.1. Impacts on Teacher Retention, 11 to 14 Months After the Pilot Program Began

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Primary outcome (%)						
Employed at original center in November or December 2023	75.6	69.1	6.5	0.14	0.19	
Secondary outcomes						
Employed at original center at time of survey (%)	88.8	78.4	10.4	0.25	0.01	**
Days employed since study start at original center, as of November or December 2023	304.7	311.3	-6.6	-0.08	0.52	
Sample size						
Staffing reports (total = 815)	254	561				
Surveys (total = 665)	215	450				

SOURCES: MDRC calculations using data from the BASE follow-up staffing reports that were completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

The primary outcome and "days employed since study start at original center, as of November or December 2023" were calculated using data from the BASE follow-up staffing reports that were completed by directors. "Employed at original center at time of survey" was calculated using data from the BASE follow-up lead and assistant teacher survey.

Teacher retention information is also available from two additional sources: (1) follow-up surveys completed by teachers 10 to 14 months after the start of the study, and (2) Professional Development Information System (PDIS) records covering April 2023 through April 2024. Outcomes based on these two sources are considered secondary outcomes because the survey data were only available for survey respondents, and the PDIS data provided a very rough measure of teacher retention, as directors may not update their centers' records immediately after teachers leave. PDIS records (presented in Appendix F) indicate whether teachers were still at their original center at some point from April 2023 through April 2024.

Data from the teachers' follow-up survey show a statistically significant increase in retention of 10.4 percentage points: 88.8 percent of program group teachers were still employed by their original center 10 to 14 months after the start of the study compared with 78.4 percent of control group teachers ($p = 0.01$).

Appendix Table F.1 presents impacts that were estimated using PDIS records. 73.5 percent of teachers in program group centers were reported to be employed at their original center at some point between April 2023 and April 2024, compared with 70.7 percent of teachers in control group centers. This difference is not statistically significant.

Teacher interviews for the implementation study suggested the pilot program may have improved their retention. Over one-half of teachers who were interviewed explicitly said that they stayed at their center because of the pilot program's salary increase. For example, one teacher said,

> Honestly, it does encourage me to stay because if I were to leave my job that I'm at now, I would not get paid near what I get paid now . . . even with the experiences that I have. Even going into our public school districts—those teachers do not get, from my understanding, as much as we do at our center with our pilot program.

Other teachers hypothesized that it would make them more likely to stay, even if they did not directly attribute their decisions to the salary increase. A few teachers believed that they saw improved retention among their peers. For example, one said, "Nobody wants to leave. . . . We have all been very satisfied with where we are, what we do. So we haven't really had any staff changes or anything like that." Teachers also reported that this perceived retention among peers led to an increased sense of stability at their center.

Pilot Program Effects on Teacher Economic Well-Being

The primary outcome used to measure economic well-being was teachers' household income as a percentage of the federal poverty line.

There is no evidence that the pilot program led to an increase in household income, on average. The top row of Table 4.2 presents household income as a percentage of the federal poverty line, calculated using poverty thresholds that were relevant to a given teacher's household size.[5] Among control group teachers, household income was about 150 percent of the federal poverty line. As context, households are eligible for Supplemental Nutrition Assistance Program (SNAP) benefits if their income is up to 130 percent of the poverty line. The pilot program did not lead to an increase in household income relative to the poverty line. The 9.6 percentage point difference between the program and control groups is not statistically significant.

The study team also assessed secondary outcomes of teachers' economic well-being by examining additional measures, such as teachers' household income, wages, income sources, employment, and whether they worked a second job. Table 4.2 also presents the impacts on these outcomes.

The pilot program did not impact average monthly income (the average monthly income for teachers in both the program and the control group was about $3,200, or $38,400 annually) or the proportion of teachers with household incomes below the poverty line.

The pilot program increased teachers' salaries, as expected. On average, hourly wages among those working were $20.40 for program group teachers and $17.27 for control group teachers. The distribution of wages between the two research groups is different to a statistically significant degree, with substantially more program group teachers earning $20 or more per hour than control group teachers ($p = 0.02$).[6]

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[5]Office of the Assistant Secretary for Planning and Evaluation (2025).

[6]Data from unemployment insurance records also show an increase in earnings. (See Appendix Table F.3.) Compared with teachers in the control group, teachers in the program group earned $574 more in Quarter 1 of 2023, $908 more in Quarter 2 of 2023, and $1,244 more in Quarter 3 of 2023. The difference in average earnings in Quarter 3 is statistically significant. This analysis uses a subsample of teachers: individuals who have Social Security numbers and whose center reports on their earnings in the unemployment insurance system.

Table 4.2. Impacts on Teacher Economic Well-Being, 10 to 14 Months After the Pilot Program Began

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Primary outcome						
Household income as a percentage of the federal poverty level	160.8	151.2	9.6	0.06	0.66	
Secondary outcomes						
Household income below the federal poverty level (%)	33.8	38.7	-4.9	-0.10	0.36	
Household income as a percentage of the federal poverty level (%)					0.98	
Less than 50%	13.8	14.8	-1.0	-0.03		
50 to 100%	20.0	23.7	-3.7	-0.09		
100 to 200%	41.1	42.7	-1.6	-0.03		
200% or higher	25.8	19.1	6.7	0.17		
Household income in prior month ($)	3,266.01	3,174.02	91.99	0.03	0.81	
Average hourly wage, among those working[a] ($)	20.40	17.27	3.13	0.78	0.00	***
Wage (%)					0.02	**
Less than $13	1.9	7.5	-5.7	-0.21		
$13 to $15	2.5	9.9	-7.4	-0.25		
$15 to $20	23.9	31.5	-7.6	-0.16		
$20 or higher	29.0	16.1	12.9	0.35		
Not working	8.5	4.2	4.4	0.21		
Employed, but missing wage information	34.7	30.5	4.2	0.09		
Employed at the time of the survey (%)	91.5	95.8	-4.3	-0.21	0.07	*
Working at two or more jobs (%)	8.8	16.8	-8.0	-0.21	0.02	**
Income sources (%)						
Respondent earnings	49.7	54.6	-4.9	-0.10	0.30	
Other adult earnings	52.1	47.7	4.4	0.09	0.34	
SSI/SSDI	9.8	8.9	1.0	0.03	0.70	
Cash assistance	10.1	11.7	-1.6	-0.05	0.58	
CCCAP	16.8	13.3	3.5	0.10	0.35	
Unemployment insurance	1.7	2.2	-0.5	-0.03	0.69	
Workers' compensation	1.8	1.9	-0.1	0.00	0.96	
Disability	2.4	4.9	-2.5	-0.12	0.17	
SNAP	16.3	23.3	-7.0	-0.16	0.10	
WIC	12.4	13.7	-1.3	-0.04	0.69	
Energy assistance	4.9	8.1	-3.2	-0.12	0.17	
Housing choice voucher	4.7	8.1	-3.4	-0.12	0.26	
Veteran's benefits	3.8	3.3	0.5	0.03	0.76	
Child support	5.7	11.0	-5.4	-0.17	0.06	*
Medicaid	44.5	45.7	-1.2	-0.02	0.78	
Other	1.6	5.0	-3.5	-0.16	0.10	
Sample size (total = 665)	215	450				

(continued)

Table 4.2 (continued)

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: CCCAP = Colorado Child Care Assistance Program; SNAP = Supplemental Nutrition Assistance Program; SSI/SSDI = Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI); WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups for continuous variables. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

A chi-square test for categorical variables was run to determine whether a difference exists in the distribution of related outcomes by research group. The p-value indicates the likelihood that the differences between the program and control groups in the distribution of outcomes arose by chance.

Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

If a respondent currently works multiple jobs, then only the primary job is reported. (The job at which the respondent works the most hours is considered primary.)

[a]The average wage is only reported for workers, so the comparison is not tested because it is nonexperimental.

Teachers in program group centers were less likely to report working and working multiple jobs, and they reported losses of some benefits. Teachers in the program group (91.5 percent) were less likely than control group teachers (95.8 percent) to report working at the time they responded to the follow-up survey, which was collected 10 to 14 months after the start of the pilot program (p = 0.07). They were less likely to report—at the time of the follow-up survey—that they were holding two or more jobs (8.8 percent of program group teachers compared with 16.8 percent of control group teachers; p = 0.02). And they were less likely than control group teachers to report receiving child support (5.7 percent of program group teachers compared with 11.0 percent of control group teachers; p = 0.06).[7]

Findings from teacher interviews validate these quantitative findings: Several teachers said that they felt relief knowing that, because they were receiving higher wages, they did not need to go elsewhere to earn extra money. Of the nine teachers who were interviewed that had held second jobs for additional income, five said that once they began receiving the salary increase, they stopped their second job and could focus on teaching. Another teacher shared a story about how, because of the increase in her wages, her husband was able to quit a job he was miserable in and find a better one that was closer to home. She explained that even though he took a salary reduction, they were able to make that decision because the pilot program's salary increase offset the pay cut.

In interviews, three teachers said that because they took the salary increase, they lost some government benefits—but they were pleased that they did not need to rely on government assistance anymore. One

[7]Using SNAP benefits records provided via the Linked Information Network of Colorado project, the study team found a similar pattern of reduced SNAP benefits. The percentage of program group teachers receiving SNAP benefits and the average SNAP amount they received appear lower compared with control group teachers, particularly in June and July 2023. But these differences are not statistically significant. (See Appendix Table F.6.)

teacher who lost SNAP benefits after accepting the salary increase said she felt a sense of pride knowing she made enough money to no longer depend on those benefits. Another teacher emphasized how relieved she felt to not need Social Security benefits, given how much work it took to continue to prove eligibility:

> For Social Security, I had to turn in so much paperwork; it was like another job just to get that little bit of extra income. With the pilot, I don't have to apply for Social Security for my child, so that's a plus!

Four teachers said that, because of the salary increase, the monthly amount they had to pay for health insurance increased. However, they felt like it was manageable, given the amount of the salary increase. Similarly, one director said that a few teachers at her center were single parents who relied on CCCAP assistance. Although their tuition fees went up, the pilot program provided enough wages for them to afford the higher fees.

Impact Study Findings for Other Secondary Outcomes

The theory of change in Figure 2.1 illustrates how an increased salary could affect teachers: They may experience less material hardship and better emotional and physical well-being, job characteristics, and working conditions. This section presents findings for these other secondary outcomes.

Pilot Program Effects on Teachers' Material Hardship

Material hardship was measured with questions in the teachers' follow-up survey: Teachers were asked about their experiences with various hardships, food insecurity, and feelings of financial strain. Table 4.3 presents the impacts on these outcomes.

Teachers in the program group reported experiencing fewer material hardships and greater financial security than teachers in the control group. Fewer teachers in the program group reported experiencing any of the seven material hardships listed in the table in the past 12 months compared with the control group (50.9 percent and 61.7 percent, respectively; $p = 0.03$). Program group teachers reported experiencing an average of 1.3 hardships in the past 12 months, whereas control group teachers reported experiencing 1.6 hardships ($p = 0.04$). Specifically, program group teachers reported being less likely to avoid filling a drug prescription because they could not afford it (13.2 percent compared with 21.6 percent; $p = 0.02$) and pay less than the full amount of other bills (37.2 percent compared with 48.7 percent; $p = 0.01$) than control group teachers.

Teachers were surveyed about how much money they generally had at the end of each of the past three months, selecting whether they were "very short of money," "somewhat short of money," or had "some or more than enough left over." The distribution of answers is not significantly different between the two groups. In the survey, teachers responded to four items about their financial security with a number on a scale from "strongly agree" to "strongly disagree," where higher scores mean they had more financial security. Program group teachers felt more financially secure than control group teachers ($p < 0.001$); the difference is statistically significant.[8] There was no difference between program group and control group

[8]Items included "My financial situation is better than it was last year at this time," "I worry about having enough money in the future," "These days I can generally afford to buy the things (I/we) need," and "There never seems to be enough money to buy something or go somewhere just for fun." McDaniel and Slack (2005); Slack et al. (2004).

teachers' ability to pay over $400 for an emergency (34.4 and 30.0 percent, respectively). Finally, fewer teachers in the program group reported experiencing "low or very low" food security (40.3 percent) compared with teachers in the control group (57.5 percent; $p < 0.001$).[9]

Table 4.3. Impacts on Teacher Material Hardship, 10 to 14 Months After the Pilot Program Began

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Experienced any material hardship in past 12 months (%)	50.9	61.7	-10.8	-0.22	0.03	**
Did not pay full rent or mortgage	24.2	28.4	-4.2	-0.09	0.33	
Evicted for not paying rent or mortgage	2.1	3.1	-1.0	-0.06	0.54	
Did not pay full gas, oil, or electricity bill	33.4	39.4	-6.0	-0.12	0.17	
Gas, oil, or electricity service turned off	6.8	8.8	-2.0	-0.07	0.46	
Cell or landline disconnected because teacher did not pay	14.9	18.1	-3.2	-0.08	0.40	
Did not fill drug prescription because teacher could not afford it	13.2	21.6	-8.4	-0.20	0.02	**
Did not pay full amount of other bills	37.2	48.7	-11.4	-0.23	0.01	**
Number of material hardships in past 12 months (1-7)	1.3	1.6	-0.3	-0.19	0.04	**
Finances at the end of the month (%)					0.17	
Some or more than enough left over	31.0	26.1	4.9	0.11		
Somewhat short of money	32.0	27.5	4.5	0.10		
Very short of money	37.0	46.5	-9.4	-0.19		
Financial security score[a] (1-4)	2.4	2.1	0.3	0.48	0.00	***
Could pay over $400 for an emergency (%)	34.4	30.0	4.5	0.10	0.29	
Low or very low food security[b] (%)	40.3	57.5	-17.2	-0.35	0.00	***
Sample size (total = 665)	215	450				

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups for continuous variables. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

A chi-square test for categorical variables was run to determine whether a difference exists in the distribution of related outcomes by research group. The p-value indicates the likelihood that the differences between the program and control groups in the distribution of outcomes arose by chance.

[a]The scale for "financial security" is 1 = insecure to 4 = secure.

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[9]Five items in the survey assessed food security: "Did you ever eat less than you felt you should?" "Were you ever hungry but didn't eat because you couldn't afford enough food?" and "I/we couldn't afford to eat balanced meals." If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

In interviews, almost all teachers said that once the pilot program began, they were no longer worried about whether they would be able to pay utilities or other bills on time. While teachers qualified that assertion by saying their financial situation was still changing month by month, most said they were in a better and more comfortable place overall. For example, teachers said that they were able to make larger purchases they had been putting off, such as purchasing a car, saving for a down payment to purchase a home, saving for higher education, buying a new washer and dryer set, or even saving to start their own day care center.

Pilot Program Effects on Teachers' Mental and Physical Well-Being

By improving economic well-being and reducing financial stress, it was hypothesized that the pilot program may lead to improvements in teachers' mental and physical well-being. Table 4.4 presents the impacts on these outcomes.

Table 4.4. Impacts on Teacher Mental and Physical Health, 10 to 14 Months After the Pilot Program Began

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Depression scale score[a] (0-21)	4.7	5.9	-1.2	-0.22	0.06*
At risk for depression[b] (%)	2.4	6.4	-4.0	-0.16	0.06*
Psychological distress score[c] (0-24)	4.6	5.3	-0.7	-0.12	0.29
Self-rated health score[d] (1-5)	3.0	2.9	0.1	0.14	0.16
Number of days teacher could not perform usual activities due to physical or mental health issues	12.1	15.0	-2.9	-0.12	0.24
Emotional exhaustion score[e] (0-54)	12.5	15.5	-3.0	-0.21	0.11
Job stress score[f] (1-5)	3.2	2.9	0.3	0.24	0.07*
Sample size (total = 665)	215	450			

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]The Center for Epidemiologic Studies Depression Scale Short Form (CES-D-SF) comprises seven items that are rated on a four-point scale from 0 = rarely or none of the time to 3 = most or all of the time.

[b]A teacher with a CES-D-SF score that is 16 or higher is considered at risk for depression.

[c]The Kessler-6 Psychological Distress Scale comprises six items on a five-point scale from 0 = none of the time to 4 = all of the time.

(continued)

Table 4.4 (continued)

[d]Self-rated health is determined using a single item on a five-point scale from 1 = poor to 5 = excellent.
[e]The emotional exhaustion subscale comprises nine items from the Maslach Burnout Inventory: Educators Survey that are rated on a seven-point scale from 0 = never to 6 = every day.
[f]Job stress is determined using a single item that is rated from 1 = very stressed to 5 = not at all stressed.

Teachers in the program group reported experiencing fewer symptoms of depression and less job stress than teachers in the control group. However, there were no effects on other measures of physical and mental health. In the survey, teachers responded to commonly used questions that were designed to assess depression and psychological distress.[10] Program group teachers reported experiencing lower levels of depressive symptoms about a year after the pilot program began compared with their peers in the control group ($p = 0.06$; effect size = 0.22).[11] Program group teachers were also less likely to be at risk for depression compared with control group teachers (2.4 percent and 6.4 percent, respectively; $p = 0.06$).[12] The pilot program did not have an effect on psychological distress.[13]

Teachers were asked to rate their overall health using a five-point scale, from "poor" to "excellent." On average, teachers in both groups chose a rating of 3, which corresponds to "good" health. Teachers were also asked to report approximately how many days over the past 30 days they had experienced poor physical or mental health that kept them from doing their usual activities. There was no effect on this measure, as the average number of days when teachers experienced poor health was about one-half of the days over the past 30 days for both groups.

Teachers in the program and control groups reported similar levels of emotional exhaustion, but program group teachers reported slightly less job stress. Teachers were asked to assess their feelings about their job and their reactions to work. The pilot program had no effect on a measure of emotional exhaustion.[14] However, program group teachers reported experiencing slightly less job stress—on average, they chose a rating of 3.2 on a scale from 1 ("very stressed") to 5 ("not stressed")—compared with control group teachers (2.9; $p = 0.07$; effect size = 0.24).

In interviews, most teachers said the pilot program did not change their job-related stress. One teacher said that, given the nature of the job, "[the stress] is always gonna be there." However, many teachers did say the salary increase made them feel less stressed about finances, their ability to pay bills, and their ability to cover their basic needs.

[10]Psychological distress is a feeling of sadness and anxiety, and it is typically temporary. In comparison, depression is marked by more severe and persistent symptoms of a depressed mood. See American Psychiatric Association (2013).
[11]The Center for Epidemiologic Studies Depression Scale Short Form, which this study used to measure depression, includes seven items that ask how often respondents felt sad, lonely, or had other experiences that are characteristic of depression in the past week. Teachers responded using a four-point scale, ranging from 1 "rarely or none of the time" (less than 1 day) to "most of the time" (5 to 7 days).
[12]When individuals score a 16 or higher on the Center for Epidemiologic Studies Depression Scale Short Form, they are considered at risk for depression.
[13]The Kessler-6 Psychological Distress Scale, which measured psychological distress, comprised six questions about teachers' feelings during the past month.
[14]This measure is the emotional exhaustion subscale of the Maslach Burnout Inventory: Educators Survey. It has nine items assessing emotional exhaustion that are rated on a seven-point scale ranging from "never" to "every day." Maslach, Jackson, and Schwab (1996).

Pilot Program Effects on Teachers' Job Characteristics

The pilot program was expected to improve teachers' experiences at their jobs. The study team assessed teachers' experiences using various measures of their job characteristics, such as their work schedules and benefits. The findings are discussed here and presented in more detail in Appendix Table F.5.

Most teachers worked in child care or education-related jobs at the time of the follow-up survey, and the pilot program may have led to an increase in the percentage of teachers who reported being lead teachers rather than assistant teachers. The majority of program and control group teachers reported working in child care (88.4 percent and 88.0 percent, respectively), followed by education (2.3 percent vs. 3.2 percent, respectively).

There were differences in teacher roles across the program and control groups ($p = 0.08$), with more teachers in the program group (79.1 percent) reporting that they were lead teachers compared with control group teachers (68.0 percent). This was a surprising finding. It is not clear whether teachers were promoted after gaining additional credentials or in name only, but the Colorado Department of Early Childhood reported that the increase in lead teachers led to higher-than-expected pilot program expenditures.

In implementation interviews, two directors said that the salary increase incentivized assistant teachers to move up to lead teacher positions. One director said, "We didn't have to hire as many leads when we needed them because we were able to push some aides into the lead position." Another director stated that he had teachers who started the pilot program as assistant teachers but had since earned credentials that led to their promotion to lead teachers.

Teachers in the two research groups had similar work schedules and benefits. The teachers' follow-up survey asked about their work schedules and the benefits provided by their employer. The majority of teachers in both groups reported working 35 hours or more weekly (72.1 percent of the program group and 76.3 percent of the control group). Similarly, teachers in both research groups reported having comparable work schedules, with most teachers working a regular daytime shift (82.2 percent of the program group and 86.3 percent of the control group). The most common benefits received by teachers were paid holidays, vacation days, professional development activities, and discounted or free child care. There was one difference in the benefits offered by employers: More program group teachers reported education stipends as a benefit they were offered than control group teachers (60.4 percent and 48.0 percent, respectively; $p = 0.09$).

Teachers in the control group were more likely to have asked for a raise in the past year. More teachers in the control group (38.1 percent) reported asking for a raise in the past year compared with teachers in the program group (17.8 percent; $p < 0.001$). There were no differences between the research groups in terms of who received a raise in the past year or who reported receiving a raise since hiring, however.

Differences in Working Conditions, by Research Group

Following the pilot program's theory of change, the study also examined whether there were differences between the research groups in different aspects of teachers' working conditions: their job demands and supports, experiences of discrimination at work, and job satisfaction. These outcomes were collected only for teachers who were working in CCEE at the time of the survey, which means the findings related to working conditions are nonexperimental. Because the pilot program did not have an impact on whether

teachers reported having a current job in CCEE (see Table F.5), the findings reported with this subsample may be suggestive evidence of the pilot program's effect.

Selected findings are presented in Table 4.5, and a wider set of findings can be found in Appendix F.

Table 4.5. Working Conditions Among Teachers Working in CCEE

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Staff-related challenges that affect work[a] (%)						
I get moved in and out of different classrooms due to staff shortages	61.4	73.2	-11.7	-0.27	0.04	**
Children get moved in and out of different classrooms due to staff shortages	57.1	69.0	-11.9	-0.26	0.11	
I get sent home without pay due to child absences	21.9	32.6	-10.6	-0.22	0.08	*
I get paid planning time, away from children, during work hours	63.9	55.3	8.7	0.17	0.17	
I am required to attend professional development during off work hours	59.9	67.7	-7.8	-0.16	0.27	
I work overtime	51.2	56.4	-5.2	-0.11	0.47	
I work nights and/or weekends to keep up	14.3	21.0	-6.7	-0.16	0.13	
I have had to change my personal time-off plans	32.8	48.8	-16.0	-0.32	0.01	**
Job tasks frustration score[b] (1-5)	1.8	1.8	0.0	-0.01	0.95	
Center leadership score[c] (1-6)	4.8	4.5	0.3	0.26	0.03	**
Center supports score[c] (1-6)	4.9	4.6	0.3	0.26	0.02	**
Center staffing score[c] (1-6)	4.4	3.9	0.6	0.42	0.00	***
Chronic work discrimination and harassment score[d] (1-5)	1.6	1.8	-0.2	-0.22	0.05	*
Overall job satisfaction score[e] (1-5)	4.5	4.2	0.3	0.24	0.03	**
Satisfaction with selected job features score[e] (1-5)						
Benefits	3.9	3.5	0.4	0.30	0.02	**
Wages	3.9	2.6	1.3	0.88	0.00	***
Advancement potential	4.0	3.5	0.6	0.39	0.00	***
Teacher self-efficacy score[f] (1-9)	7.1	7.2	-0.1	-0.06	0.61	
Decision-making authority score[g] (1-5)	3.5	3.4	0.1	0.13	0.26	
Sample size (total = 573)	190	383				

SOURCES: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey. The center leadership, center supports, and center staffing scales come from Whitebook et al. (2022). The chronic work discrimination and harassment score was developed for the YES Health study—Rooks, Xu, Holliman, and Williams, 2011—and adapted from two sources: McNeilly et al. (1996) and Bobo and Su (2000). The teacher self-efficacy score comes from Heneman et al. (2006). The decision-making authority score comes from Karasek et al. (1998).

(continued)

Table 4.5 (continued)

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]For staff-related challenges, the values represent the percentage of respondents that reported that challenges occurred sometimes or frequently.

[b]The job tasks frustration score comprises 21 different job tasks or activities rated on a five-point scale from 1 = not at all frustrating to 5 = extremely frustrating.

[c]The center leadership, center supports, and center staffing scores were determined using the Supportive Environmental Quality Underlying Adult Learning (SEQUAL) items, which are rated on a six-point scale from 1 = strongly disagree to 6 = strongly agree.

[d]The chronic work discrimination and harassment scale comprises 12 items rated on a five-point scale from 1 = never to 5 = once a week or more.

[e]Respondents rated job satisfaction on a five-point scale from 1 = dissatisfied to 5 = satisfied.

[f]The teacher self-efficacy score comprises items from the Teacher Sense of Efficacy Scale Short Form—slightly adapted for the early care and education context—that were rated on a nine-point scale where higher scores mean stronger self-efficacy.

[g]The decision-making authority subscale includes six items from the Job Content Questionnaire rated on a five-point scale from 1 = none of the time to 5 = all of the time.

Teachers in the program group who were in CCEE jobs reported having more stable working conditions. Teachers were asked about how often ("never," "sometimes," or "frequently") eight different staff-related challenges occurred while they worked. Fewer teachers in the program group reported that they were sometimes or frequently moved in and out of different classrooms due to staff shortages (61.4 percent compared with 73.2 percent of control group teachers; p = 0.04). Fewer program group teachers reported sometimes or frequently getting sent home without pay due to child absences (21.9 percent compared with 32.6 percent of control group teachers; p = 0.08) and having to change personal time-off plans (32.8 percent compared with 48.8 percent of control group teachers; p = 0.01).

Directors interviewed during the implementation study said that the salary increase improved their ability to hire new staff, which in turn improved centers' staffing configurations and teacher workload.

One director said, "It has helped us because it's given us that buffer to be able to add the extra person that we always wanted in a classroom. Now, we've been able to, this last year, put them in there." Another director talked about the positive impact that the pilot program has had on lesson planning and classroom preparation, given that they have been able to hire more teachers and free up planning periods.

Similarly, one lead teacher said how helpful it has been to have an extra teacher in the classroom, and another teacher expressed feeling more comfortable asking colleagues for help covering a classroom while that teacher took a lunch break.

Teachers in the two research groups reported similar levels of frustration with their job tasks. Teachers who were in CCEE jobs were asked to indicate the extent to which 21 different job tasks or activities were frustrating. On average, teachers in both research groups chose a rating of 1.8 on a scale from 1 ("not at

all frustrating") to 5 ("extremely frustrating"), suggesting that teachers were only slightly or moderately frustrated with different job tasks.

Teachers in the program group who were in CCEE jobs perceived their centers to have stronger leadership support, support for aiding families and children, and staffing support. In the survey, teachers who were in CCEE jobs responded to questions about their perceptions of their work environment.[15] Program group teachers perceived the leaders at their center to be stronger than teachers in control group centers did ($p = 0.03$; effect size = 0.26). Program group teachers also perceived the available support services as being more sufficient for meeting the needs of children and families than control group teachers ($p = 0.02$; effect size = 0.26). And program group teachers rated their centers as having more sufficient and effective staffing than control group teachers ($p < 0.001$; effect size = 0.42).

Teachers were also asked to report on whether they received different types of professional development support in the past year—such as mentoring; coaching; financial assistance; and substitutes to allow teachers time to prepare, train, or plan. Overall, there were few differences between the two research groups. (See Appendix Table F.8.)

Teachers in the program group who were in CCEE jobs reported less chronic discrimination or harassment in their working environment. Teachers were asked to report how often they experienced discrimination or harassment at work on 12 items using a five-point scale from "never" to "once a week or more."[16] Teachers in the program group who were in CCEE jobs reported moderately less chronic work discrimination or harassment than teachers in the control group ($p = 0.05$; effect size = -0.22).

Teachers in the program group who were in CCEE jobs reported greater job satisfaction, but there were no differences between the groups in terms of their perceptions of self-efficacy or decision-making authority.[17] Teachers rated their overall job satisfaction, as well as their satisfaction with specific features of their job, using a five-point scale, from 1 ("dissatisfied") to 5 ("satisfied"). Program group teachers who were in CCEE jobs were more satisfied with their job compared with control group teachers in CCEE jobs overall ($p = 0.03$; effect size = 0.24) and in terms of their benefits ($p = 0.02$; effect size = 0.30), wages ($p < 0.001$; effect size = 0.88), and advancement potential ($p < 0.001$; effect size = 0.39). Teachers in both groups reported similar perceptions on the self-efficacy scale.[18]

The study also examined impacts on center-level outcomes. There are few statistically significant impacts on center-level outcomes. This finding may be due to insufficient power to detect effects. Appendix F provides further details on center-level outcome findings. Data from staffing reports show a potential

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[15]To understand the effects of the pilot program on job supports, three subscales were collected from the Supportive Environmental Quality Underlying Adult Learning (SEQUAL) survey, which captures educators' perspectives on their working environments. Two subscales from the teaching supports domain were collected: one focused on staffing and the other on support services for children and families. One subscale focused on program leadership was collected from the learning community domain. All SEQUAL items are on a six-point agreement scale that ranges from "strongly disagree" to "strongly agree."

[16]The chronic work discrimination/harassment scale was developed for the YES Health Study—see Rooks, Xu, Holliman, and Williams (2011)—and adapted from McNeilly et al. (1996) and Bobo and Suh (2000).

[17]Teachers were asked to reflect on whether they felt they had decision-making authority at their job using six items from the Job Content Questionnaire. Response options on the scale ranged from "some of the time" to "all of the time." Karasek et al. (1998).

[18]The Teacher Sense of Efficacy Scale Short Form, slightly adapted for the CCEE context, had 12 items rated on a nine-point scale from 1 ("not very much") to 9 ("a great deal"), where higher scores mean stronger self-efficacy. See Heneman, Kimball, and Milanowski (2006).

pattern in the expected direction of higher retention, fewer vacancies, more hiring, and lower teacher turnover in program group centers. (See Appendix Table F.9.) While these findings are encouraging, they are not statistically significant and warrant additional research.

On the follow-up survey, fewer program group directors reported needing to adjust teacher-child groupings due to teacher absences or vacancies than control group directors ($p = 0.08$). However, more program group directors reported having staffing challenges with hiring qualified teaching staff for preschool-aged classrooms compared with control group directors ($p = 0.09$). (See Appendix Table F.11.)

Seven of the ten pilot program directors who were interviewed for the implementation study said they experienced improvements in teacher retention and a reduction in staff turnover after the pilot program began. This reduction in turnover was true for both longer-tenured teachers and for newer staff. A few directors discussed retention in the context of improving their competitive hiring advantage compared with other CCEE centers. One director spoke about retaining teachers who were hired more recently:

> The newer people that it has brought in, it has made them more motivated to stay here because, my understanding is, there's not a lot of centers that have gotten to be a part of the grant, which I guess is great for us as well.

Other directors talked about how the salary increase improved their ability to compete with job opportunities in other industries as well, including the fast food and health care industries. Of the three directors who were interviewed who did not think the pilot program improved teacher retention, two referenced low turnover prior to the salary increase and said turnover has remained steady. The third director said most of her teacher turnover was due to external causes, such as teachers taking parental leave and moving out of state.

A related theme that emerged during director interviews was that the salary increase improved the recruitment process because the better salary drew more qualified applicants and reduced the amount of time it took to fill open positions. Directors reported that the wage increase "is a powerful tool when it comes to recruitment" and said, "This additional pay really boosted our ability to get folks hired." Directors said that the salary increase pilot program not only improved the hiring process but also helped reduce their stress by decreasing the amount of time they spent on recruiting and interviewing new hires.

Differences in Teachers' Attachment to the CCEE Field, by Research Group

Similar to other compensation strategies, the pilot program aimed to increase teachers' attachment to the CCEE field.[19] This section presents effects on teachers' intention to stay at their job or in the CCEE field and their perceptions of their professional identity. These outcomes were collected only for teachers who were working in CCEE or in education at the time of the survey. Similar to effects on working conditions, the findings presented below are nonexperimental because they are based on the subset of teachers who reported that their current job was in the CCEE field or in education. Because the pilot program did not have an impact on whether teachers reported having a current job in child care (see Appendix Table F.5), the findings reported with this subsample are suggestive evidence of the pilot program's effect. Findings are presented in Table 4.6; additional findings can be found in Appendix F.

[19]Maier, Rau, Bumgarner, and Hsueh (2025).

Table 4.6. Attachment to the CCEE Field Among Teachers Working in CCEE or in Education

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Looked for a new job since January 2023 (%)	19.0	37.8	-18.8	-0.38	0.00	***
Among those who looked for a new job, the reason for looking[a] (%)					0.13	
Higher pay	30.0	54.1	-24.0	-0.48		
To find a second job	14.2	19.7	-5.5	-0.14		
Better working conditions	-0.9	6.0	-6.9	-0.29		
Other[b]	59.6	21.3	38.4	0.95		
Likely to be working at current center[c] (%)						
One year from now	78.1	68.3	9.8	0.21	0.04	**
Two years from now	70.0	56.8	13.2	0.27	0.03	**
Likely to be working in CCEE field[c] (%)						
One year from now	76.6	74.0	2.6	0.06	0.60	
Two years from now	74.0	69.5	4.5	0.10	0.32	
View of self as early learning professional[d] (1-5)	4.1	4.0	0.1	0.11	0.31	
Main reason working with young children (%)					0.95	
To help children	28.2	27.7	0.5	0.01		
Personal calling	29.2	25.2	4.0	0.09		
Career	24.2	22.7	1.4	0.03		
Other	17.9	23.8	-5.9	-0.14		
Sample size (total = 592)	195	397				

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: CCEE = child care and early education.

Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups for continuous variables. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

A chi-square test for categorical variables was run to determine whether a difference exists in the distribution of related outcomes by research group. The p-value indicates the likelihood that the differences between the program and control groups in the distribution of outcomes arose by chance.

[a]Teachers that said they had looked for a new job or an additional job were asked the main reason they had looked for work.

[b]Among those who responded "other," only 14 percent provided a written response. Thus, it is not possible to accurately categorize what the other reasons were.

[c]"Likely to be working in CCEE field" includes teachers that responded with "agree" or "strongly agree" to a question about how likely they were to still be working at their current CCEE or education-related provider.

[d]Teachers responded to the question "How strongly do you agree or disagree with the phrase *I feel like I am an early learning professional*" using a five-point scale from 1 = strongly disagree to 5 = strongly agree.

Teachers in the program group who were working in CCEE or in education jobs were less likely than control group teachers to report that they had looked for a new job since the pilot program started. In the control group, 37.8 percent of teachers reported that they had looked for a new job since the start of the pilot program compared with 19.0 percent of program group teachers ($p < 0.001$). Among those who did look for a new job, teachers reported that higher pay was the most common reason why. However, there are no statistically significant differences between the research groups in terms of their reasons for looking for a new job.[20]

More teachers in the program group who were working in CCEE or in education-related jobs reported that they intended to stay at their current *center*, but teachers in both groups expressed a similar amount of intention to stay in the CCEE *field*. Teachers' perceptions of their professional identity and reasons for working with young children did not differ. More teachers in the program group reported they were likely to be working at their current center one year from when they took the survey (78.1 percent and 68.3 percent, respectively; $p = 0.04$) and two years from when they took the survey (70.0 percent and 56.8 percent, respectively; $p = 0.03$), compared with control group teachers.

However, there was no difference between the research groups in terms of their reported likelihood of remaining in the CCEE field, perhaps because fairly high rates of teachers said they intended to stay in the field. Corroborating this finding that teachers in both research groups were equally likely to say they intended to stay in the field, there was no impact on actual retention in the CCEE field, using several data sources.[21] First, data from the follow-up teacher survey show there is no impact on teachers' employment in the child care or education fields. Second, data from the Colorado Department of Early Childhood's PDIS show there was no impact on the percentage of teachers who were listed in the registry at some point from April 2023 to April 2024. Third, unemployment insurance data show no differences between the program and control groups in terms of employment in the CCEE industry.

Finally, the follow-up survey asked teachers to rate the extent to which they viewed themselves as early learning professionals. There was no difference between the research groups. There was also no difference between the research groups in terms of teachers' main reason for working with young children. The most common reasons given by teachers in both groups were that it was a "personal calling," "it is a way to help children," and "it is my career or profession."

Variation in the Pilot Program's Effects

The results presented above are for the full sample of teachers in the evaluation. However, given that teachers varied in terms of their demographic and professional characteristics, a natural question is whether the effects of the pilot program vary based on these characteristics. Does a salary increase lead to larger effects on retention for teachers with longer tenure at their job, for example, compared with teachers who have more recently started work? Or is the salary increase more effective for the teachers with less tenure? This section discusses exploratory findings for these secondary research questions about selected subgroups of teachers. The results are shown in Appendix F.

[20]This comparison is based on the subset of teachers who said they were looking for a new job.
[21]See Appendix Tables F.1, F.3, and F.5 for these findings.

The study team selected subgroups for which there may be an expectation of differential effects (in line with prior research)—for example, groups with lower starting wages or less attachment to the field.[22] These subgroup analyses are considered exploratory, as their purpose is to generate hypotheses for further research. Differences are shown for the following subgroups:

- initial wages (less than $17 per hour versus $17 or more per hour)
- ages taught (infants and toddlers only versus preschool only, or both infants and toddlers *and* preschool)
- cost of living (high versus low to medium)
- teacher credential (earned CCEE credential versus no credential)
- teacher race and ethnicity (Black or Hispanic versus White)
- role (lead teacher versus assistant teacher)
- tenure (less than two years versus two or more years)

Differences are presented for a subset of outcomes, including the two primary outcomes and selected measures of economic well-being and mental health. The pattern of results suggests that the offer of the salary increase may have more positive effects on retention for teachers who earned more than $17 per hour at the start of the study (compared with their peers who earned less), teachers with a CCEE credential (compared with teachers without that credential), lead teachers (compared with assistant teachers), and teachers in the counties with a low or medium cost of living (compared with those in the high-cost counties). Differences for subgroups were not assessed for statistical significance, given the small sample sizes. These findings are exploratory and suggestive only. The pattern of effects on retention does not appear to differ by race or ethnicity, by the ages of the children taught, or by tenure.

[22]Austin, Edwards, Chávez, and Whitebook (2019); Caven, Khanani, Zhang, and Parker (2021); Totenhagen et al. (2016); Wells (2015); Whitebook and Sakai (2003).

Chapter 5: Effects of the Teacher Salary Increase Pilot at Wave 2

This chapter presents impact findings using data from Wave 2 (10 to 28 months after the start of the pilot program, or October 2023 through April 2025, depending on the outcome).

Summary of Findings

- The longer-term data from Wave 2, which cover up to 28 months after the start of the pilot program, show no statistically significant impacts on selected measures of teacher retention and staffing—including the primary outcome that was measured using staffing reports completed by directors—or on employment and earnings.

Methods and Research Questions

As described in Chapter 4, the effects of the pilot program were estimated by comparing outcomes for teachers or centers in the program group with outcomes for teachers or centers in the control group. Differences in outcomes (or impacts) were estimated using a statistical model that indicates their level of statistical significance, or the strength of the evidence that the observed difference is a true program impact and not a difference due to chance. The level of significance is indicated by the p-value (< 0.10), or the probability that the observed difference is due to chance.

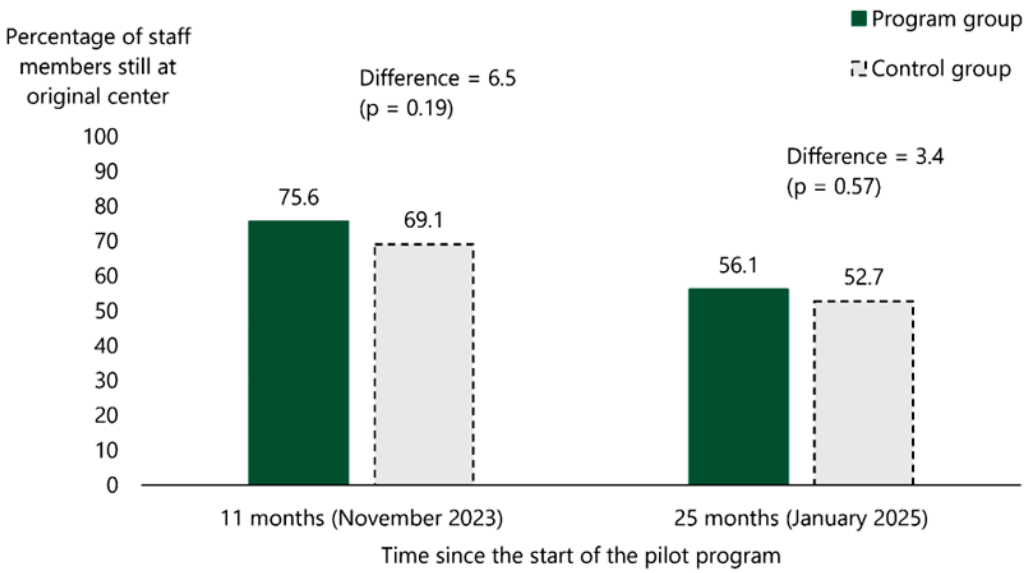
Impact Study Findings for Teacher Retention and Center Staffing

The primary Wave 2 outcome of teacher retention was obtained from the staffing reports that were completed by directors. As noted in Chapter 4, 76 percent of program group teachers stayed at their original centers through 11 months compared with 69 percent of control group teachers. The 7 percentage point difference for Wave 1 is not statistically significant. By the 25-month point (Wave 2), fewer teachers in both groups were still at their original centers: 56 percent of program group teachers compared with 53 percent of control group teachers. (See Figure 5.1). The difference of 3 percentage points is also not statistically significant.

The staffing reports were also used to construct center-level secondary outcome measures of teacher retention and hiring, including the retention rate of teachers who were at the center at the start of the pilot program, the turnover rate during the period, the proportion of unfilled teaching positions to total staff members, and the proportion of new hires to teachers who had left the center. These measures are exploratory as they were conducted on secondary outcomes. As shown in Appendix Table F.10, there are no statistically significant impacts on these center-level outcomes at Wave 2. The final sample sizes obtained for the analyses were somewhat smaller than expected, providing less statistical power than anticipated to detect impacts. The findings show an encouraging pattern in the expected direction of higher

center-level retention rates and lower teacher-turnover rates in program group centers but warrant additional research with sample sizes that are powered to detect the effect sizes (< 0.25) that were found. Data on unfilled positions were not available for Wave 2.

Figure 5.1. Retention at Original Center, as Measured Using Directors' Staffing Reports at Wave 1 and Wave 2



SOURCE: MDRC calculations using data from the BASE follow-up staffing reports that were completed by directors.

NOTE: A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

A secondary outcome measure of teacher retention was also constructed from the Professional Development Information System (PDIS) snapshots. The snapshot from April 2024, for example, captures whether a teacher was employed at a given center at some point in the prior year. Appendix Table F.2 presents impacts based on the Wave 2 data.

Data from Wave 2 show a similar pattern to the data from Wave 1.[1] Sixty-five percent of program group teachers were employed at their original center between April 2024 and April 2025 compared with 56 percent of control group teachers. The difference is not statistically significant. Similarly, there is no statistically significant impact on employment in the child care and early education field for Wave 2 (between April 2024 and April 2025).

[1]As shown in Chapter 4, there is no statistically significant impact on retention through Wave 1 as measured using PDIS data: 73.5 percent of teachers in the program group were reported to be employed at their original center at some point between April 2023 and April 2024 compared with 70.7 percent of teachers in the control group. This difference is not statistically significant.

Impact Study Findings for Teacher Employment and Earnings

Data on employment and earnings were obtained at Wave 2 to provide a secondary source of information on wages and earnings. Unemployment insurance (UI) employment and wage records provided information on wages that were earned at all employers in Colorado (including child care centers) that report to the UI system.

As noted in Chapter 4 (and shown in Appendix Table F.3), on average, teachers in the program group earned $7,005 in Quarter 1 of 2023 compared with $6,432 for teachers in the control group. The difference of $574 is not statistically significant. Based on the Wave 1 data, only the difference in earnings in Quarter 3 of 2023 (a difference of $1,244) is statistically significant. As shown in Appendix Table F.4, the Wave 2 data, which covers Quarter 4 of 2023 through Quarter 2 of 2024, show no statistically significant impacts on earnings. Finally, there is no evidence of impacts on employment in general or employment in the child care and early education field.

Chapter 6: Cost Analysis

This chapter examines the costs participating centers pay to implement the pilot program and compares those costs to potential center-level savings from reduced turnover.

It is important to note that this cost analysis does not consider the roughly $3 million per year that the Colorado Department of Early Childhood used to fund the salary increase. A full accounting of the costs and benefits of the pilot program, from the government's perspective, would require accounting for that cost and for potential savings in the short and long term. Savings might come from reduced public benefit receipt, increased access to child care for working families, and improved child outcomes.

Summary of Findings

- The costs to centers that were associated with administering the pilot program were minimal, at approximately $200 per teacher, and could be attributed largely to the time directors spent applying to the pilot program.
- Teacher turnover represents a large cost to child care centers. These costs far exceed the costs to centers to administer the pilot program. If the pilot program reduced turnover at a given center, even by one teacher, then it is probable that the costs of implementing the pilot program would be fully offset by potential savings from reductions in teacher turnover.

Methods and Research Questions

The study team collected detailed information on program costs from seven program group directors who also participated in implementation interviews and six control group directors. Directors completed a cost workbook that contained questions about director and teacher time; staffing structures; wages; and expenses related to teacher vacancies, recruitment and hiring, and training and onboarding. Program group directors were also asked for information about time and expenses associated with the pilot program. Directors completed a 30-minute technical assistance call with the study team to discuss the workbook and any questions that they had about completing it. The follow-up survey asked directors similar (albeit less in-depth) questions about the time they spent on various pilot program–related costs. Their responses were analyzed to assess center-level costs using a larger sample.

Costs were estimated using the ingredients method with data from cost workbooks and survey responses.[1] All costs—for one year of the pilot program—are presented in 2023 dollars. More details on cost study data collection and analysis methods are included in Appendix B.

The cost analysis addresses the following research questions:

1. How much does it cost centers to implement the pilot program?

[1]The ingredients method uses mixed-methods data collection to identify the quantity and quality of the resources that contribute to an educational program or intervention and uses that information to estimate the costs of the program or intervention as implemented. Levin et al. (2017).

2. Does the implementation of the pilot program lead to any fully or partially offset costs or financial savings when compared with services as usual?

Cost Study Findings

Overall, the cost (in time) to administer the pilot program was minimal, estimated at about $200 per teacher. As seen in Table 6.1, the average cost to program group centers, based on the collected workbooks, was approximately $190 per teacher for the first year of the pilot program. Costs were concentrated in staff time—largely the time directors spent applying to the pilot program and administering the salary increases—with the balance spent on supporting teachers' decision-making about whether to opt into the pilot program and on reporting requirements. No center expenses beyond staff time were reported for pilot program–related activities.

Table 6.1. Pilot Program Costs, Center Level

Resource	Cost per Teacher
Time spent on pilot program application	$60
Time spent supporting teacher decisions	$20
Time spent on reporting requirements	$30
Time spent administering salary increases	$70
Total program costs per center and per employed teacher	$190

SOURCE: MDRC calculations using data from the BASE cost workbooks.

NOTE: All costs are shown in 2023 dollars and are rounded to the nearest 10. Sums may differ due to rounding. The costs shown are for the first year of the pilot program.

Pilot program–related costs, calculated from director follow-up survey data, show that the total cost of $200 per teacher is nearly identical to the $190 that is estimated from the workbook data. (See Table 6.2.) In the survey, directors reported that they spent slightly more time supporting teacher decisions and slightly less time administering the salary increases than was reported in the workbook. To reflect a conservative estimate, the study uses the $200 cost in the remaining calculations.

Table 6.2. Pilot Program Costs per Teacher

Resource	Cost per Teacher
Time spent on pilot program application	$80
Time spent supporting teacher decisions	$40
Time spent on reporting requirements	$30
Time spent administering salary increases	$50
Total program costs per center and per employed teacher	$200

SOURCE: MDRC calculations using data from the BASE follow-up director survey.

NOTES: All costs are shown in 2023 dollars and are rounded to the nearest 10. Sums may differ due to rounding. The costs shown are for the first year of the pilot program.

Notably, the time directors spent completing the pilot program application and supporting teacher decisions is specific to implementation in the first year of the pilot program. In subsequent years, without the time spent on the application or teacher decisions, the costs per teacher would be halved.

The study team used cost workbooks and surveys that were completed by program and control group center directors (or another center administrator) to estimate the costs of teacher turnover. Turnover-related tasks tend to be a substantial burden to centers, probably exceeding the relatively minimal costs of administering the pilot program. Should the pilot program reduce turnover even slightly, savings to the center would partially or fully offset the costs to centers of pilot program implementation.

In the follow-up survey, directors were asked to consider the time they personally spent on turnover in a single year. As seen in Table 6.3, directors spent over two weeks per year on teacher turnover, on average; this time is valued at $3,440 per year using the median child care director wage from the Bureau of Labor Statistics and an adjustment reflecting the costs of benefits and other employment costs.[2] Per teacher, this time is approximately $260, which exceeds the conservative estimate of the center-level cost to implement the pilot program.

Table 6.3. Vacancy and Recruitment Costs per Year and per Teacher

Activity	Reported Director Hours	Cost per Center	Cost per Teacher
Vacancy-related costs	35	$1,360	$100
Recruitment and hiring costs	30	$1,180	$90
Training and onboarding costs	23	$900	$70
Total	88	$3,440	$260

SOURCE: MDRC calculations using data from the BASE follow-up director survey and the Bureau of Labor Statistics.

NOTE: All costs are shown in 2023 dollars and are rounded to the nearest dollar.
The costs shown are for the first year of the pilot program.

Recall that the cost to a center—in terms of resources used to apply and administer the pilot program—is approximately $200. If a given center experienced a decrease in teacher turnover or a decrease in the time it took to fill vacancies as a result of the pilot program, it could feasibly reduce the amount of time the director spent on vacancies, thereby partially offsetting the cost of the pilot program with savings related to director time alone.

Table 6.4 shows the total costs that are associated with a single instance of teacher turnover, from vacancy to a fully onboarded replacement (including expenses and staff time). Using data from the workbook, the study team estimates the total cost to centers of a single instance of teacher turnover to be nearly $7,000. This cost is primarily attributed to the time center staff members spend covering vacancies and directors spend on hiring and onboarding efforts.[3]

[2]The child care directors' wage was estimated from the U.S. Bureau of Labor Statistics (the median wage from the 2023 "Occupational Employment and Wages, 11-9031 Education and Childcare Administrators, Preschool and Daycare") and a benefits adjustment of 57 percent was applied. See Shand and Bowden (2022).
[3]Should a classroom need to be closed because of a teacher vacancy, as was reported by some centers, separate analyses (not shown) estimate the additional costs to be upward of $670 in lost revenue for a one-week closure.

Table 6.4. Costs Related to Teacher Turnover

Resource	Staff Time	Expenses	Total
Departure-related costs and vacancy coverage (per departure)	$1,430	$1,410	$2,840
Recruitment and hiring resources (per new teacher)	$900	$420	$1,320
Training and onboarding (per new teacher)	$2,600	$200	$2,800
Total costs per instance of teacher turnover	$4,930	$2,030	$6,960

SOURCE: MDRC calculations using data from the BASE cost workbooks.

NOTE: All costs are shown in 2023 dollars and are rounded to the nearest 10. Sums may differ due to rounding. The costs shown are for the first year of the pilot program.

Table 6.5 presents a *hypothetical* scenario for a center that employs 13 teachers. The turnover cost estimates that were presented in Tables 6.3 and 6.4 do not include the costs of a classroom closure that was related to a teacher vacancy. This is because, while few of the cost sample sites reported closing a classroom, directors did report occasionally needing to close classrooms on the director survey. In this hypothetical example, Table 6.5 uses the costs of turnover from a single vacancy as reported in the cost workbooks ($6,960), plus lost net revenue from a two-week classroom closure ($1,340). If one teacher's departure results in a two-week classroom closure, the costs associated with turnover to this center would probably exceed $8,000. Using the calculations above, the center would spend approximately $2,600 on time and expenses associated with the pilot program. As this hypothetical thought experiment demonstrates, if teacher turnover were reduced by one departure because of the pilot program, then the potential net savings would be $5,700.

Table 6.5. Hypothetical Comparison of Costs and Potential Savings from the Pilot Program

Cost Category	Cost
Costs related to turnover	
Cost of a single instance of turnover—including recruiting, hiring, and training a replacement—from workbook	$6,960
Potential costs of a two-week classroom closure[a]	$1,340
Subtotal: hypothetical turnover-related costs	$8,300
Center-level costs associated with the pilot	-$2,600
Potential net savings from an avoided instance of turnover (turnover costs − pilot-related costs)	$5,700

SOURCES: MDRC calculations using data from the BASE follow-up director survey, cost workbooks, and national tuition data.

NOTES: All costs are shown in 2023 dollars and are rounded to the nearest 10. Sums may differ due to rounding. The costs shown are for the first year of the pilot program.

[a]The estimated "cost" of a classroom closure is considered to be the tuition of 10 children—using the average 2023 toddler tuition rate from the National Database of Child Care Prices ($222 a week)—minus the wages that the center is no longer obligated to pay due to staff vacancy. The resulting estimate is approximately $670 a week in lost revenue, which should be considered a conservative estimate: Administrative time would likely increase to manage a classroom closure, and future earnings could decrease if families opted to leave the facility following the closure. For more information, see Appendix B.

Conclusion

In sum, the costs to centers to implement the pilot program included staff time spent on administrative tasks like completing applications and managing the attestations. The cost is conservatively about $200 per teacher per program year. In future years, that cost may be lower, given that some pilot program–related costs were related to program start-up. The costs related to teacher turnover were estimated to be nearly $7,000 per instance of turnover and included costs associated with vacancy coverage, recruitment, hiring, training, and onboarding. Given this finding, even a modest reduction in teacher turnover has the potential to lead to cost savings for centers.

Chapter 7: Conclusion and Implications

To address the challenges related to low pay in Colorado's child care and early education (CCEE) field, the Colorado Department of Early Childhood launched the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot. The evaluation of this pilot program used mixed methods to describe its implementation, impact, and costs; build evidence for compensation strategies; and inform design improvements and efforts related to CCEE workforce development strategies in and outside of Colorado.

The findings support several aspects of the pilot program's theory of change and underscore how promising compensation strategies may be. The findings show a 7 percentage point difference in teacher retention rates between the program and control groups after one year and a 3 percentage point difference after two years. Although these differences are not statistically significant, they are in the expected direction, and are therefore encouraging and warrant further study. The pilot program increased teacher wages, as expected, but it did not increase their household incomes. It is important to remember that the salary increase was temporary—it was originally intended to last only two years—which probably affected the way both teachers and directors responded to it.

By the time of the follow-up survey at Wave 1, teachers who received the salary increase were somewhat less likely to report that they were working—but they were also less likely to report working at more than one job and less likely to receive certain public benefits. These findings may explain the lack of impact on income but highlight a potential benefit: The pilot program may have allowed teachers to use the extra earnings to drop their second job while maintaining their original household income, potentially improving their work-life balance. Research outside of CCEE suggests that wage supplements have similar effects, with one program allowing parents to reduce their overtime hours.[1]

A number of secondary findings from the evaluation highlight a range of potential impacts at Wave 1. Teachers in the program group reported experiencing less material hardship, better financial security, and fewer depressive symptoms than teachers in the control group. When interviewed, teachers reported feeling more financially stable, and most teachers said they were in a better and more comfortable place overall. Among teachers who remained in CCEE or education-related jobs, program group teachers reported having more stable and positive working conditions, better job satisfaction, and a stronger intent to stay at their current center. Interviewees also spoke about better working environments and increases in teachers' morale. In addition, subgroup analyses, which are imprecisely estimated and are exploratory, suggest that the salary increase may have larger effects on retention for teachers who are more attached to the CCEE field. These measures were not available for analysis at Wave 2, and it is therefore not known whether these impacts persisted.

Center director surveys and interviews were small in number and yielded few statistically significant differences between the program and control groups. However, findings were in the expected direction (that is, directors in the pilot program reported experiencing increased teacher retention, lower teacher turnover, fewer teacher vacancies, and an easier time hiring more qualified teachers) and warrant future research that is appropriately powered to detect impacts at this level. Program-wide improvements in teachers' perceptions of their working conditions—coupled with fewer staffing issues—may have implications for center operations in the long run. For instance, less turnover means more continuity and

[1]Miller et al. (2008).

stability of care for children and families. It may also mean that children receive better quality care and learning experiences, as highly qualified, well-compensated, and healthy teachers remain at their center. Similarly, higher teacher pay may also enable centers to attract, hire, and retain qualified teachers who are better prepared to facilitate enriching learning environments for children. And less turnover can mean that less time is needed to onboard new employees, allowing directors and other administrative staff members to spend more time supporting educators in ways that increase program quality. Finally, the cost to centers of administering the pilot program was relatively low, especially when compared with the substantial costs of teacher turnover.

Using Evidence to Inform Compensation Strategies

Different strategies could be used to increase the CCEE workforce's compensation, including salary increases, retention bonuses, wage supplements, or career pathways that lead to higher salaries. These strategies have slightly different theories of change and goals. For states or localities that are looking to use the existing evidence base to inform decision-making about which strategy to employ, it is important to keep in mind the issue the strategy seeks to address.[2]

For example, the provision of $1,500 retention bonuses in Virginia was shown to effectively reduce turnover by 11 percentage points over an eight-month period.[3] In comparison, the CCCAP Teacher Salary Increase Pilot increased teachers' salaries by about $6,000 to $15,000 per year. If the primary goal is to increase teacher retention, then a retention bonus may be an effective and less expensive option. But if the goal is to address challenges for the CCEE workforce more broadly and create and maintain a stable, qualified, healthy, and well-compensated workforce, a salary increase may be more effective. It is not known whether retention bonuses lead to positive effects on teacher or center outcomes (aside from retention), as they were not assessed in the study of the program in Virginia.[4]

The findings provide some support for the pilot program's theory of change, which posited that when teachers receive a pay raise, they may feel less financial strain and less need to take a second job—which, in turn, may reduce their stress, improve their well-being, and increase their job satisfaction. These improvements may then reinforce teachers' commitment to their CCEE job, promoting retention. When teachers have more positive perceptions of their work environment and financial stability, greater job satisfaction, and reduced depressive symptoms—as seen in this study—they may ultimately be more present and responsive to children's needs in the classroom.

Lessons Learned About Designing CCEE Compensation Strategies

The implementation study found that collaboration between wide-ranging partners and adequate implementation and data systems were necessary for high-quality program design and implementation. Below are several lessons learned about implementing a compensation strategy.

[2]Maier, Rau, Bumgarner, and Hsueh (2025).
[3]Bassok, Doromal, Michie, and Wong (2021).
[4]Maier, Rau, Bumgarner, and Hsueh (2025).

Eligibility criteria. Interviews revealed that directors and teachers were concerned that the salary increase did not apply to everyone in the center, even though all staff members earned low wages. This finding suggests that eligibility criteria may have potential, unintended consequences if, in the long run, salary differences result in resentment and harm to a center's work culture.

Additionally, the implementation interviews showed that teachers changed (or wanted to change) their role or the number of hours they worked to take advantage of the salary increase. Role changes have implications for the amount of funds needed for salary increases.

Education about potential benefits cliffs. Although the effects were small and were not significant, some teachers may have lost Supplemental Nutrition Assistance Program (SNAP) benefits as their wages increased. The Colorado Department of Early Childhood offered several resources to help teachers understand the potential loss in benefits, such as a webinar, handouts, and phone-based counseling services with local partners. While about two-thirds of teachers reported using handouts that provided information about benefits cliffs, very few teachers who responded to the survey reported making an appointment with the Colorado workforce centers to discuss benefits. None of the teachers who were interviewed knew that this help was available, and almost none of the directors who were interviewed were aware of it either. This finding suggests the need for additional outreach and support to help teachers understand and prepare for the potential loss of benefits or the increased cost of subsidized benefits (such as health insurance).

Design of the program application and any data "asks." Directors found the application and enrollment processes—as well as the monthly attestations—relatively easy to complete, which facilitated the pilot program's implementation.

Implementation infrastructure. Pilot program implementers said they had to use work-arounds to store and track monthly staff eligibility and payment disbursement in a way that was needed for the pilot program. Thus, the implementation study highlighted that for smooth program implementation and data gathering, it is critical to invest in a proper database to track data at the teacher level and disburse payments.

Implications for Future Research

There is currently very limited experimental evidence about the effects of workforce development strategies that focus on increasing teachers' salaries. This study provides much-needed information on the effects of one such compensation strategy. However, additional rigorous research is needed to understand their short- and long-term impacts on outcomes beyond retention or recruitment of teachers, particularly outside of Colorado. In addition, more research and larger samples are needed to understand what size salary increase is necessary to achieve sizable effects on teacher retention, whether salary increases have larger effects for certain types of teachers or in certain types of centers, and what strategies can be combined with salary increases to further increase teacher retention and well-being.

Due to funding limitations, the pilot program limited eligibility to centers with higher levels of quality (as assessed by the state's quality rating and improvement system). Future implementation and impact research is needed to examine the effects of this pilot program in other types of centers. The pilot program may have larger impacts—but could be harder to implement—in lower-quality centers, for instance.

Although not shown in this pilot program's theory of change, ultimately, CCEE experts expect that maintaining a stable, qualified, healthy, and well-compensated workforce would probably lead to stronger

quality of care and learning experiences for young children. Future research should examine whether that is the case by collecting more information on program operations; child and family experiences; and CCEE educator turnover, well-being, and working conditions.

Conclusion

The CCCAP Teacher Salary Increase Pilot sought to address pervasive issues in the CCEE workforce in Colorado—namely, low pay and high turnover rates—and the findings from this evaluation show that it could be a promising strategy. The evaluation's encouraging findings led the State of Colorado to continue its investment in salary increases for an additional six months (and potentially longer).

Appendix A

Characteristics of the Sample at Baseline and Baseline Analyses

This appendix provides additional information on the characteristics of centers (Tables A.1, A.2, and A.7) and teachers (Tables A.3 to A.6) participating in the Colorado Child Care Assistance Program (CCCAP) Teacher Salary Increase Pilot for the full sample and by research group.

The tables show whether random assignment resulted in balance between the research groups in terms of baseline characteristics. The program and control group centers were equivalent in terms of their quality rating and improvement system (QRIS) ratings. (See Table A.2.) When looking at director-reported center characteristics from the director survey, only a few differences between the research groups are statistically significant. (See Table A.1.) Program group directors reported serving a higher number of school-aged children than control group directors (about 20 children versus 12 children, respectively) and more children whose race/ethnicity was characterized as "other" (15 percent versus 9 percent, respectively).

Appendix Table A.1. Center Type, Schedule, and Children Served at Baseline

Characteristic	All	Program Group	Control Group	P-Value	
Organization					
Years in operation at current address	16.1	16.1	16.1	0.99	
Organization type (%)					
Nonprofit organization affiliated with larger agency	5.3	5.4	5.3	0.98	
Nonprofit organization, not affiliated with larger agency	26.4	33.3	22.9	0.42	
For-profit chain	5.3	0.0	8.2	0.21	
For-profit individual	63.3	61.8	64.1	0.86	
Schedule (%)					
Academic year only	1.9	0.0	2.9	0.48	
Academic year, summer camp or programming	15.1	11.1	17.1	0.57	
Year-round	83.0	88.9	80.0	0.42	
Confidence of funding to operate long term (1=not at all confident, 5=extremely confident)	3.1	3.4	2.9	0.10	
Children served					
Total number of children enrolled	71.1	79.9	66.6	0.14	
Number of infants and toddlers	25.9	26.2	25.6	0.87	
Number of preschool-aged children	31.0	34.3	29.3	0.39	
Number of school-aged children	14.5	19.7	11.9	0.07	*
Number of children attending part time	17.2	21.4	15.4	0.27	
Number of children attending full time	57.5	62.9	54.7	0.32	
Race/ethnicity of children (%)					
White	25.3	30.8	23.3	0.38	
Black	13.0	14.4	12.4	0.58	
Hispanic	23.8	29.2	22.0	0.37	
Other	10.2	15.1	8.6	0.07	*
Center does not collect this information	24.7	38.9	17.3	0.08	*
Children facing the following scenarios[a] (1-3):					
Facing food insecurity	1.9	1.9	1.9	0.79	
Facing housing insecurity	2.0	2.1	2.0	0.65	
Receiving subsidies for care	2.8	2.9	2.7	0.19	
Having an IEP or other early intervention services	1.8	1.8	1.8	0.61	
Sample size	53	18	35		

(continued)

Appendix Table A.1 (continued)

SOURCE: MDRC calculations using data from the BASE baseline director survey.

NOTES: IEP = individualized education program.
Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
This table presents regression-adjusted means, controlling for random assignment block. Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.
[a]Directors reported on the scenarios that enrolled children face using a scale from 1 = none of the children to 3 = all or most of the children.

Appendix Table A.2. Center QRIS Ratings at Baseline and Follow-Up

Characteristic	All	Program Group	Control Group	P-Value
QRIS rating, November 2022 (%)				
1	1.4	0.0	2.0	0.52
2	0.0	0.0	0.0	N/A
3	17.1	10.0	20.0	0.32
4	60.0	60.1	60.0	0.99
5	21.6	29.8	18.3	0.23
QRIS rating, September 2023 (%)				
1	0.0	0.0	0.0	N/A
2	1.4	0.0	2.0	0.53
3	14.3	10.0	16.0	0.52
4	56.0	55.3	56.3	0.94
5	28.7	34.9	26.2	0.44
Total licensed capacity,[a] November 2022 (number of children)	94.6	105.1	90.4	0.12
QRIS rating change: November 2022 to September 2023 (%)				
Increase	11.6	5.1	14.2	0.27
No change	87.2	95.0	84.0	0.21
Decrease	1.4	0.0	2.0	0.53
Sample size	72	20	52	

SOURCE: MDRC calculations using data from the Colorado Quality Rating and Improvement System.

NOTES: QRIS = quality rating and improvement system.
Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
This table presents regression-adjusted means, controlling for random assignment block. Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.
[a]"Total licensed capacity" refers to the maximum number of children for whom care can be provided within a given age group and setting.

The equivalence of program and control group teachers was assessed using Professional Development Information System (PDIS) data, which showed that the program and control groups were similar across a range of characteristics, such as teachers' sex, age, race (although more teachers in the program group reported being Hispanic), credentials, and job role, as well as the ages of the children served by the centers. (See Table A.3.) Data from the teacher baseline survey show that the program and control groups were equivalent with very few exceptions. (See Tables A.4 to A.6.) Two characteristics for which there were differences (the ages of children who were taught in the classroom and the presence of another adult with earnings in the household) are included as control variables in the impact models to account for these differences. An overall test was conducted using the PDIS data to assess whether the program and control groups differed systematically. Specifically, program group status was regressed on the set of characteristics presented in Table A.3. The test statistic for the overall fit of the model had a p-value of 0.73, indicating that the two groups did not systematically differ.

Appendix Table A.3. Teacher Demographic and Professional Background Characteristics at Baseline: Full Sample

Characteristic	All	Program Group	Control Group	P-Value	
Female (%)	95.2	95.6	94.9	0.65	
Age (years)	39.2	39.6	39.0	0.66	
Age group (%)					
Younger than 25	14.3	12.5	15.1	0.37	
Ages 25 to 39	42.4	43.0	42.1	0.84	
Ages 40 to 59	32.7	35.1	31.6	0.44	
Ages 60+	9.8	9.2	10.1	0.65	
Race/ethnicity (%)					
White	40.7	45.8	38.4	0.26	
Black	17.8	20.6	16.6	0.52	
Hispanic (listed under race)[a]	34.1	26.9	37.3	0.12	
Other	7.4	7.3	7.4	0.93	
Hispanic (ethnicity)	41.9	33.1	45.8	0.06	*
Credential award year (%)					
2022	55.1	58.6	53.3	0.53	
Before 2022	44.9	41.4	46.7	0.53	
Did not receive a credential	35.0	30.7	36.9	0.27	
Credential type (%)					
Early Childhood Professional Credential 3.0	51.4	52.6	50.8	0.83	
Early Childhood Professional Credential 2.0	36.1	34.3	37.0	0.71	
Other	11.4	12.1	11.0	0.76	
Early Childhood Professional Credential 3.0 level[b] (%)					
Level 1	10.3	9.0	10.9	0.47	
Level 2	19.8	21.0	19.3	0.65	
Level 3	18.0	21.5	16.4	0.24	
Level 4	4.8	5.4	4.5	0.60	
Level 5	2.1	2.9	1.7	0.27	
Level 6	2.9	1.9	3.4	0.41	
Did not receive this credential	42.5	38.9	44.2	0.38	

(continued)

Appendix Table A.3 (continued)

Characteristic	All	Program Group	Control Group	P-Value
PDIS employment status[c] (%)				
Employed—verified	83.0	83.3	82.9	0.93
Verified—not active	9.1	9.3	9.0	0.90
Not verified	8.5	8.1	8.6	0.87
Teachers with a status of "not active" who are missing an end date	37.5	47.9	32.4	0.28
Role (%)				
Lead teacher	52.8	51.1	53.7	0.59
Assistant teacher	36.4	37.3	36.0	0.78
Director	5.4	5.4	5.3	0.96
Other	5.5	5.6	5.4	0.94
Age range of children (%)				
Infant and toddler only	43.3	40.2	44.8	0.34
Preschool-aged only	39.8	43.0	38.3	0.31
Infant, toddler, and preschool-aged	9.2	8.9	9.4	0.87
Wide age range or school-aged	6.8	7.3	6.6	0.79
Sample size	1,003	314	689	

SOURCE: MDRC calculations using data from the Colorado Professional Development Information System (PDIS) covering September 2022 through September 2023.

NOTES: PDIS = Colorado Professional Development Information System.
Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
This table presents regression-adjusted means, controlling for random assignment block and the hierarchical structure of the data (teachers nested within centers). Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]The PDIS includes "Hispanic" as an option in the question on race but also asks a separate question about ethnicity.

[b]Teachers voluntarily chose to participate in the credentialing process that was offered by the state to recognize their experience and knowledge in serving young children. The 3.0 credential is an updated version of the 2.0 credential and comprises six levels. Teachers are placed into one of six levels based on education, experience, and professional development. The PDIS assigns the credential level that is needed to qualify for a particular role: Assistant teachers require a level 1 credential, lead teachers require level 2, and directors require level 3. See "Learn About Credentials" from the Colorado Department of Early Childhood (n.d.).

[c]A status of "verified" indicates that the teacher worked at a given center at some point in the year prior to the date the data were obtained. It does not necessarily mean that the teacher was there at the time the data were pulled since the director may not have updated the teacher's status yet. "Verified—not active" indicates that the teacher left and the director updated the teacher's status. In this case, an exit date would indicate when the teacher left. "Not verified" indicates that the director did not confirm the teacher's status.

Appendix Table A.4. Teacher Demographic and Professional Background Characteristics at Baseline: Survey Respondent Sample

Characteristic	All	Program Group	Control Group	P-Value
Demographic characteristics				
Female (%)	97.2	98.5	96.4	0.17
Race (%)				
White	63.5	61.6	64.7	0.66
Black	17.4	18.4	16.7	0.80
Multiracial	13.2	16.1	11.4	0.23
Asian or Pacific Islander, Native American, Alaskan	4.2	2.6	5.2	0.19
Hispanic (%)	42.5	40.8	43.5	0.70
Language (%)				
English only	59.1	63.5	56.3	0.28
English plus another language	29.2	28.6	29.7	0.84
Another language only	11.8	8.4	14.0	0.20
Professional background				
Education level (%)				
High school diploma, GED, or less	33.2	34.3	32.6	0.76
Some college	40.3	39.0	41.1	0.69
Associate's degree	11.4	11.4	11.4	1.00
Bachelor's degree or higher	13.9	14.7	13.3	0.70
Among those with an associate's degree or higher (%)				
Degree is in an early childhood–related field	53.6	55.3	52.5	0.80
Currently taking CCEE college-level coursework (%)	18.7	19.0	18.6	0.92
Years of experience in CCEE	6.6	6.2	6.9	0.33
Hours of professional development in past year (%)				
15 or fewer	46.8	49.5	45.0	0.49
16 to 30	33.4	29.9	35.7	0.31
30+	19.9	20.8	19.4	0.77
Sample size	512	201	311	

SOURCE: MDRC calculations using data from the BASE baseline lead and assistant teacher survey.

NOTES: CCEE = child care and early education.
Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
This table presents regression-adjusted means, controlling for random assignment block and the hierarchical structure of the data (teachers nested within centers). Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table A.5. Teachers' Job Characteristics at Baseline: Survey Respondent Sample

Characteristic	All	Program Group	Control Group	P-Value		Lead Teachers	Assistant Teachers
Role (%)							
Lead teacher	67.9	66.7	68.6	0.70		N/A	N/A
Assistant teacher	26.7	30.1	24.6	0.20		N/A	N/A
Other	5.4	3.0	7.0	0.06	*	N/A	N/A
Hours worked per week (%)							
1 to 19	9.8	7.7	11.1	0.30		8.8	13.2
20 to 34	14.9	13.4	15.9	0.56		11.1	26.5
35 or more	75.6	79.0	73.3	0.30		80.2	60.3
Hourly wage ($)	16.42	16.37	16.44	0.86		16.87	14.85
Less than $15 (%)	23.9	25.9	22.6	0.48		20.7	44.0
$15 to less than $20 (%)	64.4	64.5	64.3	0.97		66.6	52.6
$20 or higher (%)	11.1	8.6	12.6	0.37		12.7	3.5
Ages of children in classroom (%)							
Infants and toddlers only	44.6	45.1	44.3	0.88		44.1	49.6
Preschool-aged only	36.2	41.6	32.7	0.07	*	39.5	31.1
Both	8.8	4.9	11.3	0.04	**	8.2	8.2
Tenure at current center (years)	4.9	4.6	5.1	0.54		5.8	1.7
Currently holding more than one job (%)	16.1	15.1	16.9	0.63		14.4	19.6
Sample size	512	201	311			344	136

SOURCE: MDRC calculations using data from the BASE baseline lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.
Rounding may cause slight discrepancies in calculating sums and differences.
This table presents regression-adjusted means, controlling for random assignment block and the hierarchical structure of the data (teachers nested within centers). Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.
N/A = not applicable. The role is marked as "not applicable" when the survey results are already grouped by role.

Appendix Table A.6. Teachers' Household Composition, Benefits, and Income at Baseline: Survey Respondent Sample

Characteristic	All	Program Group	Control Group	P-Value	
Household composition (%)					
Other adults in household	73.0	70.9	74.4	0.39	
Number of children in household					
None	2.3	1.9	2.5	0.67	
One	32.9	33.9	32.2	0.78	
Two or more	65.1	64.2	65.7	0.81	
Single adult with children	25.4	24.6	26.0	0.79	
Household benefits and income					
Other adult has income (%)	74.4	80.3	71.0	0.06	*
Benefits received (%)					
SNAP	23.4	26.8	21.2	0.28	
Medicaid	49.5	55.1	45.8	0.09	*
Child Health Plan Plus[a]	23.0	22.7	23.3	0.90	
Public assistance	13.1	12.0	13.8	0.63	
Free or reduced-price lunch	31.4	29.0	32.9	0.47	
Public or subsidized housing	7.8	6.7	8.6	0.57	
SSI/SSDI	5.2	4.2	5.8	0.48	
Child support	8.6	7.8	9.1	0.65	
Other	2.8	3.0	2.6	0.79	
Household income in prior year ($)	40,631.82	41,441.83	40,116.08	0.72	
Sample size	512	201	311		

SOURCE: MDRC calculations using data from the BASE baseline lead and assistant teacher survey.

NOTES: SNAP = Supplemental Nutrition Assistance Program; SSI/SSDI = Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI).

Sample sizes vary because of missing values.

Rounding may cause slight discrepancies in calculating sums and differences.

This table presents regression-adjusted means, controlling for random assignment block and the hierarchical structure of the data (teachers nested within centers). Differences between the program and control groups were tested for statistical significance. Statistical significance levels are indicated as: * = 10 percent; ** = 5 percent; and *** = 1 percent. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Child Health Plan Plus is a public low-cost health insurance for certain children and pregnant women in Colorado.

Comparing Participating Centers with the Broader Population of Centers in Colorado

Table A.7 presents data from the Colorado Information Marketplace, which provides selected data for all licensed providers in the state.[1] These data were pulled from a file dated December 1, 2022, prior to random assignment. Table A.7 shows, among eligible centers, the number of centers that applied for and entered the pilot program (61 percent of eligible centers applied; they are referred to in this appendix as the centers in the study). It also shows the centers that were eligible but did not apply to the pilot program. There appear to be a few differences between the eligible centers that applied to the pilot program and those that did not apply. Fewer centers in the study appear to be in El Paso County, but more appear to be in Arapahoe County (both of those counties are in the metropolitan center of the state). Centers in the study appear to have been slightly larger than eligible centers that were not in the study, with a licensed capacity of 94 children on average compared with 87 children in centers that did not apply. Centers in the study also appear to have had slightly higher QRIS ratings.

Appendix Table A.7. Participating Child Care Centers Compared with All Child Care Centers in Colorado

Characteristic	Eligible Centers		Not Eligible
	Did Not Apply to Pilot Program	Applied to Pilot Program	
County (%)			
Denver	20.8	21.9	15.7
El Paso	29.2	11.0	7.8
Adams	12.5	6.8	6.0
Arapahoe	14.6	26.0	8.0
Other counties that contained a center in the pilot program	20.8	34.2	39.4
Counties that did not contain a center in the pilot program	2.1	0.0	23.1
QRIS rating (1-5)	3.67	3.93	2.46
QRIS rating level (%)			
Level 1	2.1	2.7	33.9
Level 2	4.2	0.0	24.0
Level 3	20.8	19.2	7.7
Level 4	70.8	57.5	31.1
Level 5	2.1	20.5	3.3
Total licensed capacity (number of children)	86.9	94.2	78.9
Licensed capacity: infant	6.9	9.0	4.8
Licensed capacity: toddler	18.8	19.3	12.1
Licensed capacity: preschool+	61.3	65.2	61.8
CCCAP agreement in place (%)	100.0	100.0	57.0
Sample size	48	74	1,512

(continued)

[1]State of Colorado (2025).

Appendix Table A.7 (continued)

SOURCE: Colorado Information Marketplace.

NOTE: CCCAP = Colorado Child Care Assistance Program; QRIS = quality rating and improvement system.

Table A.7 also shows the locations and QRIS ratings of child care centers in Colorado that were not eligible for the pilot program. In December 2022, 1,512 child care centers were not eligible for the pilot program. Nearly one-quarter of them (23 percent) were outside the 18 counties that contained at least one center in the study. Their counties were substantially less populated than the counties that contained at least one child care center in the study. Ineligible centers appear to have had lower QRIS ratings (as expected, given that the pilot program required centers to have a QRIS rating of 3 or higher). Ineligible centers also appear to have been somewhat smaller, with a licensed capacity of 79 children. Finally, only 57 percent of ineligible centers had CCCAP fiscal agreements in place, giving them the option to serve and be reimbursed for children receiving CCCAP subsidies. Although not shown, child care centers with CCCAP agreements had somewhat higher licensed capacity and somewhat higher QRIS ratings than those without agreements.

Because the child care centers that participated in the pilot program were located in 18 of Colorado's 64 counties, the study team compared the counties to understand how the local context may have differed between the 18 counties that contained at least one center in the study and the other 46 counties that did not contain any centers in the study. The key difference between the counties was population size; the counties without any study centers had much smaller populations. For example, 9 of the 18 counties in the study had populations greater than 100,000, and 5 of them had populations greater than 500,000. This apparent difference is also seen when looking at the median population, with about 160,000 in the 18 counties with a study center and 8,000 in the other counties. The counties with at least one center in the study had somewhat younger and more diverse populations than the other counties, higher incomes, and lower poverty rates.

In sum, centers in the study were generally similar to centers that were eligible but did not apply for the pilot program. They had slightly higher QRIS ratings and higher licensed capacity, but the differences do not appear to be large. In terms of the broader population of centers, centers in the study (and all eligible centers) had notably higher QRIS ratings than the centers that were not eligible for the pilot program. Participating centers were located in 18 counties, and about one-quarter of the ineligible centers were outside of the 18 pilot counties, in counties that tended to be rural and have somewhat lower average incomes.

Comparing Directors and Teachers in the Study with the Broader Population

Table A.8 presents selected data from the Colorado Early Care and Education Workforce Data Dashboard.[2] The dashboard was created for the Colorado Department of Early Childhood by the Colorado Evaluation and Action Lab and provides a portrait of the workforce using Linked Information Network of Colorado data, including data from the PDIS. Data on both the dashboard and the directors' survey are limited to race/ethnicity and education level. Table A.8 compares study directors (using baseline director survey

[2]Colorado Evaluation and Action Lab at the University of Denver (n.d.).

data) with the full population of directors in licensed providers. The full population of directors appears less diverse than the study directors (18 percent of all directors are Hispanic, for example, compared with 26 percent of study directors). The full population of directors also appears to have had a higher level of education than study directors. These differences may be due to several factors. First, the study directors ran centers that served a certain percentage of children receiving subsidies, whereas the full population includes centers that did not serve children receiving child care subsidies. Second, the full population of directors includes directors of centers in school-based settings, and these directors may have been required to have higher education levels. Finally, because participation in the PDIS is voluntary and may vary by credential levels, directors included in the dashboard data might be a group with higher education levels.

Appendix Table A.8. Center Directors in the Study Compared with All Center Directors in Colorado

Characteristic (%)	All CCEE Center Directors in Colorado	Study Directors (From Survey)
Race		
White	73.0	72.5
Hispanic	18.0	26.0
Black	6.0	19.6
Education level		
Some college	22.0	36.5
Associate's degree	22.0	23.1
Bachelor's degree or higher	54.0	38.5
Sample size		53

SOURCES: MDRC calculations using data from the Colorado Early Care and Education Workforce Data Dashboard and the BASE baseline director survey.

NOTE: CCEE = child care and early education.

Table A.9 compares study teachers with the broader population of teachers in Colorado. A higher fraction of study teachers were Black or Hispanic compared with the full population of teachers (according to the baseline survey and the PDIS data). Study teachers (according to the baseline teacher survey) had lower levels of education than the broader workforce. Similar to the difference in education levels seen for directors, this difference might be due to the voluntary nature of the PDIS (making the dashboard sample a selected group) and the fact that dashboard data include centers that were part of school systems, whereas the study sample was limited to community-based centers.

Appendix Table A.9. Teachers in the Study Compared with All Teachers in Colorado

Characteristic (%)	All CCEE Teachers in Colorado		Study Teachers	
	Lead	Assistant	From Survey	From PDIS
Race				
White	69.0	63.0	65.2	41.8
Black	4.0	5.0	17.9	17.2
Hispanic	23.0	28.0	43.8	34.1
Education level				
Some college	31.0	33.0	40.1	30.0
Associate's degree	10.0	7.0	11.3	40.0
Bachelor's degree or higher	46.0	24.0	14.3	30.0
Sample size			512	512

SOURCES: MDRC calculations using data from the Colorado Early Care and Education Workforce Dashboard, the Colorado Professional Development Information System, and the BASE baseline teacher survey.

NOTES: CCEE = child care and early education; PDIS = Professional Development Information System.
The PDIS includes "Hispanic" as an option in the question on race but also asks a separate question about ethnicity, whereas the teacher survey only included "Hispanic" as an option in the question on ethnicity.

Appendix B

Methods and Additional Information on Data Sources

Qualitative Data Sources

The qualitative data analysis supported the implementation study and relied on data from interviews with a subset of directors, lead and assistant teachers, staff members from the Colorado Department of Early Childhood (CDEC) and the implementing vendor, and three directors from centers that were eligible to participate but did not apply.

Recruitment Process

To initiate the recruitment process for interviews, CDEC sent an introductory email to all center directors, lead teachers, and assistant teachers in participating centers to reintroduce the pilot program, explain the study, and emphasize the importance of their contributions to the study. After the initial email invitation, the study team made up to three attempts to contact each center director via phone or email before discontinuing contact and moving on. For example, if an interviewee scheduled an interview but canceled or did not show up, the study team would follow up to reschedule up to three times. However, team members used their discretion to accommodate directors' schedules and needs.

The study team used a randomly generated sample order to reach out to teachers at these centers one at a time. However, to meet target numbers toward the end of the interview period, outreach was expanded and the team began to contact multiple teachers at the same time (or, in two cases, asked center directors to send an email to their teachers to encourage participation).

Data Collection

All interviews were one hour long and were conducted by videoconference using Zoom for Government. Informed consent was obtained verbally from all participants prior to the interview using a phone-based consent script. All participants consented to both interview participation and audio recording. The study provided $50 virtual gift cards to all directors and teachers who participated in an interview (payments were not offered to staff members from CDEC or the implementing vendor). All interviews took place between October 2023 and January 2024, about 10 to 14 months after random assignment.

Table B.1 presents outreach and participation status by interviewee type and shows the number of staff members who were contacted for an interview, the number of people who declined to participate, the number for whom outreach was discontinued, and the number of people who completed interviews. In addition, the final column provides the number of centers represented by each interviewee type.

Appendix Table B.1. Implementation Research Interview Outreach and Participation Status

Interviewee	Number Contacted	Number That Declined	Number with Discontinued Participation	Number That Completed the Interview	Number of Centers Represented by Interviewees
Directors (pilot program centers)	16	2	4	10	10
Directors (eligible, but did not apply)	7	2	2	3	3
Lead teachers	45	0	32	13	10
Assistant teachers	51	2	41	8	5

Recruitment and outreach could be discontinued for several reasons: the study team received no response after a minimum of three attempts at contact, an email bounced back or a phone disconnected, an interviewee did not show up to the scheduled interview, or the study team filled all available interview slots at that center.

Sample Description

The study team attached classification codes to interviews when possible. Three classification types were at the center level: local cost of living, center size (in terms of capacity), and main funding source. Two classification types were at the teacher level: household structure and pilot program participation decision.

Centers' cost-of-living classification was determined by the study team and CDEC prior to launch. Center size was determined using the capacity numbers provided by the Colorado Shines public child care center profiles. The team obtained funding information from public online sources or from interviews with center directors who revealed the type of funding their center received as they discussed characteristics of their program or challenges they faced with sustainability. In cases where the type of funding was unclear, the center's funding was classified as "not applicable."

The following tables break down center-level classifications by interviewee type: Table B.2 shows cost of living, Table B.3 shows center size, and Table B.4 shows primary funding sources.

Appendix Table B.2. Center Cost of Living, by Interviewee Type

Cost of Living	Total Number of Interviews	Type of Interviewee
Low	8	2 directors from pilot program centers 3 lead teachers 3 assistant teachers
Medium	7	2 directors from pilot program centers 2 directors who did not apply to the program 3 lead teachers
High (Arapahoe)	3	1 director from a pilot program center 1 lead teacher 1 assistant teacher
High (Denver)	9	3 directors from pilot program centers 4 lead teachers 2 assistant teachers
High (other)	7	2 directors from pilot program centers 1 director who did not apply to the program 2 lead teachers 2 assistant teachers

SOURCE: Cost-of-living classifications come from the Massachusetts Institute of Technology's Living Wage Calculator.

NOTE: The study team wanted interviewees to represent a variety of areas that had different costs of living. Based on the Massachusetts Institute of Technology's Living Wage Calculator, three cost-of-living groups were created for one adult with no children: low, medium, and high. A low cost of living was one in which less than $17 an hour was needed to cover basic expenses, a medium cost of living was one in which $17 or more (but less than $20) was needed, and a high cost of living was one in which $20 an hour or more was needed. Because counties with a high cost of living had the most participating centers, the team broke that group into three categories based on geography.

Appendix Table B.3. Center Size, by Interviewee Type

Center Size	Total Number of Interviews	Type of Interviewee
Small (fewer than 50 children)	3	1 center director from pilot program centers 2 lead teachers
Medium (50 to 100 children)	12	4 center directors from pilot program centers 1 director who did not apply to the program 5 lead teachers 2 assistant teachers
Large (100 to 150 children)	17	5 center directors from pilot program centers 1 director who did not apply to the program 6 lead teachers 6 assistant teachers
Very large (more than 150 children)	2	2 directors who did not apply to the program

SOURCE: Center size classifications come from the Colorado Quality Rating and Improvement System.

Appendix Table B.4. Center Funding Source, by Interviewee Type

Primary Funding Source	Total Number of Interviews	Type of Interviewee
Public	5	3 directors from pilot program centers 2 directors who did not apply to the program
Private	5	4 directors from pilot program centers 1 director who did not apply to the program
Not applicable	3	3 directors from pilot program centers

SOURCE: Information on the primary funding source comes from public online sources or from center director interviews.

NOTE: In cases where the type of funding was unclear, the center's funding is classified "not applicable."

The teacher-level classifications arose from the interviews. While team members did not explicitly ask teachers about their household structure, this topic came up organically as teachers discussed their decision to opt in to the pilot program and the impact of the pilot program on their finances and family (among other things). In these cases, teachers were forthcoming about whether they were single parents, had partners, or had children. In cases where this information was not clear, household structure was classified as "not applicable." Participation information was also obtained from interviews; teachers were explicitly asked whether they had opted in. There were only two cases where participation was unclear: One teacher had recently opted in to the pilot program, but at the time of the interview had not received a paycheck with a wage increase yet. The second teacher had been part of the pilot program at a previous job, but at the time of the interview was at a different center that was not part of the pilot program. These cases were classified as "not applicable."

Two tables provide the breakdown of teacher-level classifications by interviewee type: Table B.5 shows household structure, and Table B.6 shows participation decision.

Appendix Table B.5. Teacher Household Structure, by Interviewee Type

Household Structure	Type of Interviewee
Single (no kids)	2 lead teachers 2 assistant teachers
One-parent household	3 lead teachers 1 assistant teacher
Two-parent household	2 lead teachers 3 assistant teachers
Not applicable	6 lead teachers 2 assistant teachers

SOURCE: Information on household structure comes from teacher interviews.

NOTE: If the household structure was unclear, it was classified "not applicable."

Appendix Table B.6. Teacher Participation Decisions, by Interviewee Type

Participation	Type of Interviewee
Opted in to the pilot program	13 lead teachers 6 assistant teachers
Opted out of the pilot program	0 teachers
Left job	0 teachers
Not applicable	2 assistant teachers

SOURCE: Participation information comes from the teacher interviews.

NOTE: Interviewed teachers were explicitly asked whether they had opted in to the pilot program. In two cases, participation was unclear and was classified as not applicable: One teacher had recently opted in to the pilot program, but at the time of the interview had not received a paycheck with a wage increase yet. The second teacher had been part of the pilot program at a previous job, but at the time of the interview was at a different center that was not part of the pilot program.

Qualitative Analysis

All interviews were transcribed, and qualitative coding and analysis were conducted by a team of four analysts and a lead researcher. The interviews were analyzed to identify themes in the data using NVivo (a secure software platform for qualitative research). An initial thematic codebook was drafted based on the interview protocols and the expertise of the study team members who conducted interviews. Ten percent of transcripts were used for training and were coded by all the analysts who were conducting qualitative analysis. Differences were discussed and reconciled, and the thematic codebook was updated accordingly.

Throughout the coding process, the team met weekly to identify emerging themes, discuss passages that team members were unsure how to code, assess whether the codes were adequate to describe the data, and troubleshoot any issues that arose while using NVivo.

Study team members were each assigned a section for analysis. Analysts individually reviewed the coding reports; identified patterns, trends, and variation; and developed interpretations. The team met weekly to report on findings, reflect on cross-cutting themes, and arrive at a shared set of findings that aligned with the research questions.

Quantitative Data Sources at Baseline and Wave 1

The quantitative data analysis supported the impact and cost studies and relied on several data sources: baseline and follow-up surveys from teachers and directors, the Linked Information Network of Colorado (LINC),[1] and cost workbooks from center administrators. Details about the cost workbooks are provided in the cost study section of this appendix. For more information about the quantitative impact analyses that were completed, see Appendix D.

Baseline Staffing Report Completed by Directors

As part of their application for the pilot program, directors completed a baseline staffing report in which they listed the names of teachers in their center who would be eligible for the salary increase if the center was selected for the program group. These data were used to determine the teacher sample. All 74 directors completed the baseline staffing report.

Baseline Lead and Assistant Teacher Survey

The baseline teacher survey collected information on demographic and professional credentials, job characteristics, income, economic well-being, job demands and supports, job stress, and job satisfaction. It is used to describe the teacher sample at baseline.

The baseline teacher survey was fielded by CDEC's implementing vendor from mid-November 2022 to mid-January 2023. Random assignment took place on December 15, and centers were notified shortly thereafter. The first payments to cover salary increases went out in mid-January 2023. Thus, the survey was in the field for a few weeks after directors and teachers had probably heard about the salary increase. The survey data do not include time stamps that would allow the study team to drop responses after mid-December. The overall response rate to the survey was 51 percent, with a rate of 64 percent for the program group and 45 percent for the control group.

The vendor received 632 responses to the baseline survey. Of these records, 512 were matched to the study sample file (created from the original staffing reports). There were a couple of reasons why 120 cases were unmatched. In the staffing reports, some directors listed teachers who were later deemed ineligible for the salary increase by CDEC because they did not have the correct role (lead or assistant teacher) or they worked fewer than the required 16 hours a week. Also, a general survey link was used to field the survey, and teachers were able to forward the link to potentially ineligible colleagues so that they could take the survey and receive the completion incentives.

Baseline Director Survey

The baseline director survey collected information on demographic and professional credentials; job characteristics; and center characteristics, including staff characteristics, staffing challenges, and benefits offered by the center. It is used to describe the center sample at baseline.

The baseline director survey was fielded by the implementing vendor from mid-November 2022 to mid-January 2023. Like the baseline teacher survey, responses to the baseline director survey were collected

[1]LINC is a collaborative based out of the Colorado Governor's Office of Information Technology that is designed to support research and evaluation. It collects data from state and local agencies, including data on human services, health, labor and employment, higher education, housing, K-12 education, and criminal justice.

for several weeks after centers were selected to receive the salary increase. The survey data do not include time stamps that would allow the study team to drop responses after mid-December. The director survey collected similar information to the teacher survey, as well as information on center characteristics. The overall response rate to the survey was 72 percent, with a rate of 82 percent for the program group and 67 percent for the control group.

Follow-Up Surveys for Lead and Assistant Teachers and for Directors

The follow-up surveys collected similar information to the baseline surveys, as well as information on physical and mental health, job demands and supports, and job satisfaction and stress. These data were used to examine impacts on teacher- and center-level outcomes.

Follow-up surveys were fielded to participating directors and teachers in program and control group centers and to teachers who had been in a pilot program center at baseline but had subsequently left their original center. Follow-up surveys were fielded from October 2023 through February 2024, starting at about 10 months after the wage increases began. The response rate for the teacher survey was 66 percent, with a rate of 68 percent for the program group and 65 percent for the control group. The response rate for the director survey was 74 percent, with a rate of 77 percent for the program group and 73 percent for the control group. See Appendix E for a response analysis of the teacher survey.

Follow-Up Staffing Report Completed by Directors

In November and December 2023 (11 to 12 months after the first wage increase funds were issued), directors were sent the list of teachers they had submitted as part of the baseline staffing report (the teachers who were working at their centers in December 2022 and were eligible for the salary increase). Directors were asked whether each teacher was still at the center and, if not, when the teacher had left. Information was also collected from directors on their center's number of new hires since December 2022 and the current number of unfilled positions. These data were used to examine impacts on retention and changes in staffing. Staffing reports were completed by 89 percent of directors (that is, 66 of the 74 directors).[2]

Administrative Data

Administrative records data were obtained through a partnership with the Colorado Evaluation & Action Lab via the LINC project. LINC is a collaborative based out of the Colorado Governor's Office of Information Technology, designed to support research and evaluation, which integrates data across state and local agencies including human services, health, labor and employment, higher education, housing, K-12 education, and criminal justice. Data were obtained from the following administrative data sources:

Professional Development Information System (PDIS) employment data. These employment data were obtained in September 2023 and represent a snapshot of registrants (teachers and directors) who entered a record at some point between September 2022 and September 2023. The file contains employer ID, start and end dates for each job, role, and verified employment status. Teachers first enter a record of employment and list an employer. The director then enters the PDIS and selects "verified" to confirm that

[2]Two of the 74 centers closed after random assignment.

the teacher is employed at that center. Possible responses are "verified," "verified—not active," and "not verified." Start and end dates are not required and are missing for a sizable share of records. Directors are encouraged to update the PDIS once per year and typically do so before their annual licensing visits, which occur on a rolling basis across centers.

A status of "verified" indicates that the teacher worked at a given center at some point in the year prior to the date at which the data were obtained. It does not necessarily mean that the teacher was there at the time the data were pulled, since the director may not have updated the teacher's status yet. "Verified—not active" indicates that the teacher left, and the director updated the teacher's status. In this case, an exit date would indicate when the teacher left. "Not verified" indicates that the director did not confirm the teacher's status.

PDIS demographic and credential data. This file is a snapshot of registrants from September 2023 that includes basic demographics and one record for each credential earned through 2023. Information includes the date the credential was earned and the type of credential. The teachers' education level is also in the file, but it is not mandatory to enter and is missing for most teachers.

Quality rating and improvement system (QRIS) data. This file contains monthly data for each center, with the QRIS rating (on a scale of 1 to 5) and total licensed capacity for December 2017 through September 2023. QRIS ratings are based on center performance in several areas, such as health and safety of the children, staff qualifications, learning environment, family partnerships, and business practices. Levels 1 and 2 indicate that the center meets basic health and safety requirements and may have a quality improvement plan in place. Levels 3 through 5 are considered high ratings and reflect higher quality ratings in each of the above-mentioned areas.[3]

The study team matched 72 centers from the list of center IDs to the QRIS data. Two centers closed immediately after random assignment and were not included in the initial match.

Unemployment insurance (UI) data. UI wage records provide quarterly earnings for all UI-covered jobs, which represent over 90 percent of jobs in the state. Data were matched to the subset of study teachers for whom Social Security numbers were available. This file contains quarterly UI employment and wage records, from quarter 1 of 2017 through quarter 3 of 2023.

Supplemental Nutrition Assistance Program (SNAP) data. This file contains SNAP program data, including monthly benefit amounts from April 2016 through September 2023.

Quantitative Data Sources at Wave 2

Wave 2 findings use three data sources.

Follow-Up Staffing Reports Completed by Directors

Directors were sent a list of teachers that they had submitted in their application (on the baseline staffing report) and were asked to indicate whether each teacher was still at the center and, if not, when the teacher had left. Directors also provided information about the number of new hires since December 2022

[3]For more information, see Colorado Shines (n.d.).

and the current number of unfilled positions. The Wave 2 staffing reports were fielded in January 2025 (25 months after the start of the pilot program).

Administrative Data

Administrative records data were obtained through a partnership with the Colorado Evaluation & Action Lab via the LINC project. Data were obtained from the following administrative data sources:

Professional Development Information System employment data. Data snapshots were created by matching teachers in the study to the PDIS data. These snapshots provide information on the teachers' employment status over the prior year. The Wave 2 snapshot was obtained in April 2025 (16 to 28 months after the start of the pilot program).

Unemployment insurance (UI) data. UI wage records provide quarterly earnings for all UI-covered jobs, which represent over 90 percent of jobs in the state. Data were matched to the subset of study teachers for whom Social Security numbers were available. The Wave 2 data contained earnings for Quarter 4 of 2023 and Quarter 1 and 2 of 2024 (or 10 to 18 months after the pilot program started).

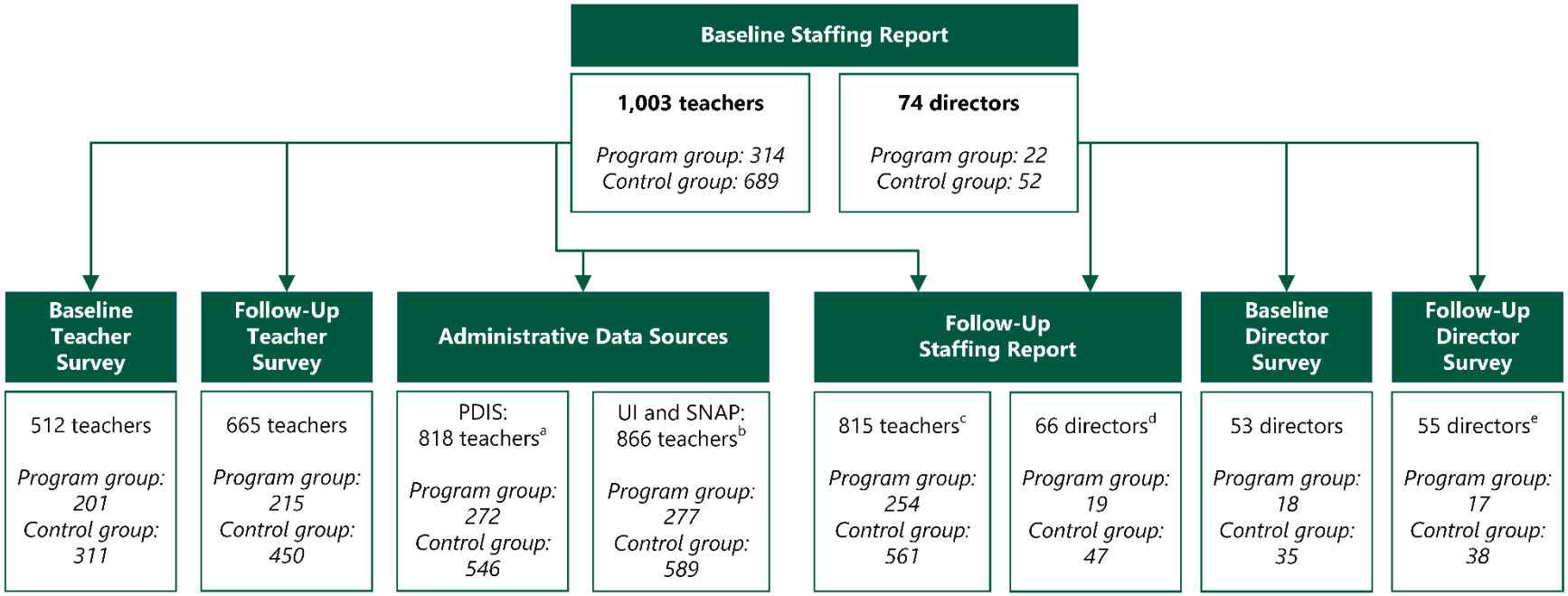
Sample Sizes

Figure B.1 shows the Wave 1 sample sizes by data source.

- Baseline teacher surveys were completed by 512 teachers (51 percent of all teachers in the study): 201 teachers in the program group and 311 in the control group.
- Baseline director surveys were completed by 53 directors (72 percent): 18 directors in the program group and 35 in the control group.
- Baseline staffing reports were completed by 74 directors (100 percent).
- Follow-up teacher surveys were completed by 665 teachers (66 percent): 215 teachers in the program group and 450 in the control group.
- Follow-up director surveys were completed by 55 directors (74 percent): 17 from the program group and 38 from the control group.
- Follow-up staffing reports were completed by 66 directors (89 percent) who provided data on 815 teachers: 254 teachers in the program group and 561 in the control group.
- PDIS records were matched to the study sample file for a total of 818 teachers (82 percent): 272 from program group centers and 546 from control group centers.
- UI and SNAP data were matched to the study sample file for a total of 866 teachers (86 percent): 277 from program group centers and 589 from control group centers.

Table B.7 displays information about the Wave 2 sample sizes.

Figure B.1. Sample Sizes by Data Source (Wave 1)



NOTES: PDIS = Colorado Professional Development Information System; UI = unemployment insurance; SNAP = Supplemental Nutrition Assistance Program.

[a]Teachers were matched from the initial application to a PDIS record with employment dates at a study center between December 2022 and February 2023.

[b]Teachers were matched from the initial application to UI and SNAP records with a valid Social Security number.

[c]Teachers were matched from the initial application to staffing reports.

[d]The study team did not pursue the two centers that closed.

[e]The study team did not pursue the two centers that closed.

Appendix Table B.7. Description of the Data Sources Collected at Wave 2

Data Source	Outcomes	Period	Sample Size
Center director staffing reports	Teachers' retention at their original center; center-level retention and turnover	Jan 2023 - Jan 2025	60 centers (753 teachers)
Professional Development Information System	Teachers' retention at their original center; retention in the CCEE field	April 2024 - April 2025	801 teachers
Unemployment insurance wage records	Employment and earnings; employment in the CCEE field	Q4/2023 - Q2/2024	866 teachers

NOTE: CCEE = child care and early education.

Cost Study

The cost analysis examined the costs associated with delivering the salary increase compared with business as usual for centers, center staff members, and state implementers. It also examined whether the salary increase led to any estimated savings that fully or partially offset these costs.

Data Collection

A subset of the directors who were sampled for the implementation research (along with a new sample of directors from the control group) was asked to complete information on program costs. Both sets of directors completed a cost workbook that asked about staff time and expenses related to teacher vacancies, recruitment and hiring, and training and onboarding. Directors at centers receiving pilot program funds were also asked for information about time and expenses related to the pilot program. The workbook was an Excel spreadsheet with a tab for each of the above categories. It prompted directors to provide information about their center's resource use in subcategories on time (for example, time spent writing a job post, publishing it on a job board, and reviewing resumes, among others) and expenses (for example, fees to post a job listing, attend a job fair, and create handouts and materials, among others). The workbook asked center directors about their staffing structures and the wages that they paid. Center administrators also completed a 30-minute technical assistance call with the study team to discuss the workbook and any questions that they had about completing it.

The cost analysis also analyzed data from the various director and teacher surveys—as well as the implementation interviews—to supplement and triangulate the data that was collected in the cost workbooks.

Sample Description

Ultimately, seven directors from program group centers and six directors from control group centers completed the cost workbook process. Centers were sampled to prioritize representation across different cost-of-living regions, as described in Table B.8. When recruitment did not result in a completed workbook

for a given group and all potential centers in that group were nonresponsive, an alternative from another group was invited.

Appendix Table B.8. Cost Evaluation Sample of Centers

Group	Cost Workbook Count: Program Group	Cost Workbook Count: Control Group
Low cost of living	1	1
Medium cost of living	2	1
High cost of living (Arapahoe)	2	1
High cost of living (Denver)	0	2
High cost of living (other)	2	1
Total	7	6

SOURCE: Cost of living classification comes from the Massachusetts Institute of Technology's Living Wage Calculator.

NOTE: The study team wanted interviewees to represent a variety of areas that had different costs of living. Based on the Massachusetts Institute of Technology's Living Wage Calculator, three cost-of-living groups were created for one adult with no children: low, medium, and high. A low cost of living was one in which less than $17 an hour was needed to cover basic expenses, a medium cost of living was one in which $17 or more (but less than $20) was needed, and a high cost of living was one in which $20 an hour or more was needed. Because counties with a high cost of living had the most participating centers, the team broke that group into three categories based on geography.

Cost Analysis

The cost study used the ingredients method to assess the costs for centers to manage and administer the pilot program, as well as the typical costs of teacher vacancies, recruitment, hiring, training, and onboarding.[4] To do so, directors were asked to list the different resources, including time and expenses, that go into these operating practices. Directors listed things like staff overtime covering vacancies, time spent writing and posting job descriptions, uniforms for new hires, and time spent in training. Each of these resources—or "ingredients"—was matched with a standardized price whenever possible. Staff time was matched to the median national wage for similar roles, sourced from the Bureau of Labor Statistics. While staff members in assistant and lead teacher roles were paid higher wages in program group centers than in control group centers, the standard national wage was used for both program and control group centers. The standard national wage reflects the market value of staff time; using the pilot program–adjusted wage would asymmetrically value staff time at program and control group centers and confound the differences that are due to pilot program–induced changes with mechanical differences in wages. Materials and expenses were matched to national retailer prices, and all prices were triangulated with the prices that centers reported paying to ensure that the prices used in the study accurately reflected the resources used by centers. When national prices were unavailable—for example, if the typical price for a job ad was not easily ascertainable—the prices that were reported by centers were averaged and then applied across all centers that reported using that resource.

[4]Levin et al. (2017).

By using standardized national prices—rather than the raw prices that were reported by center directors—the resulting cost estimates are more generalizable to the broader child care and early education field.[5] They are less likely to reflect site-level noise or to reflect specific geographical market nuance.

Overtime. Many centers reported using existing staff members to cover teacher vacancies. On the one hand, that staff time has an opportunity cost and holds value that should be considered when estimating the burden of vacancies. On the other hand, the center would need to pay a similar wage to a teacher to cover a classroom, regardless of whether it was the assigned teacher or not. Should staff time be available, the center would not experience a financial burden from replacing one teacher with another existing teacher for a time, assuming the existing teacher had extra time to spend covering the vacancy. The following process was used to include this resource without double-counting it.

If a center reported using existing staff time to cover a vacancy, it was assumed that some of the hours would require overtime pay, while others would use the standard wage. However, this level of granular information was not typically provided by centers. To fill in missing data, the study team assumed that most overtime-eligible staff members would only be able to reasonably work an additional 10 hours a week (past the standard 40 hours).[6] If time on overtime expenditures was missing, the team assumed that 10 hours of the reported coverage time would be overtime pay. Those 10 hours were counted at the overtime wage minus the typical wage ([1.5 × wage] – [1.0 × wage] = [0.5 × wage]) for whatever number of weeks was typical for a vacancy, as reported by that center.

If a center reported using a contracted sub—that is, a substitute who was provided by a temp agency at a higher total cost to the center than a staff member who was directly employed by the center—the contract sub wage was applied, less the typical teacher wage: (sub wage – typical wage) × hours covered. In addition, a flat fee was applied to reflect the annual and one-time fees that centers reported paying to temp agencies.

If a center reported someone other than a teacher filling in for a vacancy—for example, if the director covered a vacancy—the director wage was applied, less the typical teacher wage: (director wage – typical teacher wage) × hours covered.

Lost tuition. Lost tuition from classrooms that closed is not included in the preliminary findings in this report. While some centers reported needing to close classrooms due to teacher vacancies, the full value of the uncollected tuition dollars does not reflect the actual cost to the center of this loss for several reasons—primarily because the lost tuition is partially offset by lower payroll obligations. However, as any business owner would endorse, having to fully or partially close leads to consequences beyond the simple equation of net revenue loss—for example, the amorphous "cost" to unhappy families and their lost potential wages from having to miss work.

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[5]Levin et al. (2017).

[6]Guidance on overtime in education and in child care and early education cost studies is minimal. It is not mentioned in Levin et al. (2017), the Cost Analysis Standards Project (2021), or in the cost assumption guidance from Shand and Bowden (2022). Absent methodological guidance, the team assumed that a center was obligated to pay overtime if a staff member worked beyond 40 hours in a workweek. If a center is open 10 hours a day—for example, from 7:30 to 5:30, Monday through Friday—then the most a staff member could work during the school day would be 50 hours. Thus, the team assumed that there were 10 hours available for overtime. These hours would be covered by a staff member one way or the other, but the wage would depend on whether that staff member was working overtime (and receiving the time-and-a-half overtime rate) or not.

Further, the loss of tuition from classroom closures was reported in only a very small proportion of the collected workbooks—already a relatively small sample—making generalization of lost tuition hazardous using workbook data alone. A back-of-the-envelope analysis of the potential cost implications of classroom closure was conducted using publicly available tuition and teacher-to-child ratio information.

This back-of-the-envelope cost estimate used an average 2023 toddler tuition rate of $222 a week (from the National Database of Childcare Prices) and assumed a classroom with 10 children and a lead and assistant teacher.[7] The estimated "cost" of a closure was considered the tuition for the 10 children, less the wages that the center is no longer obligated to pay (assuming the closure was due to staff vacancy). It was assumed that rent and facility space, administrative overhead, and most other obligations would remain unchanged even with the closure of the classroom (although one could make a compelling argument that administrative overhead may *increase* with the management of closing and eventually reopening a classroom). Following these assumptions, it was estimated that a classroom closure would conservatively cost a center approximately $670 a week in lost revenue.

Treatment contrast. In calculating the preliminary costs of teacher vacancies—hiring, recruitment, onboarding, and training—workbooks from both program and control group centers were included. Because of the workbooks' collection in late 2023 and early 2024—after the start of the pilot program in January 2023—the costs in workbooks from program group centers are potentially subject to differences due to the pilot program. In discussions on the workbook process, at least one center director indicated that the length of vacancies had been shortened because of the incentive the pilot program offered to new employees and that recruitment expenses were generally down. This anecdotal observation is supported by findings in the implementation and impact study. However, when checked in the director follow-up survey, no significant differences in time use related to teacher turnover were reported by directors.

Missing data. Of the seven program group centers that completed cost workbooks, five provided complete cost data, one did not provide data on the pilot program costs, and one provided only partial pilot program cost data. The data from the center that provided no pilot program cost data were not used, while data from the center that provided partial data were used to supplement the full cost data from the remaining five centers. However, the resulting data are rich and describe the tasks that centers undertook to support the pilot program. These data were analyzed alongside similar data from a larger sample of survey respondents to check the robustness of the pilot program cost estimates. The resulting cost estimates from the survey data are within $10 of those from the workbooks. Missing data was not a substantial issue in any of the other areas the team investigated, and data from all seven program group centers were used to assess the potential costs of turnover.

[7]U.S. Department of Labor (n.d.).

Appendix C

Teacher and Director Experiences
with the Pilot Program

Appendix C provides information on teachers' (Table C.1) and directors' (Table C.2) experiences with the pilot program, as collected in the follow-up surveys.

Appendix Table C.1. Program Group Teachers' Experiences with the Pilot Program

Outcome (%)	Mean
Awareness	
Aware of salary increase pilot program at time of survey	93.6
If aware, how that information was learned	
From coworkers	3.2
From director	70.1
Other[a]	26.7
Decision-making	
Watched a video on how benefits might change as wage increases	51.9
If yes, the video was helpful in making a decision[b]	85.1
Read the handouts and tables on benefit changes that were provided	65.0
If so, they were helpful in making a decision[b]	90.6
Made appointment with local workforce center to discuss benefits	13.8
If so, the appointment was helpful in making a decision[b]	92.0
Received guidance from director or supervisor on decision	79.4
Overall, teacher had enough information to make an informed decision	90.4
Opted in to the pilot program	91.5
Was offered the choice to opt out of wage increase	89.5
Sample size	215

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.
Comparisons are nonexperimental. Statistical tests were not performed.
Rounding may cause slight discrepancies in calculating sums and differences.
[a]"Other" includes teachers who learned by email, advertisements or flyers, or friends.
[b]The mean represents the percentage of respondents in the intervention group who selected "moderately helpful," "very helpful," or "extremely helpful" in the survey.

Appendix Table C.2. Program Group Directors' Experiences with the Pilot Program

Outcome	Mean
Awareness (%)	
Aware of salary increase pilot program	95.9
If aware, how that information was learned	
Advertisement or flyer	2.1
Email	89.4
Other[a]	8.5
Asked for help completing application to pilot program	47.1
Perceptions (%)	
Thought the video on benefits was helpful to teachers	92.9
Thought the handouts and tables that were provided were helpful to teachers	100.0
Responded that someone else at the center provided guidance to teachers	76.5
Believed that overall, teachers had enough information to make an informed decision	88.2
Thought the salary increase was large enough	58.8
Reporting	
How often directors reached out to the administering agency for help completing staffing reports or paying higher wages (%)	
Monthly	0.0
Less than monthly	60.0
Never	40.0
How burdensome it was to complete monthly staffing reports (1=not at all, 5=extremely)	1.6
Sample size	17

SOURCE: MDRC calculations using data from the BASE follow-up director survey.

NOTES: Sample sizes vary because of missing values.
Comparisons are nonexperimental. Statistical tests were not performed.
Rounding may cause slight discrepancies in calculating sums and differences.
[a]"Other" includes the response options "other center administrator or director" and "coworker."

Appendix D

Impact Analysis Strategy

The impact analysis examined the effects of the salary increase offer on teacher and center outcomes, including teacher retention and economic well-being. The study tracked teachers in the program and control group centers for 10 to 14 months after the start of the pilot program using survey data and 8 to 16 months after the start of the pilot program using administrative records data. Because random assignment, when properly implemented, helps eliminate systematic differences between the program and control groups before the start of the pilot program, any subsequent differences in outcomes can be attributed with confidence to the pilot program.

Prior to analysis, the study team chose confirmatory (or primary) outcomes, which are the key objectives of the pilot program: teacher retention at centers and teacher economic well-being. The team also identified several exploratory outcomes to help contextualize the confirmatory findings. The impact analysis plan was preregistered on Open Science Framework.[1]

The impact of the salary increase was rigorously examined by comparing outcomes for teachers in centers that were randomly assigned to implement the salary increase with those of teachers in centers that were randomly assigned to the control group. In practice, these comparisons were conducted using a multilevel regression analysis to account for the fact that random assignment was done at the center level once centers were grouped into 10 blocks that were defined by county cost of living and center size.[2] The following two-level model provides an illustration:

$$Y_{tc} = \alpha + \delta X_{tc} + \gamma Z_c + \sum_{1}^{k} \varphi_k B_k + \beta Treat_t + u_c + e_{tc}$$

In this model, Y is the outcome of interest for teacher (t) in center (c). The model includes teacher-level and center-level characteristics (X and Z) to improve the precision of the estimated impacts. Teacher-level covariates are age, race/ethnicity, sex, credential status (from the Professional Development Information System records), tenure at center, role, initial wage (from the baseline staffing reports), ages of children taught, number of staff members at the teacher's center, and whether another adult in the home had income. At the center level, the covariates include the number of years the center had been in operation as of 2023; the center's status as a for-profit organization of any type; the proportion of total children enrolled at the center who are infants or toddlers; the proportion of total children enrolled at the center who are school aged; the total number of children that the center is licensed to serve; and the center's license rating (from 1 to 5), which is assigned by the state. The model also includes k indicators (Bk) for the random assignment block. Treat is an indicator for intervention status—or whether the teacher was at a center receiving the salary increase funding—and the coefficient β represents an estimate of program effect. Finally, because the model is two levels, there is an error term for centers (u) and for teachers within centers (e).

Missingness in impact covariates was accounted for using multiple imputation. This technique consists of fitting a regression model to variables with missing data using other variables in the dataset in order to

[1]Miller (2024).
[2]Three cost-of-living groups were created—based on the Massachusetts Institute of Technology's Living Wage Calculator—for one adult with no children, where a low cost of living was one in which less than $17 an hour was needed to cover basic expenses, a medium cost of living was greater than or equal to $17 an hour (but less than $20), and a high cost of living was $20 an hour or higher.

draw probable values. The result is a set of complete datasets, which are then pooled together using a mathematical procedure called Rubin's Rules to obtain accurate estimates.[3]

Impacts on center-level outcomes were estimated in a regression framework with variables indicating intervention status and random assignment block. Covariates are the number of years the center is in operation, the ages of the children served, for-profit status (from the baseline director survey), quality rating and improvement system (QRIS) rating, and licensed capacity (from QRIS records).

Subgroup analyses (which are exploratory) were conducted by subsetting the centers or teachers of interest and conducting the relevant analysis for those subgroups using the model described above. The study is not powered to statistically detect *differences* in effects between subgroups, so subgroup analyses are exploratory and descriptive.

[3]Rubin (1987).

Appendix E

Response Analysis

The teacher follow-up survey was fielded to all eligible teachers from October 2023 through February 2024. The survey achieved an overall response rate of 66 percent, with 68 percent for the program group and 65 percent for the control group. Whenever the overall response rate is less than 100 percent, nonresponse bias may occur. Differences may exist between the respondent sample and the larger, fielded sample, owing to differences between the sample members who completed a survey and those who did not. Furthermore, the estimates based on survey data may be biased if background characteristics differ between the research groups in the respondent sample.

Table E.1 presents baseline characteristics of the survey respondents and compares them with the baseline characteristics of nonrespondents. It also presents characteristics, by research group, within the respondent sample. The table shows that teachers who responded to the survey were different from those who did not respond, often in expected ways. Respondents are older than nonrespondents and a greater percentage of them are Hispanic. They had longer tenure at their centers and earned higher wages. They were also more likely to be lead teachers than assistant teachers. These differences raise the question of whether impacts that are estimated using the survey sample are representative of impacts for the full study sample. (See below for more information on generalizability.)

Appendix Table E.1. Baseline Characteristics of Survey Respondents (by Research Group) and of the Full Sample (by Respondent Status)

	Respondents			Full Sample		
Variable	Program Group	Control Group		Nonrespondents	Respondents	
Age group (%)						
Younger than 25	11.5	13.9		17.0	12.9	*
Ages 25 to 39	41.4	40.0		45.8	40.6	
Ages 40 to 59	37.6	34.7		27.1	35.5	**
Ages 60+	9.7	10.1		9.6	9.9	
Race/ethnicity (%)						
White	42.8	37..0		40.9	40.5	
Hispanic (listed under race[a])	30.6	39.9	*	31.0	35.9	
Black	20.5	15.7		20.2	16.5	
Other	6.8	7.2		7.8	7.2	
Hispanic (ethnicity)	36.7	47.8	*	37.8	44.5	*
Female (%)	95.1	94.6		95.9	94.8	
Credential awarded in 2022 (%)	57.8	57.3		51.6	56.3	
Credential awarded before 2022 (%)	42.2	42.8		48.4	43.7	
Tenure (years)	5.6	5.5		3.7	5.6	***
Role: lead teacher (%)	74.3	75.9		62.4	74.9	***
Initial wage ($)	17.5	17.5		16.8	17.5	***
Number of staff members in the center	14.0	13.5		13.2	13.9	

SOURCES: MDRC calculations using data from the BASE baseline staffing reports completed by directors and Professional Development Information System records.

NOTE: [a]The Professional Development Information System includes "Hispanic" as an option in the question about race but also asks a separate question about ethnicity.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Table E.1 also presents baseline characteristics for program and control group teachers within the sample of survey respondents. There are few significant differences between the two groups; the only statistically significant difference is the percentage of people who reported they were Hispanic. To assess whether there were systematic differences between the two groups, a 0/1 indicator of program group status was created and regressed on the characteristics in the table (not shown). The likelihood ratio test for the overall model is not statistically significant ($p = 0.73$), suggesting that impacts that are estimated using the survey data are unbiased.

Another way to assess the representativeness of the survey sample is to compare impacts on outcomes using administrative records, which are available for the full study sample (or at least those matched to that source) and the survey sample. Table E.2 compares impacts on outcomes for both samples using administrative records. The impact results are generally similar for both samples, although a bit more positive for the survey sample. The impact on retention using the staffing reports, for example, is 8.8 percentage points for the survey sample compared with 6.5 percentage points for the full sample.

Overall, the findings suggest that impact estimates that are obtained from the survey sample provide an unbiased look at program impacts. These impacts are also generally representative of effects for the full sample, although somewhat more positive. Effects on outcomes that were collected via the survey should be interpreted in that light.

Appendix Table E.2. Administrative Records Impacts for the Survey Sample Compared with the Full Sample

Variable	Survey Sample					Full Sample				
	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Staffing reports										
Employed at original center in November or December 2023 (%)	86.9	78.1	8.8	0.21	0.02 **	75.6	69.1	6.5	0.14	0.19
Days employed at original center since study start, as of November or December 2023	327.2	327.5	-0.3	0.00	0.97	304.7	311.3	-6.6	-0.08	0.52
Sample size	192	389				254	561			
Professional Development Information System (%)										
Employed at original center (April 2023 to April 2024)	84.3	77.9	6.3	0.15	0.23	73.5	70.7	2.8	0.06	0.64
Employed in the CCEE field (April 2023 to April 2024)	87.7	84.1	3.6	0.10	0.38	80.4	78.3	2.1	0.05	0.63
Sample size	201	384				272	546			
Unemployment insurance wage records										
Employed (%)										
Quarter 1, 2023	75.6	82.6	-7.0	-0.18	0.39	75.5	81.2	-5.8	-0.15	0.40
Quarter 2, 2023	74.1	82.7	-8.6	-0.22	0.25	75.8	80.5	-4.7	-0.12	0.47
Quarter 3, 2023	65.3	74.1	-8.9	-0.20	0.26	69.9	71.2	-1.3	-0.03	0.84
Average earnings ($)										
Quarter 1, 2023	7,567.0	6,831.8	735.2	0.16	0.37	7,005.0	6,431.5	573.5	0.12	0.40
Quarter 2, 2023	7,998.1	7,175.9	822.2	0.17	0.32	7,524.9	6,617.1	907.8	0.18	0.18
Quarter 3, 2023	7,502.3	6,501.5	1,000.8	0.20	0.23	7,188.7	5,944.6	1,244.1	0.24	0.07 *
Employed in CCEE field (%)										
Quarter 1, 2023	66.8	72.1	-5.3	-0.12	0.59	66.1	70.6	-4.4	-0.10	0.62
Quarter 2, 2023	66.9	72.0	-5.1	-0.11	0.57	64.7	67.7	-3.0	-0.06	0.72
Quarter 3, 2023	59.0	63.6	-4.5	-0.09	0.62	58.2	58.0	0.2	0.00	0.98
Sample size	195	391				277	589			

(continued)

Appendix Table E.2 (continued)

Variable	Survey Sample					Full Sample				
	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
SNAP records										
Received SNAP benefits (%)										
January 2023	17.6	19.4	-1.8	-0.04	0.62	20.3	18.1	2.3	0.06	0.49
February 2023	17.4	19.6	-2.2	-0.05	0.55	19.8	18.0	1.8	0.05	0.58
March 2023	17.1	19.4	-2.2	-0.06	0.51	19.4	17.5	2.0	0.05	0.52
April 2023	14.0	18.7	-4.6	-0.12	0.16	16.6	17.3	-0.7	-0.02	0.81
May 2023	12.6	18.9	-6.3	-0.16	0.05 *	16.8	17.1	-0.3	-0.01	0.93
June 2023	11.9	19.5	-7.6	-0.19	0.02 **	14.2	18.0	-3.8	-0.10	0.23
July 2023	10.9	19.2	-8.3	-0.21	0.01 **	14.0	17.7	-3.6	-0.10	0.24
Average SNAP amount ($)										
January 2023	151.2	171.9	-20.7	-0.05	0.62	176.0	162.5	13.5	0.03	0.71
February 2023	139.5	170.6	-31.1	-0.08	0.42	165.1	157.9	7.2	0.02	0.83
March 2023	85.5	99.8	-14.3	-0.05	0.63	90.8	91.0	-0.2	0.00	0.99
April 2023	81.5	98.8	-17.3	-0.06	0.55	87.9	89.8	-1.8	-0.01	0.94
May 2023	78.4	101.6	-23.2	-0.08	0.45	94.0	90.1	3.9	0.02	0.88
June 2023	70.6	108.2	-37.6	-0.13	0.22	84.3	95.7	-11.4	-0.04	0.66
July 2023	68.3	106.2	-38.0	-0.14	0.20	84.5	95.9	-11.4	-0.04	0.65
Sample size	195	391				277	589			

SOURCES: MDRC data calculations using data from the BASE baseline staffing reports completed by directors, Professional Development Information System (PDIS) records, unemployment insurance wage records, and Supplemental Nutrition Assistance Program (SNAP) records.

NOTE: CCEE = child care and early education.
Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.
A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix F

Additional Impact Tables

Appendix F provides additional tables showing the impacts at Wave 1 of the pilot program on teacher outcomes, center outcomes, and subgroup outcomes.

Impacts on Secondary Teacher Outcomes

The pilot program's impacts on teacher outcomes are shown in the following tables:

- Tables F.1 and F.2: teacher retention, based on Wave 1 and Wave 2 data from Professional Development Information System records
- Tables F.3 and F.4: teacher retention and teachers' earnings, based on Wave 1 and Wave 2 data from unemployment insurance (UI) wage records
- Table F.5: teachers' job characteristics 10 to 14 months after the pilot program began, based on data from the follow-up teacher survey
- Table F.6: Supplemental Nutrition Assistance Program (SNAP) receipt, based on SNAP records
- Table F.7: teachers' job demands, based on data from the follow-up teacher survey
- Table F.8: professional development services that teachers received, based on data from the follow-up teacher survey

Appendix Table F.1. Impacts on Teacher Retention Based on Wave 1 PDIS Records

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Employed at original center (April 2023 to April 2024)	73.5	70.7	2.8	0.06	0.64
Employed in the field (April 2023 to April 2024)	80.4	78.3	2.1	0.05	0.63
Sample size (total = 818)	272	546			

SOURCE: MDRC calculations using Professional Development Information System (PDIS) records.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.2. Impacts on Teacher Retention Based on Wave 2 PDIS Records

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Employed at original center (April 2024 - April 2025)	64.6	56.2	8.4	0.17	0.17
Employed in the field (April 2024 - April 2025)	75.5	70.7	4.7	0.10	0.29
Sample size (total = 801)	264	537			

SOURCE: MDRC calculations using Professional Development Information System (PDIS) records.

NOTES: Sample sizes vary because of missing values.
Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.
Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.
Rounding may cause slight discrepancies in calculating sums and differences.
A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.3. Impacts on Teacher Retention and Earnings Based on Wave 1 UI Wage Records

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Employed (%)					
Quarter 1, 2023	75.4	81.2	-5.8	-0.15	0.40
Quarter 2, 2023	75.8	80.5	-4.7	-0.12	0.47
Quarter 3, 2023	69.8	71.2	-1.3	-0.03	0.84
Average earnings ($)					
Quarter 1, 2023	7,005.01	6,431.50	573.51	0.12	0.40
Quarter 2, 2023	7,524.85	6,617.08	907.77	0.18	0.18
Quarter 3, 2023	7,188.67	5,944.58	1,244.09	0.24	0.07 *
Employed in CCEE field (%)					
Quarter 1, 2023	66.1	70.6	-4.4	-0.10	0.62
Quarter 2, 2023	64.7	67.7	-3.0	-0.06	0.72
Quarter 3, 2023	58.2	58.0	0.2	0.00	0.98
Sample size (total = 866)	277	589			

SOURCE: MDRC calculations using unemployment insurance (UI) wage records.

NOTES: CCEE = child care and early education.
Sample sizes vary because of missing values.
Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.
Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.
Rounding may cause slight discrepancies in calculating sums and differences.
A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.4. Impacts on Teacher Retention and Earnings Based on Wave 2 UI Wage Records

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Employed (%)					
Quarter 4, 2023	70.5	67.8	2.7	.06	0.71
Quarter 1, 2024	67.1	68.5	-1.4	-.03	0.84
Quarter 2, 2024	67.2	67.4	-0.2	0.00	0.98
Average earnings ($)					
Quarter 4, 2023	7,251.73	6,084.21	1,167.52	0.18	0.13
Quarter 1, 2024	7,143.12	5,908.81	1,234.30	0.20	0.10
Quarter 2, 2024	7,296.62	6,426.59	870.02	0.12	0.30
Employed in CCEE field (%)					
Quarter 4, 2023	54.8	52.3	2.5	0.05	0.75
Quarter 1, 2024	51.3	50.3	1.0	0.02	0.90
Quarter 2, 2024	51.0	50.1	0.9	0.02	0.91
Sample size (total = 866)	277	589			

SOURCE: MDRC calculations using unemployment insurance (UI) wage records.

NOTES: CCEE = child care and early education.

Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.5. Impacts on Characteristics of Current Job, 10 to 14 Months After the Pilot Program Began

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Industry					0.10	
Child care	88.4	88.0	0.3	0.01		
Education	2.3	3.2	-0.9	-0.05		
Other	1.2	4.4	-3.2	-0.15		
Not employed	8.6	4.2	4.4	0.21		
Role, if still employed at original center					0.08	*
Lead teacher	79.1	68.0	11.2	0.24		
Assistant teacher	14.9	14.6	0.3	0.01		
Other	5.8	18.1	-12.3	-0.33		
Hours worked per week					0.38	
1 to 19	4.2	2.6	1.6	0.10		
20 to 34	14.1	16.1	-2.0	-0.05		
35 or more	72.1	76.3	-4.2	-0.10		
Not working	9.5	4.9	4.6	0.21		
Usual work schedule					0.62	
Regular daytime shift	82.2	86.3	-4.1	-0.12		
Regular evening or night shift	2.1	3.9	-1.8	-0.09		
Irregular shift	3.8	3.0	0.9	0.05		
Rotating or split shift	3.3	2.2	1.1	0.08		
Not working	8.9	4.4	4.5	0.21		
Self-employed	10.8	11.3	-0.6	-0.02	0.95	
Employer-provided benefits[a]						
Paid sick days	70.0	69.4	0.6	0.01	0.94	
Paid vacation days	82.9	79.2	3.7	0.09	0.56	
Paid holidays	89.9	87.0	2.9	0.09	0.56	
Paid COVID leave	44.0	37.1	7.0	0.15	0.34	
Dental benefits	50.5	42.6	7.8	0.16	0.36	
Vision insurance	37.6	37.6	0.0	0.00	1.00	
Retirement plan	53.6	45.9	7.7	0.15	0.46	
Health or medical insurance plan	55.3	50.4	4.9	0.10	0.53	
Discounted or free child care	84.6	77.0	7.6	0.18	0.19	
Other insurance[b]	44.0	39.3	4.8	0.10	0.60	
Employee wellness and mental health resources[c]	31.1	32.5	-1.4	-0.03	0.87	
Professional development[d]	87.8	78.9	8.9	0.22	0.15	
Education stipend	60.4	48.0	12.4	0.25	0.09	*
Career advancement opportunities if a new degree or credential is obtained	70.9	64.6	6.4	0.13	0.31	
Other expense reimbursement[e]	53.9	44.0	9.9	0.20	0.16	
Bonus[f]	48.9	41.7	7.2	0.15	0.29	
Other benefit specified	16.4	31.7	-15.3	-0.33	0.33	

(continued)

Appendix Table F.5 (continued)

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Requested a raise in the past year	17.8	38.1	-20.3	-0.42	0.00	***
Among those who requested a raise					0.81	
Received requested amount	40.8	27.2	13.7	0.31		
Received less than the requested amount	34.5	40.0	-5.4	-0.11		
Did not receive raise	23.6	32.9	-9.3	-0.20		
Received raise since hiring	88.2	84.9	3.4	0.09	0.34	
Sample size (total = 665)	215	450				

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups for continuous variables. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

A chi-square test for categorical variables was run to determine whether a difference exists in the distribution of related outcomes by research group. The p-value indicates the likelihood that the differences between the program and control groups in the distribution of outcomes arose by chance.

If a respondent currently works multiple jobs, then only the primary job is reported. (The job at which the respondent works the most hours is considered primary.)

[a]Employer-provided benefits include benefits that are or eventually will be offered, regardless of whether the respondent receives them.

[b]Other insurance includes life insurance or disability insurance.

[c]Examples of employee wellness and mental health resources include gym memberships and counseling and telehealth services.

[d]Examples of professional development include paid training time, paid planning time, and coaching.

[e]Examples of other types of expense reimbursement include mileage, supplies, and snacks.

[f]Examples of bonuses include hiring bonuses or retention bonuses.

Appendix Table F.6. Impacts on SNAP Receipt

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Received SNAP benefits (%)					
January 2023	20.3	18.0	2.3	0.06	0.49
February 2023	19.8	18.0	1.8	0.05	0.58
March 2023	19.4	17.5	2.0	0.05	0.52
April 2023	16.6	17.3	-0.7	-0.02	0.81
May 2023	16.8	17.1	-0.3	-0.01	0.93
June 2023	14.2	18.0	-3.8	-0.10	0.23
July 2023	14.0	17.6	-3.6	-0.10	0.24
Average SNAP amount ($)					
January 2023	176.02	162.49	13.53	0.03	0.71
February 2023	165.12	157.92	7.20	0.02	0.83
March 2023	90.81	90.99	-0.17	0.00	0.99
April 2023	87.94	89.77	-1.84	-0.01	0.94
May 2023	94.04	90.09	3.94	0.02	0.88
June 2023	84.29	95.66	-11.37	-0.04	0.66
July 2023	84.46	95.89	-11.43	-0.04	0.65
Sample size (total = 866)	277	589			

SOURCE: MDRC calculations using Supplemental Nutrition Assistance Program (SNAP) records.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.7. Other Job Demands Among Teachers Working in CCEE

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Care for children facing the following scenarios: (%)					
Speak languages other than English	84.4	84.0	0.4	0.01	0.93
Experience poverty	78.9	81.1	-2.2	-0.05	0.65
Experienced trauma	72.8	73.3	-0.5	-0.01	0.93
Have challenging behaviors	86.9	85.8	1.2	0.03	0.78
Have disabilities	60.0	63.0	-3.0	-0.06	0.63
Are from historically marginalized groups	83.9	78.8	5.0	0.12	0.23
Are from families with mixed immigration status	73.7	75.2	-1.4	-0.03	0.76
Number of scenarios children in care face (0-7)	5.4	5.5	0.0	-0.02	0.86
Sample size (total = 573)	190	383			

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: CCEE = child care and early education.

Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Appendix Table F.8. Professional Development Services Among Teachers Working in CCEE

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
PD services received in past year (%)						
Regular meetings with supervisors to discuss work and progress	79.3	66.6	12.7	0.27	0.02	**
In-person or virtual attendance at regional, state, or national conferences	43.9	39.5	4.4	0.09	0.50	
Paid substitutes to allow teachers time to prepare, train, or plan	45.5	35.7	9.8	0.21	0.15	
Mentoring or coaching	70.0	70.1	0.0	0.00	1.00	
Workshops or training sponsored by the center	76.9	72.9	4.0	0.09	0.53	
Workshops or training provided by other organizations	72.6	67.9	4.7	0.10	0.48	
Visits to other classrooms or centers	59.2	49.6	9.7	0.19	0.10	
A community of learners—such as a peer learning group or professional learning community—facilitated by an expert	41.9	33.5	8.4	0.18	0.14	
Tuition assistance	35.0	30.4	4.6	0.10	0.41	
Onsite associate's or bachelor's courses	20.5	15.7	4.8	0.13	0.25	
Other	8.5	18.8	-10.2	-0.27	0.36	
PD financial assistance received in past year (%)						
Assistance with direct costs, such as tuition or registration fees	33.4	30.1	3.3	0.07	0.55	
Help with other costs of participation, such as travel or child care for the teacher's own children	24.4	27.2	-2.8	-0.06	0.54	
Release time to participate in PD activities	45.0	39.2	5.8	0.12	0.39	
Hours of PD since January 2023	20.4	23.2	-2.8	-0.13	0.31	
Frequency of outside coaching received since January 2023 (%)						
At least once a month	31.3	23.1	8.2	0.19	0.10	
Less than once a month	68.7	76.9	-8.2	-0.19	0.10	
Currently enrolled in CCEE coursework (%)	18.6	15.0	3.6	0.10	0.41	
Sample size (total = 573)	190	383				

SOURCE: MDRC calculations using data from the BASE follow-up lead and assistant teacher survey.

NOTES: CCEE = child care and early education; PD = professional development.

Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

Impacts on Center Outcomes

The study looked at several secondary (exploratory) outcomes for centers, specifically the retention of teaching staff members, turnover, vacancies and hiring, and turnover-related challenges to center-level staffing. (See Tables F.9, F.10. and F.11.)

Appendix Table F.9. Impacts on Center-Level Staffing Based on Wave 1 Staffing Reports

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Retention rate of teaching staff members from December 2022 to November 2023[a]	70.8	66.6	4.2	0.19	0.53
Unfilled teaching positions as a percentage of total staff	39.6	50.5	-10.9	-0.25	0.38
New hires as a percentage of teachers who left	232.1	179.1	53.0	0.16	0.60
Turnover rate (December 2022 to November 2023)[b]	26.5	31.6	-5.1	-0.25	0.40
Sample size (total = 66)	19	47			

SOURCE: MDRC calculations using data from the BASE follow-up staffing report completed by directors.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the experimental design (block random assignment), controlling for the number of years the center had been in operation as of 2023, the center's status as a for-profit organization of any type, the proportion of total children enrolled at the center who were infants or toddlers, the proportion of total children enrolled at the center who were school-aged, the total number of children who the center was licensed to serve, and the center's license rating (1 to 5) that was assigned by the state.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]The retention rate is the percentage of teachers working at the center in December 2022 who were still working at the center in November 2023.

[b]The turnover rate is calculated as the number of original teachers who left the program during the period divided by the average number of staff members at the center over that period.

Table F.10. Impacts on Center-Level Staffing Based on Wave 2 Staffing Reports

Outcome (%)	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value
Retention rate of teaching staff members from December 2022 to January 2025[a]	54.7	50.7	4.05	0.16	0.62
New hires as a percentage of the teachers who left	318.3	288.7	29.58	0.09	0.81
Turnover rate (December 2022 to January 2025)[b]	50.8	55.1	-4.7	-0.11	0.73
Sample size (total = 60)	19	41			

SOURCE: MDRC calculations using data from the BASE follow-up staffing reports that were completed by directors.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the experimental design (block random assignment), controlling for the number of years the center had been in operation as of 2023, the center's status as a for-profit organization of any type, the proportion of total children enrolled at the center who were infants or toddlers, the proportion of total children enrolled at the center who were school-aged, the total number of children who the center was licensed to serve, and the center's license rating (1 to 5) that was assigned by the state.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]The retention rate is the percentage of teachers working at the center in December 2022 who are still working at the center.

[b]The turnover rate is calculated as the number of original teachers who left the program during the period divided by the average number of staff members at the center over that period.

Appendix Table F.11. Impacts on Center-Level Staffing Based on the Director Survey

Outcome	Program Group	Control Group	Difference (Impact)	Effect Size	P-Value	
Directors who "often" or "always" experienced the following staffing issues: (%)						
Not enough teaching staff for infant and toddler classrooms	9.8	28.6	-18.8	-0.42	0.21	
Not enough teaching staff for preschool-aged classrooms	13.9	19.5	-5.6	-0.14	0.68	
Hiring qualified teaching staff for infant and toddler classrooms	49.1	37.3	11.8	0.24	0.52	
Hiring qualified teaching staff for preschool-aged classrooms	67.9	38.1	29.8	0.60	0.09	*
Staff turnover for infant and toddler classrooms	26.2	17.2	9.0	0.22	0.54	
Staff turnover for preschool-aged classrooms	25.7	16.2	9.4	0.23	0.52	
Since December 2022, failure to find enough teaching staff has led to the following: (%)						
Closing classrooms or accepting fewer children	19.0	41.1	-22.1	-0.44	0.22	
Capping the number of children enrolled	29.8	54.3	-24.5	-0.48	0.16	
Extent to which teacher turnover did the following: (1=not very much, 5=very much)						
Affected the quality of service provided	2.6	2.9	-0.3	-0.27	0.48	
Reduced morale and increased stress for the staff	3.0	3.2	-0.1	-0.12	0.76	
Caused other teachers to leave	2.8	2.7	0.1	0.08	0.83	
Interrupted the director's regular job responsibilities	2.9	3.5	-0.6	-0.44	0.26	
Caused families to leave the center	2.1	2.1	-0.1	-0.06	0.87	
In a typical week, number of hours spent doing the following:						
Managing staff schedules and assignments	9.7	12.3	-2.5	-0.14	0.67	
Arranging for substitutes or floaters to fill in for a teacher's absence or vacancy	9.1	8.1	0.9	0.06	0.86	
Filling in for a teacher's absence or vacancy	12.9	16.1	-3.2	-0.14	0.67	
In a typical week, director had to adjust teacher-child groupings because of teacher absence or vacancy on most days (%)	19.5	49.5	-30.0	-0.59	0.08	*
Typical time to fill open teacher position (%)						
Less than 1 month	79.2	56.4	22.7	0.45	0.37	
1 to 3 months	20.2	31.7	-11.5	-0.24	0.37	
More than 3 months	0.4	13.6	-13.2	-0.40	0.37	
Sample size (total = 55)	17	38				

SOURCE: MDRC calculations using data from the BASE follow-up director survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the experimental design (block random assignment), controlling for the number of years the center had been in operation as of 2023, the center's status as a for-profit organization of any type, the proportion of total children enrolled at the center who were infants or toddlers, the proportion of total children enrolled at the center who were school-aged, the total number of children who the center was licensed to serve, and the center's license rating (1 to 5) that was assigned by the state.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

The pilot program does not have a statistically significant effect on center-level staffing; however, exploratory analyses suggest that program group centers had increased retention, lower turnover, fewer vacancies, and more hires compared with control group centers. Table F.9 shows the exploratory impacts of the pilot program on center-level staffing using data from Wave 1 follow-up staffing reports that were completed by directors about 11 months after the start of the pilot program. While none of the effects are statistically significant, the results suggest that program group centers had higher retention rates than control group centers by 4.2 percentage points (70.8 percent compared with 66.6 percent). The amount of unfilled teaching positions, as a percentage of total staff members, was lower in program group centers than control group centers by 10.9 percentage points (39.6 percent compared with 50.5 percent).

The amount of new hires, as a percentage of the teachers who left, was higher in program group centers than control group centers by 53.0 percentage points (232.1 compared with 179.1), suggesting not only that program group centers filled their vacancies but that they also may have expanded their programs.

Finally, the turnover rate—defined as the number of teachers (from the original group of teachers employed by the center in December 2022) who left, divided by the average number of staff members employed at the center from December 2022 through November 2023—was lower in program group centers than control group centers by 5.1 percentage points (26.5 percent compared with 31.6 percent).

Impacts on Subgroups

Impact estimates for subgroups are shown in the following tables:

- Table F.12: initial wages (less than $17 an hour versus more than $17/hour)
- Table F.13: ages taught (infants and toddlers only versus preschool only or both preschool and infants and toddlers)
- Table F.14: cost of living (high versus low or medium)
- Table F.15: teacher credential (child care and early education credential versus no credential)
- Table F.16: teacher race and ethnicity (Black or Hispanic versus White)
- Table F.17: role (lead teacher versus assistant teacher)
- Table F.18: tenure (less than two years versus two or more years)

Appendix Table F.12. Pilot Program Impacts, by Initial Wage

Outcome	Less than $17 per Hour				$17 or More per Hour			
	Program Group	Control Group	Difference (Impact)		Program Group	Control Group	Difference (Impact)	
Data from staffing reports (%)								
Employed at original center in November or December 2023	70.7	66.4	4.3		83.4	71.8	11.6	
Data from follow-up survey								
Employed at the time of the survey (%)	94.2	95.9	-1.7		90.2	96.4	-6.2	*
Employed at original center at the time of the survey (%)	88.7	77.0	11.7	**	92.7	80.2	12.5	**
Wage is $20 or higher (%)	34.6	10.9	23.6	***	74.2	40.9	33.2	***
Household income in prior month	3,203.08	2,961.29	241.79		3,203.63	3,536.82	-333.19	
Household income as a percentage of the federal poverty level[a]	158.1	142.7	15.3		157.0	166.1	-9.0	
Low or very low food security[b] (%)	49.3	56.6	-7.3		33.4	56.9	-23.5	***
At risk for depression[c] (%)	1.9	5.3	-3.4		3.7	6.5	-2.8	
Samples size (total = 840)	150	324			107	259		

SOURCES: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.13. Pilot Program Impacts, by Ages Taught

Outcome	Infants and Toddlers Only			Preschool Only, or Both Preschool and Infants and Toddlers		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	78.9	74.4	4.5	75.2	71.3	3.9
Data from follow-up survey						
Employed at the time of the survey (%)	94.8	95.2	-0.4	90.6	96.7	-6.2 *
Employed at original center at the time of the survey (%)	89.8	81.8	8.0	87.1	81.6	5.5
Wage is $20 or higher (%)	49.5	19.0	30.5 ***	53.6	31.4	22.2 **
Household income in prior month	3,067.25	3,164.07	-96.82	3,382.62	3,465.55	-82.93
Household income as a percentage of the federal poverty level[a]	123.4	141.0	-17.5	179.9	169.0	10.9
Low or very low food security[b] (%)	38.5	55.2	-16.7 *	36.6	59.2	-22.6 ***
At risk for depression[c] (%)	2.1	5.4	-3.2	1.5	6.3	-4.8
Samples size (total = 707)	112	205		133	257	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.14. Pilot Program Impacts, by Cost of Living

Outcome	Teachers in Counties with a High Cost of Living			Teachers in Counties with a Low to Medium Cost of Living		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	77.2	74.2	3.0	71.9	60.4	11.5
Data from follow-up survey						
Employed at the time of the survey (%)	91.2	96.3	-5.1	91.9	95.2	-3.2
Employed at original center at the time of the survey (%)	91.1	82.3	8.8	87.1	70.9	16.1 **
Wage is $20 or higher (%)	60.0	29.9	30.1 ***	42.0	17.9	24.2 ***
Household income in prior month	2,823.42	3,123.04	-299.62	3,714.19	3,403.57	310.62
Household income as a percentage of the federal poverty level[a]	123.1	143.7	-20.6	201.0	169.2	31.8
Low or very low food security[b] (%)	38.6	55.0	-16.4 **	43.6	61.1	-17.5 *
At risk for depression[c] (%)	1.2	5.4	-4.2 *	4.7	7.6	-2.9
Samples size (total = 899)	185	389		92	233	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.15. Pilot Program Impacts, by Teacher Credential

Outcome	Earned a Credential in 2022 or Earlier			No Credential Earned		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	79.1	69.9	9.2 *	63.9	63.8	0.1
Data from follow-up survey						
Employed at the time of the survey (%)	94.3	95.9	-1.6	82.5	95.4	-12.8 **
Employed at original center at the time of the survey (%)	92.0	79.4	12.6 **	76.9	73.5	3.4
Wage is $20 or higher (%)	58.0	31.9	26.0 ***	24.4	14.8	9.6
Household income in prior month	3,622.36	3,442.77	179.59	2,506.55	2,384.16	122.39
Household income as a percentage of the federal poverty level[a]	180.2	167.1	13.1	125.8	110.8	15.0
Low or very low food security[b] (%)	35.4	58.0	-22.6 ***	51.1	58.5	-7.4
At risk for depression[c] (%)	2.1	5.8	-3.8	2.4	9.3	-6.9
Samples size (total = 899)	200	397		77	225	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.16. Pilot Program Impacts, by Race/Ethnicity

Outcome	Black or Hispanic			White		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	75.6	68.7	6.9	77.1	66.7	10.4
Data from follow-up survey						
Employed at the time of the survey (%)	88.9	95.6	-6.7 **	95.2	96.5	-1.4
Employed at original center at the time of the survey (%)	87.3	78.8	8.5	89.7	77.3	12.4 **
Wage is $20 or higher (%)	56.8	26.2	30.6 ***	42.9	27.3	15.6
Household income in prior month	3,316.04	2,868.00	448.04	3,248.86	3,494.55	-245.69
Household income as a percentage of the federal poverty level[a]	161.6	127.6	34.0	162.4	167.8	-5.4
Low or very low food security[b] (%)	43.7	59.3	-15.6 **	35.5	54.0	-18.4 **
At risk for depression[c] (%)	0.7	6.1	-5.5 *	4.2	6.7	-2.5
Samples size (total = 841)	151	371		112	207	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.17. Pilot Program Impacts, by Role

Outcome	Lead Teacher			Assistant Teacher		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	81.4	71.7	9.7 *	61.9	61.8	0.1
Data from follow-up survey						
Employed at the time of the survey (%)	93.6	97.3	-3.7 *	84.8	91.9	-7.0
Employed at original center at the time of the survey (%)	92.4	80.4	12.0 **	81.1	69.8	11.3
Wage is $20 or higher (%)	58.2	28.7	29.5 ***	33.7	16.5	17.2 *
Household income in prior month	3,458.65	3,391.84	66.80	2,346.50	2,522.08	-175.58
Household income as a percentage of the federal poverty level[a]	169.5	163.4	6.0	118.0	117.5	0.5
Low or very low food security[b] (%)	41.7	56.4	-14.8 **	41.8	59.0	-17.2
At risk for depression[c] (%)	3.8	3.9	-0.1	0.3	10.7	-10.4 *
Samples size (total = 849)	178	414		86	171	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in the household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

Appendix Table F.18. Pilot Program Impacts, by Tenure

Outcome	Less than Two Years			Two or More Years		
	Program Group	Control Group	Difference (Impact)	Program Group	Control Group	Difference (Impact)
Data from staffing reports (%)						
Employed at original center in November or December 2023	66.3	59.3	7.0	84.9	76.7	8.2
Data from follow-up survey						
Employed at the time of the survey (%)	89.2	95.2	-6.0	92.5	96.3	-3.8
Employed at original center at the time of the survey (%)	85.2	69.7	15.5 **	93.0	84.2	8.8 *
Wage is $20 or higher (%)	42.1	17.8	24.3 **	61.2	29.7	31.5 ***
Household income in prior month	3,063.24	2,599.36	463.88	3,415.40	3,583.13	-167.73
Household income as a percentage of the federal poverty level[a]	143.5	121.3	22.3	184.6	178.2	6.4
Low or very low food security[b] (%)	57.3	54.7	2.6	27.7	59.2	-31.5 ***
At risk for depression[c] (%)	2.5	11.2	-8.7 *	2.4	3.1	-0.8
Samples size (total = 810)	121	272		122	295	

SOURCE: MDRC calculations using data from the BASE staffing reports completed by directors and the follow-up lead and assistant teacher survey.

NOTES: Sample sizes vary because of missing values.

Statistical significance levels are indicated as follows: *** = 1 percent; ** = 5 percent; * = 10 percent.

Results come from statistical models that account for the hierarchical structure of the data (teachers nested within centers) and the experimental design (block random assignment). Models also control for teacher age, race/ethnicity, sex, credential level, tenure at center, role, and initial wage—as well as whether teachers have another adult with earnings in their household, the number of staff members at the center, and the ages of the children taught in the classroom.

Rounding may cause slight discrepancies in calculating sums and differences.

A two-tailed t-test was applied to the differences between the outcomes of the program and control groups. The p-value indicates the likelihood that the differences between the program and control groups arose by chance.

[a]Household income as a percentage of the federal poverty line was calculated using poverty thresholds relevant to a given teacher's household size. See Office of the Assistant Secretary for Planning and Evaluation (2025).

[b]Food security was assessed via five items about whether teachers were eating less, not eating when they were hungry, or not eating balanced meals because they could not afford enough food. If a respondent responded affirmatively to two or more items, they were considered to have low or very low food security.

[c]A teacher with a Center for Epidemiologic Studies Depression Scale Short Form score that is 16 or higher is considered at risk for depression.

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