Pima Community College's Pathways to Healthcare Program

Three-Year Impact Report

OPRE Report No. 2020-43

March 2020

PACE
Pathways for Advancing Careers and Education

Pima Community College's Pathways to Healthcare Program: Three-Year Impact Report

A Pathways for Advancing Careers and Education (PACE) / Career Pathways Intermediate Outcomes Study Publication

OPRE Report No. 2020-43

March 2020

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Submitted to:
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Office of Planning, Research, and Evaluation
Administration for Children and Families
U.S. Department of Health and Human Services

Contract No. HHSP23320095624WC, Task Order HHSP23337019T

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Acknowledgements

The efforts of many individuals have been indispensable in the evaluation of Pathways to Healthcare. We are especially grateful to administrators and staff at Pima Community College for their commitment to improvement and evaluation. In particular, we thank Pathways to Healthcare program leaders Amanda Abens and Brian Stewart for their hard work and collegial spirit in working with the PACE project team to develop the study and support data collection activities. We also owe a deep debt of gratitude to the hundreds of adults who volunteered to participate in the evaluation and shared their experiences with us in surveys and in-depth interviews.

We gratefully acknowledge financial support and technical guidance from the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services. Contracting Officer's Representatives Nicole Constance and Amelia Popham played a critical role in guiding the study and provided helpful comments on multiple drafts of this report. We also thank the following ACF staff for their feedback and other efforts on behalf of the study: Hilary Bruck, Elaine Carpenter, Mark Fucello, Naomi Goldstein, Emily Schmitt, and Kim Stupica-Dobbs.

At Abt Associates, a large team contributed to the evaluation. Brenda Rodriguez led the survey data collection effort, with help from Jill Mizzell and a team of interviewers. David Judkins led the data analysis effort, with support from Douglas Walton, Danielle Bartolanzo, and Nayara Mowry. We also acknowledge useful feedback on report drafts from Larry Buron, David Fein, Jacob Klerman, and Laura Peck; assistance from Bry Pollack in editing the report; and support in production and graphic design from Marina Kosareva and Daniel Jefferson Smith.

Contents

List of Exhibits

List of Boxes

Overview

This report documents the impacts three years after random assignment for the Pathways to Healthcare program, operated by Pima Community College and Pima County One Stop in Tucson, Arizona. The program aimed to help low-income, low-skilled adults access and complete occupational training that could lead to increased employment and higher earnings. Pathways to Healthcare consisted of five elements:

(1) Mapping 16 existing healthcare occupational training programs into five pathways, each incorporating a ladder that enabled students to obtain stackable credentials;

(2) Proactive advising such as career counseling;

(3) Scholarships for tuition and books;

(4) Two compressed basic skills programs that in one semester remediated students whose low skills prevented them from enrolling directly in training; and

(5) Job search assistance.

Pathways to Healthcare is part of the **Pathways for Advancing Careers and Education (PACE)** study. Funded by the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services, PACE is a multi-site experimental evaluation of nine programs aimed at helping low-income adults to access career pathways. The Career Pathways Intermediate Outcomes (CPIO) Study extends the follow-up period to three years for programs in the PACE Study. Future reports produced by the Career Pathways Long-Term Outcomes Study will extend the follow-up period further.

Purpose

Pathways to Healthcare was an effort to address the increased demand in the local labor market for workers in the healthcare sector and provide improved labor market opportunities for low-income, low-skilled adults. It operated between 2010 and 2016 with funding from the ACF Health Profession Opportunity Grants (HPOG) Program. Pathways to Healthcare was organized as a pathway that trained students for entry-level occupations, such as Certified Nursing Assistant and Medical Office Clerk, as well as for higher-level positions, such as Licensed Practical Nurse and Health Information Technology-related jobs. It incorporated a range of financial, academic, employment, and personal supports and services.

This research was undertaken to evaluate whether Pathways to Healthcare was successful in providing training to low-income, low-skilled adults and whether the program's efforts led to impacts on credentials, earnings, healthcare employment, and other life outcomes.

Research Questions

Three years after random assignment, what were the effects of Pathways to Healthcare on:

- educational outcomes?
- entry into career-track employment and higher earnings?
- individual and family well-being, including income and other life outcomes?

Key Findings

Analyses in this report indicate that after three years, Pathways to Healthcare:

- ***Increased the receipt of postsecondary credentials taking a year or more of college to earn—one of the two confirmatory outcomes in this report.***

The program increased the receipt of postsecondary credentials taking a year or more of college to earn from 11 percent to 18 percent, an impact of 7 percentage points. Credentials that typically require at least a year of college are associated with higher-level pathway courses, such as Licensed Practical Nurse and Medical Assistant. The program increased receipt of college credentials taking less than a year from 6 to 26 percent, a noticeably larger 20 percentage point impact. Credentials associated with short-term training include Certified Nursing Assistant and Medical Office Clerk.

- ***Had no detectable impact on average quarterly earnings in follow-up quarters 12-13, the second of two confirmatory outcomes in this report.***

Treatment and control group members both earned about $4,000 per quarter in quarters 12 and 13 after random assignment. There was no evidence of positive impacts on earnings through quarter 18.

- ***Had no detectable impact on employment overall as of three years after random assignment, but increased employment in the healthcare field.***

Slightly less than two thirds of both the treatment and control groups reported being employed as of the follow-up survey. About 40 percent of the treatment group self-reported employment in the healthcare field, an increase of 5 percentage points over the control group. There were no detectable impacts on characteristics of job quality, such as jobs that pay at least $14 per hour, require “at least mid-level skills,” or offer health insurance.

Methods

The Pathways to Healthcare evaluation used an experimental design in which program applicants were assigned at random to a treatment group that could access the program or a control group that could not, then compared their average outcomes. From February 2012 to February 2014, more than 1,200 applicants were randomly assigned. The impact study used data from a follow-up survey conducted three years after random assignment, administrative records from Pima Community College, earnings records from the National Directory of New Hires, and college enrollment data from the National Student Clearinghouse. The study measured impacts on training, employment, and earnings outcomes approximately three years after random assignment for all measures and up to five years for select earnings and education measures with available administrative data.

Executive Summary

Pima Community College (PCC) and Pima County One-Stop (PCOS) in Tucson, Arizona, implemented the **Pathways to Healthcare Program** to help low-income, low-skilled adults access and complete healthcare occupational training that could lead to increased healthcare employment and higher earnings. In doing so, PCC also aimed to address expected labor shortages in healthcare occupations in the Tucson area.

Abt Associates is evaluating Pathways to Healthcare as part of the **Pathways for Advancing Careers and Education (PACE)** study. Funded by the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services, PACE is a multi-site experimental evaluation of nine programs aimed at helping low-income adults to access career pathways. This report, which is part of the Career Pathways Intermediate Outcomes study, summarizes Pathways to Healthcare's impacts on educational attainment, earnings and employment, and other life outcomes over a three- to five-year follow-up period.[1] It extends analyses from an earlier report that covered implementation and short-term impacts (18 months after randomization) on education and employment-related outcomes.[2] Future reports produced by the Career Pathways Long-Term Outcomes Study will extend the follow-up period further.

The Pathways to Healthcare Evaluation

Pathways to Healthcare aimed to engage low-income adults in college and facilitate their academic and career progress by augmenting the Pima Community College's existing training programs with support and employment services. It operated between 2010 and 2016 with funding from the ACF Health Profession Opportunity Grants (HPOG) Program.[3]

Pathways to Healthcare mapped 16 existing healthcare occupational training programs into five pathways and aspired to guide participants along them: Medical Office, Nursing, Medical and Physician Support, Emergency Medicine, and Other. Each pathway incorporated multiple steps, and each step (except the last) was associated with a higher-level credential. The program also included proactive academic and non-academic advising; scholarships for tuition and books; two compressed basic skills programs that in one semester remediated students whose low skills prevented them from enrolling directly in training; and job search assistance.

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1 All outcomes are measured at least three years after random assignment. For some outcomes in the educational attainment and earnings and employment domains, administrative records are available for up to five years after random assignment.

2 That implementation and early impact report is available at https://www.acf.hhs.gov/opre/resource/pima-community-college-pathways-to-healthcare-program-implementation-early-impact-report.

3 ACF is separately evaluating the HPOG Program through the HPOG 1.0 Impact Study. Pathways to Healthcare is included in the pooled analyses of that study. For more information see https://www.acf.hhs.gov/opre/research/project/health-profession-opportunity-grants-hpog-impact-studies.

Abt Associates used an experimental evaluation design to estimate the impact of access to Pathways to Healthcare on participants' postsecondary training, earnings and employment, and other life outcomes.[4] A total of 1,217 individuals agreed to participate in the study—609 were randomly assigned to the treatment group and 608 to the control group. The analysis estimates impacts for each outcome by calculating the difference between average values in the treatment and control groups. The experiment was designed to capture the effects of the program overall rather than the separate contributions of its components.[5]

The short-term report indicated that PCC implemented as designed the program's key components, including basic skills education, occupational training pathways, and advising. In general, treatment group members received more supportive services than control group members did, though the proportion of each group receiving services was low. For example, 23 percent of treatment group members and 14 percent of control group members reported receiving employment services. Though the 9 percentage point difference is statistically significant, it remains that the majority of treatment group members did not receive employment services.

As of 18 months after random assignment, Pathways to Healthcare increased hours of occupational training—the short-term confirmatory outcome pre-selected to assess whether the program was on track to meet its longer-term education and earnings goals. The program also increased college credentials earned.

Key Findings from the Current Report

This report begins by describing participation of the treatment group in Pathways to Healthcare training since the short-term report. Then the focus shifts to the impact of Pathways to Healthcare on postsecondary training, earnings and employment, and other life outcomes over a three- to five-year follow-up period.

Participation in Training

The Pathways to Healthcare program first aimed to increase participation in and completion of an initial step on a career pathway; next it advised participants to work in a healthcare job related to the credential earned and later to return and enroll in a subsequent step on the pathway.

[4] Such a design ensures that any estimated impacts can be attributed to program access rather than to unmeasured differences between eligible study sample members with access (the treatment group) and without access (the control group).

[5] Designers of Pathways to Healthcare deliberately included a package of multiple strategies (e.g., assessment, instruction, supports, and employment connections) that they hypothesized were needed to produce desired impacts. Thus, the evaluation focuses on whether the program as a whole, when implemented in real-world conditions, produced an impact.

- ***The treatment group's participation in Pathways to Healthcare occupational training and their progress along its pathways grew over the three years of follow-up.***

As of three years after random assignment, 56 percent of the treatment group had enrolled in occupational training, an increase from 48 percent in the first 18 months. Overall, 19 percent of treatment group members earned a credential at a level higher than where they began their training, indicating that they took a next step on their career pathway.

The Pathways to Healthcare program ended in 2016, but among the options available to treatment group members to continue their progress was to enroll in further training through PCC's second-round HPOG grant, the **Health Career Opportunities with Personalized Educational Supports (HOPES)**, which is expected to end in 2020.[6] Or they could enroll in other programs at PCC or elsewhere in the community. According to HOPES program records, 84 treatment group members, or nearly 14 percent of the Pathways to Healthcare treatment group, received training as part of HOPES.[7]

Impacts on Postsecondary Training

Pathways to Healthcare continued to have impacts on credential receipt after the impacts observed in the 18-month report; that is, the program's impact on receipt of college credentials taking less than a year to earn ("short-duration" credentials) persisted. At three years after randomization, there was an impact of the program on *credentials taking a year or more of college to earn* ("long-duration" credentials)—pre-selected as the confirmatory outcome at this later follow-up point. The program also increased the number of college credits earned and overall enrollment in college at three years after random assignment.

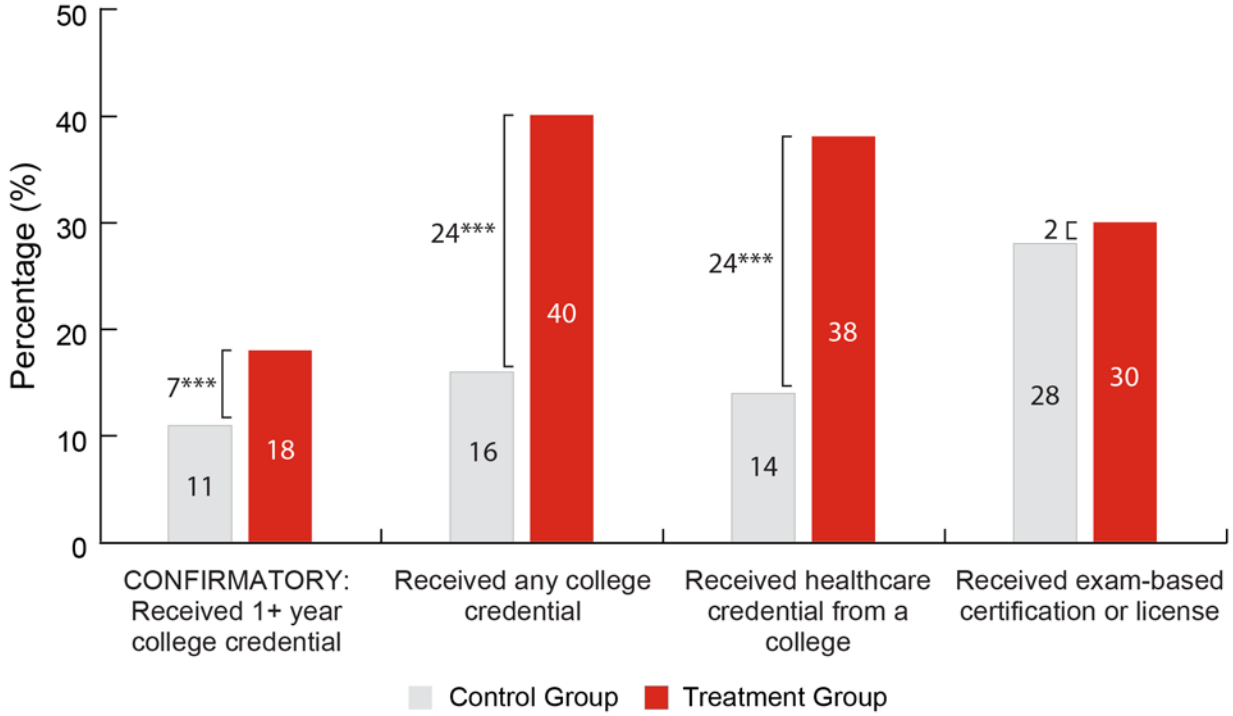
- ***The treatment group earned more college credentials that take a year or more to earn—the confirmatory educational outcome in this three-year report—than did the control group.***

Credentials that typically require at least a year of college are associated with higher-level pathway courses, such as Licensed Practical Nurse and Medical Assistant. Pathways to Healthcare increased the receipt of these types of credentials from 11 percent in the control group to 18 percent in the treatment group, an impact of 7 percentage points (Exhibit ES-1).

[6] The second HPOG grant is expected to end in September 2020. As of a fall 2017 site visit, PCC expected to sustain the program after the grant ends, although state and college budget cuts could affect these plans.

[7] If Pathways to Healthcare participants enrolled in or completed credentials through HOPES during the three-year follow-up period, that enrollment/attainment was counted as part of the three-year outcomes analyzed in this report. See Chapter 3.

Exhibit ES-1: Impacts on Postsecondary Training Outcomes, Three Years after Randomization



Source: PCC records: Received 1+ year college credential, Received any college credential, and Received healthcare credential from a college. Blend of PACE 18-month and three-year follow-up surveys: Received exam-based certification or license.

Note: Sample size for Received 1+ year college credential, Received any college credential, and Received healthcare credential from a college is 609 in the treatment group and 608 in the control group. Sample size for Received exam-based certification or license is 530 in the treatment group and 510 in the control group. Statistical significance is based on one-tailed tests. Receipt of exam-based certification or license is based on responses from both the 18-month and three-year follow-up surveys.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***Pathways to Healthcare had larger impacts on receipt of any college credentials defined broadly than it did on long-duration college outcomes specifically.***

Exhibit ES-1 also reports impacts for secondary outcomes in the postsecondary training domain, including *received any college credential* and *received a healthcare credential from a college*. As shown, Pathways to Healthcare's 24 percentage point impact for *any credential* (which includes both short-duration and long-duration ones) is more than three times as large as the impact for long-duration credentials only (7 percentage points). The impact is an increase of 140 percent above the control group mean (16 percent). The program also had a 24 percentage point impact on *receipt of a healthcare credential from a college*. There was no detectable difference in *receipt of exam-based certifications or licenses*.

- ***Pathways to Healthcare increased college enrollment and credits.***

The program increased full-time-equivalent months enrolled in college from a control group mean of five months by 0.8 months according to PCC administrative records and by 2.8 months according to the three-year follow-up survey. The program also increased the average number of college credits earned by 2.3 credits (Neither shown).

Impacts on Earnings, Employment, and Other Life Outcomes

Pathways to Healthcare's impact on credentials generated little detectable impact on employment, earnings, or other life outcomes over the nearly five-year follow-up period observed.

- ***Pathways to Healthcare had no detectable impact on average quarterly earnings in follow-up quarters 12-13—the confirmatory earnings outcome in this three-year report.***

Exhibit ES-2 shows that treatment and control group members both earned about $4,000 per quarter in follow-up quarters 12 and 13. At that time, the difference in average quarterly earnings was positive but small (+$17) and not statistically significant. As is true in all evaluations of job training programs, the impact was estimated with uncertainty. A plausible range of estimates taking into account this uncertainty would be −$322 to +$356.[8] Most of this range is either negative or not sufficiently larger than zero to be meaningful.[9] The exhibit also shows no evidence of positive earnings impacts through quarter 18. Thus, the treatment group's additional training has not yet produced increased earnings.

- ***Pathways to Healthcare had no detectable effect on employment overall as of three years after random assignment, but it did increase self-reported employment in the healthcare field.***

Slightly less than two thirds of both the treatment and control groups reported employment at the time of the three-year follow-up survey. Nearly four of 10 treatment group members self-reported employment in the healthcare field, an impact of 5 percentage points relative to the control group.

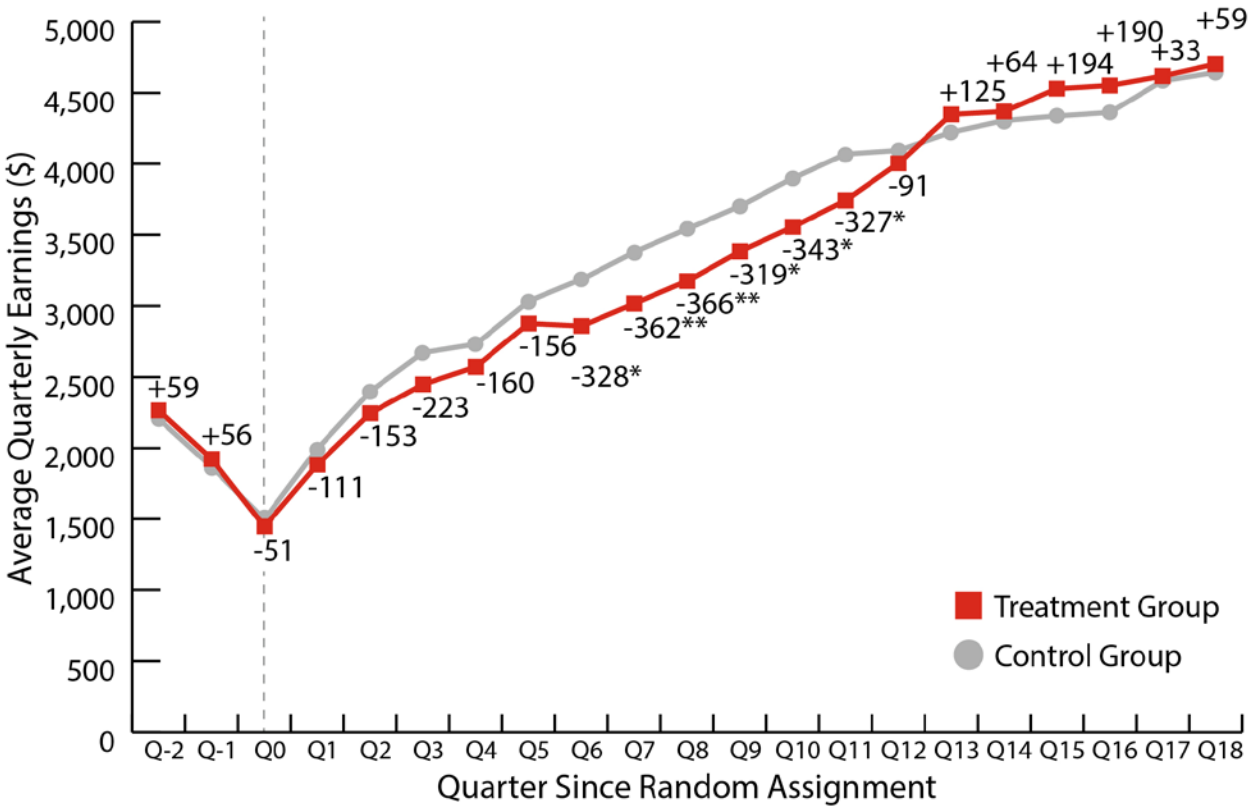
There were no detectable impacts on other characteristics of employment. This included jobs that pay at least $14 per hour, jobs that require "at least mid-level skills," hours worked per week, type of shift (regular or varying), availability of health insurance, or a supportive working environment.[10]

[8] These values are the endpoints for a 90 percent confidence interval for average earnings in quarters 12 to 13.

[9] The upper end of this plausible range is not large relative to results from some recent studies. For instance, about two years after random assignment, impact for those assigned to the Wisconsin Regional Training Partnership (WRTP) in the Sectoral Employment Impact Study (SEIS) was $782 per quarter (Maguire et al. 2010) and for Per Scholas (one provider in the WorkAdvance Demonstration) was $937 per quarter (Hendra et al. 2016).

[10] We tested whether the program could generate a moderate initial boost in wages with the expectation for further impact over time (a key assumption in the theory of change). We defined these jobs using the 60th percentile of the control group wage distribution, which corresponded to $14 per hour.

Exhibit ES-2: Impact on Average Earnings in Successive Follow-up Quarters, Three Years after Randomization



Source: National Directory of New Hires.

Note: Earnings estimates within each quarter are exploratory outcomes and statistical significance is based on two-tailed tests. Sample size is 609 in the treatment group and 608 in the control group.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***Findings were mixed for career knowledge, availability of career supports, and psycho-social skills.***

Improvements to these outcomes are hypothesized to boost postsecondary educational attainment and career progress. As well, improvements in educational attainment and career progress are expected to positively affect these outcomes. The treatment group reported greater access to career supports, but no more confidence in their career knowledge or higher levels of psycho-social skills.

- ***Pathways to Healthcare had no detectable impact on most measures of family economic well-being.***

The Pathways to Healthcare theory of change implies that outcomes related to family economic well-being will improve as a result of increases in education and training leading to more favorable earnings and employment outcomes. However, the program did not have any detectable impact in this area. The results do not show a statistically significant difference in health insurance coverage between the treatment and control groups; roughly 90 percent of

both groups reported having coverage. Nor did the program have a detected impact on receipt of means-tested public benefits, participant student debt, or any signs of financial distress.[11]

Possible Explanations

To summarize the main results over the three- to five-year follow-up period covered in this report, Pathways to Healthcare increased educational credentials but had no impact on earnings. The report explores several possible explanations for the combination of positive impacts on education outcomes and no detectable impact on earnings:

- **A large share of treatment group members did not engage in the program.**

Forty-four (44) percent of the treatment group did not engage in any occupational training within three years after random assignment. This is slightly lower than in the 18-month follow-up period, when 52 percent did not participate in occupational training, because some treatment group members who had not engaged in the short-term had engaged within three years. If occupational training is required in order to observe an impact on earnings, then the large minority of treatment group members who did not engage reduces average impacts for the study sample as a whole.

- **The program mostly increased short-duration credentials with modest potential to lift wages.**

Pathways to Healthcare had large impacts on short-duration credentials (20 percentage points). Short-duration credentials are typically associated with initial pathway steps, and wages for occupations in those steps do not differ substantially from wages that can be earned outside of the healthcare field (e.g., personal care and service, food preparation or serving). Thus, a short-duration credential may position the worker on the initial step of a career ladder, but absent follow-on training, the credential would not necessarily generate an impact on earnings.

- **Impacts on long-duration credentials are too small to generate earnings impacts.**

Average hourly wages should grow when participants move to occupations associated with higher-level credentials. The relatively small impact of the Pathways to Healthcare program on receipt of long-duration credentials implies impacts on earnings may not be large enough for the study to detect.

[11] Unsecured debt is debt other than student debt and secured debt (mortgages and title loans); spousal debt is included. Signs of financial distress is a flag for utility disconnects, delayed health/dental care, hunger, or trouble paying bills or making ends meet.

Looking Ahead

A future report will document the impact of Pathways to Healthcare on educational progress and earnings approximately six years after random assignment. In that report, detectable impacts on earnings would be expected only if there are changes along the dimensions discussed in the prior section; that is, if more treatment group members engage in training associated with longer-duration credentials and shift into higher-paying jobs. That six-year follow-up research will explore whether impacts on long-duration credentials grow and impacts on earnings emerge.

1. Introduction

The federal Bureau of Labor Statistics (BLS) projects that healthcare occupations will add more jobs through 2026 than any other occupational group, largely due to an aging population. The healthcare sector's projected growth rate, 18 percent, is much faster than any other occupational group.[12]

Community colleges and other training providers are offering a range of training programs tailored to this increased demand in the healthcare sector. Many of these programs are organized as pathways that train students for entry-level occupations, such as Certified Nursing Assistant and Medical Office Clerk, as well as higher-level positions, such as Licensed Practical Nurse and jobs in Health Information Technology. These programs range in length from one to 24 months, and result in a variety of credentials ranging from occupational certificates to associate degrees. Moreover, programs aim to enroll a variety of students—in particular nontraditional students—who are older, are likely to be combining work and school, and have children. To do so, they offer accelerated coursework, flexible formats (e.g., online, at different locations in the community), and incorporate basic skills remediation for those who have been out of school for a period of time.

In recent years, federal initiatives have aimed to help low-income adults, including Temporary Assistance for Needy Families (TANF) recipients, access training in order to attain skills needed to become self-sufficient.[13] The Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services funded one such initiative, the **Health Profession Opportunity Grants (HPOG)** Program. In 2010, ACF awarded a first round of HPOG grants (HPOG 1.0) to programs that provided TANF recipients and other eligible low-income individuals with the opportunity to obtain education and training for occupations in the healthcare field that were expected to either experience labor shortages or be in high demand.[14]

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12 See https://www.bls.gov/ooh/healthcare/home.htm.

13 The TANF program, which is time limited, assists families with children in providing for the family's basic needs. The Federal government provides block grants to States to run the TANF program. States have broad flexibility to carry out their programs. States determine the design of the program, the type and amount of assistance payments, the range of other services to be provided, and the rules for determining who is eligible for benefits.

14 The HPOG Program was authorized by the Affordable Care Act (ACA), Public Law 111-148, 124 Stat. 119, March 23, 2010, sect. 5507(a), "Demonstration Projects to Provide Low-Income Individuals with Opportunities for Education, Training, and Career Advancement to Address Health Professions Workforce Needs," adding sect. 2008(a) to the Social Security Act, 42 U.S.C. 1397g(a), and extended by the Bipartisan Budget Act of 2018, Pub. L. 115-123, through fiscal year 2019. ACF awarded a second round of grants in 2015.

Pima Community College (PCC) in Tucson, Arizona, received an HPOG 1.0 grant to implement the **Pathways to Healthcare Program**. The program provided financial support for training, along with case management, supportive services, and employment services, to encourage low-income adults to train for healthcare jobs. It operated through a partnership between PCC and Pima County One-Stop (PCOS) from 2010 to 2016.[15]

Abt Associates is evaluating Pathways to Healthcare as part of the **Pathways for Advancing Careers and Education (PACE)** study. Funded by ACF, PACE is studying nine programs aimed at helping low-income adults to access career pathways (see Programs in PACE box). This study, the Career Pathways Intermediate Outcomes study, extends the follow-up period to three years for programs in the PACE study. Future reports produced by the Career Pathways Long-term Outcomes Study will extend the follow-up period further.

Programs in PACE

- **Bridge to Employment in the Healthcare Industry**, San Diego Workforce Partnership, San Diego County, CA*****
- **Carreras en Salud**, Instituto del Progreso Latino, Chicago, IL^
- **Health Careers for All**, Workforce Development Council of Seattle-King County, Seattle, WA*****
- **Integrated Basic Education and Skills Training (I-BEST) program** at three colleges (Bellingham Technical College, Everett Community College, and Whatcom Community College), Washington State
- **Pathways to Healthcare**, Pima Community College, Tucson, AZ*****
- **Patient Care Pathway Program**, Madison College, Madison, WI
- **Valley Initiative for Development and Advancement (VIDA)**, Lower Rio Grande Valley, TX
- **Workforce Training Academy Connect**, Des Moines Area Community College, Des Moines, IA
- **Year Up**, Atlanta, Bay Area, Boston, Chicago, National Capital Region, New York City, Providence, and Greater Seattle

*****Programs funded through the Health Profession Opportunity Grants (HPOG) Program.

^Program partially HPOG funded.

All nine programs include some features of the overarching career pathways framework (Fein 2012). This framework posits that postsecondary education and training should be organized as a series of steps leading to successively higher credentials and employment opportunities in growing occupations. To effectively engage, retain, and facilitate learning of a diverse population, career pathways programs integrate four program components:

(1) **Academic and non-academic assessment** to identify student needs and factors that may facilitate or hinder academic success, so advisors can make appropriate placements and referrals;

[15] Grants were five years in duration. Grantees could request a six-month no-cost extension. PCC received a six-month extension and provided services through the Pathways to Healthcare program through March 2016.

(2) **Innovative basic skills and occupational skills instruction** to make education and training more manageable for nontraditional students who are likely to be balancing school and work (e.g., accelerated courses) and who may have low levels of basic skills (e.g., contextualization);

(3) **Academic and non-academic supports** (e.g., academic advising, tutoring, financial support, and referrals to support services) to help students succeed in their current academic step and to proceed to and complete subsequent steps; and

(4) **Strategies to connect participants and employers** during the program, such as internships, or post program, such as employment workshops.

Because the nine programs vary in their target populations, mix of components, and occupational fields, PACE is evaluating each program separately.[16] This report documents the impact of Pathways to Healthcare on postsecondary training, earnings and employment, and other life outcomes of students approximately three years after they agreed to participate in an evaluation of the program. An earlier report shared findings on implementation and short-term (18-month) impacts on education, employment, and related outcomes (Gardiner et al. 2017).

The remainder of this chapter describes Pathways to Healthcare key components and context (Section 1.1). It then summarizes findings from the 18-month report (Section 1.2). Finally, it provides a roadmap to the remainder of the report (Section 1.3).

1.1 The Pathways to Healthcare Program

ACF awarded PCC of Tucson, Arizona, a five-year, $18-million HPOG grant to launch and operate the Pathways to Healthcare program. The program ended in 2016.[17]

The major Pathways to Healthcare program components were:

- **Mapping 16 of PCC's occupational training programs into five pathways** and identifying a "ladder" of programs within each pathway (Levels 1 through 3). This structure clarified for students how completion of one credential can lead to a next-higher credential (and a higher-paying job) (see Exhibit 1-1). Moreover, Level 1 programs included all prerequisites for Level 2, and Level 2 programs included prerequisites for Level 3. PCC tied learning outcomes to expected outcomes in the industry, with each level indicating greater mastery. This structure made the sequencing of programs and credentials within each pathway clear. The 16 occupational training programs varied along several dimensions: in length (from one to 24 months), in whether

[16] PACE-related documents, including profiles and implementation and early impact reports for each program, can be found at www.acf.hhs.gov/opre/research/project/pathways-for-advancing-careers-and-education and www.career-pathways.org.

[17] PCC began implementing a modified version of the Pathways to Healthcare program, Health Career Opportunities with Personalized Educational Supports (HOPES), with funding from a second-round HPOG grant (HPOG 2.0) awarded in 2015 and implemented beginning in 2016.

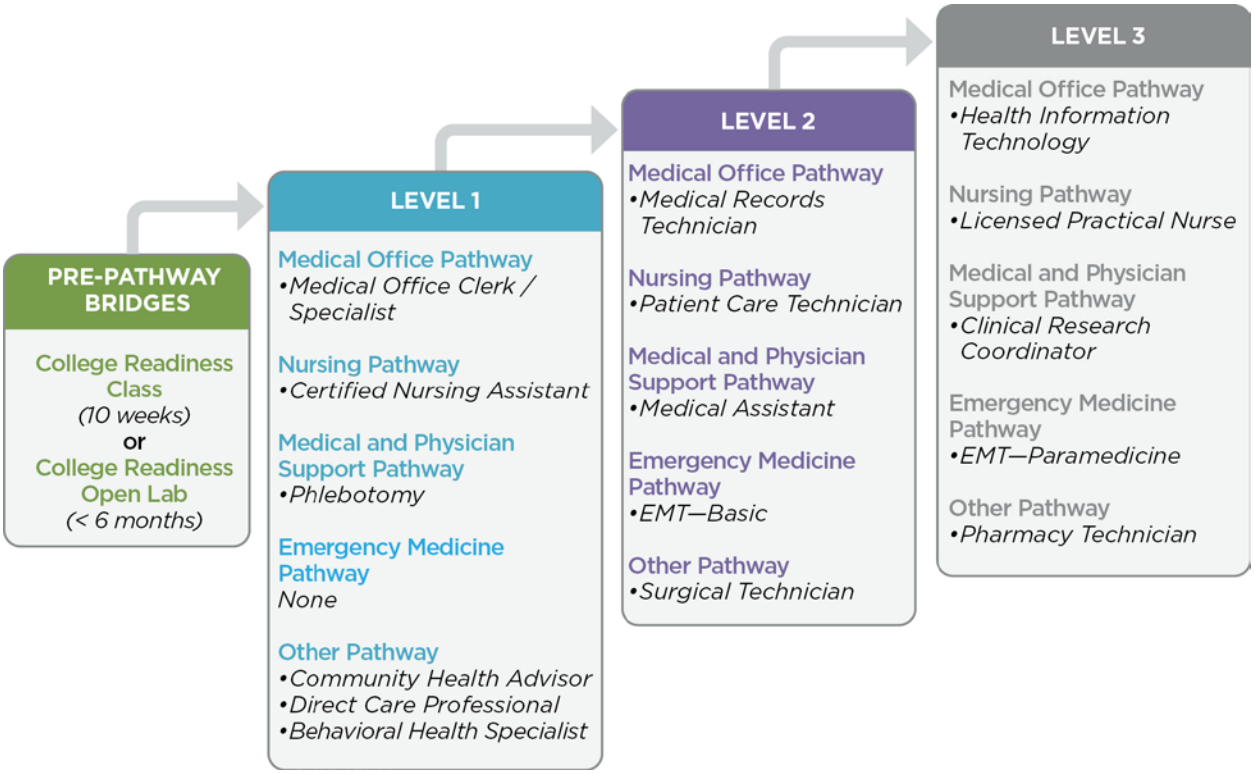
completers obtained credits or noncredit "clock hours," and in whether completion resulted in a degree or a certificate.

- **More-intensive and proactive academic and non-academic advising** to identify and resolve barriers to program participation, aid participants in selecting a training program, help them persist in and complete the chosen program, and subsequently enter employment. Participants had three advisors: one at PCOS to identify and address barriers to participation and two at PCC. Students worked with one PCC advisor when they were preparing for occupational training (e.g., filling out required paperwork, scheduling classes, attending a College Readiness class or lab) and a different PCC advisor after their program began.
- **Scholarships** for tuition, books, and other program supplies, to reduce the cost of obtaining a certificate or degree.
- **Two compressed and contextualized College Readiness basic skills "bridge" programs** for participants who did not test high enough on college assessments to enter their occupational training program directly.[18] The 10-week course and the self-paced open lab aimed to help students quickly remediate their basic skills so that they could retake and pass the assessments.[19]
- **Employment supports**, including resume preparation, coaching for interviews and other forms of job search assistance to help program completers locate employment, most of which staff developed in the later years of the Pathways to Healthcare program.

[18] Applicants deemed eligible for Pathways to Healthcare first took the TABE to determine whether they needed to start at the College Readiness level, and then took the ACT Compass to determine their starting level within a pathway. See Section 1.1.1 for details on eligibility requirements.

[19] Participants could select either College Readiness bridge format; selection was generally a function of schedules. Participants who worked during the day and could not commit to a structured class tended to enroll in the lab.

Exhibit 1-1: Pathways Overview, Pathways to Healthcare



As noted above, the pathways were designed so that each level completed was associated with a higher-paying position. Hourly wages for Level 1 occupations were not substantially different from entry-level wages outside of the healthcare field. For instance, according to the BLS, the average wage in the Tucson Metropolitan Statistical Area (MSA) in May 2018 was $14.36 per hour for a Certified Nursing Assistant; $14.97 for a health support worker; and $16.84 for a Phlebotomist.[20] These wages are only slightly higher than other initial career ladder steps including personal care and service ($13.39 per hour) and food preparation and serving jobs ($13.15 per hour). Furthermore, these are average wage rates; at entry level the wages are likely lower than reported here.

As participants progressed along pathways, they could expect gradual wage growth. Average wages for Level 2 occupations such as Medical Assistant and Surgical Technician were $15.04 and $22.74 per hour, respectively. Average wages for Level 3 occupations such as Pharmacy Technician and Licensed Practical Nurse were $17.47 and $24.26, respectively.

Each occupational training in Pathways to Healthcare involved upfront activities such as the training-specific "passport," which was a checklist of steps students must have completed prior to starting a training program. Program participants also worked with their advisors to create a Training Plan, which listed preparatory activities required to enroll in a particular training program. However, depending on when a participant entered Pathways to Healthcare, he or she

[20] See https://www.bls.gov/oes/current/oes_46060.htm.

might have had to wait for a training class to start. On average, the length of time from program enrollment to the start of the first training class was four months. Toward the end of the grant period, PCC implemented a bi-monthly group orientation to engage participants and remind them of the steps required prior to entering training.

PCC designed the program so that students could take multiple steps on a pathway. As noted, each pathway included a natural sequencing of training programs and associated credentials that recognized student progress. With the exception of one program pairing (Certified Nursing Assistant to Patient Care Technician), completers had to work for at least six months before returning for the next level of training to ensure that the occupation was a good fit, and then take the initiative to re-enroll in the next pathway course of study. The time-limited funding through the HPOG 1.0 grant may have curtailed some students' ability to return and earn a higher-level credential.[21] For example, a treatment group member who enrolled in a training program toward the end of the Pathways to Healthcare grant period would not have had time to complete training, obtain work experience, and return for a second training before the HPOG 1.0 funding expired in March 2016.[22]

1.1.1 Eligibility and Enrollment

For the PACE evaluation of Pathways to Healthcare, PCC staff screened applicants for eligibility and then randomly assigned eligible applicants to a treatment or a control group. To be eligible for the program, applicants had to:

- Reside in Pima County;
- Have income at or below 70 percent of the Lower Living Standard Income Level;[23]
- Be eligible to work in the United States; and
- Have an interest in a healthcare-related career.

Applicants deemed eligible who consented to be in the study completed two study forms (the Basic Information Form and the Self-Administered Questionnaire). Random assignment governed program entry. Those study participants randomly assigned to the treatment group

[21] HPOG 2.0 grants were awarded in September 2015. As a result, HPOG 1.0 grantees who were awarded HPOG 2.0 grants (such as PCC) did not know they could continue supporting students until the end of the HPOG 1.0 grant period.

[22] To address this issue, per ACF guidance, PACE study participants could enroll in additional training through HOPES, PCC's second-round HPOG-funded program. According to the research team evaluating HPOG 2.0, PCC staff conducted outreach to HPOG 1.0 treatment group members to alert them to its new grant and the opportunity to obtain additional training without having to go through the new evaluation's random assignment.

[23] Lower Living Standard Income Level is a measure, determined by the U.S. Department of Labor, to establish "low-income" status. In 2013, for a family of four in Pima County, 70 percent of the Lower Living Standard Income Level was $27,724 annually. This is about 16 percent higher than the poverty guideline the same year for a family of four ($23,850). See https://aspe.hhs.gov/2014-poverty-guidelines.

could access Pathways to Healthcare; those assigned to the control group could not.[24] Between February 2012 and January 2014, PCC staff randomly assigned 1,217 study participants: 609 to the treatment group and 608 to the control group.

Although the control group could not enroll in Pathways to Healthcare, they could enroll in other services and programs in the community. In practice, control group members had access to much, but not all, of the services available to treatment group members. With the exception of one evening Nursing Assistant course taught by an HPOG-funded instructor, control group members could enroll in PCC's 16 occupational programs mapped to Pathways to Healthcare, but they would need to seek financial support on their own. Thus, the key treatment-control group differences were the availability of:

- The College Readiness bridges for those who needed them;
- Financial assistance in the form of scholarships;
- Academic advising to help navigate the enrollment process and to provide academic supports;
- Non-academic advising to identify and address challenges to enrollment and persistence in the program; and
- Dedicated employment services.

1.1.2 Characteristics of the Study Sample

Exhibit 1-2 shows the study sample's characteristics at baseline, both overall and for the treatment and control groups separately. The *p*-values in the right-most column indicate that the evaluation's random assignment procedure produced treatment and control groups with no significant differences in these characteristics.

Exhibit 1-2 also shows that the Pathways to Healthcare study sample reflects the program's eligibility criteria closely. At application, sample members were low income; approximately half had annual household incomes of less than $15,000, and about 85 percent had incomes less than $30,000. About two thirds received benefits from the Supplemental Nutrition Assistance Program (SNAP) or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). TANF recipients, a target population for the HPOG Program generally, accounted for about 8 percent of study participants.

About three fifths reported experiencing signs of financial hardship in the past year.[25] Most study participants were not working at the time of random assignment, although the majority

[24] Eligible applicants who did not consent to be in the study did not fill out the study forms and were not able to enroll in Pathways to Healthcare.

[25] *Financial hardship* is defined as ever missed rent/mortgage payment in prior 12 months or reported generally not having enough money left at the end of the month to make ends meet over the last 12 months.

expected to start working in the following months, perhaps suggesting a need or desire to combine work and education and training.

Exhibit 1-2: Selected Characteristics of the Pathways to Healthcare Sample at Baseline

Characteristic	All Participants	Treatment Group	Control Group	*p*-Value
Age (%)				.320
20 or under	8.4	6.9	9.8	
21 to 24	13.0	13.3	12.8	
25 to 34	31.7	32.2	31.3	
35 or older	46.9	47.6	46.2	
Sex (%)				.929
Female	82.7	82.8	82.7	
Male	17.3	17.2	17.4	
Race/Ethnicity (%)				.631
Hispanic, any race	55.8	56.4	55.2	
Black, non-Hispanic	11.5	12.3	10.7	
White, non-Hispanic	26.6	26.6	26.6	
Other, non-Hispanic	8.0	7.0	9.1	
Current Education (%)				.779
Less than a high school diploma	8.4	7.9	8.8	
High school diploma or equivalent	34.5	35.4	33.6	
Less than 1 year of college	16.4	16.9	15.9	
1 or more years of college	26.3	26.5	26.0	
Associate degree or higher	14.5	13.3	15.7	
Income (%)				.618
Less than $15,000	48.9	50.1	47.6	
$15,000 to $29,999	36.2	35.9	36.6	
$30,000 or more	14.9	14.1	15.8	
Mean ($)	$17,236	$16,817	$17,653	.294
Public Assistance / Hardship in Past 12 Months (%)				
Received WIC or SNAP	68.3	67.1	69.6	.345
Received public assistance or welfare	7.7	7.3	8.1	.676
Reported signs of financial hardship	59.4	61.6	57.3	.128
Current Work Hours Per Week (%)				.211
0	65.6	66.9	64.3	
1 to 19	6.8	5.6	8.0	
20 to 34	15.6	14.7	16.6	
35 or more	12.0	12.9	11.2	
Expected Work Hours Per Week in Next Few Months (%)				.408
0	30.4	30.4	30.5	
1 to 19	5.8	4.8	6.8	
20 to 34	37.4	37.0	37.7	
35 or more	26.5	27.8	25.0	
Sample sizes	1,217	609	608	

Key: SNAP = Supplemental Nutrition Assistance Program. WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.
Source: PACE Basic Information Form.

Note: There are no significant differences at the $p = .10$ level. Some percentages for characteristics do not add up to 100% due to rounding. Public Assistance/Hardship in Past 12 Months does not add to 100% because the categories are neither mutually exclusive nor exhaustive. See Appendix A for more details on baseline characteristics.

In terms of demographics, study participants were older than traditional college students. About 80 percent were age 25 and older, and almost half were age 35 or older. In terms of education, about 60 percent had less than a high school education, a high school diploma or equivalent, or less than a year of college. The great majority of study participants were female. More than half identified as Hispanic.

1.1.3 Local Context

Pima County, located in southern Arizona on the border with Mexico, is urban and ethnically diverse. At the time of the study, the county had more than one million residents; Tucson, with a population of 527,972, was the largest city.[26] The median household income in Pima County was $46,233, lower than for Arizona ($49,928) and the United States ($53,657).[27]

Like the national economy, the local economy improved over the study period. Between March 2013 and March 2015, the Pima County unemployment rate decreased from 6.6 percent to 5.3 percent. By March 2018 (the end of the current report's observation period), it had fallen further to 4.4 percent. [28]

The types of healthcare jobs for which Pathways to Healthcare provided training were projected to grow locally. Occupational projections for the Tucson MSA indicate that between 2012 and 2022, "healthcare practitioner and technical"[29] occupations will increase by 18 percent and "healthcare support"[30] occupations by about 23 percent.[31] In its HPOG grant application, PCC also noted that every year thousands of older people retire to the Sun Belt (which stretches across the southern United States, including Tucson) and that Arizona, relative to other states, has a lower than average number of caregivers (2.3 per 1,000 residents compared with 3.5 nationally). The aging population could easily "overwhelm" the healthcare system.[32]

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[26] U.S. Census Bureau, Vintage 2014 Population Estimates: Sub-county Population Places and MCDs. Populations for 2014.

[27] Pima County data from https://www.census.gov/quickfacts/table/PST045215/04019. Arizona data from https://www.census.gov/quickfacts/table/PST045215/04. U.S. data from https://www.census.gov/data/tables/time-series/demo/income-poverty/cps-hinc/hinc-01.html.

[28] See http://data.bls.gov.

[29] This occupational group includes physicians (e.g., internists, surgeons, and obstetricians), nurses (e.g., registered, midwives, nurse practitioners, Licensed Practical Nurses and Licensed Vocational Nurses), dietitians and nutritionists, pharmacists, physical therapists, medical and clinical laboratory technicians, medical records and health information technicians, among others.

[30] This occupational group includes home health aides, nursing assistants, orderlies, occupational therapy assistants and aides, medical assistants, and phlebotomists, among others.

[31] https://laborstats.az.gov/employment-forecasts 2012-2022 Tucson MSA Occupation Projections Tables & Graphs.

[32] Application for Federal Assistance, Pathways to Healthcare Professions.

1.2 Earlier Findings on Pathways to Healthcare from PACE

The earlier *Pathways to Healthcare Implementation and Early Impact Report* (Gardiner et al. 2017) provides useful context for the current report. In its initial phase, the PACE evaluation assessed the Pathways to Healthcare program's implementation and short-term (18-month) impacts. The PACE **implementation study** examined the design and operations of Pathways to Healthcare and analyzed participation patterns of treatment group members in training and other activities. Its **short-term impact study** measured the program's effects on training, credentials, and self-reported employment and career progress. This section summarizes key findings from that report.

1.2.1 Earlier Results from the Implementation Study

This section summarizes program implementation and participants' experiences in the program through 18 months after random assignment.

- ***More than 60 percent of treatment group members enrolled in education or training.***

Thirty-five (35) percent of treatment group members enrolled directly in occupational training and 26 percent enrolled in one of the College Readiness bridge options for students whose basic academic skills were too low to enter an occupational program directly. Half of bridge participants proceeded to occupational training.

However, 38 percent of treatment group members did not engage in any education or training activities. Responses to the 18-month follow-up survey suggest that reasons for not enrolling included not enough time for work and for family and not enough financial aid. Also, as noted above, about four months on average elapsed between random assignment and the start of a training program, which may have discouraged some treatment group members from enrolling.

- ***Less than half of treatment group members enrolled in occupational training; those who did generally enrolled in Level 1 programs.***

As of the 18-month follow-up, 48 percent of treatment group members enrolled in occupational training. This proportion includes half of the College Readiness completers (13 percent of treatment group members) and those who enrolled directly in occupational training (35 percent of treatment group members). Nursing Assistant was the most commonly attended and completed program, accounting for 30 percent of all treatment group members and 63 percent of those who enrolled in occupational training. Another 10 percent attended other Level 1 programs, including Medical Office Clerk (6 percent) and Phlebotomy (4 percent). Sixteen (16) percent participated in Patient Care Technician training, a short-term Level 2 program that enabled Nursing Assistants to work in hospitals and nursing homes.

- ***The treatment group was more likely than the control group to participate in education and training. They were also more likely to use advising and employment services.***

The treatment group was more likely than the control group to participate in any education and training (60 percent of the treatment group versus 47 percent of the control group) and

healthcare-related training (37 percent versus 30 percent). Treatment group members were also more likely to participate in basic skills instruction than were control group members (18 percent versus 10 percent), with the College Readiness bridges likely accounting for the difference.

In terms of support services, treatment group members were more likely than control group members to receive career counseling (28 percent versus 19 percent), help arranging supports (14 percent versus 7 percent), and job search assistance (23 percent versus 14 percent). Despite the treatment group engaging in these services to a greater degree than the control group, fewer than a quarter of treatment group members reported receiving each service.

1.2.2 Earlier Results from the Impact Study

The PACE research team designated a single educational measure—*hours of occupational training*—as the confirmatory indicator of the Pathways to Healthcare program's success at 18 months. The short-term analyses also assessed a variety of other education outcomes, as well as several employment-related outcomes believed to provide an early indication of expected longer-term educational, employment, and earnings impacts.

- ***Pathways to Healthcare increased the total hours of college occupational training that students received (the confirmatory outcome at 18 months).***

Pathways to Healthcare increased the primary outcome of interest for the 18-month analysis period: hours of occupationally focused college training. The program had a 63-hour impact on total hours of training: 190 hours for the treatment group compared with 127 hours for the control group, a relative increase of 50 percent. Converting these estimates to weeks implies trainings were relatively short for both groups as of 18 months—the treatment group trained for nearly five weeks compared to three weeks for the control group, on average. The program also increased receipt of a credential from a college.

- ***Pathways to Healthcare had mixed effects on measures of early career progress 18 months after random assignment.***

The research team assessed the impact of the program on two dimensions of career progress. First, self-assessed progress toward career goals included measures of perceived career progress, confidence in career knowledge, and access to career supports. The analyses found positive impacts for these measures, with the largest effect on perceived career progress. Second, the study considered three different employment outcomes. As of 18 months, there was no evidence of impact on employment in a job that paid at least $12 per hour, required at least mid-level skills, or was in a healthcare occupation.

1.3 Guide to Rest of the Report

This report has seven chapters. **Chapter 2 summarizes the Pathways to Healthcare study design and analytic methods**, including a discussion of the career pathways theory of change and its implied research questions. The chapter also documents how the study implemented random assignment and describes its principal data sources.

Chapter 3 describes the flow of the treatment group through healthcare training in Pathways to Healthcare. The short-term report found that 38 percent of the treatment group

did not participate in any training by 18 months. This chapter begins by updating those estimates as of three years after random assignment. We also summarize the flow of participants through various components of Pathways to Healthcare. This descriptive analysis provides context for the estimates of impact on postsecondary training in the chapter that follows.

Chapter 4 presents the three-year impact findings on postsecondary education and training. As noted above, at 18 months after random assignment, Pathways to Healthcare had increased the share of its participants who received training and who received a postsecondary credential taking less than a year of college to earn ("short-duration" credential). This chapter reports analyses of how those early gains in training and healthcare credentials evolved over time. With the extra follow-up time allowing study participants time to complete more training, we identified the impact on credentials requiring a year or more of college to earn ("long-duration" credentials, which include associate and higher degrees) as the most important outcome measure of program success in the education domain at three years.

Chapter 5 presents the three-year impact findings on earnings and employment. The short-term impact study conducted a relatively limited analysis of impacts on labor market outcomes at 18 months because such impacts were expected to take longer to emerge. This three-year report provides more detail on impacts on labor market outcomes for a period when such impacts might plausibly emerge. We identified earnings as the most important outcome measure of program success in the earnings and employment domain.

Chapter 6 presents the three-year impact findings on other life outcomes such as career knowledge, availability of career supports, psycho-social skills, family economic well-being, parental engagement, and child outcomes. If the Pathways to Healthcare program has an impact on earnings, then it might also be expected to affect these outcomes. Even without an earnings impact, there may be impacts on some of these well-being measures. For example, the financial assistance component of the program may lower school debt levels.

Chapter 7 concludes with a discussion of the findings and open questions for future research.

A separate Appendix volume provides technical details on analysis methods, data sources, and sensitivity analysis. A forthcoming cost addendum will describe the costs of the Pathways to Healthcare program.

2. Methods

This chapter describes the PACE evaluation design and analytic methods as applied to the Pathways to Healthcare program. It begins with a discussion of the program's theory of change. It then describes the evaluation design, data sources, and analysis procedures.

2.1 Pathways to Healthcare Theory of Change

Exhibit 2-1 below depicts the career pathways theory of change as applied to Pathways to Healthcare. It shows in detail how the program is hypothesized to produce effects on outcomes such as career knowledge and resources, which in turn will lead to effects on early (18-month) outcomes such as hours of training and credential receipt, and eventually to longer-term gains in main outcomes, such as employment, earnings, additional credentials, and other life outcomes.

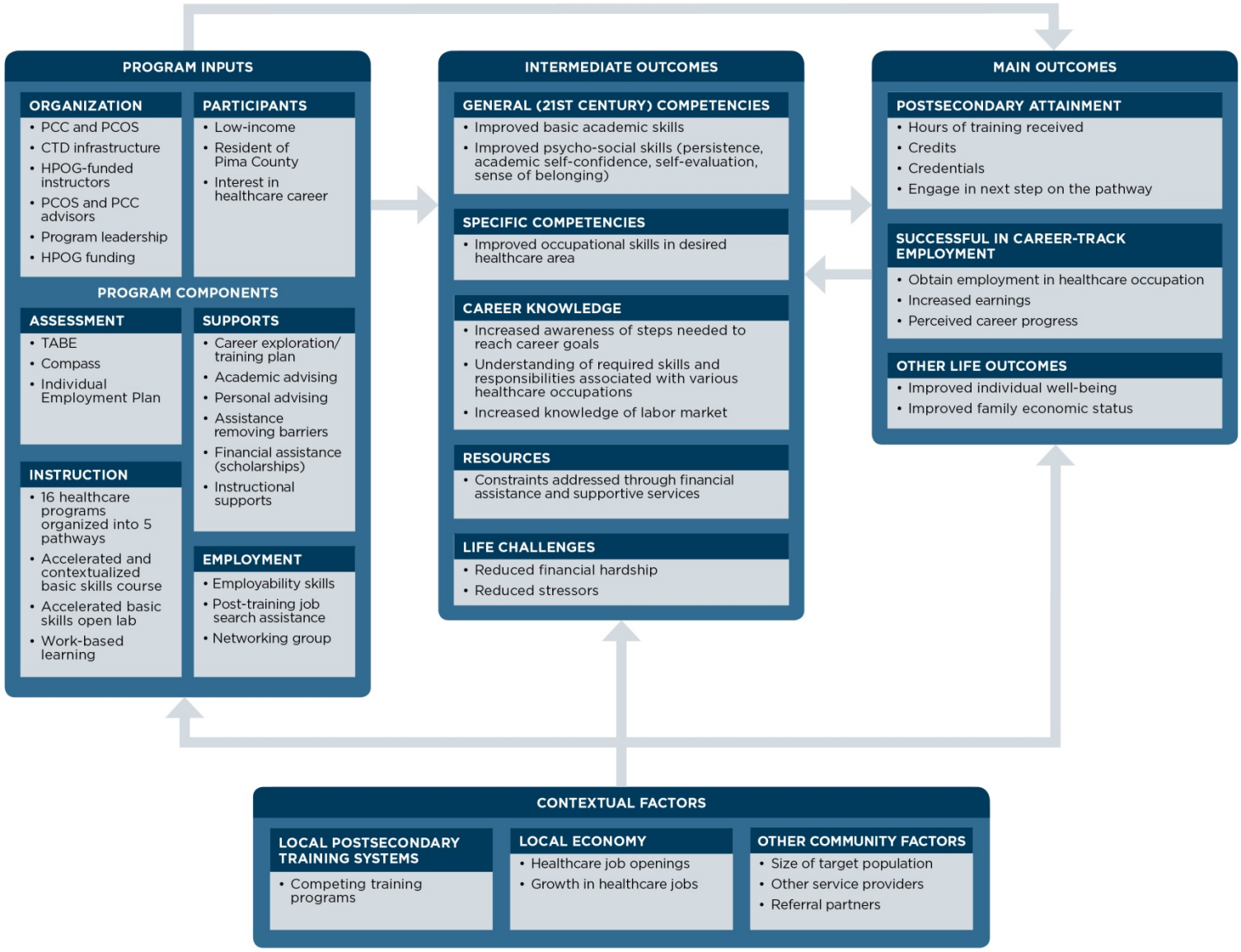
Starting in the box at the left, the theory of change begins with **program inputs** and **program components**. The earlier, short-term report (Gardiner et al. 2017) found that these program inputs (PCC and PCOS services, PCC program staff and leadership, HPOG funding, and participant characteristics) and program components (assessment, instruction, supports, and employment connections) were largely in place and operating as anticipated.[33]

The middle box shows the **intermediate outcomes**. Improving participants' competencies and career knowledge, removing barriers to school or work, and addressing life challenges was a necessary precursor to improving the main (longer-term) outcomes of interest. The Pathways to Healthcare program intended to affect these outcomes quickly so that students would be better positioned to engage in education and training. As described in Chapter 1, the short-term report found improvements in some but not all of these areas.

[33] Although the Pathways to Healthcare program ended in 2016, PCC continues to provide occupational training through its Center for Training and Development, and PCOS (now called ARIZONA@WORK Pima County) still provides employment services through the Workforce Innovation and Opportunity Act. In addition, PCC received a second-round HPOG grant to operate the HOPES program, which retains many Pathways to Healthcare components.

The HOPES program is being evaluated as part of ACF's National Evaluation of the 2nd Generation of Health Profession Opportunity Grants (HPOG 2.0 National Evaluation). Although random assignment governs access to the HOPES program, OPRE and the evaluation team did not want any PACE study participants to be randomly assigned a second time. Therefore, Pathways to Healthcare participants can bypass random assignment and participate in HOPES services. PACE control group members could not receive Pathways to Healthcare program services for three years following random assignment. After this embargo period, control group members could enroll in HOPES without going through random assignment. More information about the HPOG 2.0 National Evaluation is available at https://www.acf.hhs.gov/opre/research/project/national-evaluation-of-the-2nd-generation-of-health-profession-opportunity-grants-hpog-20-national-evaluation.

Exhibit 2-1: Career Pathways Theory of Change for Pathways to Healthcare



The **main outcomes**, which are the focus of this report, appear in the far right box. They include additional postsecondary credential attainment, career-track employment, and improvement in other life outcomes, such as family economic well-being. These outcomes are most directly connected to the program's goal of improving employment and earnings for TANF recipients and other low-income individuals. The earlier, short-term report highlighted the impact of Pathways to Healthcare on postsecondary attainment after 18 months. However, a non-trivial proportion of students in both the treatment and control groups were still enrolled in training. As a result, we anticipated that educational impacts might continue to evolve. For example, perhaps members in the treatment group will get differentially more training; perhaps those in the control group will catch up. This report documents impacts on postsecondary attainment again after three years.

Aside from some measures of career progress and job quality, the short-term report did not include impacts on earnings and employment, anticipating that it was too early to draw conclusions at that time. However, with many treatment group members participating in relatively short-duration training programs, it seems reasonable to expect impacts to emerge within three years. The theory of change also specifies that if improvements in educational attainment lead to improvements in earnings and employment, then that should in turn lead to improvements in other life outcomes. It seems reasonable that these changes should be visible now, three years out.

Finally, the exhibit shows that a number of **contextual factors** can affect impacts including other available training programs and local economic conditions. The earlier, implementation study explored these factors (see Gardiner et al. 2017), and we discuss them again in this report when they are useful for explaining program impacts.

2.2 Research Questions at Three-Year Follow-up

Three years after random assignment, what were the effects of Pathways to Healthcare on:

- educational outcomes?
- entry into career-track employment and higher earnings?
- individual and family well-being, including income and other life outcomes?

Each of these research questions is addressed, in turn, in the chapters that follow.

2.3 Data Sources

Analyses in this report use several data sources: PCC records; baseline surveys administered to study participants immediately prior to random assignment; follow-up surveys conducted approximately 18 months and three years after random assignment; earnings and employment

data from the National Directory of New Hires (NDNH); and school enrollment data from the National Student Clearinghouse (NSC).[34] We describe each of these data sources below.

2.3.1 Local College Records

PCC records are the chief data source for education outcomes in this report. These records measure participation in education and training at PCC for both the treatment and control groups, as well as receipt of credentials. We looked at the degree to which PCC enrollments covered college experience in the sample by checking against NSC records. We adjusted for modest differences found, using NSC data (see Section 2.3.4 for description of NSC data).[35]

2.3.2 Baseline Surveys

This report uses data from the baseline surveys to describe the sample and for regression adjustment. All 1,217 study participants completed the Basic Information Form just prior to random assignment. This form captured demographic information, family characteristics, educational history, and work and earnings information. At this time study participants also completed a Self-Administered Questionnaire, which collected more-sensitive personal information such as training commitment and academic confidence.[36]

2.3.3 Follow-up Surveys

This report focuses on outcomes measured in a three-year follow-up survey, with some reference to 18-month follow-up survey data analyzed in the short-term report.

18-month Survey. The earlier follow-up survey provided measures of outcomes that the theory of change indicated Pathways to Healthcare might affect in the short term. Administered by telephone or in person, the 18-month survey response rate was 80 percent (82 percent in the treatment group and 78 percent in the control group). Some of the findings summarized in Chapter 1 are based on these data. The other use of the 18-month survey data in this report is to help impute values for missing data on job and education spells from other data sources.

Three-year Survey. We designed the three-year follow-up survey to measure outcomes that the theory of change indicated Pathways to Healthcare might affect over a longer time horizon, such as employment and other life outcomes. The survey also captured detail on respondents' educational history, a limited number of psycho-social skills, and their children's experiences

[34] To learn about HPOG1.0 and PACE restricted use data archived at the Inter-university Consortium for Political and Social Research, see: https://doi.org/10.3886/ICPSR37290 (for HPOG) and https://doi.org/10.3886/ICPSR37289 (for PACE).

[35] See Appendix B for more details on our decision to use PCC records for education outcomes and the construction of educational outcome measures. See Appendix E for sensitivity tests for outcome measures from the different potential data sources.

[36] PCC staff administered the Basic Information Form on paper and then entered it electronically into the study database. Because the Self-Administered Questionnaire asked for personal information (criminal records, psycho-social skills, social support, career orientation and knowledge, and personal and family challenges), study participants filled out a paper form and then placed it in a sealed envelope that PCC staff sent to Abt Associates for data entry.

with school (as applicable). The response rate for the three-year follow-up survey was 86 percent overall (87 percent in the treatment group and 84 percent in the control group). The median response occurred at 38 months.[37] Appendix C provides detailed descriptions of the outcomes based on the three-year survey used in this report.[38]

2.3.4 National Student Clearinghouse

This study used data on college enrollment from the NSC to evaluate and adjust local college records and to analyze and adjust for the survey (see Appendix D). NSC is a nonprofit organization that collects data on student enrollment, degrees earned, and other credential completion data from most U.S. institutions of higher education. Designed to aid the administration of student loan programs, researchers also use NSC data to study college access and persistence. As in most administrative data systems, data are subject to various coverage and content limitations. Most importantly, coverage of private, for-profit two-year colleges is very low (less than 30 percent), and the NSC makes no attempt to collect data from schools that are not colleges (i.e., not accredited to grant degrees).

2.3.5 National Directory of New Hires

Wage records from the NDNH are a major data source for earnings and employment analyses in this report. Maintained by the federal Office of Child Support Enforcement, the NDNH includes quarterly earnings measured by state Unemployment Insurance systems and earnings of federal civilian and military employees provided by various federal agencies. The PACE evaluation had access to these data for study sample members for two years prior to random assignment through the end of the evaluation period.[39] Additional detail is provided in Appendix F.

2.4 Evaluation Design and Analysis Plan

The PACE evaluation used an experimental design to estimate the impact of access to Pathways to Healthcare on participants' outcomes. Such a design ensures that any estimated impacts can be attributed to program access rather than to unmeasured differences between eligible study sample members with access (the treatment group) and without access (the control group).

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[37] The median response occurred at 38 months. More than 75 percent of the respondents completed the survey 39 months or less after random assignment. The longest lag between randomization and completion was 53 months. Additional months of follow-up potentially increases recall error and shifts means for time-sensitive variables. However, the lags were fairly well balanced between the treatment and control groups, so this variation in lags between randomization and completion should not lead to false claims of program effects.

[38] The full instrument is available at http://www.career-pathways.org/career-pathways-pace-three-year-instrument/.

[39] At the time this three-year impact report was written, 18 quarters of NDNH data were available. However, the pre-specified confirmatory and secondary outcomes in this report use only the first 13 quarters.

As designed, the experiment captured impacts for all sample members, regardless of whether those assigned to the treatment group actually received the program services. In other words, this design—an "intent to treat" approach—assesses whether access to the program including all of its components led to better outcomes for those offered the chance to participate in it, relative to what they could have obtained without the program. For a voluntary (rather than mandatory) program, the intent to treat estimate is often the most policy relevant. However, it is important to remember that the program is being compared to other programs and services that are available in the local area, rather than being compared to no training.

Another important aspect of the PACE evaluation's design is that the experiment captures the effects of the program overall, rather than the contributions of its components. Designers of Pathways to Healthcare deliberately included a package of multiple strategies (e.g., assessment, instruction, supports, and employment connections) that they hypothesized were needed to produce desired impacts. As a result, the evaluation focuses on whether the program as a whole, when implemented in real-world conditions, produces an impact.

2.4.1 Hypothesis Testing

The Pathways to Healthcare theory of change targets a range of outcomes. The PACE evaluation structures the analysis by establishing three categories of hypotheses:

- **Confirmatory hypotheses** center on outcomes most critical to judging the program's success in achieving its goals within the designated time period. By limiting the confirmatory analysis to a single outcome in each of two separate domains, we avoid the statistical problem that arises from "multiple comparisons."[40] For the three-year impact study of Pathways to Healthcare, we specified two confirmatory tests: *an increase in attainment of postsecondary credentials requiring a year or more of college* in the education domain and *an increase in average quarterly earnings in quarters 12 and 13 after random assignment* in the employment domain. Because each has a hypothesized direction (an increase in the average level of the outcome) we applied a one-tailed test of statistical significance, ignoring possible effects in the other direction.
- **Secondary hypotheses** address a parsimonious set of other important indicators of program success. Secondary hypotheses also posit effects in an expected direction, so we applied one-tailed tests for statistically significant effects only in the specified direction. Outcomes for these hypotheses at three-year follow-up include *credential receipt, enrollment and number of college credits, employment status and indicators of career pathways employment, indicators of career progress,* and *measures of financial well-being*. The hypothesized direction is an increase in the average level for all

[40] Testing for program impacts on so many outcomes causes a statistical problem: it provides the program many chances to demonstrate success, and with enough chances even an unsuccessful program might appear to have one or two impacts. If the evaluation did not account in some way for the multiplicity of hypothesis tests, some of findings would reach conventional levels of statistical significance merely by chance, even if there were no real effects on any outcome. This is known as the problem of "multiple comparisons."

outcomes other than some measures of financial distress, where we hypothesize a decrease in the average level.

- **Exploratory hypotheses** include a larger number of additional possible effects for related outcomes. They are intended to help improve our understanding of findings from the confirmatory and secondary analyses. Exploratory hypotheses may but do not necessarily speculate the direction of effects, and therefore we applied two-tailed tests. Some examples of outcomes for exploratory hypotheses include *quarterly earnings and employment for each quarter after random assignment*, various measures of *job quality*, and measures of *financial well-being* such as household income.

Prior to estimating Pathways to Healthcare impacts, the research team published an analysis plan specifying key hypotheses and outcome measures.[41] The team subsequently assessed data quality, refined the plan, and publicly registered it on the Open Science Framework website.[42] The purpose of the analysis plan and registration was to guide the work of the research team and publicly commit to particular hypotheses and an estimation approach that aligns with ACF's commitment to promote rigor, relevance, transparency, independence, and ethics in the conduct of evaluations.[43]

2.4.2 Impact Estimation Procedures

We conducted analyses to estimate the impact of Pathways to Healthcare on the hypothesized outcomes described above.

Random assignment ensures that, on average, study sample members in the treatment and control groups will have similar characteristics at baseline. Random assignment also ensures that measured differences in subsequent outcomes provide unbiased estimates of program impacts. To address any effects that chance differences arising from random assignment might have on estimates, analysts typically estimate impacts using a procedure that compensates for chance differences in measured baseline characteristics. Such procedures also help to increase the precision of estimates.

To select baseline characteristics and estimate impacts, the PACE evaluation developed an approach that respects the conservative tradition of including out-of-balance characteristics, no matter what, in addition to empirically selected covariates, but without incurring large losses in precision. We describe details of this approach, a recently developed technique called "least absolute shrinkage and selection operator" (LASSO), in Appendix A.

We then used a regression-adjustment model—including the identified covariates—to estimate impacts. All analyses of survey data applied weights developed to adjust for differential nonresponse across groups of study participants that have different likelihoods of survey

[41] See Judkins, Fein, and Buron (2018).

[42] See https://osf.io/wj6gc/ for the 18-month report registration and https://osf.io/ua4bw/ for the three-year report registration.

[43] See https://www.acf.hhs.gov/opre/resource/acf-evaluation-policy.

response. Additional details on these and other aspects of the analysis appear in Appendices A and B.

The text box *How to Read Impact Tables* describes how to navigate and understand the tables in the impact chapters.

How to Read Impact Tables

The exhibits in Chapters 4-6 show the outcome measure in the left-most column (**Outcome**).

The next column (**Treatment Group**) presents the treatment group's regression-adjusted mean outcome, followed in the next column by the control group's actual mean outcome (**Control Group**). The regression adjustments correct for random variation in baseline covariates between the two groups (and thus differ slightly from the raw means) and improve the precision of the estimates.

The next column (**Impact (Difference)**) is the impact of being offered Pathways to Healthcare—that is, the difference between the treatment and control group means. The **Standard Error** column is a measure of uncertainty in the estimated impact that reflects both chance variation due to randomization and any measurement error. The column labeled **Relative Impact** presents the impact as a percentage change from the control group mean. It offers a sense of how "big" or "small" the impact on the treatment group is, at least relative to the control group's level. For outcomes with no natural unit of measurement we report an **Effect Size** instead of the relative impact. The effect size is a standardized measure that defines impacts as a fraction of the pooled standard deviation across the treatment and control groups. It offers a sense of the size of the impact relative to how much the outcome varies across the full sample and allows for comparison of the size of the impact across scale outcomes.

The final column, ***p*-Value**, is the probability that the observed or a larger difference between the treatment and control groups would occur by chance, even if there was in reality no difference between the two groups.

Statistical significance

There are several common standards for judging statistical significance. In this report, tests are considered statistically significant and highlighted in tables if the *p*-value is less than .10. The smaller the *p*-value, the more likely that the observed difference between the treatment and control groups is real, rather than occurring by chance. Tests with *p*-values smaller than .10 are separately flagged:

* for .10 (10 percent level)

** for .05 (5 percent level)

*** for .01 (1 percent level)

Categories of findings

Tests of statistical significance for confirmatory and secondary outcomes are one-sided tests because we have a directional hypothesis for these impacts. The confirmatory and secondary analyses are reported using **bold text** in the tables. Tests of significance for exploratory outcomes use a two-sided test, a test we use because we do not have a directional hypothesis. Exploratory analyses are reported using regular (not bolded) text in the tables.

3. Treatment Group Participation in Healthcare Occupational Training

Pathways to Healthcare was designed to facilitate multiple occupational training steps in each of five pathways. Students who needed to improve their basic skills first enrolled in College Readiness. Thereafter, each pathway spanned entry-level programs (Level 1) through advanced-level ones (Level 3), as described in Chapter 1 (see Exhibit 1.1). This chapter describes the treatment group's engagement in training beyond the early follow-up period.

As of the short-term follow-up period, 48 percent of treatment group members had enrolled in occupational training: 35 percent enrolled directly in occupational training, and 13 percent enrolled in occupational training after completing a College Readiness bridge. Among the 52 percent who did not enroll in occupational training, 38 percent did not engage in any services, and the remaining 13 percent enrolled in and completed a College Readiness bridge but did not progress to training.

Section 3.1 explores the extent to which treatment group members made progress on their pathways over the three-year follow-up by advancing at least one level. Advancement through the pathways is key to the theory of change, and detailed information on courses of study and credentials are only available for the treatment group.[44] For instance, for those who start in a Level 1 training to prepare for an entry-level job, progression to subsequent levels on the pathway is likely needed to raise earnings. Occupations associated with Level 1 credentials have entry-level wages comparable to other entry-level occupations outside of healthcare. The program could only expect to increase wages if it moved more treatment group members to higher levels on the pathways than they would otherwise have accessed.

Section 3.2 focuses on the longer-term follow-up period (between the 18-month and three-year follow ups) and identifies the credentials earned in terms of level and length. The specific credentials give more detail on the particular pathways participants pursued. Section 3.3 examines whether treatment group members who did not engage in training in the first follow-up period did so by the time of the second follow-up at three years.

Section 3.4 explores treatment group participation in PCC's second-round HPOG-funded program, HOPES. After Pathways to Healthcare ended in 2016, HOPES became the available source of HPOG tuition assistance and other supports.

Section 3.5 summarizes the participation findings, which in turn set the stage for the impacts on postsecondary training in Chapter 4.

3.1 Movement along the Pathways

Our first question is whether treatment group members who enrolled in any training by 18 months continued to another pathway level by three years after they were randomly assigned.

[44] Administrative records indicate whether the control group was enrolled in PCC or not, but we do not have more detailed information (e.g., the particular course of study) for control group members.

Overall, 37 percent of the treatment group earned a credential within three years. Almost one third of the credentials earned were at least one level higher than the initial training level earned by 18 months, indicating that these participants took a second step on their pathway.

Exhibit 3-1 below reflects this movement using a flow diagram. The starting points on the left of the exhibit reflect the level of the first PCC training in which treatment group members enrolled, and the endpoints on the right of the exhibit reflect the level of the highest credential they earned through three years. The gray flows reflect those whose first PCC training was at the College Readiness level; the blue flows reflect those whose first PCC training was at Level 1; the red flows reflect those whose first PCC training was at Level 2; and the green flows reflect those whose first PCC training was at Level 3. The widths of each start point, endpoint, and the flows from left to right are all proportional to the number of participants who followed that flow.

As reflected in Exhibit 3-1, starting at the top left side and moving down the exhibit:

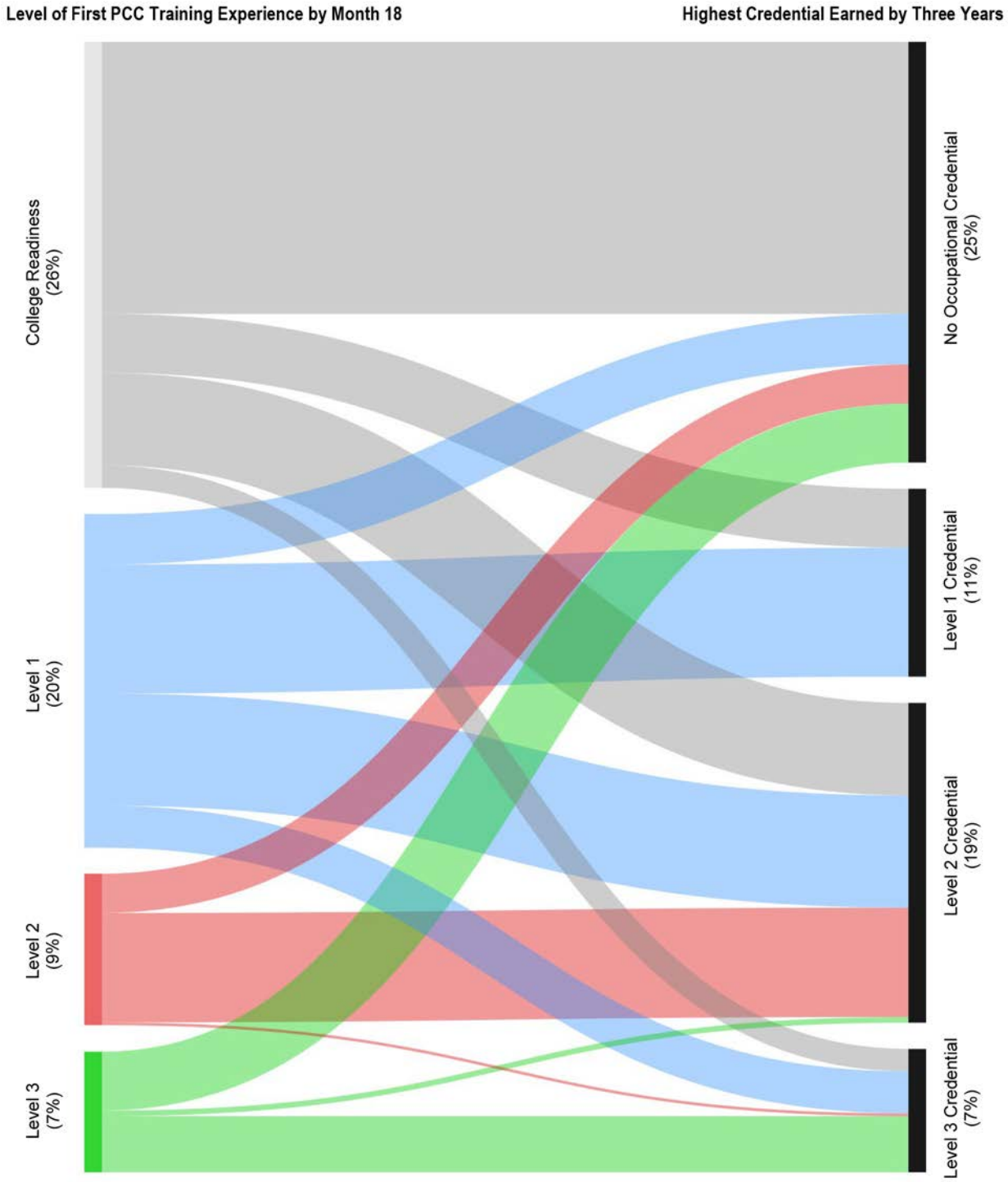
- 26 percent of all treatment group members started their training at the College Readiness level. Nine (9) percent of all treatment group members earned a credential by three years after random assignment having started at College Readiness: 3 percent earned a Level 1 credential; 5 percent earned a Level 2 credential; and 1 percent earned a Level 3 credential.
- Moving down the exhibit, 20 percent of all treatment group members started their training at Level 1. The large majority of them (17 percent of all treatment group members) earned credentials within three years: 8 percent earned a Level 1 credential only; 7 percent earned a Level 2 credential; and 2 percent earned a Level 3 credential.
- Fewer treatment group members (9 percent of all treatment group members) started their training at Level 2. Six (6) percent of all treatment group members earned a Level 2 credential within three years, and fewer than 1 percent earned a Level 3 credential.
- Seven (7) percent of all treatment group members started their training at Level 3. About half of them earned credentials within three years: fewer than 1 percent of all treatment group members earned a Level 2 credential, and 3 percent earned a Level 3 credential.

Taken together, by three years after random assignment, almost 19 percent of all treatment group members had earned a credential at least one level higher than the level where they began their training:

- the 9 percent who started in College Readiness transitioned to Level 1, 2, or 3;
- the 9 percent who started in a Level 1 course went on to Level 2 or 3; and
- the <1 percent who started in a Level 2 course went on to Level 3.

This 19 percent of all treatment group members represents 31 percent of those who enrolled in any education or training within the first 18 months of follow-up.

Exhibit 3-1: Flows from First Training to Credentials over a Three-Year Follow-up Period (Treatment Group Only)



Source: PCC records.

Note: Starting points on the left side of the figure reflect the level of the first PCC training in which participants enrolled in the first 18 months after random assignment. (It does not include the 6 percent all of treatment group members who started their initial training in month 19 or later.) Endpoints on the right side of the figure reflect the level of the highest credential earned by the end of the three-year follow-up period. Starting point and endpoint percentage labels reflect percentage of the entire treatment group of 609. Almost 62 percent of treatment group members (375 of 609) enrolled in any training within 18 months.

3.2 Receipt of Long-Duration Credentials between the Two Follow-ups

Some treatment group members earned credentials taking a year or more of study ("long-duration" credentials) during the first 18 months of follow-up, but more did so between the 18-month and three-year follow-ups.

PCC records show that 18 months after random assignment, 3 percent of treatment group members had earned a long-duration credential. The most common long-duration credentials earned were for Licensed Practical Nurse (LPN) (Level 3) and Medical Assistant (Level 2), each accounting for one third of those credentials attained. The remaining one third included Level 2 Surgery Technician, Level 3 Pharmacy Technician, and associate degrees not included on a pathway (Liberal Arts).

A larger share of treatment group members, 11 percent, earned a long-duration credential in months 19 to 36, and most of these were Level 2 or 3 credentials. PCC records show that Medical Assistant (Level 2) was the most common, accounting for 44 percent of those credentials, followed by LPN (31 percent). About 4 percent of long-duration credentials were for Pharmacy Technician (Level 3) or Surgical Technician (Level 2). Sixteen percent of long-duration credentials were Associate of Applied Science degrees or Associate of Arts degrees.

3.3 Initial Engagement with Occupational Training after Short-Term Follow-up

We also explored whether the 52 percent of treatment group members who did not enroll in occupational training during the first follow-up period did so by three years after random assignment. The short-term follow-up survey responses indicated lack of time and money contributed to non-enrollment decisions. As well, the delay between study enrollment and the start of training—an average of four months according to PCC administrative records—could be a factor.

We found 8 percent of the treatment group enrolled in occupational training for the first time after the short-term follow-up. This includes 2 percent of those who completed College Readiness during the initial follow-up period and transitioned to occupational training after 18 months and the 6 percent who began directly in occupational training after month 18. Collectively, this group earned 3 percent of the credentials earned by the treatment group as a whole during the second follow-up period.

Although a modest number of additional treatment group members first engaged in occupational training between months 18 and 36, more than 40 percent of all treatment group members had still not engaged by the three-year follow-up.

3.4 Continued Training through HPOG 2.0 Grant

To reduce the financial burden of attending school, Pathways to Healthcare provided scholarships for occupational training. Pathways to Healthcare's scholarships, advising, and other services intended to help students persist ended in 2016 when PCC's HPOG 1.0 grant ended.

Although Pathways to Healthcare services were no longer available to support their training when the first round HPOG grant ended, treatment group members could receive services through PCC's second-round HPOG grant, HOPES. Although not identical, HOPES retains many Pathways to Healthcare components, including distinct career pathways, scholarships, advising, and employment supports. Like Pathways to Healthcare, HOPES is part of a randomized controlled trial evaluation; however, as noted earlier, ACF allowed Pathways to Healthcare study participants to bypass that evaluation's random assignment and receive HOPES services.[45] Control group members, too, could bypass random assignment once their three-year embargo from receiving Pathways to Healthcare program services ended.[46]

HOPES data show that a small share of Pathways to Healthcare study participants did pursue additional training.[47] According to HOPES program records, 84 treatment group members, or nearly 14 percent of the treatment group, received training as part of HOPES. As well, 34 control group members, or 6 percent of the control group, bypassed random assignment and enrolled in HOPES services.

3.5 Summary

This chapter provided a detailed, descriptive overview of occupational training receipt within the treatment group. Analyses in this chapter show that within three years of random assignment, about one in five treatment group members (19 percent) earned a credential at least one level higher than where they began their training. About 11 percent of the treatment group earned these credentials after the short-term follow-up at 18 months, and many of the credentials they earned were for programs that took a year or more of study. This is the type of progress that should lead to occupations with higher starting wages, compared with treatment group members who earned Level 1 credentials only or no credentials at all. More than 40 percent of the treatment group had not engaged in any training by 36 months.

The next chapter reports estimates of the Pathways to Healthcare program's impact on postsecondary training; that is, estimates for the treatment group relative to the control group.

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[45] OPRE and the evaluation team did not want any PACE study participants to be randomly assigned a second time.

[46] As of January 2017, all control group members could seek HOPES services.

[47] These tabulations come from the management information system developed for the HPOG 2.0 Program in use by all second-round HPOG grantees, called the Participant Accomplishment and Grant Evaluation System (PAGES). Data in PAGES are available for members of the Pathways to Healthcare treatment and control groups who enrolled in HOPES after Pathways to Healthcare ended.

As described in that chapter, more than 9 percent of treatment group members were still enrolled in college at the end of the three-year follow-up period. Some of these treatment group members accessed training and supports through HOPES, the HPOG 2.0 follow-on program to Pathways to Healthcare that is not expected to end until 2020. Regardless of the source, movement through a program's pathways to higher-level credentials is a key feature of the career pathways theory of change and necessary to observe impacts on earnings.

4. Impacts on Postsecondary Training

This chapter reports the impact of Pathways to Healthcare on postsecondary training for the three-year follow-up period, with some analyses extending to nearly five years after random assignment. Whereas Chapter 3 focused on the experiences of the treatment group only, this chapter assesses the Pathways to Healthcare program's impact by comparing the treatment group's versus the control group's training outcomes.

The Pathways to Healthcare theory of change posits that the combination of basic skills remediation (College Readiness bridges, for those who need it) and occupational training, coupled with a range of academic and non-academic supports, will increase postsecondary credential attainment.

Though credential attainment and career-track employment are Pathways to Healthcare's ultimate goals, it seemed likely based on PCC's program model that a large proportion of students would still be engaged in training at 18 months. As a result, the pre-specified confirmatory outcome for the 18-month follow-up period was *hours of occupationally focused training*.[48] Indeed, about 40 percent of the treatment group and 25 percent of the control group were still enrolled in college occupational training in the last six months of the 18-month follow-up period. The short-term report concluded that the treatment group received more total hours of occupationally focused training and more total credentials than the control group, indicating the program was on the right track toward achieving those ultimate goals (Gardiner et al. 2017).

By three years after random assignment, it is reasonable to expect completion of "long-duration" credentials (those taking a year or more of college to earn, which include associate or higher degrees). Thus, the confirmatory outcome for the education domain in this report is *receipt of any postsecondary credential that typically requires at least a year of college to earn*. The theory of change suggests that this outcome is appropriate for assessing whether Pathways to Healthcare is continuing to meet its postsecondary attainment goals after three years. The increase in hours of training and credentials in the short term, coupled with high rates of continued enrollment, positions the program for impacts on long-duration credentials associated with Level 2 or Level 3 training within each pathway.

This chapter uses PCC records and study participants' responses to the three-year follow-up survey to report impacts on credentials as well as on enrollment and credits.[49]

[48] Hours of training completed appeared to be the best single indicator of whether the program was meeting its short-term goal, per its theory of change. The measure included both credit training and noncredit training, as the five healthcare pathways included both types.

[49] See Appendix B for a discussion of imputation procedures to incorporate data from the NSC and the three-year follow-up survey for those who enrolled in schools other than PCC.

4.1 Impact on Credentials

This section describes impacts on credential receipt. It addresses two related, but distinct, issues. First, the chapter reports the impact on total credentials received after random assignment. It begins with the three-year confirmatory outcome, *receipt of a postsecondary credential taking one or more years of college to earn*. This longer-term postsecondary milestone was attainable within the follow-up period, even for treatment group members who started at the College Readiness level or control group members who started with basic skills remediation. We also assess impacts for receipt of other types of credentials. Second, the chapter considers how impacts for credentials have changed since the 18-month follow-up.

- ***The treatment group earned more credentials that take at least a year of college than the control group did.***

Pathways to Healthcare increased the receipt of credentials typically requiring a year or more of college from 11 percent to 18 percent, an impact of 7 percentage points (Exhibit 4-1). This impact represents a 62 percent increase over the control group.

- ***Pathways to Healthcare had larger impacts on receipt of postsecondary credentials defined broadly than it did on long-duration credentials specifically.***

The theory of change predicts not only an increase in long-duration credentials three years after random assignment, but also that impacts on short-duration credentials should grow. This is particularly true given the rates of continued enrollment at the conclusion of the 18-month follow-up period. The theory of change implies that impacts would grow as participants engaged in and completed initial or follow-on credentials.[50] Indeed, Pathways to Healthcare increased receipt of short-duration credentials by 20 percentage points. The impact for *any credential* (which includes both short-duration and long-duration ones) is about three times as large as the impact for long-duration credentials only (see Exhibit 4-1).[51] Most credentials earned were healthcare related for both the treatment and control groups.[52]

The impact on credentials was not limited to those received from colleges. Consistent with the short-term impact report, treatment group members received more credentials from any type of school (a college, another education/training institution, or a licensing/certification body) than did the control group. A greater share of the treatment group earned any credential (21 percentage

[50] The most common Level 2 program during the 18-month follow-up period was Patient Care Technician—a short-duration, add-on credential to Nursing Assistant.

[51] This finding is also corroborated using responses to the three-year follow-up survey. In those analyses we find an impact of 18 percentage points for receipt of any type of postsecondary credential from a college, and an impact of 5 percentage points for receipt of any postsecondary credential that typically requires at least a year of college. Both impacts are statistically significant at the 5 percent level.

[52] Exhibit 4-1 notes reports that 40 percent of the treatment group earned any postsecondary credential from a college. This rate differs from the figure reported in Chapter 3 (37 percent). This difference is due to the imputation procedures we use in this chapter and that these estimates are regression-adjusted impacts, whereas Chapter 3 reported rates from PCC records that are not regression adjusted.

point impact) or a healthcare credential (22 percentage point impact) from any type of school than did the control group. This suggests that control group members did not substitute another type of training provider for a college. The only outcome for which there was no detectable impact was receipt of an exam-based certification or license.

Exhibit 4-1: Three-Year Impacts on Postsecondary Credentials

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
PCC Records						
Confirmatory Outcome: Received credential taking 1+ year of college (%)	18.4	11.3	+7.0***	(2.0)	+61.9	<.001
Received at least associate degree (%)	4.3	2.5	+1.8*	(1.0)	+72.0	.073
Received any credential from a college (%)	39.9	16.4	+23.5***	(2.4)	+143.3	<.001
Received healthcare credential from a college (%)	38.0	14.1	+23.9***	(2.4)	+169.5	<.001
Received credential taking <1 year of college (%)	26.0	5.6	+20.4***	(2.0)	+364.3	<.001
Sample size	609	608				
18-Month and Three-year Follow-up Surveys						
Received exam-based certification or license (%)	30.3	27.8	+2.4	(2.9)	+8.6	.203
Three-year Follow-up Survey and PCC Records						
Received a credential from any type of school (%)	44.2	22.8	+21.4***	(2.9)	+93.9	<.001
Received healthcare credential from any type of school (%)	41.5	19.4	+22.1***	(2.8)	+113.9	<.001
Sample size	530	510				
Number of credentials received from any type of school among those who earned credentials (non-experimental) (#)	1.71	1.48	+0.22**	(0.09)	+14.9	.019
Sample size	244	113				
Number of healthcare credentials received from any type of school among those who earned credentials (non-experimental) (#)	1.67	1.37	+0.30***	(0.09)	+21.9	<.001
Sample size	229	95				

Source: PCC records: postsecondary credentials. Blend of PCC and three-year follow-up survey data: "any type of school" credentials. Blend of 18-month and three-year follow-up survey data: exam-based credentials.

Note: Confirmatory and secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. Italicized outcomes identify comparisons that are non-experimental. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***The impact of Pathways to Healthcare on long-duration credentials was larger in months 19 to 36 after random assignment than in the first 18 months.***

Exhibit 4-2 below compares impacts on credentials over time. The levels for credentials that take a year or more of college to earn are quite small in both the treatment and control groups in the first 18 months, which supports the decision to focus on training hours in the short-term report. In fact, there is a negative impact on receipt of such long-duration credentials.

The impact both for any credential taking a year or more of college and specifically for associate degrees or higher was larger in months 19 to 36 than in the first 18 months. Statistical tests

conclude that the impacts for receipt of the two outcomes over months 19 to 36 differ from the impacts for those same two outcomes over the first 18 months. Over the later months, Pathways to Healthcare increased receipt of any credential taking at least a year of college by 9 percentage points and receipt of associate degrees or higher by 2 percentage points.

Exhibit 4-2: Impacts on Postsecondary Credentials over Time

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Months 1-18						
Received credential taking 1+ year of college (%)	3.4	5.4	−2.0*	(1.2)	−37.0	.084
Received at least associate degree (%)	1.0	1.2	-0.1	(0.6)	−8.3	.821
Received any credential from a college (%)	23.5	10.2	+13.3***	(2.1)	+130.4	<.001
Received healthcare credential from a college (%)	23.0	8.7	+14.3***	(2.1)	+164.4	<.001
Months 19-36						
Received credential taking 1+ year of college (%)	15.3	6.2	+9.0***	(1.7)	+145.2	<.001
Received at least associate degree (%)	3.3	1.3	+1.9 **	(0.8)	+146.2	.020
Received any credential from a college (%)	20.7	6.7	+14.0***	(1.9)	+208.9	<.001
Received healthcare credential from a college (%)	19.1	5.8	+13.3***	(1.8)	+229.3	<.001
Sample size	609	608				

Source: PCC records.

Note: Statistical significance is based on two-tailed tests. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]). Some people earned credentials in both months 1-18 and months 19-36. They are included in both counts, thus the sum of the month 1-18 and 19-36 percentages can be larger than the totals in Exhibit 4-1.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

4.2 Impact on Enrollment and Credits

This section reports the impact of Pathways to Healthcare on enrollment in college and receipt of college credits three years after random assignment. In the short term, the program increased enrollment in college in all months following random assignment. As noted below, these impacts persisted.

The earlier report did not address impacts on credits earned, because many Level 1 and Level 2 programs resulted in noncredit "clock-hour" certificates. Clock hours are defined by the program and are the weekly number of hours a student spends attending class or other instructional activities (e.g., labs) that count toward completing a program of study. Each clock-hour program has a total number of clock hours required (e.g., Medical Office Clerk is 120 hours).[53] Other PCC programs, including a number of Level 2 and Level 3 ones, are for credit. In credit programs, students need to complete a certain number of credits to successfully complete the program (e.g., Medical Assistant is 28 credits). Some programs offer clock-hour and credit

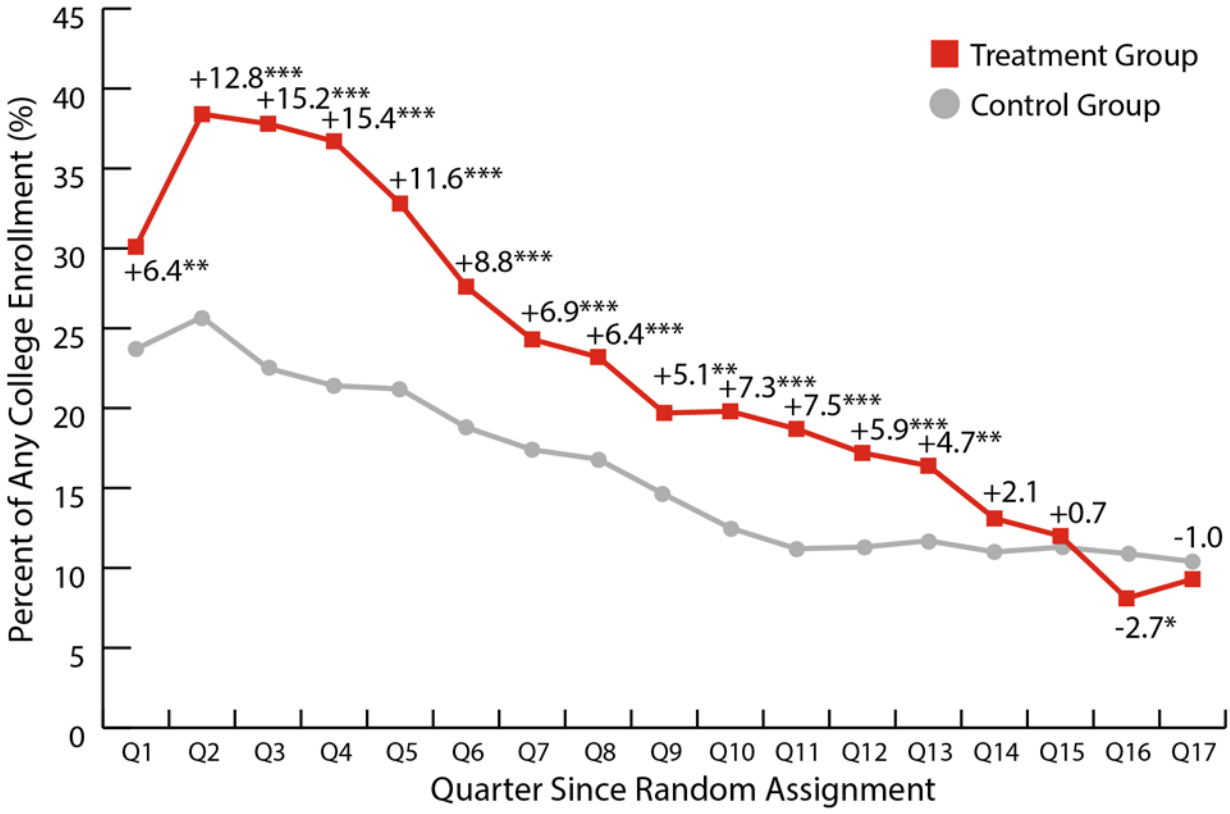
[53] Neither the College Readiness class nor its lab had clock-hour requirements, and no credential was awarded for completion of the class or lab.

certificates (e.g., Nursing Assistant is 120 clock hours or four credits). The predominance of clock-hour programs in Pathways to Healthcare has implications for impacts on credits. LPN, one of the more common Level 3 programs, is clock hour.

- ***Access to Pathways to Healthcare increased enrollment in college and full-time equivalent (FTE) enrollment.***

Exhibit 4-3 plots trends in enrollment in any college by quarter after random assignment; quarters 1 through 6 show the impact during the first follow-up period. The treatment group continued to enroll in college at significantly higher rates than the control group through quarter 13. However, as summarized below, levels of enrollment never exceeded 40 percent of the treatment group and 30 percent of the control group. By quarter 17, about 9 percent of the treatment group and 10 percent of the control group was enrolled in training, with no detectable difference between the two.

Exhibit 4-3: Impact on Any College Enrollment by Quarter, Three Years after Randomization



Source: PCC records.

Note: Enrollment estimates within each quarter are exploratory outcomes and statistical significance is based on two-tailed tests. Sample size is 609 in the treatment group and 608 in the control group.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

Pathways to Healthcare also increased FTE enrollment in college, though the magnitude of the increase varies by data source. The pre-registered secondary outcome measures FTE enrollment using PCC records. According to those data, Pathways to Healthcare increased FTE

enrollment by 0.8 months, a relative impact of 19 percent (Exhibit 4-4). According to the three-year follow-up survey responses, Pathways to Healthcare increased FTE enrollment in college by 2.8 months, a relative impact of 56 percent (Exhibit 4-4). Although not registered as a secondary outcome, the measure based on survey records seems to have more validity—only with survey responses was the distribution of FTE months comparable to all students in the PCC records.[54]

The larger survey estimate of FTE enrollment impact is more consistent with the larger impact on credentials reported in Section 4.1. There are at least two reasons the PCC records may underestimate FTE enrollment. First, students who enrolled in PCC Center for Training and Development (CTD) courses had very high rates of withdrawal (for which they were not counted as enrolled in PCC records even if they did participate for some time). Second, we made assumptions in order to "translate" CTD clock hours into attempted hours. For instance, we assumed that 45 CTD clock hours required the same level of effort as a three-credit PCC course. Excluding participants who withdrew from our enrollment calculations and our translating of CTD clock hours to FTE enrollment could have resulted in an underestimate of FTE enrollment from PCC records.

Exhibit 4-4: Three-Year Impacts on Other Enrollment Measures

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
PCC Records						
Number of college credits (#)	8.55	6.27	+2.28***	(0.83)	+36.7%	.003
FTE (full-time-equivalent) months enrolled in college (#)	5.41	4.66	+0.75**	(0.45)	+16.1%	.048
Completed >10 FTE months enrolled in college (%)	18.2	17.3	+0.9	(2.1)	+5.2%	.661
Sample size	609	608				
Three-year Follow-up Survey						
FTE months enrolled in college (#)	7.76	4.97	+2.79***	(0.53)	+56.1%	<.001
FTE months enrolled in any school[a] (#)	5.91	5.21	+0.70	(0.51)	+13.4%	.169
Current enrollment in training or education (%)	15.5	12.2	+3.4	(2.1)	+27.9%	.109
Sample size	530	510				

Source: PCC records and PACE three-year follow-up survey.

Note: Secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Relative Impact" represents impacts as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

[a] Outcome based on blend of PCC records and three-year follow-up survey data.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

The impacts for FTE months enrolled and college credits are smaller than that for credentials. For reference, the relative impact for postsecondary credentials requiring a year or more of

[54] This is especially evident for students who enrolled in courses in the CTD. See Appendix E for more information.

college was 62 percent, and for any postsecondary credential it was 143 percent; but for college credits it was 37 percent and for FTE months enrolled it was 16 percent.[55] The Pathways to Healthcare program's rich advising services offer one plausible explanation for this difference—treatment group members had access to dedicated advisors who helped students navigate paperwork and other pre-course requirements (e.g., background checks).

- ***Pathways to Healthcare increased receipt of college credits.***

In the three-year follow-up period, the treatment group earned an average of 8.6 credits—an increase of 2.3 credits over the control group. As noted above, however, most Pathways to Healthcare programs resulted in noncredit certificates. Thus, we did not expect to see a large accumulation of credits even when we documented an impact on credentials.

[55] The relative impact for FTE months is 56 percent using the three-year follow-up survey and 16 percent using PCC records. Both are much smaller than the relative impact on credentials, though the survey-based estimate is closer.

5. Impacts on Earnings and Employment

The Pathways to Healthcare theory of change suggests that positive impacts on occupational training certifications will lead to higher levels of earnings and employment, particularly healthcare-related employment. We did not assess earnings and employment impacts for the short-term report at 18 months because we hypothesized that it would be too early for the impacts to emerge. However, it seems reasonable to expect impacts after three years because program participants would have had enough time to attain one or more credentials, including ones taking a year or more of college, and gain healthcare-related employment and earnings associated with their credentials. As described in Chapter 4, the program had impacts on postsecondary credential attainment, including credentials that take at least one year of college.

This chapter reports whether training impacts translated into impacts on earnings, employment, and other measures of job quality three years after random assignment. The confirmatory outcome for the earnings and employment domain, or the outcome we use to determine whether Pathways to Healthcare is meeting its goals, is *average quarterly earnings in follow-up quarters 12-13*, which corresponds to months 37 through 42 after random assignment.

5.1 Impact on Earnings

We used NDNH wage records to determine whether earnings impacts emerged by the end of the three-year follow-up period. Exhibit 5-1 summarizes these findings.

- ***Pathways to Healthcare had no detectable impact on average quarterly earnings in follow-up quarters 12-13.***

The top row in Exhibit 5-1 below shows that the difference in average quarterly earnings in quarters 12 and 13 between the treatment and control groups was positive but close to zero (+$17) and not statistically significant.

As is true in all evaluations of job training programs, the impact was estimated with uncertainty. When we incorporate that uncertainty into a range of plausible impacts, we estimate that the true impact could be as large as +$356 or as small as −$322.[56] Most of this range is either negative or not sufficiently larger than zero to be meaningful.[57]

The increase in college enrollment reported in Chapter 4 combined with the lack of impacts on earnings suggests that the treatment group substituted work for training or reduced their hours

[56] These values are the endpoints for a 90 percent confidence interval for average earnings in quarters 12 to 13.

[57] The upper end of this plausible range is not large relative to results from some recent studies. For instance, about two years after random assignment, impact for those assigned to the Wisconsin Regional Training Partnership (WRTP) in the Sectoral Employment Impact Study (SEIS) was $782 per quarter (Maguire et al. 2010) and for Per Scholas (one provider in the WorkAdvance Demonstration) was $937 per quarter (Hendra et al. 2016).

while in school. If training improves earnings as implied by the theory of change, we should observe improvements after training is completed and participants return to work or increase their hours. In Chapter 3 we reported that occupations associated with Level 1 trainings had lower average annual earnings than occupations associated with Level 2 or 3 trainings. The lack of earnings impacts might reflect that more treatment group members completed a Level 1 course than a higher step on the pathway. As a result, over the entire period from randomization to quarter 13, the treatment group had earned about $2,800 *less* than the control group.[58]

Exhibit 5-1: Three-Year Impacts on Earnings

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Confirmatory Outcome: Average quarterly earnings Q12-Q13 ($)	4,175	4,158	+17	206	+0.4%	.467
Total Earnings ($)						
In last year of follow-up (Q10-Q13)	15,648	16,284	−636	733	−3.9%	.386
Since randomization (Q1-Q13)	40,107	42,921	−2,814*	1,681	−3.9%*	.094
Sample size	609	608				

Source: National Directory of New Hires.

Note: Confirmatory and secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Relative Impact" represents impacts in column 3 as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

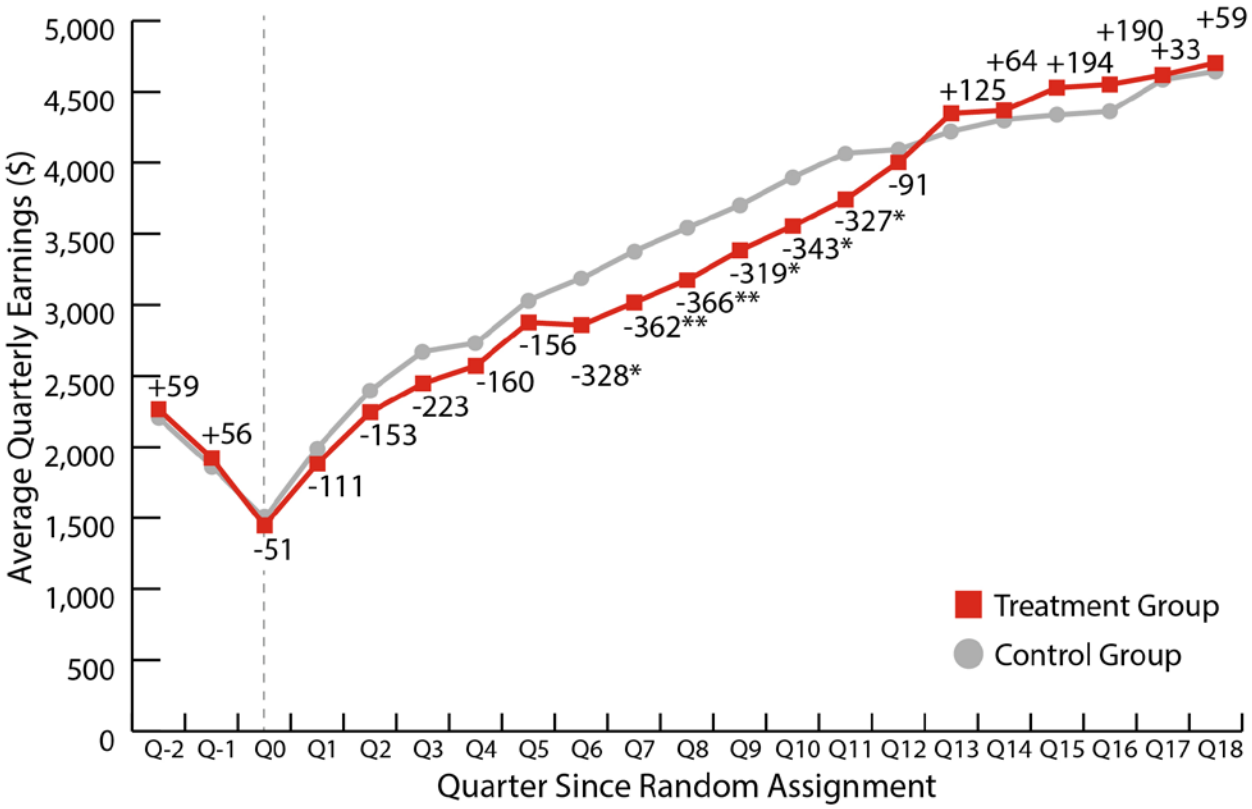
Exhibit 5.2 reports the trend in earnings by quarter from before random assignment to the 18th follow-up quarter, which is the last quarter for which we have earnings information for the full sample.[59] In the two quarters before random assignment (Q−2 and Q−1 in the graph), earnings fell for both the treatment and control groups.[60] Following random assignment, average quarterly earnings begin to grow but there is no detectable difference between the treatment and control groups. In each of quarters 6 through 11, the control group had higher earnings than the treatment group. These quarters presumably correspond to the quarters during which the treatment group remained in training but the control group transitioned to the labor market. The negative impacts reflect lost wages for the treatment group during training. In quarters 12 through 18 there is no difference between the treatment and control groups in quarterly earnings.

[58] Our estimates of cumulative earnings do not discount or control for inflation. Discounting would amplify lost earnings during the early quarters after random assignment and reduce any gains in later quarters, making the net difference even larger. Controlling for inflation is not crucial because inflation over the study period was approximately 2 percent per year (Bureau of Labor Statistics 2019). As well, inflation affects the treatment and control groups equally, and our goal here is to estimate whether there has been any increase in earnings following training, rather than to precisely estimate the magnitude of those earnings.

[59] The 18th follow-up quarter corresponds to 54 months (or 4.5 years) after random assignment.

[60] This is known as the "Ashenfelter dip" (Ashenfelter 1978).

Exhibit 5-2: Impact on Average Earnings in Successive Follow-up Quarters



Source: National Directory of New Hires.

Note: Earnings estimates within each quarter are exploratory outcomes and statistical significance is based on two-tailed tests. Sample size is 609 in the treatment group and 608 in the control group.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

5.2 Impact on Employment

This section examines impacts on the level of employment and job characteristics as captured in the three-year follow-up survey. These offer additional information on the earnings estimates reported above.

- ***Pathways to Healthcare had no detectable impact on employment as of three years after random assignment.***

Exhibit 5-3 shows that the treatment and control groups had similar employment levels at the time of the three-year follow-up survey, which is consistent with analysis of administrative earnings data. Slightly less than two thirds of both the treatment and control groups reported employment at the time of survey follow-up, and we do not detect any difference between them.

Exhibit 5-3: Three-Year Impacts on Employment and Career Progress

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Employed at survey follow-up (%)	63.9	62.3	+1.7	(3.0)	2.7%	.291
Indicators of Career Pathways Employment						
Employed and: (%)						
Earning $14 per hour or more[a]	21.2	24.4	−3.2	(2.6)	−13.1%	.887
Paid under $10 per hour	10.1	10.4	−0.3	(1.9)	−2.9%	.872
Paid $10 to $13.99 per hour	31.7	26.8	+4.9*	(2.9)	18.3%	.088
Working in the healthcare field (self-classification)	39.4	34.8	+4.6*	(3.0)	13.2%	.066
Working in a healthcare occupation (any industry)	20.7	21.4	−0.7	(2.7)	−3.3%	.803
Working in a job requiring at least mid-level skills[b]	22.0	21.0	+1.0	(2.6)	4.8%	.349
Indicators of Job Quality						
Employed and: (%)						
Working at least 32 hours per week	44.8	42.6	+2.2	(3.2)	5.2%	.500
Working straight day, evening, or night shifts	50.9	51.2	−0.3	(3.3)	−0.6%	.928
Working in job that offers health insurance	43.5	42.9	+0.7	(3.1)	1.6%	.833
Working in job with supportive working environment[c]	31.3	31.1	+0.2	(3.0)	0.6%	.942
Sample size	530	510				

Source: PACE three-year follow-up survey.

Note: Secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Relative Impact" represents impacts in column 3 as a percentage of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

[a] $14 per hour is the 60th percentile of the wage distribution for control group members who were employed at survey follow-up.

[b] O*NET Job Zone 3 or higher.

[c] A job is considered to have a supportive working environment if the worker reports a rich combination of family-friendly policies, helpful coworkers and supervisors, high job satisfaction, generous fringe benefits, and opportunities for advancement.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

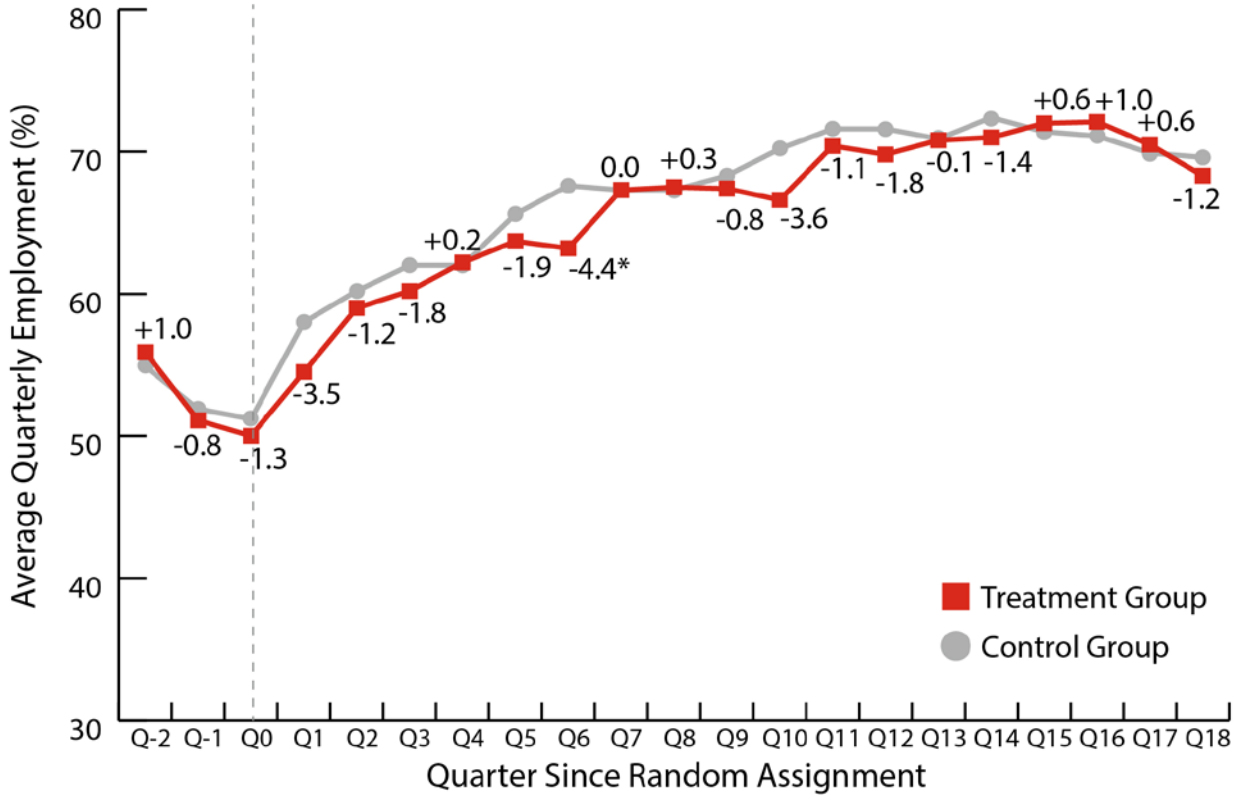
Exhibit 5-4 shows the time trend in quarterly employment using NDNH records. The time trend shows very little difference in employment over time (the difference in quarter 6 is statistically significant at the 10 percent level).[61]

To supplement the quarterly earnings reported in the previous section, we tested whether the program could generate a moderate initial boost in wages with the expectation for further impact over time (a key assumption in the theory of change). We define these jobs using the 60th

[61] Though the impacts are consistent, the levels of employment differ slightly between the three-year survey (Exhibit 5-3) and the administrative records (Exhibit 5-4). Survey-reported levels of employment are less than 65 percent, but administrative records indicate levels of employment around 70 percent. This difference is likely because the survey reflects employment at a single point in time whereas the administrative records reflect employment at any time during each quarter.

percentile of the wage distribution for control group members who were employed, which corresponds to about $14 per hour (Exhibit 5-3). Less than one quarter of both the treatment and control groups were employed at jobs that paid $14 per hour or more at the time of the survey, and we do not detect evidence of a program impact.

Exhibit 5-4: Employment Impacts by Quarter



Source: National Directory of New Hires.

Note: Employment estimates within each quarter are exploratory outcomes and statistical significance is based on two-tailed tests. Sample size is 609 in the treatment group and 608 in the control group.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

- ***Pathways to Healthcare increased self-reported employment in the healthcare field.***

The three-year follow-up survey asked study participants about their employment status, and for those working at the time of the survey, the characteristics of their job. As Exhibit 5-3 above shows, nearly 40 percent of the treatment group self-reported employment in the healthcare field, an increase of 5 percentage points over the control group.

The survey also included three open-ended questions about the kind of work done, usual activities completed, and the job title. We converted these into a U.S. Department of Labor Standard Occupational Classification (SOC) code and used that code to classify employment in the healthcare sector (see Appendix C). Using this measure there is no detectable impact on employment in a healthcare occupation.

One explanation for this finding is that more treatment group members are working in the healthcare field but in occupations that the SOC system does not classify as being healthcare jobs (e.g., an IT-related job at a hospital).[62] Because impacts for these two outcomes do not agree and we suspect some of the healthcare jobs PCC trained for were classified in the SOC system as non-healthcare employment, we place more weight on the pre-registered secondary outcome (self-reported employment in the healthcare field).

- ***Pathways to Healthcare had no detectable impact on measures of job quality.***

The bottom panel of Exhibit 5-3 above reports treatment and control group members' assessment of job quality. Treatment group members were no more likely than control group members to report that their current job required "at least mid-level skills," classified as jobs with O*NET Job Zone 3 or higher.[63] About one in five study participants in both the treatment and control groups reported employment in this type of job. Similarly, the program did not improve other measures of job quality, such as working in a job for at least 32 hours per week or working straight shifts. Treatment group members were no more likely to report working in a job that offers health insurance, or working in a job with a supportive working environment.

[62] To explore this hypothesis further, we tabulated the occupations that were self-reported as in the healthcare field but were not coded in the SOC system as healthcare jobs. The most common of these occupations was Personal Care Aide. In the 2010 SOC system Personal Care Aide was not considered a healthcare job. This status was revised in 2018.

[63] O*NET defines occupations in Job Zone 3 as those that "need medium preparation." Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate degree. O*NET lists Medical Assistant as an example of an occupation in Job Zone 3 (O*NET 2019).

6. Impacts on Other Life Outcomes

This chapter examines whether Pathways to Healthcare affected other life outcomes, including those related to career knowledge and support, family economic well-being, parental engagement, and child outcomes. The program's theory of change implies that outcomes in these domains will improve as a result of increases in education and training that lead to more favorable earnings and employment outcomes. As discussed in Chapter 4, treatment group members were more likely to earn a range of postsecondary credentials. However, training thus far has not translated into career-track jobs with higher earnings, as seen in Chapter 5. As a result, the grounds for more distal effects are somewhat uncertain.

6.1 Impact on Career Knowledge, Availability of Career Supports, and Psycho-social Skills

This section reports Pathways to Healthcare's impacts on career knowledge, availability of career supports, and psycho-social skills. Improvements to these outcomes are hypothesized to boost postsecondary educational attainment and career progress (Judkins et al. 2018).

- ***The Pathways to Healthcare program increased access to career supports, but not confidence in career knowledge.***

Three years after random assignment the treatment group reported greater access to career supports (an effect size of 0.15), but we do not detect a difference in confidence in career knowledge (Exhibit 6-1 below).[64] These findings are consistent with the short-term report at 18 months.

[64] An effect size of 0.15 corresponds to approximately 56 percent of the treatment group scoring higher than the comparison group (Judkins et al. 2008).

Exhibit 6-1: Impacts on Career Knowledge, Career Supports, and Psycho-social Skills

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Effect Size	*p*-Value
Confidence in career knowledge[a]	3.35	3.34	+0.01	(0.04)	+0.02	.385
Career Supports						
Access to career supports[b]	1.59	1.54	+0.05**	(0.02)	+0.15**	.011
Perceived career progress[c]	3.10	2.93	+0.17***	(0.06)	+0.19***	.003
Psycho-social Indicators						
Grit[d]	3.34	3.37	−0.04	(0.03)	−0.07	.303
Core self-evaluation[e]	3.43	3.44	−0.01	(0.03)	−0.01	.838
Index of life challenges[f]	1.69	1.65	+0.04	(0.04)	+0.07	.250
Perceived stress[g]	2.01	1.97	+0.04	(0.05)	+0.05	.427
Social support[h]	3.67	3.69	−0.02	(0.03)	−0.05	.436
Sample size	530	510				

Source: PACE three-year follow-up survey.

Note: Secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Effect Size" represents impacts in column 3 as a fraction of the pooled standard deviation across the treatment and control groups. See Appendix C for a description of outcome measures.

[a] Seven-item scale tapping self-assessed career knowledge; response categories range from 1=strongly disagree to 4=strongly agree.

[b] Six-item scale tapping self-assessed access to career supports; response categories range from 1=no to 2=yes.

[c] Three-item scale on whether reaching long-range education goals and employment goals and whether on career path; response categories range from 1=strongly disagree to 4=strongly agree.

[d] Eight-item scale measuring self-assessed persistence and determination; response categories range from 1=strongly disagree to 4=strongly agree.

[e] Twelve-item scale measuring self-assessed self-efficacy; response categories range from 1=strongly disagree to 4=strongly agree.

[f] Five-item scale of situations that could interfere with school, work, job search, or family responsibilities.

[g] Four-item scale measuring self-reported perceived stress; response categories range from 1=never to 4=very often.

[h] Ten-item scale measuring availability of social support; response categories range from 1=strongly disagree to 4=strongly agree.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

Among other outcomes in this domain, the treatment group reported greater perceived career progress (effect size of 0.19, another finding that remains unchanged from the short-term report).[65] We do not detect differences in psycho-social skills, including grit, core self-evaluation, life challenges, perceived stress, and social support.

6.2 Impact on Family Economic Well-Being

This section reports impacts for several measures of family economic well-being, including health insurance coverage, receipt of means-tested benefits, unsecured debt and student loan debt, and financial status.

[65] The measure of perceived career progress is a three-item measure that combines progress toward longer-term educational goals, progress toward longer-term employment goals, and a self-report that one is on a career path. In a sensitivity analysis we removed the education component of the measure to test whether impacts were being driven by that component. Removing that component did not change the results.

The Pathways to Healthcare theory of change suggested that a number of program components, including academic and non-academic advisors, employment workshops, and financial assistance to pay for training and related expenses, would lead to positive outcomes on a range of family economic well-being measures, including receipt of means-tested public benefits, debt levels, and signs of financial distress. The expected direction of some effects is less clear at the three-year mark. For example, non-academic advising could facilitate enrollment in a means-tested program such as TANF or Medicaid to make it easier for students to persist in college. Career-track employment and higher earnings could reduce the need for these benefits, but not all treatment group members are employed in career-track jobs (see Chapter 5). Access to financial supports would lead to lower student debt. However, students may have had to take out loans or borrow from their families to pay for non-academic expenses while they were in school (e.g., rent) leading to higher levels of debt.

- ***Pathways to Healthcare had no detectable impact on most measures of family economic well-being.***

As Exhibit 6-2 below shows, nearly 90 percent of both the treatment and control groups had health insurance coverage from any source three years after random assignment, with no detectable difference between the two. And though access to Pathways to Healthcare did not reduce receipt of means-tested public benefits overall, more of the treatment group (33 percent) received Medicaid than the control group (26 percent).

We posit several explanations for why access to Pathways to Healthcare might increase receipt of Medicaid. First, Medicaid expansion in Arizona in 2013 coincided with this study's follow-up; the support services offered to those in Pathways to Healthcare may have encouraged application for Medicaid and/or removed some of the institutional barriers that might have inhibited application. Another possibility is that treatment group members had more access to Medicaid via a stronger connection to healthcare training and employment, which could have reduced the administrative and informational barriers associated with Medicaid enrollment. Still another could be that treatment group members had a greater understanding of the importance of health insurance and made sure they were covered in any way they could (employer-sponsored or Medicaid).

Exhibit 6-2: Impacts on Varied Measures of Family Economic Well-being

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
Has health insurance coverage (%)[a]	88.6	89.5	−0.9	(2.0)	−1.0%	.667
Receipt of means-tested benefits						
Any means-tested public benefits (%)	60.3	52.9	+7.4	(3.1)	14.0%	.991
TANF	4.4	2.9	+1.5	(1.2)	51.7%	.203
SNAP	31.6	30.4	+1.3	(2.7)	4.3%	.641
Medicaid	32.6	25.6	+6.9**	(2.8)	27.0%	.013
Debt						
Average student debt amount ($)						
Participant's student debt	1,995	2,054	−59	(388)	−2.9%	.439
Parental student debt	89	54	+35	(56)	64.7%	.532
Unsecured debt of $5,000 or more[b] (%)	33.3	29.6	+3.7	(2.9)	12.5%	.212
Financial Status						
Any signs of financial distress[c] (%)	56.2	53.7	+2.5	(3.1)	4.7%	.789
Average monthly household income ($)	2,638	2,766	−128	(114)	−4.6%	.261
Average monthly personal income ($)	1,444	1,426	+18	(68)	1.3%	.794
Didn't experience food insecurity (%)	89.6	90.8	−1.2	(1.9)	−1.3%	.541
Sample size	530	510				

Source: PACE three-year follow-up survey.

Note: Secondary outcomes are bolded and statistical significance is based on one-tailed tests; exploratory outcomes are not bolded and statistical significance is based on two-tailed tests. "Relative Impact" represents impacts in column 3 as a fraction of the corresponding control group mean (i.e., 100 × [impact/control group mean]).

[a] Has health insurance coverage includes the offer of healthcare by an employer or actual receipt of health insurance if not offered by an employer.

[b] Unsecured debt is debt other than student debt and secured debt (mortgages and title loans). Spousal debt included.

[c] Signs of financial distress is a flag for utility disconnects, delayed health/dental care, hunger, or trouble paying bills or making ends meet.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

Similarly, Pathways to Healthcare did not have an impact on debt or signs of financial distress overall. There was no detectable impact on either student debt or parental student debt. More than half of both the treatment and control groups reported signs of financial distress overall, but there was no difference between the two. There were also no differences between the treatment and control groups in household income, personal income, or adequacy of food for the household.

6.3 Impact on Parental Engagement and Child Outcomes

This section reports impacts for several outcomes related to parental engagement and child well-being for study participants with children under age 18 at the time of random assignment. The Pathways to Healthcare program provided no direct services to children, but it is plausible that effects might flow from parents' experiences with the program and increases in their educational attainment, employment, or income. It is possible that parents who pursue training in a field, complete the training, and move into employment in their field feel they accomplished a life goal, which could lead them to encourage their children to do well in school and attend postsecondary education—a positive for children. As well, it is possible that parents could role-

model the value of education, for example, by doing homework together with their children—also a positive. Conversely, it is also possible that parents who are at school or working have less ability to engage with and supervise their children—a negative for children.

Note that the three-year follow-up survey asked these questions only of parents who had children under age 18 at the time of random assignment, and for some questions, only parents of children in grades K-12.[66] Because not all sample members were parents and the parents sample size is smaller than the overall sample size, the analysis is not well powered to detect small differences in impacts.[67]

- ***Pathways to Healthcare had no detectable impact on parental engagement and child outcomes.***

The top panel of Exhibit 6-3 reports impacts for parental engagement with all children under age 18. More than three quarters of both treatment and control group members believe their children will graduate college. Less than a quarter of each group classified themselves as highly engaged parents. Finally, parents in both the treatment and control groups reported similar levels of self-efficacy for helping their child navigate school.

The bottom panel of Exhibit 6-3 above reflects parental report of child outcomes for children in kindergarten through grade 12. As with parental engagement, we do not detect any differences in child outcomes between the treatment and control groups. About 10 percent of both groups reported their child had ever repeated any grades (including prior to random assignment). On average, children of parents in both the treatment and control groups were late for school about one day and were absent about 1.4 days in the prior month.

[66] The sampling frame for parents with children included those whose projected interview date for the three-year survey came before the end of the summer in the year their child turned age 18. Those projections were not always correct. As a result, some of the children in the sampling frame were older than age 18 at the time of the three-year survey.

[67] Our analysis plan (Judkins et al. 2018) noted that we would report impacts for all-grade and K-12 questions in programs where we had least 200 children.

Exhibit 6-3: Impacts on Parental Engagement and Child Outcomes

Outcome	Treatment Group	Control Group	Impact (Difference)	Standard Error	Relative Impact	*p*-Value
All Children						
Parent believes child will graduate college (%)	76.7	83.9	−7.2	(5.2)	−8.6%	.169
Highly engaged parent (parent almost always present for meals and other daily family activities) (%)	20.8	24.7	−3.8	(5.3)	−15.4%	.472
Parent self-efficacy for helping child navigate school[a]	3.48	3.42	+0.1	(0.07)	+0.10	.436
Sample size	162	120				
Children Grades K-12						
Child repeated any grades (%)	10.0	8.5	+1.5	(3.9)	17.6%	.704
Days child late for school last month (#)	1.05	1.08	−0.03	(0.26)	−2.8%	.915
Days child absent from school last month (#)	1.39	1.41	−0.01	(0.28)	−0.7%	.957
Sample size	139	99				

Source: PACE three-year follow-up survey.

Note: Statistical significance is based on two-tailed tests. "Relative Impact" represents impacts in column 3 as a fraction of the corresponding control group mean (i.e., 100 × [impact/control group mean]). For the scale variable (parent self-efficacy), we report effect size rather than relative impact. "Effect Size" represents impacts in column 3 as a fraction of the pooled standard deviation across the treatment and control groups.

[a] Parental self-efficacy based on seven items (e.g., "I know how to help my child in school") rated from 1=disagree very strongly to 6=agree very strongly. See Appendix C for more details on child outcome measures.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

7. Discussion and Conclusions

PCC received an HPOG 1.0 grant award to implement Pathways to Healthcare. The program—which operated between 2010 and 2016—defined and sought to guide participants in five occupational training pathways along with providing financial, academic, and other supports. The program aimed to increase students' skills and receipt of credentials of value to employers. This report documents program impacts on postsecondary training, earnings and employment, and other life outcomes three years after random assignment (with follow-up extended to up to five years after random assignment where administrative records are available).

The program's theory of change posits that impacts on education outcomes will translate into career-track employment and earnings impacts. Evidence on the two confirmatory outcomes in this study, however, is mixed:

- Pathways to Healthcare did *increase receipt of a credential requiring a year or more of college to earn* by 7 percentage points—the confirmatory outcome in the education domain.
- The program had no detectable impact on the confirmatory outcome in the earnings and employment domain—*increase in average quarterly earnings in follow-up quarters 12-13*. Our estimated impact of +$17 per quarter is not significantly different from zero. The uncertainty associated with the estimate implies a plausible range of −$322 to +$356. This range implies PCC did not have a meaningful impact on earnings in the first three years after random assignment. Furthermore, estimated earnings impacts remained small and statistically insignificant when we extended the analysis to nearly five years.

Beyond these two confirmatory outcomes, Pathways to Healthcare increased short-duration educational credentials, employment in the healthcare field, access to career supports, and perceived career progress. However, the program did not generate detectable impacts on other measures of interest, including job quality, family economic well-being, or psycho-social skills.

This concluding chapter provides possible explanations for the Pathways to Healthcare impact findings. It then describes implications of the findings for other job training programs. It ends with questions for future research.

7.1 Possible Explanations for Pathways to Healthcare Impact Findings

This section explores three possible explanations for the impact findings: (1) a large share of the treatment group did not engage in training; (2) few participants advanced beyond their first step (Level 1) on the pathway; and (3) the impact on long-duration credentials (those taking a year or more of college) within three years was not large enough to generate earnings impacts.

- **A large share of treatment group members did not engage in the program.**

As the theory of change indicates, non-enrollment in any training affects impacts on short-term credentials, subsequent credentials, and earnings. One potential explanation for the absence of statistically significant earnings impacts at the three-year follow-up is that 44 percent of treatment group members had not engaged in any type of occupational training during this time. As the short-term (18-month) report indicated, there are many possible reasons for non-engagement, including difficulty combining work, school, and family responsibilities. We would not expect impacts to emerge for earnings or other outcomes for this large share of treatment group members who received no training from Pathways to Healthcare. This has repercussions for the estimated average impact of the program. Because non-enrollees are included in impact estimates and are not expected to have any impact from the program, they dilute the average impact for the overall treatment group.[68]

- **The program mostly increased short-duration credentials with modest potential to lift wages.**

Pathways to Healthcare implemented five healthcare pathways, most starting at Level 1 and continuing to Level 3. The impacts on postsecondary attainment reported in Chapter 4 indicate much larger impacts on receipt of short-duration credentials (requiring less than a year of college to earn) than on receipt of long-duration ones (requiring at least a year): a 20 percentage point impact for short-duration credentials compared to a 7 percentage point impact for long-duration credentials. Those short-duration credentials are typically associated with Level 1 programs, and administrative records indicate that the majority of treatment group members did not move beyond Level 1.[69] As noted in Chapter 1, average wages associated with Level 1 occupations do not differ substantially from those that could be earned outside of the healthcare field (e.g., personal care, food preparation). A short-duration credential may position the worker on the initial step of a career ladder, but we would not expect such a credential to generate a meaningful impact on earnings at this time point. Unless the large share of the treatment group who earned Level 1 credentials move along their pathways to higher-paying jobs through additional training, it is unlikely that they will earn more than those who did not complete any training. This will be a question of interest for the long-term follow-up study currently underway.

These results are consistent with the three-year findings for the HPOG 1.0 Impact Study (Peck et al. 2019). That study pooled data from 23 grantees (including PCC). Comparing Pathways to Healthcare to the HPOG 1.0 Impact Study findings is akin to comparing it to the average

[68] As noted in Chapter 2, the study used an intent to treat approach, which captured impacts for all sample members, regardless of whether those assigned to the treatment group actually received any services.

[69] For instance, within the 18-month follow-up period, the most common short-duration credential was Certified Nursing Assistant. This first step on the Nursing pathway is a five-week program (nine weeks if it includes Level 2 Patient Care Technician training). Less common Level 1 programs were Phlebotomy (six months), the first step on the Medical and Physician Support pathway; and Medical office Clerk/Specialist (one month), the first step on the Medical Office pathway.

HPOG 1.0 program. That study found that, as with Pathways to Healthcare, the most popular trainings among HPOG 1.0 programs were short-duration trainings, such as Nurses' Aide. That study also found that impacts on earnings for HPOG 1.0 grantee programs were similar to those of Pathways to Healthcare—no impact on average quarterly earnings during quarters 12 and 13 after random assignment.

- **Impacts on long-duration credentials are too small to generate earnings impacts.**

Chapter 1 noted that occupations associated with higher-level credentials have higher average hourly wages. As reported, wages for some Level 2 and 3 occupations (e.g., Surgical Technician, Licensed Practical Nurse) are higher than for others (e.g., Medical Assistant, Pharmacy Technician). More treatment group enrollment in courses to prepare for these higher-wage occupations appears to be needed in order to detect impacts on earnings.

All Level 2 and 3 credentials required at least one year of full-time college. The extent to which Pathways to Healthcare increased receipt of these credentials and created opportunities to obtain these higher-wage jobs has implications for the impact we expect to emerge for quarterly earnings. The relatively small impact on receipt of long-duration credentials—7 percentage points by the three-year follow-up—implies that we should expect a similarly small impact on earnings. Rough calculations suggest that in order to detect an impact on earnings, the impact on postsecondary credentials requiring at least a year of college would need to be considerably larger than 7 percentage points.[70]

[70] To demonstrate, consider the following calculation. Suppose wages are the same for employed treatment group and control group members, both for those who earn no credential and for those who earn a short-duration credential. We would not expect an impact on earnings for this part of the sample, all else equal. If all treatment group and control group members who earned longer-duration credentials were employed in higher-wage occupations at the three-year follow-up, we would expect an impact of approximately +$250 to +$350 in quarterly earnings. To increase this to +$500 in quarterly earnings, the impact on long-duration credentials would need to be roughly 10 to 13 percentage points.

For demonstration, we derive this +$250 to +$350 as follows. Per Chapter 1, those employed in higher-wage occupations can expect an increase in average wages of approximately $8 to $10 per hour relative to the wages they could earn with a short-duration credential; an improvement of 7 percentage points implies an increase in average wages of approximately 50 to 70 cents per hour (7 percent x $8-$10 per hour). Assuming roughly 500 hours of work per quarter, we would expect an earnings impact of only approximately +$250 to +$350 in quarterly earnings. Given that not all Level 2 and Level 3 occupations have higher wages, this is an upper bound for the likely impact.

7.2 Implications for Programs

The mixture of positive impacts in the education domain and no detectable impact in the employment domain suggests the following implications for Pathways to Healthcare and similar sectoral job training programs.

- **Programs can have a positive impact on credential attainment for non-traditional students.**

Pathways to Healthcare and similar programs targeted low-income, low-skilled adults, many of whom had not been in an educational setting in years. The impact on any credential shows that non-traditional students can engage in, persist, and complete programs. The entry-level (Level 1) trainings in four different pathways ensured there were diverse options for participants starting on the initial pathway rung.

- **Programs with multi-step pathways should encourage participants to seek higher-level credentials.**

Pathways to Healthcare requested that program completers work for at least six months prior to starting a follow-on training to ensure that the occupation was a good fit.[71] After such a gap, it might be useful for program staff to more aggressively reach out to participants and encourage them to return for higher-level trainings. Additionally, if participants are not working in their field of training because they did not like the work or could not find a job, such outreach is an opportunity to encourage participants to try a different type of program (e.g., medical records rather than direct patient care).

Programs may also need to help participants prepare for higher-level trainings. Most of the Pathways to Healthcare Level 2 and 3 programs had considerably higher math and reading level requirements than Level 1 programs. To address this, PCC helped participants prepare for the LPN program assessment test by implementing a pre-LPN reading group. The instructor focused on test-taking skills and reading strategies while the group read a few pages of the assigned book. A memoir about an author‘s stroke, *The Diving Bell and the Butterfly*, was selected because of its extensive health-related vocabulary.

- **Programs should identify and address causes of nonparticipation.**

There are several reasons why individuals might not start a training program. Non-traditional students may have difficulty combining work and school and may not be able to afford to stop working in order to pursue their education full time. Additionally, a delay between enrolling in a program and starting classes, either because of extensive pre-training requirements (e.g., paperwork, assessments) or infrequent course start dates, can negatively affect participation. As described in the 18-month report, the average time between random assignment and the start of Pathways to Healthcare training was almost four months. This delay may have increased the fraction of the treatment group who did not participate in training. More attention to reducing this delay seems worthwhile. Toward the end of the grant period, PCC implemented

[71] The one exception was the CNA to Patient Care Technician pairing.

a bi-monthly group orientation to engage participants between random assignment and training, and describe the steps required prior to entering training so that participants would have a full understanding of the program timeline.

- **College-based programs should strengthen employment services to help connect training completers find credential-related employment.**

Bridging the gap between program completion and employment can be difficult for programs. In particular, college programs may have limited experience providing employment services beyond program-related internships and clinical placements. PCC partnered with Pima County One Stop to provide employment services. The program also funded an employment specialist to work with employers in the community and advise the program on hiring trends. Over the course of the program, PCC and PCOS developed new job search-related workshops and launched a student-alumni networking group. However, according to the 18-month survey, less than one-quarter of treatment group members reported receipt of employment services.[72]

In preparing its application for its second HPOG grant, PCC staff conducted an employer survey and met with members of PCC Career Advisory Councils. Employers and Advisory Council members helped select the pathways and provided information about the academic knowledge program completers would need to meet employer demands. Employers also pointed to the importance of participants obtaining experiential learning prior to starting a job. In response, PCC and PCOS planned to leverage employer relationships for in-program experiential learning experiences (e.g., clinical experiences, internships, apprenticeships) and hiring program completers.

7.3 Open Questions

Three years after random assignment, Pathways to Healthcare improved educational progress, specifically receipt of credentials, but did not improve earnings. A future report will focus on the impact of Pathways to Healthcare on earnings approximately six years after random assignment. This section highlights questions for that longer-term research.

- **Will treatment group members continue to progress in college faster than control group members?**

More than 18 percent of treatment group members earned a postsecondary credential taking a year or more of college to earn. As noted above, most of these credentials are associated with higher-paying jobs. A key consideration is whether more treatment group members will continue to earn long-duration credentials relative to control group members. Some were still in training at the end of the three-year follow-up period (16 percent of the treatment group; 12 percent of

[72] It is possible that participants received more services than they reported if the response categories did not resonate with them. For example, discussions about career options were embedded in many Pathways to Healthcare services, including advising and employment services; however, as "career counseling" was not a distinct program component, students may not have reported receiving it (and the same could be true for control group members). No other data are available to corroborate these estimates.

the control group) and may still complete a Level 2 or 3 credential. Others could return for additional training, particularly if they can continue to access financial assistance and support through HOPES. Our analyses from Chapter 3 found some evidence of treatment group members returning for additional training through HOPES to a greater degree than control group members did.

A key question is whether continued progress in college by the treatment group will differ from the control group's progress. As of this report, low levels of enrollment for both the treatment and control groups seem inconsistent with substantial additional progress in college and in particular with differentially more progress for the treatment group than for the control group.

It is, however, possible that the treatment group may make more progress in college relative to the control group. For instance, though we know the treatment and control groups remain enrolled at similar rates, we do not know from the college records what types of trainings or credentials the control group are pursuing. We cannot rule out meaningful differences in these trainings or credentials. In addition, the program's emphasis on pathways may have instilled an interest in returning for additional training and an understanding of the next pathway step among the treatment group that differs from the control group's interest and understanding. If this were the case, we might observe differences in college enrollment at a later date despite the fact that enrollment rates do not differ as of this three-year follow-up.

- **Will more members of the study sample find employment in healthcare?**

Consistent with its goals, the Pathways to Healthcare program increased self-reported employment in the healthcare field. However, the levels of employment in healthcare for both the treatment group and control group were lower than anticipated—roughly one third of the study sample reported employment in the healthcare field. For reference, Peck et al. (2019) reported more than 50 percent of the HPOG 1.0 treatment group was employed in healthcare after three years.

There are several reasons why more Pathways to Healthcare treatment group members were not working in the healthcare field at the point of follow-up. One possibility is the low rate of engagement with occupational training. Another is that levels of overall employment are lower for Pathways to Healthcare than for the broader HPOG 1.0 treatment group. Also, as noted above, wages associated with entry-level credentials in healthcare may not be higher than what workers could earn in another, perhaps less difficult, job. Furthermore, some participants may have received a credential but not attempted or passed a licensing exam. As a result, these participants would be unable to work in the healthcare field for which they trained. Whether more members of the study sample will find employment in healthcare in the future remains an open question.

- **Will impacts on earnings emerge over a longer follow-up period?**

As noted above, earnings gains are associated with higher-level credentials, and they can take time to emerge. Treatment group members earned these credentials at higher rates than control group members did. Nevertheless, neither the levels nor the impacts are large. It is unlikely Pathways to Healthcare will have earnings impacts unless a much larger share of treatment

group members enroll in and complete long-duration credentials, including Level 2 and 3 credentials and associate degrees. As of five years after random assignment, there were some impacts on long-duration credentials, including associate degrees. However, it is unclear whether this impact will increase enough in the future to produce detectable impacts on earnings.

- **Will impacts differ for the next generation of career pathways programs?**

Pathways to Healthcare was an early career pathways program. The PCC staff who designed the program did not have a large base of evidence from which to draw. Rather, program staff blended program components the literature suggested were important to helping the target population persist in and complete training. As more rigorous evidence has become available, career pathways programs have adjusted their approaches. For instance, the Funding Opportunity Announcement (FOA) for HPOG 2.0 was much more explicit in requiring applicants to structure their programs in line with the career pathways framework, including placing stronger emphasis on participants returning for additional training and supporting them in long-term training.[73] Future evaluations of career pathways programs, such as the National Evaluation of HPOG 2.0, should consider the extent to which those programs have improved implementation of career pathways programs and the extent to which improved implementation leads to better training and labor market outcomes.

[73] The HPOG 2.0 FOA required applicants to provide a narrative description or diagram that demonstrated "how all of the proposed healthcare occupational trainings and basic skills training are linked together in one or more career ladders and/or lattices, with priority given to occupations that are expected to be full time, have regular hours, offer benefits, and/or have strong potential for advancement." The FOA notes that by themselves, many entry-level healthcare occupations do not have these characteristics, "which is one of the reasons why a career ladder and/or lattice can be so critical to a participant's success." Applicants had to include the SOC code for each proposed occupational training, the average starting wage in the grantee's service area, and how many students will start in each training (HHS/ACF/OFA 2015). This added language expanded upon the characteristics of training activities described in the HPOG 1.0 FOA, which required programs to "support participants' advancement along a defined career pathway, such as an articulated career ladder, if such a pathway exists in the healthcare industry, or that involve developing such pathways where they do not currently exist" (HHS/ACF/OFA 2010).

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