



Pathways for Advancing Careers and Education (PACE)

Technical Supplement to the Evaluation Design Report: Impact Analysis Plan

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PACE
Pathways for Advancing
Careers and Education



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1. Introduction and Design

This analysis plan supplements the Evaluation Design Report for the Pathways for Advancing Careers and Education (PACE) evaluation.¹ It provides additional description of the nine programs studied, summarizes the characteristics of the sample enrolled in each program, and specifies the confirmatory and secondary hypotheses that PACE will test in separate analyses for each of the nine programs participating in the study. Although this supplement recaps some background on the study design, readers should refer to the design report for fuller discussion.

In the remainder of Section 1, we describe the nine programs to be analyzed separately for PACE, summarize how their designs varyingly embody key career pathways services, and give the total number of sample members that each program randomly assigned.

In Section 2, we summarize principal data sources described in the Evaluation Design Report, identify baseline measures used in description and other purposes, analyze statistics by program for these characteristics, and summarize our approach to missing data. Appendix Exhibit A.1 provides operational specifications for baseline measures.

Section 3 describes planned analyses of services received by treatment and control group members. These contrasts provide information critical to understanding the possible sources of any observed impacts on outcomes targeted.

Section 4 specifies confirmatory and secondary hypotheses, and associated outcome measures, on which impact analysis will focus.² The section covers these outcomes at the 15- and 36-month follow-up stages and describes steps we will take to refine measures for each of the nine programs. Because the career pathways framework hypothesizes long-term impacts, it also describes long-term confirmatory outcomes in the event ACF decides to support such a study.³ In addition to documenting our hypotheses here, in the interest of transparency we will register them at What Works Clearinghouse⁴ and Open Science Framework.⁵

¹ See Abt Associates (2014). The EDR is available at <http://www.acf.hhs.gov/programs/opre/resource/pathways-for-advancing-careers-and-education-evaluation-design-report>.

² To minimize confusion, this document refers to the outcomes tested in confirmatory analyses as “confirmatory outcomes.” Although our design report follows the more general practice of naming these “primary outcomes,” the distinction between confirmatory and secondary analyses in this analysis plan is easier to follow with similarly-named (i.e., confirmatory and secondary) outcomes.

³ As noted in the PACE Evaluation Design Report, ACF has funded the 15- and 36-month follow-up studies. At this time, ACF has not decided to conduct a long-term study. We nonetheless include provisional specifications for such a study because pre-specification of confirmatory outcomes prior to examining impact estimates is central to disciplining analyses that potentially addresses the success of the programs.

⁴ <http://ies.ed.gov/ncee/wwc/references/registries/index.aspx>

⁵ <https://osf.io/>

1.1 Description of Intervention

In commissioning PACE, the Administration for Children and Families (ACF) directed Abt Associates to establish the project's substantive focus through an iterative approach involving stakeholder outreach, literature review, and site identification. The agency encouraged the Abt team to cast a wide net to identify the most promising strategies for increasing self-sufficiency of economically disadvantaged adults and families. Previous project papers and reports describe this process, how it led to the project's career pathways framework, and the nine interventions we are studying.⁶ As background to the analysis approach described in later sections of this document, the next few sections summarize key features of the conceptual framework and study programs.

PACE is testing the impacts of nine programs, each involving a different configuration of career pathways design components. As discussed in the design report and a series of published program profiles, each program embodies key assumptions in the career pathways framework guiding the PACE evaluation, while targeting different populations and using varying service strategies. For this reason, and because the programs draw from diverse funding streams and policies, ACF and the PACE team decided to analyze the impacts of each program separately, rather than as a pooled set.

1.2 Logic Model

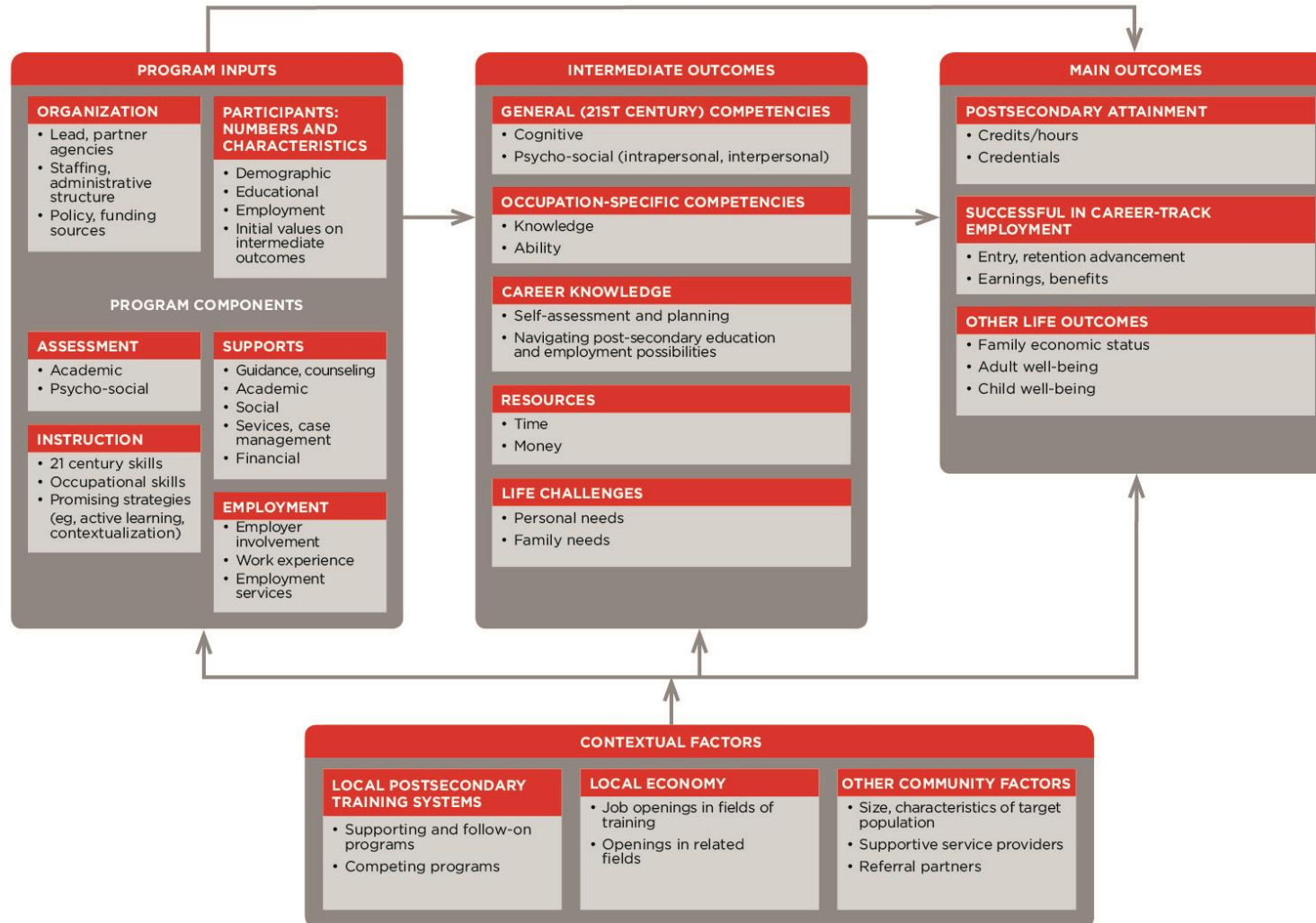
Exhibit 1.1 depicts the overarching PACE career pathways framework, which underlies our analysis plan. Its major domains frame the way we describe interventions and their samples later in this section, services selected for analysis in Section 3, and outcomes for confirmatory and secondary impact analyses in Section 4.

At the far right of Exhibit 1.1, main outcomes include the proximate education and employment outcomes on which PACE programs focus most directly, as well as more distal outcomes which the programs may affect. Among the proximate outcomes, we have selected a small number of education and employment outcomes for confirmatory tests of each program's "success." Later in this plan (Section 4.1), we identify these outcomes.

As explained in Section 4.2, another important set of analyses will test hypothesized impacts on a wider range of outcomes. These secondary hypotheses cover tests of impacts on additional measures of educational and employment success; on intermediate outcomes programs target most directly to boost main educational outcomes; and, in the longer term, on broader measures of well-being.

⁶ See Abt Associates Inc. (2009), Fein (2012), and profiles for individual PACE programs at www.career-pwathways.org and <http://www.acf.hhs.gov/programs/opre/research/project/pathways-for-advancing-careers-and-education>. Note that from this project's inception through 2014, the project was known as Innovative Strategies for Increasing Self-sufficiency (ISIS). Evaluation reports and briefs created during that time use the previous project name.

Exhibit 1.1: PACE Career Pathways Framework Logic Model



1.3 Research Questions

The PACE Evaluation Design Report (EDR) articulates research questions that the study will answer, including the key impact study questions and data sources that we will use to address them. The study will assess key impacts in three areas:

- (1) What is the impact of each program on key indicators of progress in career pathways-relevant training, such as persistence in education and the achievement of certificates and degrees?
- (2) What are the impacts of each program on entry to career-track employment and earnings?
- (3) What are the impacts of each program on individual and family well-being?

In addition, the EDR articulates implementation research questions, including:

- (4) What are the treatment-control group differences in service receipt?

This analysis plan describes the key details regarding how we will answer the above four questions from the EDR. In so doing, we specify how we will analyze:

- The baseline characteristics of the sample for each PACE program;
- Each program's impacts on the kinds and levels of services received; and
- Each program's impacts on confirmatory and secondary outcomes at each point in time related to education, employment and well-being.

1.4 Programs Included in the Study

To engage, retain, and facilitate learning among low-skilled adults, the career pathways framework includes four categories of service strategies: (1) assessments of skills and needs; (2) promising and innovative approaches to basic skills instruction and occupational training ("core curriculum"); (3) academic and non-academic supports to promote success; and (4) approaches for connecting students with career-track employment opportunities. Within each of these categories, there are a variety of promising strategies. Though many programs include all of these strategies, the extent and ways in which they do so vary.

The programs selected for inclusion in PACE incorporate signature strategies of this framework. Here, we summarize main features of the nine study programs pertinent to the impact analysis. Although the nine programs are relatively comprehensive, their organizational auspices, strategies and emphases differ considerably. Exhibit 1.2 summarizes high-level features of each program and indicates the size of the total sample randomly assigned for PACE. Exhibit 1.3 shows the main emphases in each program

design, within the career pathways framework. A series of published PACE profiles provide more detail on each of the nine programs.⁷

Main Features. Community colleges operate four programs, workforce investment boards (WIBs) operate two and non-profits operate the remaining three. To classify programs, PACE uses a model distinguishing five levels of postsecondary training—beginning at the bottom with “on-ramp” and “bridge” programs, moving to progressively longer certificate programs, and building to associate’s and bachelor’s degree programs (see EDR, Exhibit 1.1).

The nine PACE programs vary in the levels at which participants can step onto career ladders and in the number of subsequent steps services covered. Exhibit 1.2 provides a brief sketch of target populations, training and employment levels, and services for each program.

At the lower rungs of the ladder, Workforce Training Academy Connect (WTAC) at Des Moines Area Community College prepares low-skilled adults who do not test into the Workforce Training Academy to enroll in short-term vocational training at the college, resulting in a short-term certificate in an occupation in demand in the region. At higher rungs, the Valley Initiative for Development and Advancement (VIDA) in southeast Texas (lower Rio Grande Valley) targets adults who are college ready (or will be after a short preparatory course) to complete one- or two-year programs in diverse in-demand occupations.

⁷ Program profiles are available at www.career-pathways.org/pace-documents/ and <http://www.acf.hhs.gov/programs/opre/research/project/pathways-for-advancing-careers-and-education>.

Exhibit 1.2: Main Features of the Nine PACE Programs

Program	Thumbnail Sketch	Target Population	Career Ladder Steps (a), Service Duration	PACE Sample Size (b)
Bridge to Employment in Health Care (San Diego Workforce Partnership)	Community-based navigators support training of low-income adults or TANF recipients in varied health care occupations. Individual training accounts (ITAs) help participants pay for training; navigators provide supports.	Individuals in San Diego County with income below 200% of the federal poverty line or receiving TANF and who have a high school diploma/equivalent.	Steps III-V, duration open-ended.	1,007
Carreras en Salud (Instituto del Progreso Latino, Chicago)	Health care ladder offering opportunities ranging from low-level bridge programs to associates- and bachelor's-level nursing degrees.	Low-income Latino adults in Chicago with academic skills ranging from the 6th to 11th grade levels.	Steps I-IV, duration open-ended.	800
Health Careers for All (Workforce Development Council of Seattle-King County)	Community-based navigators support training in several health career pathways for low-income adults or TANF recipients. Individuals receive ITAs for training or enroll in specified community college cohort programs.	Adults with income below 175% of the federal poverty line or receiving TANF, as well as some higher-income/skill individuals with other barriers.	Steps II-V, duration open-ended.	654
Integrated Basic Education and Skills Training (I-BEST) , Three Washington State Community Colleges)	Statewide community college program providing credit-bearing coursework in varied occupations concurrent with basic skills or ESL instruction, as well as enhanced guidance and other supports.	Adults not meeting specified skill levels on placement tests for entry to occupational programs of interest.	Steps II-IV, duration varies. (State model stresses completion of a year of full-time coursework.)	632
Pathways to Healthcare (Pima Community College, Tucson)	Navigation and supports (financial/academic/social) in 16 different healthcare occupations within five general pathways. Low-skilled individuals start in college readiness program.	Low-income adults in Pima county below 70% of federal poverty line.	Steps II-IV, duration open-ended.	1,220
Patient Care Pathways Program (Madison Area Technical College, Wisconsin)	Two college bridge programs—one ladder to one-year, and the other to two-year, health care credentials.	Individuals testing below program entry requirements on COMPASS.	Steps II-IV, each program (PCA1 or PCA2) is one semester if taken alone, two if taken consecutively.	500
Valley Initiative for Development and Advancement (VIDA, South Texas)	Intensive individual and group advising and supports for full-time college enrollment to complete 1- and 2-year credentials. Pre-college skill-level students enroll in College Prep Academy first.	Low-income adults with high school credentials, at/close to college ready.	Steps III-IV, (small fraction starts at II), duration open-ended.	959
Workforce Training Academy Connect (Des Moines Area Community College)	Basic skills and multi-occupational trainings leading to a certificate.	Low-income and low-skill adults, typically at <9 th grade skill levels, with or without high school credentials.	Steps I-II, duration open-ended	943
Year Up (Eight urban areas)	One-year, full-time program providing customized skills training and corporate internships.	Economically disadvantaged youth aged 18-24 with high school credentials, screened for motivation and moderate level of risk factors.	Steps III-IV, duration is one year.	2,544

(a) Career ladder levels, as depicted in Exhibit 1.1 in the PACE Evaluation Design Report (Abt Associates 2014), distinguish five major levels of training and employment: I, basic bridge programs to further training; II, sectoral bridge programs leading to semi-skilled employment; III, short-term certificate programs leading to entry-level skilled employment; IV, 1-2 year certificate-to-AA-level training leading to middle skilled jobs; and V, bachelor's and above-level training leading to high-skilled employment.

(b) Treatment and control groups combined.

Exhibit 1.3: Major PACE Program Components

Component	Program (a)								
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU
Formal Assessment Process (b)									
Foundational academic skills	✓	✓✓	✓	✓	✓	✓	✓✓	✓	✓✓
Psycho-social skills / life challenges	✓	✓✓	✓		✓		✓✓	✓	✓✓
Instruction									
Only for PACE students									
Foundational academic		✓✓		✓✓	✓✓	✓	✓✓	✓	✓✓
Occupational training		✓✓	✓	✓✓	✓✓	✓			✓✓
Psycho-social/life		✓✓				✓	✓✓	✓✓	✓✓
Generally available training	✓✓	✓✓	✓✓	✓✓		✓✓	✓✓	✓✓	
Supports									
Personal guidance/counseling	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Academic supports		✓✓		✓	✓	✓	✓✓	✓✓	✓✓
Social supports		✓✓	✓	✓✓	✓✓	✓		✓✓	✓✓
Supportive services/case management	✓✓	✓✓	✓✓	✓	✓	✓✓	✓	✓✓	✓✓
Financial assistance	✓✓	✓✓	✓✓	✓		✓✓	✓✓	✓✓	✓✓
Connections to Employment									
Employers involved in design/teaching		✓					✓	✓✓	✓
Work experience during training (and available only to participants) (c)	✓			✓					✓✓
Post-program employment services	✓	✓	✓			✓	✓✓	✓	✓✓

✓ = component included; ✓✓ = major emphasis. Check marks indicate importance in each program's logic model—they do not indicate relative intensity across programs or the degree to which components are implemented intensively by programs. The PACE implementation study will assess the degree to which operating programs actually embody these components.

(a) BEH: Bridge to Employment in Health, San Diego; CES: Carreras en Salud, Chicago; HCA: Health Careers for All, Seattle-King County; IBEST: Integrated Basic and Education Skills, Washington State; PCPP: Patient Care Pathways Program, Madison; PTH: Pathways to Health, Pima County; VIDA: Valley Initiative for Development and Advancement, Texas; WTAC: Workforce Training Academy Connect, Des Moines; YU: Year Up, 8 cities.

(b) Assessments administered directly by program, including unstandardized/qualitative approaches if governed by well-specified process. All programs conduct some assessment at intake—in programs with a "major emphasis" on assessment, assessment is structured as an ongoing, formal aspect of service delivery.

(c) Excludes clinical internships and other work experience available to students generally.

A number of programs cover multiple steps. Carreras en Salud (CES), which provides training in health care to low-income Latinos in Chicago, encourages entry at multiple levels and aims to sustain participation through as many subsequent steps as possible. Programs concentrating on a narrower set of steps include the Patient Care Pathway Program (PCPP) at Madison College, VIDA in southeast Texas, WTAC at DMACC and Year Up (YU), operating in eight large cities nationally. The remaining programs – Bridge to Employment in Health Care (BEH) in San Diego, Health Careers for All (HCA) in Seattle, Integrated Basic Education and Skills Training (IBEST) in Washington State, and Pathways to Health Care (PTH) in Tucson —fall somewhere in-between.

PACE programs target their recruitment efforts on individuals who satisfy varying criteria, as summarized in the second column in Exhibit 1.2. A majority explicitly target economically disadvantaged youth or adults on the basis of income or residence in high-poverty areas. Others target on the basis of skills (and thus indirectly target economic disadvantage). One program intentionally targets participants

based on race-ethnicity (Latinos in CES). Several others, though, operate in geographic areas with high concentrations of particular racial-ethnic groups (e.g., PTH in southern Arizona, VIDA in southeast Texas, BEH in San Diego County, and YU in eight urban areas with large minority populations). One program, YU, targets a specific age group (i.e., individuals aged 18-24) with at least a high school degree or equivalent. Both VIDA and YU target populations able and willing to pursue training on a full-time basis. Finally, though not identified as a target factor in Exhibit 1.2, most programs focus on particular occupations and screen explicitly or implicitly for career interest in those occupations.

Service Emphases. Exhibit 1.3 identifies the major program components included in each PACE program, distinguishing further those that represent a major emphasis in each program design. Exhibit 1.4 includes brief program summaries that connect the major program components to the program’s hypothesized theory of change and expected outcomes.

Most programs assess academic skills and personal and family needs at the outset using a wide variety of tools and processes. The table identifies programs as having a “major” emphasis on assessment if they also maintain an ongoing assessment process as part of their service delivery plan.

Five programs put a major emphasis on training specifically designed for their PACE students (and thus not available to PACE control group members), though all but one program (Year Up) also use the education and training generally available. Customized training typically involves more hands-on, project-based activity and classroom interaction than traditional, lecture-based instruction.

All nine programs put a major emphasis on supports. Supports are the principle focus in programs relying mainly on generally available training. Nearly all programs include proactive guidance, case management, and other staff supports. PTH helps participants navigate through 16 health care programs in 5 pathways at Pima Community College, and is a good example of a career guidance model. Many feature a cohort approach—designed to strengthen support from peers and staff—in which program participants take some or all classes together and participate in other activities with instructors and staff. Some programs provide financial assistance with school and life expenses. Most help participants access other public benefits and support services in the community. Only YU puts a major emphasis on work experience, providing six-month corporate, non-profit and governmental internships available only to program participants. Although other programs utilize training that includes clinical internships (mostly in health care), such work experience is not limited to PACE participants. Most programs provide at least some job search and related employment services.

1.5 Experimental Design

The PACE impact study uses an experimental design. As described in the Evaluation Design Report, each program recruited eligible applicants (see the design report’s Section 1.4 for a description of the eligibility requirements) and then randomly assigned applicants to either a treatment group offered access to the program or to a control group that could not access the program but could receive other services in the community. The total number of randomly assigned sample members appears in the last column of Exhibit 1.2. In all but one instance, eligible applicants were assigned to treatment and control groups at a 1:1 ratio—for the larger Year Up sample, the ratio was 2:1.

Exhibit 1.4: Program Summaries

Program	Summary
Bridge to Employment in the Healthcare Industry	By providing assistance for training and related supports, BEH enables participants to attend the health care program of their choice. Individual training accounts (ITAs) help participants pay for training at the selected accredited proprietary school or community college. Navigators at three community-based organizations guide participants on choosing the training program and provider by requiring each participant to research at least two schools before being eligible for an ITA. This step aims to help participants make informed decisions about which health care program to select given their own career goals and circumstances. Well-informed decisions are hypothesized to lead to greater rates of retention in and completion of training, as well as a greater probability of employment in the field of the training. Navigators arrange other financial supports to help the participant attend school, including transportation, child care, and school supplies.
Carreras en Salud	CES's health care pathway enables individuals to pursue credentials and employment in increasingly more skilled and higher paying jobs in the nursing field. The career ladder starts as the ESL with career exploration level and progresses through a Licensed Practical Nurse (LPN) degree. Participants enter at the step appropriate to their basic skill and education level. After obtaining a credential, they can continue on the next occupational training step or seek employment with the option to return to Carreras later for additional training. Support services help participant persist in their programs and advance. Case managers work with participants to identify barriers to program persistence and needed supports, such as child care and transportation. Academic advisors assist participants in the pre-college training steps with developing studying and test-taking skills and identifying tutoring needs. Instituto covers tuition for the courses it offers, and staff help participants in the college-level programs apply for financial aid. It is hypothesized that enabling participants to start at the pathway step that fits her academically, providing personal and academic advising to address barriers and support completion, and providing financial assistance for training, individuals will be more likely to complete training, attain credentials and enter employment in the health care field.
Health Careers for All	HCA supports training for participants through individual training accounts (ITA) to use at local health care training providers and purchasing of courses specifically designed for HCA participants at local community colleges. This financial assistance covers most or all of tuition expenses. Navigators at a community-based organization work with participants to support career exploration and planning, and determine individual barriers to success and needed supports. By requiring that participants complete labor market research and an employer research form, it is hypothesized that participants are more likely to select an occupation and training program that is a good fit for their skills and interests, resulting in higher rates of training enrollment, retention and completion, as well as a greater probability of employment in the field of the training. Participants also receive assistance from the navigators and a dedicated job developer to develop their job search skills and secure employment in the field of training.
I-BEST	By integrating basic skills instruction with occupational training, I-BEST aims to accelerate lower-skilled students' transition into and through college-level occupational fields of study. The I-BEST program allows individuals with skills

Program	Summary
	levels that are lower than required for college-level programs to pursue credit-bearing, short-term certificate programs while improving their basic skills. I-BEST supports students through use of a team teaching approach that pairs a basic skills instructor with an occupational instructor in the classroom, and also provides additional basic skills instruction and supplemental financial aid and advising. It is hypothesized that the combination of increased access to credit-bearing programs and dedicated support through basic skills instruction and advising results in participants earning more college credits, and increasing the likelihood of them obtaining a credential with labor market value.
Pathways to Healthcare	PTH aims to assist low-income individuals attain high-paying healthcare jobs by providing training in 16 targeted healthcare fields. For individuals who need academic preparation prior to beginning occupational training, the program offers a contextualized basic skills course and open lab designed to prepare individuals to meet entry requirements for occupational training, expose them to training and career opportunities, and connect them to supports. For all participants, dedicated college advisors and One-Stop case managers assist program participants in exploring training options, navigating course requirements and sequencing in credit-bearing programs, and discussing next steps on the career pathway. PTH provides financial assistance in the form of scholarships or training provided at no cost (certain nursing assistant cohorts), and helps participants identify additional sources of funding for training if needed. Program staff also connects participants to instructional and other supports to aid participants to persist in training. Work-based learning opportunities are designed to facilitate acquisition of skills, meet requirements for licensing and certification exams, build résumés, and connect participants to potential employers. Employment assistance is available during and after the program. It is hypothesized that enhanced student support and tuition assistance will facilitate participants' selection of training that aligns with a student's skills and career goals, encourage engagement in their courses and persist in training, as well as a greater probability of employment in the field of the training.
Patient Care Pathways Program	PCPP aims to accelerate entry into college-level health care diploma and degree programs for lower-skilled students by enabling them to improve their basic skills concurrent with occupational training courses, while providing advising and other supports. The courses in the semester-long academies often utilize curricula contextualized for the health field to provide students with a clear connection between the course content and their field of interest. An advisor works individually with students to identify potential barriers to success, map career goals, identify course requirements for the credential of interest, coordinate instructional supports such as tutoring, register for the appropriate courses, and make referrals to supportive services as needed. It is hypothesized that low-skilled students will be more likely to persist in their educational pathway by allowing them to more quickly complete the necessary basic skills remediation and start their health-related courses more quickly.
Valley Initiative for Development and Advancement (VIDA)	VIDA provides extensive financial assistance with tuition, transportation and child care, with the goal of enabling participants to attend college full time and obtain certificates and degrees in high-demand occupations. The program is premised on the belief that part time enrollment plays an important role in student dropout and failure to complete credentials. For participants with lower basic skills levels, VIDA's 16-week College Preparatory Academy provides math,

Program	Summary
	reading, and writing remediation that aims to greatly reduce the time they spend remediating skills and accelerate entry into college diploma and degree programs. VIDA’s counselors hold mandatory weekly group and individual meetings with participants to address academic and personal challenges that otherwise might derail training. It is hypothesized that the combination of extensive financial assistance and frequent, required meetings with a counselor will help participants engage in full-time college programs, persist, and earn a credential.
Workforce Training Academy Connect	WTAC intends to accelerate entry into college occupational certificate courses for students who otherwise could not enroll due to low basic skill levels. WTAC packages accelerated basic skills remediation, psychosocial skills development, and advising with college occupational training programs. After improving their math and reading skills, participants enroll in occupational certificate courses in high-growth, high-demand sectors. WTAC covers the cost of tuition. The program includes an occupation-specific career readiness lab that prepares participants to secure employment in the field of training. It’s hypothesized that accelerated basic skills remediation coupled with advising and a direct path into occupational training will lead to greater rates of training course enrollment and completion, attainment of a credential with market value, and employment.
Year Up	Year Up, a non-profit with eight urban sites participating in PACE, aims to “close the Opportunity Divide by providing urban young adults with the skills, experience, and support that will empower them to reach their potential through professional careers and higher education.” The one-year program offers 21 weeks of occupational training for knowledge-based careers in growing industries, for which students can earn college credits from a partner institution at no cost. Year Up provides students with an educational stipend, advising, and connections to other resources and supports to aid in program persistence. The program encourages a “feedback culture” and embraces a philosophy of “high expectations, high support” designed to foster the development of psychosocial skills and competencies demanded by employers. Students proceed through the program in learning communities and abide by a student contract, both of which emphasize professional behaviors and accountability. Students also take classes in professional skills and business communications. Following successful completion of the occupational training, students are placed in a full-time, six-month internship. In addition to providing work-based learning opportunities and career exploration, it is hypothesized that internships also provide connections with potential post-program employers and important experience and references to add to résumés. Mentoring, job readiness activities, alumni networks and employment placement assistance aim to facilitate graduates’ post-program transitions to employment or higher education.

2. Data Sources and Sample Description

The PACE Evaluation Design Report provides a detailed discussion of major data sources underlying the impact study. Here, we briefly recap these sources, specify baseline variables for describing the nine program samples and other purposes, and review our approach to missing data. As the main focus of Section 4 is the outcomes selected for confirmatory and secondary impact analyses, we postpone discussion of outcome measures until that section.⁸

Several types of data will be common across the nine PACE programs. These data come from the following sources:

- Baseline surveys (including a Background Information Form (BIF), collecting basic demographic information and a Self-Administered Questionnaire (SAQ), measuring attitudes and other more sensitive items);
- Follow-up surveys 15 and 36 months after random assignment;
- Quarterly earnings records from the National Directory of New Hires (NDNH); and
- College enrollment records from the National Student Clearinghouse (NSC).

In addition, we will have college records from local or state systems for a small number of programs,⁹ as well as additional baseline data from program management information systems.

2.1 Baseline Characteristics and Description of the Study Sample

Uses of baseline data in the PACE evaluation include: (1) describing study participants; (2) adjusting for missing data (from whole survey and item nonresponse); (3) improving the precision of impact estimates through regression adjustment; and (4) analyzing differences in impacts across subgroups. Variable specifications will vary somewhat across these applications.

Exhibit 2.1 presents the specifications for baseline characteristics as used to describe the nine programs. In addition to standard demographic variables, many characteristics represent pre-program measures of the outcomes that career pathways programs aim to affect. The exhibit is organized according to key domains in the general theory of change for career pathways framing the PACE evaluation design. We refer readers to appendix Exhibit A.1 for details on operationalization of these measures, noting also how these variables are specified as covariates in regression adjustment models. The appendix exhibit

⁸ Full lists of confirmatory and secondary outcomes, with associated details on operationalization and data sources appear in appendix Exhibits A.2 and A.3. Readers interested in comparing outcomes for PACE with those in ACF's related Health Profession Opportunity Grants (HPOG) Impact evaluation can refer to these exhibits.

⁹ PACE has developed or is developing agreements with the five major colleges served by VIDA and with the California Community Colleges Chancellor's Office for BEH and is receiving records from the three PACE I-BEST colleges. Preliminary analysis of National Student Clearinghouse indicated minimal enrollments by sample members at other Washington community colleges.

also includes a few additional characteristics measured using administrative data common to all programs (e.g., recent earnings history based on Unemployment Insurance wage records) and obtained from individual sites.

Exhibit 2.1: Demographic Background of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Demographic Background										
Age (%)										
Under 21	12.3	17.9	6.3	22.2	23.4	8.4	14.3	14.1	42.8	21.9
21-24	20.0	26.6	16.1	14.9	21.2	13.0	16.4	22.9	56.4	29.0
25-34	32.3	34.1	43.7	29.8	30.0	31.7	27.7	40.6	0.8	24.6
35+	35.5	21.4	33.9	33.2	25.4	46.9	41.6	22.4	0.0	24.5
Female (%)	83.7	92.9	85.2	57.5	84.3	82.7	62.6	70.9	41.0	67.5
Race-ethnicity (%)										
Hispanic	46.5	99.4	12.8	26.0	8.8	55.8	15.3	95.8	31.4	45
Black, non-Hispanic	21.6	0.0	51.4	7.6	20.8	11.5	47.4	0.9	54.0	28.2
White, non-Hispanic	19.5	0.6	28.9	54.9	67.3	26.6	33.8	3.0	8.5	21.2
Other, non-Hispanic	15.0	0.0	14.6	14.1	6.4	8.0	7.1	0.1	11.4	8.8
Family Structure (%)										
Has children										
Living w/spouse/partner	13.4	21.3	14.9	18.9	18.5	17.0	10.5	13.8	2.4	12.0
Single	28.2	24.1	36.4	16.6	18.3	38.9	20.1	28.2	6.5	21.7
Total with children	41.6	45.4	51.3	35.5	36.8	55.9	30.6	42.0	8.9	33.7
No children										
Living w/spouse/partner	12.0	11.7	11.4	17.3	19.7	7.7	19.9	15.8	4.5	11.3
Single	46.4	43.0	37.3	47.2	43.5	36.5	49.5	42.2	86.6	55.1
Total with no children	58.4	54.7	48.7	64.5	63.2	44.2	69.4	58.0	91.1	66.4
Living w/parents (%)	28.7	36.1	15.1	28.6	26.5	24.1	16.9	33.2	68.4	38.0
Total Sample (#) (c)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

(a) Current statistics reflect sample through September 2014 for Year Up and through August for the remaining programs, will be updated for full samples in final draft. Global significance tests (chi-square, F-test) indicate statistically significant variation in all characteristics ($p < .01$) across programs.

(b) BEH: Bridge to Employment in Healthcare, San Diego; CES: Carreras en Salud, Chicago; HCA: Health Careers for All, Seattle-King County; IBEST: Integrated Basic and Education Skills, Washington State; PCPP: Patient Care Pathways Program, Madison; PTH: Pathways to Health, Pima County; VIDA: Valley Initiative for Development and Advancement, Texas; WTAC: Workforce Training Academy Connect, Des Moines; YU: Year Up, 8 cities.

(c) Total numbers randomly assigned (see note "a"). Actual sample sizes for individual characteristics vary due to item non-response.

Exhibit 2.2: Educational Backgrounds of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Educational Background										
Either parent attended college (%)	44.4	17.8	44.7	45.3	51.8	43.6	30.2	26.3	55.4	42.4
Usual high school grades (%)										
Mostly A's	19.9	16.4	23.2	6.9	6.1	19.4	8.3	19.3	10.4	14.3
Mostly B's	54.4	51.6	48.5	33.2	43.1	50.3	36.9	65.7	49.4	49.5
Mostly C's or below	25.7	32.0	28.4	59.9	50.8	30.3	54.8	15.0	40.3	36.2
Highest level of education completed (%)										
No high school degree/GED	3.6	9.7	13.4	30.7	3.0	8.4	40.1	0.7	0.6	9.8
High school degree/GED	36.7	49.2	29.8	40.0	44.4	34.5	36.8	26.1	51.8	40.6
Under 1 year's college credit	19.4	13.7	14.4	11.1	24.8	16.4	10.8	15.8	22.1	17.4
1 year+ of college credit	23.3	17.4	24.0	9.5	21.6	26.3	8.2	52.7	22.5	23.6
Associate's degree or above	17.0	10.0	18.4	8.8	6.3	14.5	4.2	4.7	3.1	8.6
Vocational certificate (%)	44.6	32.7	39.8	19.3	39.5	44.6	20.9	31.4	18.4	30.3
Total Sample (#) (c)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

See notes for Exhibit 2.1.

Exhibit 2.3: Career Knowledge of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Career Knowledge										
“Strongly agree” knows (%)										
How to assess abilities and challenges	50.6	40.5	50.2	32.3	27.6	44.6	29.1	51.7	49.5	44.2
How to make a plan for 5-year goals	51.5	44.3	56.6	35.9	35.2	41.2	32.8	56.0	45.1	44.8
How to get help with issues at school	60.7	47.0	62.8	44.9	43.2	54.2	39.9	58.0	59.0	54.0
The type of job that is best for you	53.8	49.3	60.6	42.6	42.7	49.7	37.6	60.6	41.4	47.7
The type of organization you want to work for	55.2	46.8	53.9	39.5	43.8	47.9	34.7	61.1	38.5	45.7
The occupation you want to enter	62.7	64.0	65.4	48.4	54.0	59.6	41.2	70.2	43.9	54.6
The education/training program best for you	57.7	54.4	63.7	41.7	40.5	52.2	37.5	68.0	45.2	50.7
Index (average of items)	56.0	49.4	58.8	40.6	41.0	49.9	36.1	60.8	46.0	48.8
Total Sample (#) (c)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

See notes for Exhibit 2.1.

Exhibit 2.4: Psychosocial Indices of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Psycho-Social Indices (Means) (Possible ranges for each shown next to index names below)										
Student readiness (ACT Inc.)										
Academic discipline (1-6)	5.55	5.51	5.45	5.07	5.06	5.41	4.92	5.52	5.28	5.32
Training commitment (1-6)	5.73	5.77	5.63	5.42	5.59	5.66	5.34	5.77	5.52	5.60
Academic confidence (1-6)	5.11	4.93	4.96	4.47	4.43	4.92	4.32	5.03	5.05	4.87
Emotional stability (1-6)	5.40	5.37	5.30	4.95	5.00	5.28	4.85	5.23	5.33	5.23
Other indices										
Social support (1-4)	3.35	3.35	3.26	3.21	3.31	3.33	3.09	3.30	3.35	3.30
Stress (1-5)	2.13	2.17	2.23	2.31	2.22	2.19	2.58	2.20	2.20	2.24
Depression (1-4)	1.45	1.39	1.54	1.60	1.55	1.51	1.82	1.54	1.59	1.56
Total Sample (#) (c)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

See notes for Exhibit 2.1.

Exhibit 2.5: Resource Constraints of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Resource Constraints: Financial										
Family income last year (%)										
Less than \$15,000	53.4	34.5	64.4	48.5	27.3	49.1	56.2	51.1	38.5	46.3
\$15,000-29,000	29.4	41.6	24.3	24.6	31.8	36.4	26.2	36.6	26.7	30.6
\$30,000+	17.2	23.9	11.3	27.0	40.9	14.5	17.6	12.3	34.8	23.1
Average (\$)	17,913	21,062	13,573	22,263	33,467	17,263	16,393	16,401	27,188	21,172
Receiving food assistance (WIC/SNAP) in past 12 months (%)	47.6	42.4	80.3	58.6	35.6	68.3	65.8	67.6	32.8	52.3
Receiving cash assistance/ TANF in past 12 months (%)	19.9	4.7	41.1	21.3	4.4	7.7	14.4	5.5	6.6	11.9
Reporting financial hardship in past 12 months (%)	53.9	36.9	61.2	48.5	34.1	59.4	62.7	67.2	29.7	47.8
Resource Constraints: Time										
Current work hours (%)										
0	61.9	48.9	69.9	66.6	27.9	65.6	62.2	64.9	47.6	56.7
1-19	10.4	5.8	9.6	8.5	11.5	6.8	5.1	11.8	10.5	9.0
20-34	16.1	20.7	14.3	11.7	32.6	15.6	13.3	14.8	26.7	19.4
35+	11.6	24.6	6.3	13.2	27.9	12.0	19.5	8.5	15.2	14.9
Expected work hours next few months (%)										
0	24.3	22.8	24.2	41.1	18.3	30.4	22.3	55.3	36.3	32.2
1-19	9.2	6.3	11.3	9.9	15.1	5.8	4.7	12.6	23.0	12.8
20-34	29.6	40.0	34.8	32.0	47.4	37.4	28.0	21.0	31.1	32.4
35+	36.8	30.9	29.7	17.0	19.2	26.4	45.0	11.2	9.6	22.6
Expecting to attend school part-time if accepted (%)	27.2	29.3	23.3	32.4	40.0	17.2	49.9	5.4	11.6	22.5
Total Sample (#) (c)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

See notes for Exhibit 2.1.

Exhibit 2.6: Life Challenges of the Nine PACE Program Samples (Treatment and Control) (a)

Characteristic	Program (b)									All Programs
	BEH	CES	HCA	IBEST	PCPP	PTH	WTAC	VIDA	YU	
Life Challenges										
Citing situation as interfering fairly/very often in past 12 months (%)										
Child care arrangements	16.6	14.7	30.4	16.9	15.2	19.6	26.7	34.0	5.1	17.3
Transportation	25.9	19.4	39.9	29.6	14.1	26.0	47.3	36.4	29.5	30.1
Alcohol/drug abuse	1.4	0.3	1.9	5.2	3.0	3.1	8.7	1.0	5.8	3.8
Illness/health condition	14.8	6.3	19.6	20.4	17.4	17.1	27.1	17.3	11.3	15.7
Arguments with family members	19.0	13.4	19.3	23.5	25.0	20.6	33.5	22.4	27.3	23.4
Physical threats/violence from a family member	1.7	1.3	4.8	5.5	2.0	4.4	7.7	3.1	2.8	3.5
Index (average in original scale units; 1-5)	1.45	1.36	1.62	1.56	1.44	1.53	1.77	1.62	1.46	1.52
Owning Car (%)	68.3	65.7	56.3	62.7	84.9	67.9	59.1	67.9	28.8	55.8
Internet equipped computer at home (%)	75.1	74.3	61.7	72.0	84.1	64.7	50.5	58.3	84.9	71.6
Ever arrested (%)	13.6	5.7	14.4	29.0	20.7	26.1	41.1	17.9	16.2	19.9
Total Sample (c) (#)	1,007	800	654	632	500	1,220	943	958	2,544	9,258

See notes for Exhibit 2.1.

Impact reports for each PACE program will show these statistics separately for the treatment and control groups, with tests for significant differences between groups. Random assignment ensures that there are no systematic differences between the groups, though some differences can arise by chance.¹⁰

Global tests show statistically significant differences across the set of nine programs for all characteristics.¹¹ In many instances the differences are large. For example, although the majority of participants are female in nearly all programs, the proportion of female participants is substantially higher (over 80 percent) for the five programs concentrating on health occupations than for the other four programs. Two programs (CES and VIDA) serve virtually all-Hispanic populations, while African Americans are the largest group in three (HCA, WTAC, and YU). Educational backgrounds indicate substantial differences in academic skills and attainment, consistent with basic differences in program logic and target populations discussed in Section 1. Differences in self-assessed career knowledge, student readiness, and other psycho-social skills generally track educational and economic disadvantage. Though all programs recruited from low-income populations, some served more economically disadvantaged groups than others. For example, about 60 percent or more of participants reported a financial hardship at baseline in four programs (HCA, PTH, VIDA and WTAC) but less than 40 percent did

¹⁰ Readers interested in operational definitions of PACE baseline characteristics should refer to Exhibit A.1 in the appendix.

¹¹ Global significance tests (chi-squared, F-statistic) indicate statistically significant variation across sites for all characteristics at $p < .01$.

in three others (CES, PCPP, and YU). Those experiencing higher levels of financial hardship generally also reported more life challenges interfering with school, work and family responsibilities.¹²

We will draw from the same set of characteristics in specifying covariates for regression models in the impact analysis. Categorical variables will be represented as dummy variables, with one category omitted as the reference group. Our starting point for baseline covariates will be those included in prediction models for college outcomes in Fein (2015), which analyzes a sample of PACE control group members, pooling across programs. Appendix Exhibit A.1 documents covariate specifications.

Given the substantial differences in distributions for baseline characteristics across programs, adjusting the cut-points of categorical variables may help to improve the fit of baseline covariates for each program and thus maximize the precision of the estimated treatment impact. For this reason, and to accommodate additional baseline measures from local administrative systems, we plan to assess this pooled-sample model's fit and re-calibrate where necessary for each program sample. We will do so in each program analysis by re-running baseline prediction models for control group members using confirmatory outcomes prior to estimating impacts. Results may lead to dropping some covariates and adjusting the cut-points for others. Final covariate lists will be documented as dated updates to Exhibit A.1 prior to beginning impact analysis for each program. To ensure that analyses are transparent and reproducible, technical appendices to each program impact report also will document final specifications of each variable for each program analysis.

In addition to the baseline survey-based characteristics shown in Exhibit 2.1, baseline characteristics will include several measures of pre-randomization employment history based on wage records and program-specific characteristics where applicable and collected by each program. Examples of the latter include scores from locally-administered skills assessments, current college enrollment status, and nativity (see Exhibit A.1).

By design, specifications for PACE baseline characteristics are very similar to those in ACF's Health Profession Opportunity Grants (HPOG) Impact Study.¹³ There are some differences, though. Notably, PACE baseline surveys measured additional characteristics pertinent to the project's underlying theory of change, and as noted above PACE also will include a small number of program-specific measures based on local data. Minor differences in cut-points for some categorical variables were needed to sharpen contrasts across PACE programs.

2.2 Missing Data and Measurement Error

The PACE Evaluation Design Report discusses our general approach to missing data. For convenience, this section briefly recaps the approach. We also note plans to check for errors in survey-reported college enrollments and to assess the adequacy of local college records in covering college enrollments.

¹² See Fein (2015) for an extended analysis of these baseline characteristics and their relationship to subsequent college outcomes for a sample of PACE control group members pooled across programs.

¹³ See Harvill, Moulton and Peck (2015) for HPOG Analysis Plan.

The design report addresses steps to evaluate and correct for two kinds of missing data problems in information gathered through surveys. The first is nonresponse in follow-up surveys. As discussed in the Evaluation Design Report (Abt Associates, 2014), nonresponse can bias impact estimates.

We will use data from baseline surveys and administrative systems to check and, if necessary, adjust for differential survey nonresponse bias across the treatment and control groups. Prior to analyses for each program, we will use baseline data to test for differential selectivity in survey nonresponse between the treatment and control groups. In addition, we will use two administrative data sources—the NSC and NDNH—to evaluate whether survey respondents and non-respondents differ on subsequent college and employment outcomes captured in these sources.

To correct for any differential non-response identified, we will estimate and apply non-response weights. This standard procedure involves first estimating predicted probabilities of response as a function of baseline covariates and, if necessary, indicators of post-randomization engagement with school and work based on administrative data, separately for treatment and control groups. The next step is to calculate the inverse of these estimated probabilities and weight each observation by this amount using standard weighting routines in statistical software.

A second type of missing survey data is item nonresponse for sample members where an interview was conducted. Here, our strategy involves filling in selected missing survey data elements (e.g., baseline characteristics and outcomes) using multiple imputation routines available in standard statistical software. In general, such imputation uses statistical relationships between items estimated for sample members for whom the items are not missing to estimate values for sample members for whom data are missing on some but available for other items.

A third type of survey error involves misreporting due to recall and other response errors. Of particular concern is possible error in measures of post-secondary education and training, since for most programs, the survey will be the chief data source for related confirmatory and secondary outcomes. Correcting only for survey and item nonresponse as described above will not address misreporting for these outcomes. To check for misreporting, we will assess the consistency between college enrollments as documented in the NSC and reported in PACE follow-up surveys. Specifically, we will calculate and compare months of post-randomization college enrollment in the two data sources, assessing the degree to which levels of agreement are similar for treatment and control group members. Consistency between the two groups will bolster confidence in survey estimates of outcomes related to college enrollments and, more generally, of other training-related outcomes subject to similar errors.

Inconsistency would call the accuracy of survey data into question and prompt consideration of remedial adjustment or, perhaps, more direct use of NSC data in impact analyses.¹⁴

In sites for which we have collected local college records, we will use the NSC data to assess the degree to which enrollments in these colleges represent high and comparable shares of all enrollments in the treatment and control groups. A finding that these colleges accounted for different shares of enrollments in the treatment and control groups would prompt a decision to use survey data instead.

¹⁴ We are still working on details of a potential adjustment method and plan to finalize our approach and implement any adjustments prior to beginning actual impact analysis in each site. Adjustment likely would entail imputing to discrepant survey observations estimated values for outcomes based on NSC-measured college enrollments. Estimated credits, for example would be imputed for such cases on the basis of observed statistical associations between months of enrollment in the NSC and self-reported credits for non-discrepant cases. The NSC's coverage has been well studied, and it is known to cover a very high fraction of colleges participating in federal Title IV financial aid programs. Such schools are highly relevant to policy, given federal aid expenditures and higher monitoring and scrutiny of such institutions. Thus, any improvement in outcome measures for sample members attending such schools is desirable.

3. Analysis of Differential Receipt of Education, Training, and Related Career Pathways Services

Critical in interpreting each PACE program's impacts is the difference in the levels and kinds of instruction and supports received by treatment and control group members. To measure this difference—sometimes known as the treatment-control contrast—we compare service experiences reported by treatment and control group members in the 15-month survey.

In particular, we compare the two groups on general types of career pathways services received in the 15 months after random assignment. Separate analyses, described in Section 2 of the Evaluation Design Report, will assess treatment group members' experiences with program-specific services as part of the implementation study for each program.

Exhibit 3.1 identifies measures of receipt for three broad categories of career pathways services: instruction, supports, and connections to employment.¹⁵ They include a mix of items applicable to all respondents and items applicable only to students (treatment and control group members who took classes since randomization). The former include measures of any receipt of broad types of education and training, career counseling, help arranging supports, and job search assistance. The latter include characteristics of training received—such as its intensity (full/part-time), psycho-social/life skills covered, and place-specific receipt of supports and work experience.

The analysis will estimate the difference between the two groups for each measure. For measures that apply to all sample members, regardless of whether they received training, we will estimate a regression model to adjust for baseline differences between the groups. These regression-adjusted differences between the two experimental groups can be interpreted as the causal effect of the PACE program on career pathways services. For measures that only apply to sample members who received training, we will not estimate a regression model and will simply compare mean values for the programs treatment and control group members attended.

¹⁵ The survey did not ask about participation in a fourth major career pathways service category identified in Section 1: assessments of academic skills or non-academic skills/needs.

Exhibit 3.1: Common Measures of Service Receipt from the PACE 15-Month Survey

Major Service Category	Measure of Service Receipt
Core Instruction	
Type and characteristics of instruction	<p>Received any education or training in:</p> <ol style="list-style-type: none"> Foundational skills (non-credit) <ul style="list-style-type: none"> Basic academic skills English as a Second Language College classes for credit Occupational training (non-credit) Other skills <p>1 & 2 1 & 3 2 & 3 Any of the above</p> <p>Number of places attended</p> <p>Type of school/place attended (at 1st place)</p> <p>School/work intensity (at 1st place)</p> <ul style="list-style-type: none"> Full-time school & full-time work Full-time school & part-time/no work Part-time school & full-time work Part-time school & part time/no work <p>Level of difficulty finding time to do well (at 1st place)</p> <p>Level on class experience indices (first place) for:</p> <ul style="list-style-type: none"> Relevance to career/life Engagement/active learning
Occupation	<p>Received any education or training in:</p> <ul style="list-style-type: none"> [EACH OF LIST OF MAJOR OCCUPATIONS, INCLUDING SPECIFIC HEALTH OCCUPATIONS] Any occupation
Psychosocial/life skills	<p>Hours of psycho-social/life skills instruction (any place)</p> <p>Average level of emphasis on:</p> <ul style="list-style-type: none"> Cognitive skills Intra-personal Inter-personal Career planning Finding/changing jobs Finances Other life challenges
Supports	
Personal guidance/counseling	<p>Received services (at most recent place) for:</p> <ul style="list-style-type: none"> Academic advising Financial aid advising Career counseling Any advising/counseling <p>Received career counseling (anywhere)</p>
Academic supports	Received tutoring in subjects where needed extra help (at most recent place)
Social supports	How much emphasis on community (at most recent place)?
Supportive services/case management	<p>Received help arranging supports (at most recent place)</p> <p>Received help arranging supports (anywhere)</p>

Major Service Category	Measure of Service Receipt
Financial assistance	<p>Received financial aid/grant support (at 1st place)?</p> <ul style="list-style-type: none"> • Tuition/school expenses • Living expenses <p>Received loan (own/parent's name) (at 1st place)?</p> <ul style="list-style-type: none"> • Tuition/school expenses • Living expenses <p>Average loan amount, if received (at 1st place)</p> <p>How difficult to obtain enough financial support (at 1st place)?</p>
Connections to Employment	
Employers involved in design/teaching	Took class taught by instructor from local employer or offered on-site at local employer (at 1 st place)
Work experience during training	<p>Offered work experience in career field (at 1st place):</p> <ul style="list-style-type: none"> • As work study job • Clinical internship/practicum • Visits to local employer • Apprenticeship • Other • Any work experience
Post-program employment services	<p>Received job search assistance (at last place)</p> <p>Received job search assistance (anywhere)</p>

4. Impact Analysis

The PACE Evaluation Design Report describes our overall approach to the impact analysis—including technical estimation strategies and formats for presenting results. In this analysis plan, we provide more details on the planned analyses. Most importantly, we specify hypotheses to be tested in confirmatory (Section 4.1) and secondary (Section 4.2) analyses for each site at major follow-up intervals.

As discussed in the design report, confirmatory hypotheses are in line with the program’s logic model and are especially important for informing policy decisions and program learning about the PACE programs. We will use “confirmatory” in the 15-month report to reference hypotheses that are signal indications of each program’s progress. We will use the term in the 36-month report to reference its mid-term success. We will use “secondary” to reference hypotheses for impacts on a wider, but still limited and pre-specified, set of outcomes as implied by program logic models. Identifying these hypotheses in advance is a key strategy for disciplining analysis, particularly to help guard against over-interpretation of the increased number of spurious findings that can arise by chance when analyzing multiple outcomes. Analysis will involve one-sided tests of statistical significance for both categories of hypotheses.

This section also notes (in Section 4.3) a change in the approach to subgroup analyses since the design report. The revised plan treats all subgroup analysis as exploratory, rather than as secondary, in recognition of limited statistical power to detect subgroup differences with the final sample sizes obtained for PACE sites.

4.1 Confirmatory Hypotheses

This section specifies confirmatory hypotheses for each PACE program for each of the funded follow-up reports (15 and 36 months) and outlines our approach to measuring confirmatory outcomes. We also include confirmatory hypotheses for a long-term study should ACF decide to undertake it. In Section 4.1.1, we identify confirmatory hypotheses for each program and their accompanying rationales. In Section 4.2.2, we briefly describe our approach to measuring these outcomes.

The PACE Evaluation Design Report explains our decision to limit confirmatory tests to one hypothesis per major domain at each follow-up interval.¹⁶ The chief rationale is to avoid the need to adjust significance levels to account for the increased risk of false positives across multiple tests in a domain, and attendant loss of statistical power in each test.

4.1.1 Specifying Confirmatory Hypotheses

Exhibit 4.1 summarizes outcomes to be tested in confirmatory hypotheses for each of the nine programs. In this section, we first discuss considerations underlying selections and then summarize the selections that resulted.

¹⁶ Below, we describe an exception to this rule addressing unique aspects of the Year Up logic model.

Education and employment are the two main outcome domains for confirmatory analyses in PACE. Confirmatory hypotheses for education involve measures of educational progress that vary across programs and over time—reflecting varying program goals, approaches, and target populations. Confirmatory hypotheses for employment success involve the same measures of average quarterly earnings for all programs at successive follow-up intervals.

Exhibit 4.1: Confirmatory Outcomes for Educational Progress in PACE

Program (a)	15-Month Report	36-Month Report	Long-Term
BEH	Hours of training received	Receipt of any education or training credential requiring at least one year of school	Receipt of education or training credential requiring at least one year of school
CES	Hours of training received	Receipt of any college credential	Receipt of any college credential requiring at least one year of school
HCA	Hours of training received	Receipt of any education or training credential requiring at least one year of school	Receipt of any education or training credential requiring at least one year of school
IBEST	College credits received	Receipt of college credential requiring at least one year of school	Receipt of college credential requiring at least one year of school
PCPP	College credits received	Receipt of college credential requiring at least one year of school	Receipt of college credential requiring at least one year of school
PTH	Hours of college training received	Receipt of college credential requiring at least one year of school	Receipt of college credential requiring at least one year of school
VIDA	College credits received	Receipt of college credential requiring at least one year of school	Receipt of college credential requiring at least one year of school
WTAC	Receipt of any education or training credential	Receipt of any education or training credential requiring at least one year of school	Receipt of any education or training credential requiring at least one year of school
YU	Level of psycho-social skills	NA	NA

(a) BEH: Bridge to Employment in Healthcare, San Diego; CES: Carreras en Salud, Chicago; HCA: Health Careers for All, Seattle-King County; IBEST: Integrated Basic and Education Skills, Washington State; PCPP: Patient Care Pathways Program, Madison; PTH: Pathways to Health, Pima County; VIDA: Valley Initiative for Development and Advancement, Texas; WTAC: Workforce Training Academy Connect, Des Moines; YU: Year Up, 8 cities.

As background, we start by briefly summarizing several important conceptual distinctions between potential measures of educational progress. Then, we explain the rationale for confirmatory educational outcomes selected for each of the nine programs.

The most basic distinction is between measures based on time in school and measures based on gains in skills and competencies. Time-based measures include measures of different units of “seat time”—such as hours in school, months or terms completed, and credits earned—as well as of receipt of credentials based on completion of specified amounts of education and training. The underlying logic models of nearly all PACE programs focus most heavily on progress construed in terms of completing stackable increments of training—nearly always connected to time-based programming (e.g., completion of specified sequences of courses).

Within this class of outcomes, a further important distinction is between programs mainly focused on college training and those using a wider range of training providers.¹⁷ The policies and logic underlying five PACE programs stress progress in college, for the potential college systems offer to build and transfer stackable quantity increments—including potential for progressing from non-credit training to higher levels of credit-based instruction and credentials. The four remaining programs (BEH, HCA, WTAC, and YU) provide training in varied college and non-college (e.g., proprietary school) settings and do not identify attainment of college credentials as the main goal.

The second major category of educational outcomes includes indicators of acquired skills and competencies. Such indicators ideally are measured through observed performance on tasks required for success in a particular occupation. This second category of educational outcomes also includes credentials explicitly tied to demonstrated performance—typically through examinations and usually tied to requirements for successful performance in a specific occupation. The most common forms of these credentials are industry-based certifications and occupational licenses awarded by government regulatory agencies.

As most PACE programs focus on multiple kinds and levels of educational progress, the challenge in selecting a single confirmatory outcome is to choose an indicator of success at specified follow-up intervals that best captures essential program objectives. A further consideration was ACF's preference for choosing simple, easily-understood confirmatory outcomes over more complex indicators (e.g., indices combining multiple measures).

At 15 months, confirmatory hypotheses for seven programs posit increases in hours of school or college credits completed (see first column in Exhibit 4.1). These indicators capture progress at a point when substantial proportions of participants will not have had enough time to complete the credentials they are pursuing. Our confirmatory outcome is college credits for three programs (I-BEST, PCPP, and VIDA) and total hours of college-based training in a fourth (PHC) that mixes non-credit and for-credit instruction. Hours of education and training from any provider are appropriate for three programs utilizing a mix of non-credit (college and proprietary schools) and college credit-based instruction (BEH, CES, and HCA)—including one program, CES, which for many participants begins with non-credit classes and progresses to for-credit instruction.

As seen above, for four programs the main emphasis is on promoting college-based training, and 15-month hypotheses posit increases in hours of college-based instruction. Within these programs, we make a further distinction between those with a clear emphasis on credit-based instruction (I-BEST, PCPP, and VIDA) and one that utilizes a mix of credit and non-credit college instruction (PTH): the confirmatory outcome for the latter is hours of any college training. Although an eighth program—

¹⁷ The term “college” has no universal definition and there is no legal authority governing its usage. Our preferred definition is that embodied in the IPEDS system—namely, degree-granting post-secondary institutions eligible to participate in federal Title IV financial aid programs. In analyzing survey data, however, we will follow the PACE survey logic, which simply asks respondents if they took classes at a college (leaving the determination to them) and if the classes were for regular college credit or not.

WTAC—also emphasizes college instruction (mainly non-credit), its central emphasis on a series of very short occupational certificate courses with analogues in non-college settings (e.g., proprietary schools) makes “receipt of any education or training credential” a reasonable criterion for short-run success.

Note that, although confirmatory analyses will test increases in college-based hours, credits, and (at later follow-up intervals) credentials in college-focused programs, secondary analyses will test for impacts on training across a wider range of settings (see Section 4.2).

The ninth program, YU, provides intensive training in the short-run, but this intervention’s main emphasis is on connecting participants to career-track employment, rather than to post-secondary education. Year Up training puts much more emphasis on skills than credentials, compared to other PACE programs—particularly knowledge, attitudes and behaviors needed to adapt to and function successfully in professional work settings. Recognition of this central focus argues for substituting psycho-social skills for education as a major confirmatory domain at 15 months. The strongest available indicators in this domain from the PACE follow-up survey—the Grit and Savvy scales—both tap key focal behaviors for this intervention. Given our substantially larger sample size, we plan to include both indices as confirmatory outcomes and adjust for multiplicity.

For all programs but YU, 36-month confirmatory hypotheses for educational progress will focus on increases in educational credential attainment. Hypotheses for five programs will pertain to college-based credentials (CES, I-BEST, PCPP, PTH, and VIDA), while hypotheses for three programs focus on increase receipt of any (college or non-college) credential (BEH, HCA, and WTAC). Should ACF decide to study long-term outcomes, confirmatory hypotheses for educational progress also will focus on increases in educational credential attainment.

Confirmatory hypotheses for seven programs at 36 months specify increases in credentials requiring at least a year of education and training—with four outcomes specific to college credentials (IBEST, PCPP, PTH, and VIDA) and three not specific to college (BEH, HCA, and WTAC). Such credentials apply to two kinds of program-specific logic models – those directly supporting longer credentials, as well as designs providing short-term training and career planning and other supports intended to boost longer-term educational persistence. For CES, we establish any college credential as the confirmatory standard at 36 months, since it enrolls students at very diverse levels and emphasizes non-credit college bridge instruction at lower levels.¹⁸

Recognizing that other elements of YU could contribute to progress towards educational credentials and occupational certifications and licenses, we posit increased post-secondary credential attainment and receipt of an industry certification or occupational license at 36 as secondary, rather than confirmatory, hypotheses.

¹⁸ Should ACF decide to study long-term impacts, confirmatory educational outcomes will be credentials taking a year or more. If feasible, this information would come from administrative records, such as the National Student Clearinghouse, local college records, or both.

In the employment domain, 36-month confirmatory hypotheses posit increases in average total earnings for all programs. Specifically, we hypothesize positive impacts on average total earnings in the 12th quarter. Because YU's logic model puts a heavy emphasis on short-term earnings impacts, a confirmatory analysis will test the hypothesis of increased earnings in the 5th quarter following each cohort's scheduled class start.¹⁹ Should ACF decide to study long-term earnings impacts, the confirmatory hypothesis would posit increases in average total earnings for all programs over the eight quarters preceding the report period (expressed as average quarterly earnings based on data from the NDNH), for example, quarters 13-20 were the report to cover 60 months of follow-up.

4.1.2 Approach to Measuring Confirmatory Educational Outcomes

Data sources and procedures for operationalizing confirmatory hypotheses for educational progress will vary by outcome and program. Basic considerations are whether hypotheses are restricted to advancement in college and, where so, whether PACE was able to obtain records from a high proportion of colleges that treatment and control group members attended—including records for non-credit instruction where covered by confirmatory hypotheses. Where both conditions apply, measures of hours, credits, and credential receipt will be based on college records. Where they do not, measures will be based on data on these outcomes from follow-up surveys.

As described in Section 2.3, we will assess coverage of state/local college records and accuracy of survey-reported enrollments using college enrollment data from the National Student Clearinghouse (NSC). Records in the NSC establish dates of college enrollment for students at over 90 percent of colleges nationally.

To measure total education and training hours, we will combine self-reported non-credit hours and credits, converting credits to hours at a rate of three hours per credit per week, reflecting national standards.²⁰ Where college records are available, we will use credits from this source for purposes of this calculation.

Evaluation of this and other data quality issues requires site-level data and thus will be conducted before beginning impact analyses for each program. Any resulting refinements to measures must be

¹⁹ Scheduled YU starts often occurred several months after the quarter of random assignment: in such cases, students might still be in internships and unavailable for regular employment five quarters later. Year Up's own performance monitoring system defines employment success on the basis of outcomes in the fourth month after graduation (allowing for program graduation and several months to enter employment). To ensure observations capture a minimum of five complete quarters (and thus test unambiguous expectation for employment success), we measure follow-up starting with the quarter of scheduled class start for each randomly assigned cohort (for control group members, this is the quarter they would have started Year Up classes had they been allowed to participate).

²⁰ The standard assumes one hour of class and two hours of study/preparation per credit each week, consistent with the Carnegie unit, as enforced by the Department of Education (National Archives, 2010, Section 600.2). We are still reviewing how other researchers/agencies have weighted credit and non-credit hours in creating summary measures of training hours and will publish any revision to this approach in dated updates to Appendix A.2.

done without knowledge of the implications for actual impacts to avoid any possibility of fishing for impacts. We will document final specifications as dated updates to appendix Exhibits A.1 (baseline covariates) and A.2 (confirmatory outcomes). Technical appendices in published impact reports will summarize supporting psychometric evidence for selected measures.

4.2 Analyses of Secondary Outcomes

Secondary analyses test an expanded set of hypothesized impacts implied by program logic models. As described in the Evaluation Design Report, we do not plan to adjust statistically for the increased likelihood of false positives associated with multiple tests. Rather, to increase confidence in results, we limit secondary analyses to a parsimonious set of outcomes and to hypotheses with a clear expected direction.

This section identifies the set of secondary outcomes of interest (4.2.1) and summarizes planned data quality analyses to test different measures and ensure only psychometrically sound measures are included in impact analyses for each PACE program (4.2.2).

4.2.1 Specifying Hypotheses for Secondary Outcomes

There are three broad categories of secondary outcomes in PACE: (1) additional indicators of educational and employment success; (2) intermediate, or “proximate” outcomes that programs aim to influence in order to foster education and employment success; and (3) more distal improvements in well-being resulting from improvements in skills and economic status. These categories map to major domains in the career pathways framework underlying the project (see Section 1, Exhibit 1.1). Exhibit 4.2 summarizes core secondary outcomes for impact analyses in all PACE programs. As discussed in Section 4.2.2, some winnowing from this list is likely to result from psychometric analysis preceding impact analysis for each program.

The first two domains in Exhibit 4.2 identify additional indicators of education and employment success. To capture progress in educational and employment more fully, we hypothesize increases in several indicators of occupational skills and employment success, namely: receipt of an industry certification or occupational license (tied to skills-based examinations) and several measures of employment at higher skill levels (wages above a specified threshold for each program, job benefits, and occupational skill level).

Measures in the next four domains capture hypothesized impacts on intermediate outcomes—that is, the outcomes which programs target directly in order to improve education and employment results. Some important domains in our general theory are not represented, since they are not amenable to measurement in survey self-reports (notably, academic and occupation-specific skills).

Within these broad categories, Exhibit 4.2 identifies intermediate outcomes to be tested in secondary analyses for all PACE programs. Although program designs vary, all address these outcomes through some means. For example, programs varyingly aim to bolster psycho-social skills through counseling, various classroom and work-based instruction approaches, learning communities, and positive school experiences. Similarly, programs varyingly may try to help students address life challenges and

associated stresses through instruction in life planning skills, supportive services, and financial assistance.²¹

The theory of change guiding PACE also includes more distal outcomes that career success may influence positively, namely family economic status, adult well-being, and child well-being. Due to small sample sizes of families with children at baseline in all sites, we will limit secondary analysis to the first two domains and investigate child impacts as exploratory analyses.²² Because theory suggests that positive impacts on family economic status and adult well-being follow proximate effects on education, employment and other outcomes, we will include analyses for these distal outcomes in the 36-month, but not 15-month impact report.

In addition to these secondary outcomes tested for all programs, we also will test a limited number of program-specific secondary hypotheses. One category includes early tests of outcomes treated as confirmatory at later follow-up points. For example, though full impacts on credential receipt in VIDA may not emerge until 36 months, we expect to see partial impacts at 15 months because a substantial number of participants entered the program well enough into certificate/degree programs. A second category of secondary analyses applies to programs where confirmatory hypotheses focus on college outcomes: for these programs, secondary analyses test for impacts on training (hours and credentials) in any setting. Such tests will tell us whether any impacts on college attainment represent a net increase in levels of training (as expected) or reflect mainly substitution of college for non-college training. Specific tests in this category are listed in a footnote to appendix Exhibit A.3.

A small number of additional secondary analyses will test more program-specific hypotheses, as shown at the bottom of appendix Exhibit A.3. For CES, we will test for hypothesized impacts on self-reported English fluency at 15 and 36 months, as this program puts a strong emphasis on non-native English speakers at lower steps of its training ladder. For five programs concentrating on training in the health sector, *employment in health occupations* will be a secondary outcome. Finally, for Year Up we will test impacts on several risky behaviors of concern for youth and young adults.

4.2.2 Measuring Secondary Outcomes

For many outcomes, covering key career pathway theory domains required the PACE team to develop new measures, adapt existing measures, or include in surveys established measures not validated for low-income adult populations. Careful analysis thus is needed to increase confidence that that resulting

²¹ Our measure of stress (the Perceived Stress Scale) was designed to measure *perceived abilities to cope with demands of life*. Other survey-based measures in the stress literature reflect self-reports on the actual number and severity of stressors.

²² The number of participants with children across PACE program samples will vary from about 110 (PCPP) to 475 (VIDA). Effective sample sizes for analysis are even smaller, however, as previous research suggests the most informative analyses focus on impacts for children in different age groups. By way of example, for children in school grades 6-12, the smallest detectable effect sizes on a standard social skills scale range from .34 to .79 across sites. Based on past studies, impacts in this range are unlikely. For example, the largest effect observed was .14 in Head Start Impact Study, which tested a program directly targeting these behaviors (Puma, et al., 2012).

measures are capable of detecting true impacts. Specifications in Appendix A.3 are provisional for this reason.

The approach to finalizing secondary measures involves, first, summarizing existing psychometric evidence from literature largely gathered during PACE survey development and, then, analyzing reliability and validity with actual data for each PACE program prior to proceeding to impact analysis. Findings may prompt adjustments to cut-points, level of measurement (categorical or continuous?), items included in indices, and number of indices (one construct or two?) and will figure into decisions about whether an outcome's inclusion is warranted in the impact study for each program. These analyses, when examined in the light of each program's logic model, may prompt use of program-specific items or indices. Insofar as they require data for each program, we will conduct these analyses near the end of data collection for each program. As noted earlier, we will document specifications in dated updates to Exhibit A.3 prior to beginning impact analyses for each program.

Exhibit 4.2: Common PACE Secondary Outcomes

Construct	Secondary Outcome	Follow-up Months	
		15	36
Occupational credentials	Receipt of industry certification or occupational license	✓	✓
Employment success	Employment at or above specified wage	✓	✓
	Employment with benefits	✓	✓
	Employment at/above specified skill level	✓	✓
	Employment in health care occupation (a)	✓	✓
Psycho-social skills			
Work ethic/ conscientiousness	Level on Grit scale	✓	✓
Self-evaluation	Level on Core Self-Evaluation scale	✓	✓
	Level on Academic Self-Confidence scale	✓	✓
Interpersonal	Level on Career Network scale	✓	✓
Career knowledge	Level on Career Knowledge scale	✓	✓
Resource constraints	Citing difficulty in securing financial support for school (b)	✓	
Life challenges	Level on index of Challenges Interfering with School, Work, or Family Responsibilities	✓	✓
	Level on Perceived Stress scale	✓	✓
Family economic status	Annual household income		✓
	Level of debt		✓
	Receipt of public assistance		✓
	Level on material hardship scale		✓

(a) Analyzed for five programs focused exclusively on health occupations (BEH, CES, HCA, PCPP, and PHC).

(b) As a reason for not enrolling or leaving school, or as a difficulty while in school.

4.3 Subgroup Analysis as Exploratory rather than Secondary

As defined in the PACE evaluation, secondary analyses include tests of a parsimonious set of hypothesized impacts implied by program logic models. In principle, hypotheses for subgroup differences in impacts also are candidates for secondary analyses. On further analysis, it became clear that samples in all PACE programs were too small to detect many potential subgroup differences whose sizes would be relevant to policy.

The PACE team set sample size targets to provide sufficient power to detect substantively important overall impacts. The literature offers little cogent guidance on determining the smallest subgroup difference that is important to detect in specific instances. A rough rule of thumb is to aspire to minimum detectable differences in impacts (MDDIs) on par with the smallest overall impacts important to detect, the assumption being that the underlying rationale for assigning importance per unit of impact will be similar for overall impacts and differences in impacts.²³

A sample of 1,000 – the original target in PACE recruitment (which five site samples approximate or exceed) – will detect impacts of 6.2 percentage points in credential receipt and \$324 in quarterly earnings (or \$1,296 in annual earnings) at the 10-percent significance level in a one-tailed test.²⁴ For a sample of 1,000, the smallest detectable *differences* in impacts for two equally-sized subgroups are 14.3 percentage points and \$760 (or \$3,040 per annum), for credential receipt and earnings respectively.²⁵ With 600 observations (three site samples fall between 500 and 700), minimum detectable impacts (MDIs) increase to 8.0 percentage points for credential receipt and \$418 for quarterly (\$1,672 annual) earnings, and MDDIs are 18.3 and \$980 quarterly (\$3,920 annual). These are the MDDIs for tests of hypotheses involving two equally-sized subgroups. MDDIs will be even larger for tests involving three or more subgroups or imbalanced numbers across groups.

Consider the implications for subgroup differences given an estimated overall 10-percentage point increase in credential receipt in a site with 1,000 sample members. To detect a difference in similarly-sized subgroups, we will need reason to expect no more than a four-point impact for one group and at least an 18 point impact for the other. In a 600-case site, the spread would need to be from at least one to 19 points. Though situations where impacts are as large as 18-19 percentage points in one group and effectively zero in the other are possible, they have been fairly uncommon in the literature. The larger PACE sample for Year Up (n=2,544) will detect overall impacts and subgroup differences as small as four points and nine points, respectively—still, for an overall impact of 10 points, impacts for two evenly balanced subgroups would need to range from 5.5 to 14.5 points.

Because MDDIs for subgroups are considerably larger than the smallest subgroup differences of interest, it would be inappropriate to test subgroup hypotheses as secondary analyses. Recognizing the practical and scientific interest in subgroup differences in impacts, we will report subgroup results under the exploratory analysis heading. There, interest lies in discovery of patterns that may warrant further consideration and testing with larger samples, and the consequences of higher false positive rates are not as serious.

²³ Rothwell (2005, cited in Klerman, 2010).

²⁴ See Abt Associates (2014, Exhibit 3.2).

²⁵ MDDIs here assume two-tailed tests and a 10-percent significance level.

5. Schedule and Deliverables

Program intake periods varied across the nine PACE sites—stretching generally from November 2011 to early 2014, but continued to December 2014 for two programs. Exhibit 5.1 shows the end of random assignment each site and the expected submission dates of 15- and 36-month site reports.

The PACE project will submit the first draft 15-month impact report in June 2016, with all 15-month reports drafted by May 2017. Final reports will follow drafts by about four months. The schedule calls for release of final 36-month reports between April 2018 and May 2019.

Exhibit 5.1: Impact Report Schedule by Program

Program	End of Random Assignment	Draft 15-Month Report to ACF	Final 15-Month Report to ACF	Data Files and Documentation for 15-Month Study	Draft 36-Month Report to ACF	Final 36-Month Report to ACF	Data Files and Documentation for 36-Month Study
BEH (CA)	Nov 2013	Jun 2016	Oct 2016	Nov 2017	Feb 2018	Jun 2018	Jul 2019
CES (IL)	Sep 2014	Feb 2017	Jun 2017	Nov 2017	Oct 2018	Feb 2019	Jul 2019
HCA (WA)	Dec 2014	May 2017	Sep 2017	Nov 2017	Jan 2019	May 2019	Jul 2019
IBEST (WA)	Sep 2014	Feb 2017	Jun 2017	Nov 2017	Oct 2018	Feb 2019	Jul 2019
PCPP (WI)	Jan 2014	Jun 2016	Oct 2016	Nov 2017	Feb 2018	Jun 2018	Jul 2019
PHC (AZ)	Jan 2014	Jun 2016	Oct 2016	Nov 2017	Feb 2018	Jun 2018	Jul 2019
VIDA (TX)	July 2014	Dec 2016	Apr 2017	Nov 2017	Aug 2018	Dec 2018	Jul 2019
WTAC (IA)	Dec 2014	May 2017	Sep 2017	Nov 2017	Jan 2019	May 2019	Jul 2019
YU (National)	Sep 2014	Feb 2017	Jun 2017	Nov 2017	Oct 2018	Feb 2019	Jul 2019

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Appendix Tables

Exhibit A.1: Operationalization of Baseline Measures

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
Common Measures			
Demographic Background	Age	Categorical measure: Under 21 21-24 25-34 35+*	BIF, RABIT: B02_dob R_RA_Date_Assigned
	Female	Binary variable 1 if female 0 if male	BIF: B07_sex
	Race-ethnicity	Categorical measure: Hispanic Black, non-Hispanic White, non-Hispanic* Other, non-Hispanic	BIF: B09_Hispanic B10_race_white B10_race_black B10_race_Am_Indian B10_race_Pacific B10_race_Asian
	Family structure	Categorical measure: Spouse/partner, own children Spouse/partner, no own children Single, own children* Single, no own children (Only biological and adopted children of randomized participant considered here. Step children, grandchildren, younger siblings, and other children not considered.)	BIF: B13_hh_spouse B13_hh_partner B13_hh_your_children
	Living with own parents	Binary variable 1 if living with own parent(s) 0 otherwise (Presence of parents of spouse not considered.)	B13_hh_parent
Educational Background	Parent attended college	Binary variable: 1 if either parent attended college 0 otherwise	BIF: B21a_mother_educ B21b_father_educ
	Usual high school grades	Categorical measure: Mostly A's Mostly B's Mostly C's or below*	BIF: B23_grades

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
	Highest level of education completed	Categorical measure for descriptive analyses: No high school degree High school degree/GED Under 1 year's college credit 1 year+ of college credit Associate's degree or above Categories in covariate specification (each as binary variable): High school degree or less* Under 1 year's college credit 1 year+ of college credit Associate's degree or above	BIF: B17_educ
	Received vocational certificate	Binary variable 1 if yes 0 if no	BIF: B18_voctech_cert
Career Knowledge	Knows how to assess abilities and challenges	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13a_Abilities
	Knows how to make a plan for 5-year goals	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13b_Plan
	Knows how to get help with issues at school	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13c_Help
	Knows the type of job that is best for you	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13d_Job
	Knows the type of organization you want to work for	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13e_Organization
	Know the occupation you want to enter	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13f_Occupation
	Knows the education/training program best for you	Binary variable: 1 if strongly agree 0 otherwise	SAQ: S13g_Education

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
	Index (average of items)	Average of items (scale ranging 1-4)	SAQ: S13a_Abilities S13b_Plan S13c_Help S13d_Job S13e_Organization S13f_Occupation S13g_Education
Psycho-Social Indices	Academic discipline ²⁶	Average of items (scale ranging 1-6) after reversing responses to negatively-phrased items	SAQ: S11ad_d_Disciplined S11ad_ii_Do_Best S11ad_j_Skip_Classes S11ad_kk_Consistently S11ad_m_Abilities S11ad_n_Notes S11ad_nn_Hard_Working S11ad_pp_Assignments S11ad_r_Deadlines S11ad_u_Performance
	Training commitment ²⁷	Average of items (scale ranging 1-6) after reversing responses to negatively-phrased items	SAQ: S11cc_b_Other_Than_School S11cc_dd_Succeed S11cc_ee_Best_Choice S11cc_f_Stop_Attending S11cc_gg_Committed S11cc_i_How_Long S11cc_jj_Achieve_Goals S11cc_ll_Right_for_Me S11cc_p_Do_Well S11cc_t_Motivated

²⁶ Modified version of the Academic Discipline scale in the Student Readiness Index (SRI), a proprietary product of ACT, Inc., Le, et al. (2005). Further validation in Peterson, et al., (2006).

²⁷ Modified version of Commitment to College scale in the Student Readiness Index (SRI), a proprietary product of ACT, Inc., Le, et al. (2005). Further validation in Peterson, et al., (2006).

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
	Academic confidence ²⁸	Average of items (scale ranging 1-6) after reversing responses to negatively-phrased items	SAQ: S11sc_bb_Main_Ideas S11sc_c_Fast_Learner S11sc_cc_Performance_Inter S11sc_h_Keeping_Up S11sc_k_Less_Talented S11sc_mm_Achieve_Little S11sc_o_Intelligent S11sc_oo_Confident_Abilities S11sc_qq_Work_Harder S11sc_rr_Top_20 S11sc_x_Abstract_Topics S11sc_z_Not_Smart
	Emotional stability ²⁹	Average of items (scale ranging 1-6) after reversing responses to negatively-phrased items	SAQ: S11es_a_Calm S11es_aa_Arguments S11es_e_Lose_Control S11es_ff_Frustration S11es_g_Irritated S11es_hh_Out_of_Control S11es_l_Upset S11es_q_Express_Anger S11es_s_Think_Clearly S11es_v_Temper S11es_w_Annoyed S11es_y_Patient
	Social support ³⁰	Average of items (scale ranging 1-4) after reversing responses to negatively-phrased items	SAQ: S12a_Depend S12b_Close S12c_Turn_To S12d_Activities S12e_Respect S12f_Assistance S12g_Emotional_Security S12h_Competence S12i_Interests S12j_Trustworthy

²⁸ Modified version of the Academic Self-Confidence scale in the Student Readiness Index (SRI), a proprietary product of ACT, Inc., Le, et al. (2005). Further validation in Peterson, et al., (2006).

²⁹ Modified version of the Emotional Control scale in the Student Readiness Index (SRI), a proprietary product of ACT, Inc., Le, et al. (2005). Further validation in Peterson, et al., (2006).

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
	Stress ³¹	Average of items (scale ranging 1-5) after reversing responses to negatively-phrased items	SAQ: S14a_Control S14b_Confidence S14c_Going_Your_Way S14d_Difficulties
	Depression ³²	Average of items (scale of 4) after reversing responses to <i>positively</i> -phrased items	SAQ: S16a_Bothered S16b_Blues S16c_Mind S16d_Depressed S16e_Effort S16f_Sleep S16g_Happy S16h_Enjoy S16i_Sad
Resource constraints (financial)	Family income in past 12 months	Categorical measure: Less than \$15,000 \$15,000-29,999 \$30,000+*	BIF: B27_tot_fam_income_cats B27_tot_fam_income
	Family income in past 12 months	Continuous measure (for those who give only a categorical response, average response within category imputed)	BIF: B27_tot_fam_income_cats B27_tot_fam_income
	Receiving food assistance (WIC/SNAP) in past 12 months	Binary variable: 1 if yes 0 if no	BIF: B26b_WICSNAP
	Receiving cash assistance/TANF in past 12 months	Binary variable: 1 if yes 0 if no	BIF: B26c_PA
	Reporting financial hardship in past 12 months	Binary variable: 1 if yes if 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, 0 otherwise	SAQ: S08_Rent S09_Money

³⁰ Short form version of the Social Provisions Scale (Cutrona and Russel, 1987). Original scale has 24 items. This ten-item short version, also known as the SPS-10, is discussed and documented in Hoven (2012).

³¹ Cohen, et al. (1983).

³² A short-form version of the Center for Epidemiologic Studies—Depression Scale, also known as the CES-D. Short version due to Santor and Coyne (1997).

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
Resource constraints (time)	Current work hours	Categorical measure for description: 0 1-19 20-34 35+ Categorical measure for covariate: 0-19* 20-34 35+	BIF: B24_curr_hours
	Expected work hours in next few months	Categorical measure for description: 0 1-19 20-34 35+ Categorical measure for covariate: 0-19* 20-34 35+	SAQ: S02a_Work_Hours
	Expecting to attend school part-time if accepted	Binary variable: 1 if yes 0 if no	SAQ: S01_Future_School
Life challenges	Child care arrangements	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15a_Child_Care
	Transportation	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15b_Transportation
	Alcohol/drug abuse	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15c_Alcohol
	Illness/health condition	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15d_Illness
	Arguments with family members	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15e_Arguments
	Physical threats/violence from a family member	Binary variable: 1 if fairly or very often 0 otherwise	SAQ: S15f_Violence

Domain, Sub-Domain	Variable Description	Operationalization Details	Data Source(s)
	Index (average of items)	Average of items (scale ranging 1-5)	SAQ: S15a_Child_Care S15b_Transportation S15c_Alcohol S15d_Illness S15e_Arguments S15f_Violence
	Own a car	Binary variable: 1 if yes 0 if no	SAQ: S07_Car
	Internet equipped computer at home	Binary variable: 1 if yes 0 if no	SAQ: S06_Computer S06a_Internet
	Ever arrested	Binary variable: 1 if yes 0 if no	SAQ: S10_Arrested
Employment and earnings	Proportion of quarters employed last year	Divide number of quarters with any earnings by four, using the four quarters prior to the quarter of random assignment.	NDNH
	Average quarterly earnings last year	Calculate average of quarterly earnings across the four quarters prior to the quarter of random assignment.	NDNH

Data source abbreviations: RABIT = Random Assignment and Baseline Information Tool, BIF = Basic Information Form, SAQ = Self-Administered Questionnaire, NDNH = National Directory of New Hires.

* = category omitted in creating binary (dummy) variables for regression-adjustment models.

(a) Updated tables including program-specific refinements and measures based on local administrative data will be published on-line prior to commencing impact analysis for each PACE program.

Exhibit A.2: Operationalization of Confirmatory Outcomes at 15 and 36 Months (a)

Domain, Sub-Domain	Variable Description	Operationalization Details	Follow-up Interval(s)	Programs	Data Source(s)
Education	Hours of training received	For each of four types of noncredit training (ESL, Basic, Vocational, other skills), multiply weeks of training by typical hours per week. Multiply each college credit by 3 (assuming 1 hour class, 2 hours homework/week) * 15 (typical length of college term). Then sum across types.	15	BEH, CES, HCA	15-month survey. Items A.12, A.13, A.15, A.16, A25a, A.28, A.29 place by place. A.50 and A.51 overall.
	College credits received	Number of credits.	15	IBEST, PCPP, VIDA	15-month survey for IBEST and PCPP. A25a. Local college records for VIDA.
	Level of psycho-social skills	Average of 8 items in Grit scale. Average of 13 items in Savvy scale.	15	YU	15-month survey. B.3 for Grit, B.5 for Savvy
	Receipt of any education or training credential	Binary indicator formed from school-by-school reports of diplomas and certificates.	15	WTAC	15-month survey. A.22 and A.23 by place for diplomas and certificates resulting from course of study for college credit and A.26 and A.27e for occupational training not for college credit.
	Receipt of any education or training credential requiring a year or more of school	Binary indicator formed from list of all diplomas and certificates awarded. The 1+ year distinction for credit-based credentials is based on whether respondents checked certificates of 1+ year for certificates or a higher degree. For non-credit instruction it is determined by coding specified credentials.	36 Long term	BEH, HCA, WTAC	36-month survey. Item I.2a.
	Receipt of any college credential	Binary indicator. Create by aligning reported credentials received and dates of receipt with enrollment spells at corresponding institutions. Identify as college if documented as title-IV eligible in the federal Integrated Post-secondary Education Data System (IPEDS).	36	CES	36-month survey. C.1 (institution name), C.2 and C.3 (attendance start and stop dates), I.2a (type o credential earned), and I.2c (award date).
	Receipt of any college credential requiring a year or more of school	Binary indicator for college credential receipt, as above. The 1+ year distinction for college credentials is based on whether respondents checked certificates of 1+ year for certificates or a higher degree.	36 Long term	IBEST, PCPP, PHC. CES Long term only	36-month survey. C.1 (institution name), C.2 and C.3 (attendance start and stop dates), I.2a (type of credential earned), and I.2c (award date).
Employment	Average total earnings in the 5 th follow-up quarter	Sum all earnings reports in 5 th quarter	15	YU	NDNH
	Average total earnings in the 12 th follow-up quarter	Sum all earnings reports in 12 th quarter	36	All programs	NDNH
	Average total earnings over the most recent 8 follow-up quarters	Sum all earnings reports in named quarters	Long term	All programs	NDNH

Note: Secondary analyses for each site generally will provide estimates for educational outcomes shown above not selected as confirmatory. Updated tables, with any program-specific refinements based on data quality findings, will be published on-line prior to commencing impact analysis for each PACE program.

Exhibit A.3: Operationalization of Secondary Outcomes

Domain, Sub-Domain	Variable Description	Operationalization Details	Follow-up Interval(s)	Programs	Data Source(s) for 15- and 36-Month Measures (a)
Occupational credential receipt	Receipt of industry certification or occupational license	Binary indicator of receipt of professional, state, or industry certification, license or credential.	15, 36	All	15-month survey items A.56, A.56a-A.56d 36-month survey items I3d-I3i
Employment success	Employment at or above specified wage	Binary indicator of employment with wages at/above threshold determined for each program based on its logic and goals.	15, 36	All	15 month survey items E.1 and E.2 (about current or most recent job) 36-month survey items F.5 for current job and F.7 for every prior job since randomization.
	Employment with benefits	Binary indicator of whether offered employer-provided health insurance and paid sick leave.	36	All	36-month survey items G.7, G.8
	Employment at/above specified skill level	Binary indicator of employment utilizing occupational categories with cross-walk to skill levels in the federal O*NETS system, with thresholds calibrated to PACE program target occupations. Occupational categories coded from standard open-ended items on type of work, usual activities, and title.	36	All	36-month survey items G.1-G.5.
	Employment in health occupation	Binary indicator of whether employed in health occupation.	15, 36	All	15-month survey items E.3, E.4, and E.5. 36-month survey items G.1-G.5
Psycho-social skills					
Work ethic/ conscientiousness	Level on Grit scale	Average of 8 items in scale after reversing scores for items phrased negatively.	15, 36	All	15-month survey item B.3 36-month survey item K.1
Self-evaluation	Level on Core Self-Evaluation scale	Average of 12 items in scale after reversing scores for items phrased negatively.	15, 36	All	15-month survey item B.6 36-month survey item K.3
	Level on Academic Self-Confidence scale	Average of 12 items in scale after reversing scores for items phrased negatively.	15, 36	All	15-month survey item B.4 36-month survey item K.2
Interpersonal	Level on Career Network scale	Average of 6 items in scale.	15, 36	All	15-month survey item C.1 36-month survey item K.4
Career knowledge	Level on Career Knowledge scale	Average of 7 items in scale.	15, 36	All	15-month survey item C.3 36-month survey item K.6
Resource constraints	Citing difficulty in securing financial support for school	Binary indicator set to 1 if cited difficulties securing financial support—as reason for not enrolling in or leaving school, or as a difficulty while in school—and 0 otherwise.	15	All	15-month survey item A.35 (repeated for each institution attended)

Domain, Sub-Domain	Variable Description	Operationalization Details	Follow-up Interval(s)	Programs	Data Source(s) for 15- and 36-Month Measures (a)
Life challenges	Level on index of Challenges Interfering with School, Work, or Family Responsibilities	Average of 7 items in scale at 15 months. Average of 5 items in scale at 36 months.	15, 36	All	15-month survey item D.3 (7 items) 36-month survey item K.7 (5 items)
	Level on Perceived Stress scale	Average of 4 items in scale after reversing scores for items phrased positively.	15, 36	All	15-month survey item D.4 36-month survey K.8.
Family economic status	Annual household income	Reported income in prior month, multiplied by 12.	36	All	36-month survey item M.4
	Level of debt	Average total amount of personal loans for education and other reasons (not including home and car loans), imputing values at midpoint of categories for the latter.	36	All	36-month survey items M.6, M.8
	Receipt of public assistance	Binary indicator of whether or not received either food assistance or cash assistance/TANF.	36	All	36-month survey items M1a-M1i.
	Level on material hardship scale	Average of 7 items in scale.	36	All	36-month survey M.9
Program-Specific Outcomes (b)					
Basic skills	Level of English fluency	Average on 4-item scale with levels ranging from 1-4.	15, 36	CES	15-month survey item D.3 36-month survey item K.9
Life challenges	Risky behaviors	Binary indicator = 1 if any of: associate with people who might get me in trouble, smoke cigarettes, or had unprotected sex in past three months. 0 otherwise.	15	YU	15-month survey items D.6, D.8, D.9, D.9a, D.9b

Note: Updated tables, with any program-specific refinements based on data quality findings, will be published on-line prior to commencing impact analysis for each PACE program.

(a) Only 15- and 36-month outcomes are specified.

(b) Any additional measures will be added as dated updates to this table, with dates preceding the point each impact analysis begins for each program.