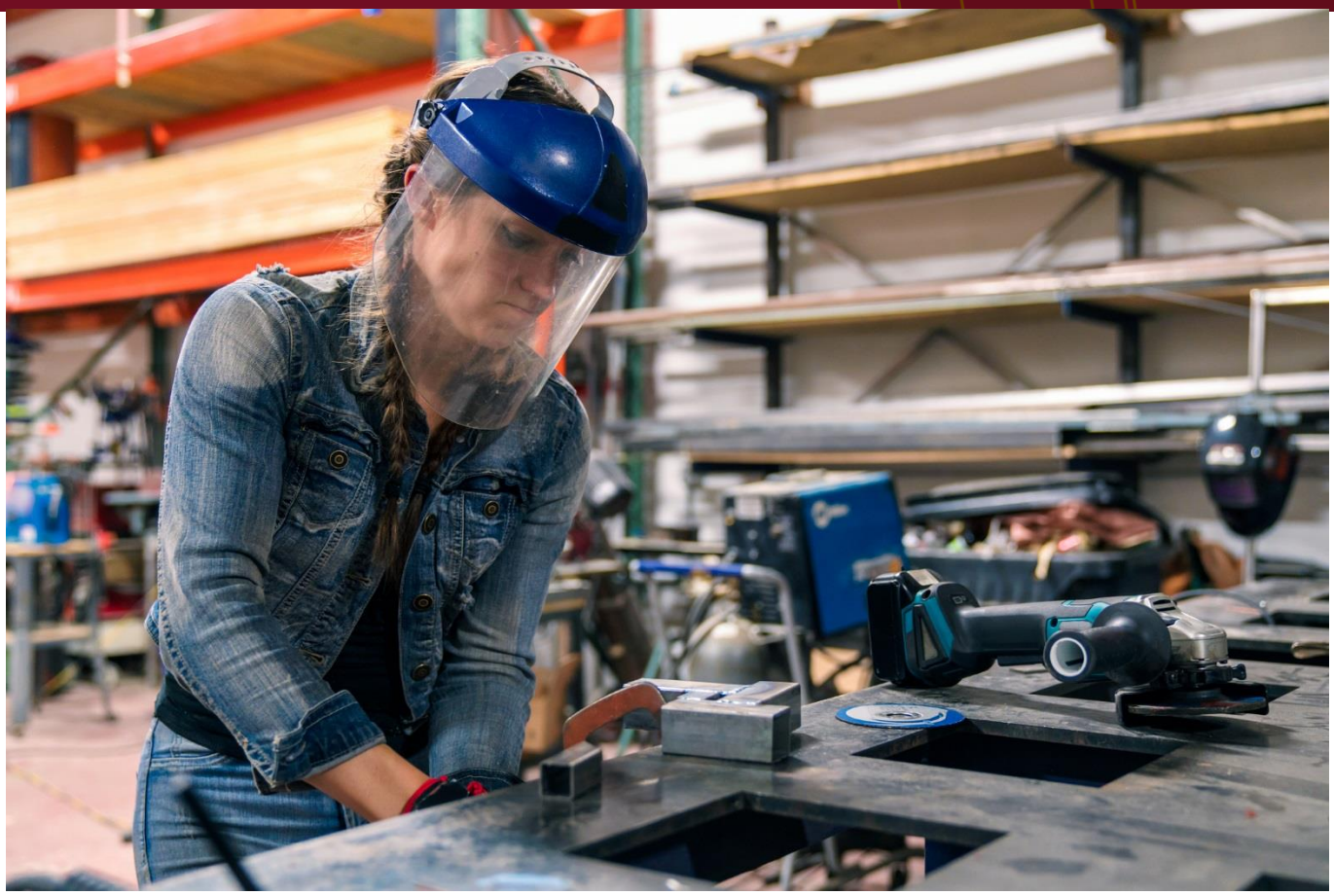
Feasibility Study and Evaluation of Non-Traditional Occupation Demonstrations

FINAL EVALUATION REPORT



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IMPAQ INTERNATIONAL LLC

SUBMITTED TO

Gloria Salas-Kos, Contract Office Representative
Employment and Training Administration
U.S. Department of Labor

SUBMITTED BY

Eileen Poe-Yamagata, Project Director
IMPAQ International, LLC
10420 Little Patuxent Parkway
Suite 300
Columbia, MD 21044
(443)256-5500
www.impaqint.com

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AUTHORS

Neha Nanda, IMPAQ International
Carolyn Corea, IMPAQ International
Luke Patterson, IMPAQ International
Eileen Poe Yamagata, IMPAQ International
Paula Mian, IMPAQ International
Chris Zhang, IMPAQ International

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ABSTRACT

In June 2013, the U.S. Department of Labor (DOL) contracted with IMPAQ International (IMPAQ) to implement the "Feasibility Study and Evaluation of the Non-Traditional Occupation (NTO) Demonstration." NTOs for women generally offer higher wages and more opportunities for advancement compared to traditionally female dominated occupations. The overall purpose of the NTO study was to: (1) identify barriers to NTOs and promising strategies for addressing those barriers, (2) design and implement a demonstration of a promising strategy, and (3) evaluate the effectiveness of the strategy implemented under the demonstration. The evaluation team engaged two American Apprenticeship Initiative (AAI) grantees providing entry-level training in NTOs— Construction and Advanced Manufacturing in South Seattle and Information Technology in New Mexico— to implement the demonstration.

The intervention involved multi-mode outreach designed to reduce misperceptions, increase awareness and encourage women to enter traditionally male occupations and related training programs. To evaluate the intervention, a study sample comprised of female jobseekers engaged with the local public workforce system was utilized. The research team initiated a randomized-control trial (RCT), in which a treatment group received gender-themed recruitment content designed to increase awareness of NTOs among women and to address misperceptions women may have about NTOs. A control group received non-themed, generic recruitment content. Content was delivered to individuals assigned to each group through multiple emails and a postcard, all of which directed the jobseeker to a website containing additional recruitment content. Each contact encouraged the jobseeker to take specific steps towards enrolling in an NTO training program. The evaluation design measured and compared the effectiveness of the two sets of recruitment content used to encourage women to take short-term actions towards applying to an NTO training program. The actions or behaviors female jobseekers were nudged to take included: (1) opening the email, (2) clicking on a link in an email directing the jobseeker to a recruitment website, (3) completing an interest form, (4) gathering more information on the training program, and (5) applying for the training program.

The impact study found statistically significant positive effects in South Seattle on outcomes 2 (clicked on a link in an email) and 3 (completed an interest form). In New Mexico, the evaluation team observed a change in magnitude and direction of the impact estimates from negative and statistically significant for outcome 1 (opened the email) to nearly zero for outcome 3.[1] Completion rates for the two exploratory outcomes—outcomes 4 (looked for more information) and 5 (enrolled in the program)—were low overall in the two demonstration sites as well as for both treatment and control groups within sites.

Analysis of outcome completion rates for both treatment and control group over time suggested that the sharp increases in outcome completion following each reminder constitute promising evidence supporting the effectiveness of a multi-pronged recruitment approach.

The report concludes with a discussion of study findings, implications, recommendations, and next steps for future research.

Keywords: non-traditional occupations, construction, advanced manufacturing, information technology, apprenticeships, women, employment, barriers to employment, strategies, random assignment design, selection bias in randomized control trials

[1] Propensity-score matching correction for selection bias was used for outcome 2 in South Seattle and outcomes 2 and 3 in Central New Mexico. Correction for outcome 3 in South Seattle could not be implemented due to sample size constraints.

EXECUTIVE SUMMARY

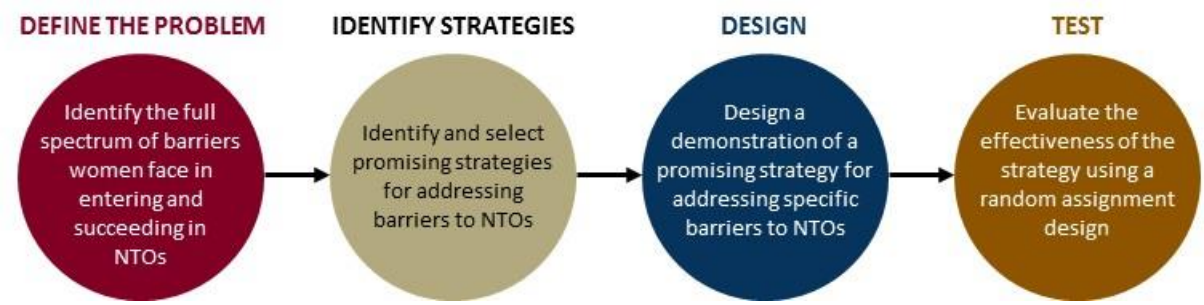
In June 2013, the U.S. Department of Labor (DOL) contracted with IMPAQ International (IMPAQ) to implement the "Feasibility Study and Evaluation of the Non-Traditional Occupation (NTO) Demonstration." NTOs are occupations where specific populations and subpopulations are traditionally underrepresented. DOL defines underrepresented occupations as those in which individuals from one gender constitute less than 25 percent of the individuals employed in such occupations.[2] The findings presented in this Final Evaluation Report of the NTO demonstration provide the first rigorous evidence on the value of using gender-themed recruitment content to encourage women to seek training in NTOs.

The overall purpose of the NTO study was to: (1) identify barriers to NTOs and promising strategies for addressing those barriers, (2) design and implement a demonstration of a promising strategy, and (3) evaluate the effectiveness of the strategy implemented under the demonstration. To implement this study, IMPAQ partnered with the Institute for Women's Policy Research, the National Alliance for Partnerships in Equity, and the communications firm Reingold, Inc., referred to collectively as the evaluation team.

1. STUDY OVERVIEW

The evaluation team worked through a strategic process with DOL to achieve the NTO study's objectives, beginning with an extensive literature review of barriers to entering NTOs and promising strategies for addressing those barriers. The findings from the literature review, combined with recommendations from DOL and other subject matter experts, were used to develop a treatment intervention designed to increase awareness of NTOs among women and address misperceptions women may have about NTOs. Exhibit ES.1 summarizes the study implementation process.

Exhibit ES.1: Study Implementation Process



To implement the demonstration, two American Apprenticeship Initiative (AAI) grantees— South Seattle Community College (Seattle, Washington) and Central New Mexico Community College (Albuquerque, New Mexico) were invited to participate in the study after a feasibility review of their interest and ability to conduct the demonstration. Both grantees provide entry-level training in industries that are NTOs for women. The South Seattle grantee provides training in

[2] See https://www.dol.gov/wb/stats/nontra_traditional_occupations.htm. Retrieved on 12/29/2016.

advanced manufacturing and construction; the Central New Mexico grantee provides training in information technology (IT). The demonstration was implemented at each participating site in very similar ways, but with slight site-specific adjustments to ensure customization to different site characteristics.

To evaluate the demonstration, the evaluation team used a study sample comprising women jobseekers engaged with the local public workforce system. The team initiated a randomized-control trial (RCT), in which a treatment group received gender-themed recruitment content and a control group received generic-themed recruitment content. The evaluation was designed to measure and compare the effectiveness of the two sets of recruitment content in encouraging women to take short-term actions towards applying to an NTO training program. The demonstration delivered multiple emails and postcards to individuals which directed the jobseekers to a website containing additional recruitment content.

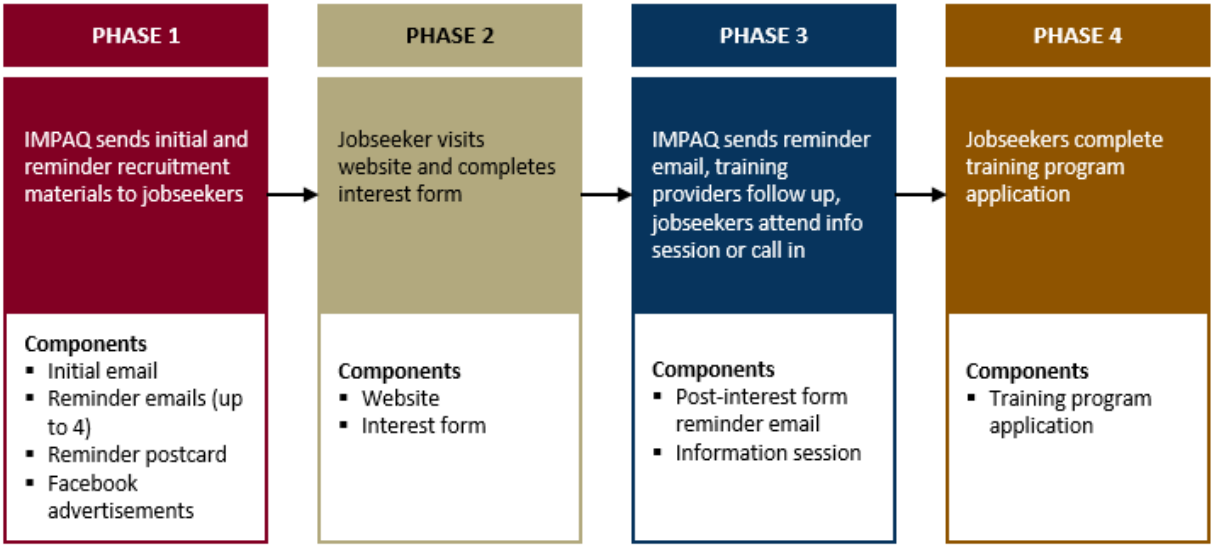
2. THE DEMONSTRATION

Developing the NTO demonstration involved creating a multipronged outreach approach, selecting the target population, and identifying implementation sites.

2.1 The NTO Demonstration's Multipronged Approach

The evaluation team, in collaboration with DOL, selected a multipronged outreach approach to create more awareness and reduce misperceptions of NTOs. This approach consisted of four contact phases (see Exhibit ES.2), each encouraging the jobseeker to take specific steps towards enrolling in an NTO training program.

Exhibit ES.2: Multi-pronged Outreach Demonstration Phases



Phase 1: The evaluation team sent the initial recruitment email, up to four reminder emails, and a final follow-up postcard (each in two versions, depending on the jobseeker's treatment/control status) to the women jobseekers in the study sample.

Phase 2: The jobseeker visited the appropriate (treatment or control) website and completed an interest form.

Phase 3: The evaluation team sent post–interest form reminder emails to individuals who completed the interest form; training providers followed up with individuals who completed the interest form; and jobseekers gathered more information about the program.

Phase 4: Jobseekers enrolled in a program.

2.2 Target Population

In collaboration with DOL, the evaluation team determined that the outreach associated with the NTO demonstration would target women. The evaluation team then made the decision to target low-to-medium skilled women because this subgroup: (1) demonstrates the greatest need for improved workplace skills, and (2) constitutes the most appropriate fit for an entry-level training program.

2.3 Sites

When implementing a demonstration, evaluators must identify a site or sites to ensure the demonstration takes place within an organizational, demographic, and geographic setting that supports the demonstration. Careful consideration led the evaluation team to select the American Apprenticeship Initiative (AAI) grantee setting as most suitable, as measured by a specific set of criteria. Within the grantee group, the team chose two AAI grantees that best fit the suitability criteria and also expressed interest in participating in the study: South Seattle and Central New Mexico.

3. THE EVALUATION DESIGN

The evaluation's RCT randomly assigned a sample of women jobseekers to either the gender-themed treatment group (who received materials specifically designed to encourage women to enter and remain in NTO careers), or the generic-themed control group (who received a set of materials that did not target women particularly or mention characteristics that might make NTOs particularly attractive to women).

3.1 Research Questions

The NTO study addressed two research questions:

1. Is gender-themed recruitment content more effective in encouraging women to take short-term steps (opening an email, clicking on a link, completing an interest form) towards applying to an NTO training program compared to generic recruitment content?
2. Do responses to these messages vary across different subgroups of women (defined by age, ethnicity, education, veteran status, etc.)?

3.2 Treatment Content

For each demonstration site, the evaluation team developed both gender-themed treatment and generic-themed control recruitment content for the three outreach modes (email, website, and postcard). All of the content for each of the outreach modes was provided in both English and Spanish.

Gender-themed Treatment vs. Generic-themed Control Content. The evaluation team developed the generic-themed content for the control group to reflect the "typical" outreach materials used to recruit participants for workforce training programs operated through community/technical colleges. The treatment group versions of content differentiated from the control group versions in three ways:

Gender-framed treatment themes designed to reduce perceived barriers to NTO participation for women. Through extensive research noted in the companion literature review for this study, the evaluation team identified and included several themes designed to counteract messages associated with lack of awareness and misperceptions of NTOs. Themes included: (1) NTOs pay higher wages than typical employment for women, (2) women in NTOs can take pride in important work products, (3) women in NTOs can serve as role models for women more generally, and (4) employment in some NTOs can create a better work-life balance for women.[3]

Use of female images. Whereas the vast majority of the photos in the control content were of men, the treatment content included primarily photos of women.

Use of testimonials from women. Testimonials or quotes from women training for, or working in, NTOs highlighted the NTO themes noted above as appealing particularly to women.

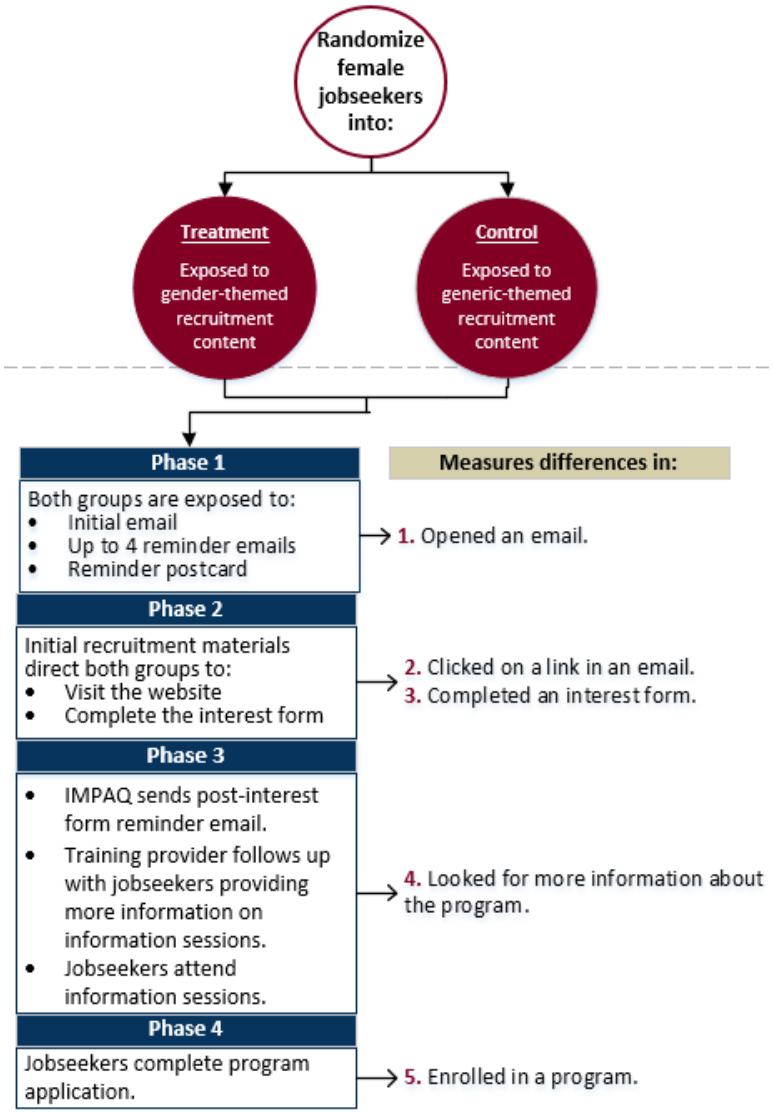
Common to both treatment and control groups, the evaluation team also developed recruitment content that contained information on the training program industries and incorporated behavioral techniques to obtain a higher response rate. In addition, the team incorporated a set of evidence-based behavioral techniques (nudges) designed to encourage completion of short-term outcomes. Certain content was customized by site to align with the NTO industries specific to each site, but site-customized content was the same for both treatment and control groups in the respective sites.

3.3 Random Assignment

Random assignment of the demonstration sample to either the gender-themed treatment group or the generic-themed control group was done on a 50/50 basis through a batch randomization process. Exhibit ES.3 summarizes the evaluation design, including the anticipated outcomes for each phase. A total of 16,401 (8,224 in the treatment group and 8,177 in the control group) jobseekers were randomized in South Seattle, while 20,857 jobseekers participated in Central New Mexico's demonstration (10,430 in the treatment group and 10,427 in the control group).

[3] Nanda, N., Corea, C., Roy, M., Patterson, L.., Poe-Yamagata E., (2018). *Feasibility Study and Evaluation of Non-Traditional Occupation Demonstrations - Literature Review Report.*

Exhibit ES.3: Evaluation Design Summary



3.4 Evaluation Outcomes

The evaluation team measured the effectiveness of the intervention based on the degree to which it achieved specific outcomes, which can be categorized as either confirmatory or exploratory. Confirmatory outcomes are those for which causal impacts of the intervention can be estimated. Exploratory outcomes are those that are less likely to be able to attribute to the intervention itself.

Three confirmatory outcomes— (1) opened an email, (2) clicked on a link in an email, and (3) completed an interest form—are outcomes for which analysts can estimate the impact of the intervention with known statistical confidence, given sample size, available data, and study constraints. Two exploratory outcomes— (4) looked for more information about the program and (5) enrolled in a program—are outcomes for which there may be suggestive relationships in the data, but from which no conclusions can be drawn about the intervention's impact.

3.5 Data Sources and Collection

The evaluation required two main types of data on the demonstration sample.

State Workforce Participant Data. The demonstration and its evaluation relied on jobseeker contact and demographic information on women for three purposes: (1) to select the demonstration sample, (2) to extract baseline data for the demonstration sample, and (3) to compile contact information for distributing the recruitment content to the demonstration sample. The evaluation team worked with the states' Workforce Agencies (SWAs) to access information for all women who received workforce system services within the local area.[4] Demographic composition of women in the two sites is provided in chapter 4.

Outcomes Data. For both sites, the three confirmatory outcomes were tracked using data available from email distribution software, Active Campaign, and built-in website analytic tools, which tracked whether each email was opened. In addition, each email had the appropriate unique link to either the gender-themed treatment or generic-themed control website, which allowed the website's analytic tools to track who visited the website. Data on outcomes 1 (opened an email) and 2 (clicked on a link in an email) were collected differently. For South Seattle, the evaluation team tracked these outcomes directly. For Central New Mexico, the SWA collected the data on outcomes (1) and (2) as part of conducting the demonstration outreach, and then transferred the data to the evaluation team.[5] For outcome 3 (completing an interest form), the team tracked the relevant data without site involvement. Since the form and form submission button on each website were linked to an email automation platform named Active Campaign, every time a contact submitted an interest form, the data they entered in the form would be passed into the corresponding contact fields in Active Campaign.

Data for exploratory outcomes (4) and (5) were collected by training providers, since interested jobseekers reached out directly to them to express interest in the program and/or to enroll in a program. Both sites collected these data as part of implementing the demonstration, and then transferred the data to the evaluation team on an agreed-upon schedule. The team linked attendance and application/enrollment records to the original sample using identifiers such as name, contact information, and Social Security Number (SSN).[6,7]

4. OUTCOME COMPLETION AND PROGRAM IMPACTS

The goal of the NTO demonstration, as noted, was aimed to encourage more women to consider careers in NTOs by addressing awareness and misperception barriers in the way of women's employment in NTOs. The demonstration's evaluation tested the effectiveness of a woman-

[4] New Mexico Department of Workforce Solutions, Albuquerque for Central New Mexico; Employment Security Department, Seattle and the surrounding areas for South Seattle.

[5] The Washington SWA shared contact information, enabling the evaluation team to conduct the outreach and collect data on all confirmatory outcomes. The New Mexico SWA chose to collect data on outcomes 1 and 2.

[6] For Central New Mexico, the evaluation team shared attendance and application/enrollment records with the New Mexico SWA; the SWA, in return, matched the data back to the study sample.

[7] The grantees did not collect SSNs for outcome 4. For this outcome, the evaluation team used a string matching process that required strict matches of imperfect identifiers such as last name, date of birth, email address, and phone number.

specific targeted multi-pronged outreach intervention in nudging women to take short-term actions towards NTO training programs.

4.1 Trends in Outcome Completion Rates Over Time

The proportions of the site demonstration samples who completed outcome 1 (about 33 percent overall in South Seattle, 36-37 percent overall in Central New Mexico) were far larger than for outcome 2 (3.5 percent overall in South Seattle, 7.6 percent overall in Central New Mexico) and outcome 3 (0.4 percent overall in South Seattle, 5.1 percent in Central New Mexico). The decrease by demonstration phase was a result of the cumulative nature of the intervention (e.g., outcome 2, clicked on a link in an email, cannot be completed if outcome 1, opened an email, has not been completed). Chapter 3 discusses the natural attrition of the sample at each subsequent outcome in more detail.

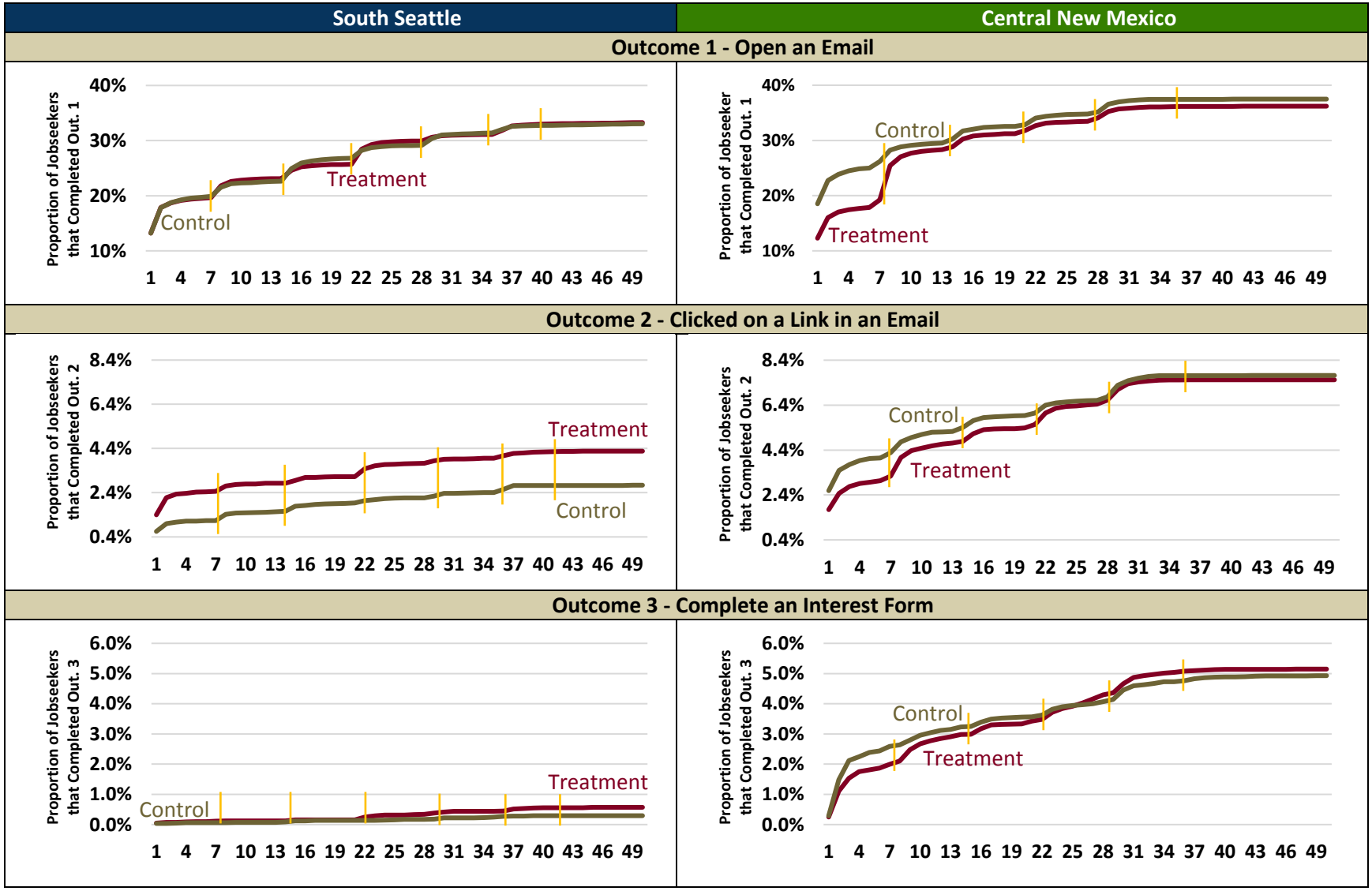
Exhibit ES.4 shows that the share of women jobseekers who completed each of the three confirmatory outcomes over the demonstration period spiked after each email (postcards were sent concurrent with the third follow-up email). In each graph, the numeral 1 represents the first day of the demonstration, the date the initial email was sent.[8] Follow-up emails (marked by yellow lines) were sent on days 8, 15, 22, 29 and 36 for both sites, with an extra email sent on day 43 for South Seattle. These days all featured distinct jumps in outcome achievement for both groups.[9]

These outcome completion spikes demonstrate that a multi-pronged recruitment campaign with multiple "touches" may be key to increasing overall participation—which is promising evidence in support of the effectiveness of using a multi-pronged recruitment approach. The spike pattern provides valuable information for training practitioners looking to boost the overall effectiveness of their recruitment campaigns, especially given the low cost/burden imposed by these activities.

[8] In South Seattle, the dates of day 1 were 7/31/17 (Cohort 1 sample) and 2/5/18 (Cohort 2 sample). In Central New Mexico, they were 9/18/17 (Cohort 1 sample) and 1/16/18 (Cohort 2 sample).

[9] The site difference in number of emails was due to New Mexico SWA's budgeting and administrative constraints.

Exhibit ES.4: Share of Jobseekers that Completed Confirmatory Outcomes, by Demonstration Day and Site



Notes: Emails were sent for both demonstration sites on days 1, 8, 15, 22, 29 and 36 in the graphs above, as demonstrated by the yellow lines. An extra email was sent in South Seattle on day 43.

4.2 Impact Findings for Confirmatory Outcomes

The evaluation examined the impact of the gender-themed content on confirmatory outcomes 1 (opened an email), 2 (clicked on a link in an email), and 3 (completed an interest form) for both South Seattle and Central New Mexico, as measured by the differences in outcomes between the gender-themed treatment group and the generic-themed control group. For each of the two sites, this section presents: (1) the estimated *average* treatment effect among all women jobseekers in the sample for whom the evaluation team has complete data, and (2) the estimated treatment effects across subgroups of interest.

Our analysis corrects for self-selection into outcomes 2 and 3 completion using propensity score matching (PSM). The estimated treatment effect on outcome 2 is then interpreted as the effect of gender-themed outreach content on women jobseekers' likelihood of clicking on a link in an email, *conditional on* opening the email. For outcome 3, the estimated treatment effect is interpreted as the effect of gender-themed content on women jobseekers' likelihood of completing the interest form, *conditional on* clicking on a link in an email.[10]

Overall impact estimates by site

South Seattle (Construction and Advanced Manufacturing)

- The evaluation team found no statistically significant impact of receiving gender-themed content on completion of outcome 1 (opened an email). See Exhibit A.1 in Appendix A for the email subject lines.
- Women jobseekers who received gender-themed content and opened the emails were 5.6 percentage points significantly more likely than those in the matched generic-themed control group who received generic content to complete outcome 2 (clicked on a link in an email.)
- The *unconditional* probability of completing outcome 3 (completed an interest form) was 0.3 percentage points significantly higher among women who received gender-themed content compared to the control group.

Central New Mexico (Information Technology)

- The evaluation team found a statistically significant negative impact of 1.3 percentage points on outcome 1 (opened an email). It is noteworthy that, at this phase of the intervention, the jobseekers had *only* been exposed to the email subject lines See Exhibit A.1 in Appendix A of the full report.
- Women jobseekers who received gender-themed content and completed outcome 1 (opened an email) experienced a statistically insignificant positive impact (2.2 percentage points) on completing outcome 2 (clicked on a link in an email) compared to the matched control group.
- Women jobseekers who received gender-themed outreach materials and completed outcomes 1 (opened an email) and 2 (clicked on a link in an email) experienced a small,

[10] Given the limitation in sample size, for the South Seattle sample the estimated treatment effect on outcome 3 must be interpreted as the effect of gender-themed content on outcome 3 (completed an interest form) *unconditional* on either email opening or link clicking.

statistically non-significant negative impact (-0.8 percentage points) on completing outcome 3 (completed an interest form) compared to the matched control group.

Subgroup Impact Estimates

South Seattle (Construction and Advanced Manufacturing)

- Women 55 or older experienced a strong positive and significant gender-themed treatment effect of 3.7 percentage points on outcome 1 (opened an email) compared to the control group.
- For outcome 2 (clicked on a link in an email), the *conditional* effect of being exposed to gender-themed content is statistically significant at 9.1 percentage points for women jobseekers ages 45-54, and 6.7 percentage points for women jobseekers ages 55 or older. Women jobseekers who were non-Hispanic and women jobseekers who were not employed were both 5.4 percentage points significantly more likely to complete outcome 2 compared to the matched control group. Other notable statistically significant subgroup results among the gender-themed treatment group include a 5.6 percentage points higher likelihood of completing outcome 2 (clicked on a link in an email) for non-veterans, as well as those without a disability (6.3 percentage points), and those without a high school degree (9.3 percentage points) or with college education or higher (6.0 percentage points).
- For outcome 3 (completed an interest form), *unconditional* on having completed outcome 2, women jobseekers ages 25-34 and 35-44 who were exposed to the gender-themed content were significantly more likely to complete the interest form compared to the control group. Positive and statistically significant effects remained among women jobseekers who were non-Hispanic, who had a college degree or higher, who were non-veterans, who were non-disabled, who were not employed, and who were employed, with magnitudes ranging from 0.2 to 1.1 percentage points.

Central New Mexico (Information Technology)

- Women jobseekers in the following subgroups were the main contributors to the statistically significant negative effect for Central New Mexico on outcome 1 (opened an email) among the gender-themed treatment group: ages 25-34 (-2.7 percentage points), ages 35-44 (-4.0 percentage points), with no income (-1.6 percentage points), non-veterans (-1.2 percentage points), living in one-person households (-14 percentage points), living in two-person households (-1.2 percentage points), disabled (-7.3 percentage points), and not employed (-1.2 percentage points).
- Women jobseekers among the gender-themed treatment group ages 35-44 and ages 45-54 were significantly less likely to complete outcome 2 (clicked on a link in an email) by 5.3 and 6.4 percentage points, respectively, compared to the matched control group.
- For outcome 3 (completed an interest form), the non-significance of the overall impact estimate *conditional* on completing outcomes 1 and 2 carries over across all subgroups.

4.3 Exploratory Outcomes

Completion rates for the two longer-term exploratory outcomes (outcomes 4 and 5) were extremely low across the two sites, overall and for both treatment and control groups.[11] However, the multipronged recruitment approach overall was successful in encouraging many women in both the treatment and control groups to seek more information about the programs, and in Central New Mexico, to enroll in the program. The number of jobseeker women who enrolled in the Central New Mexico program (91), for example, accounted for almost a third of the 300 program slots available in this new program.

5. STUDY IMPLICATIONS AND NEXT STEPS

This section discusses implications of the impact study findings for DOL, as well as for workforce development stakeholders. Based on qualitative feedback from program staff in the South Seattle and Central New Mexico demonstration sites, the discussion also includes the potential usefulness of the demonstration's recruitment materials and intervention model for workforce development stakeholders. Evolving from this discussion and feedback from grantee program staff, the section ends with recommendations for improving the recruitment of women into NTOs.

5.1 Study Implications

The NTO demonstration implemented a research-based strategy designed to reduce barriers to NTO careers associated with women jobseekers' limited awareness and misperceptions about NTOs. Implemented in two sites reflecting a range of socio-economic and programmatic differences, the intervention's impact differed by site. Individually, and, in some cases together, the site findings point to important implications for evidence-based methods of conducting outreach that can encourage women to take early steps towards NTO participation.

Key Implications

- **Gender-themed Content Can Be Effective.** The overall positive impact of implementing gender-themed recruitment materials in South Seattle indicates that gender-themed content addressing women's concerns and misperceptions about, and highlighting the benefits of, NTO careers can reduce negative perceptions among women jobseekers about working in NTOs.
- **Repeated Exposure to Content Is Important.** A multi-pronged recruitment campaign that includes multiple modes and multiple "touches" may be key to increasing overall participation. Sharp increases in outcome completion among both treatment and control groups immediately following each reminder constitute promising evidence supporting the effectiveness of using a multi-pronged recruitment approach.
- **Understanding the Target Population's Career Preferences Is Essential.** The difference in impacts across demonstration sites – South Seattle offering entry-level manual trades training, New Mexico offering IT related training- and several subgroups demonstrates

[11] Differences in outcomes 4 and 5 between treatment and control groups for South Seattle were not tested for statistical significance. The differences for Central New Mexico were not statistically significant at conventional levels.

that the recruitment content may be misaligned with the career preferences of women jobseekers within those subpopulations. This variation highlights the need to ensure recruitment content reflects a clear understanding of the career preferences and perceived occupational barriers of different subgroups (such as age, ethnicity, veteran status, disability status, income, and household size) to more effectively attract those jobseekers and address their NTO-related concerns.

- **Program Context Likely Influences Responses.** Differences in outcome completion rates and impact findings across sites demonstrate that the industries, economic context, demographics, and training programs specific to a region likely influenced the impacts of the NTO demonstration. For example, the expected growth of the IT industry in Central New Mexico along with the *paid* on-the-job training component of the IT apprenticeship program may have contributed to an *overall* enthusiasm among both treatment and control groups for occupations in IT, resulting in no statistically significant differences in responses between the gender-themed treatment group and the generic-themed control group.

5.2 Recruitment Content and Implementation Going Forward

In addition to implications derived from the impact study findings, it is important to consider qualitative lessons learned from implementing the NTO demonstration—to further improve similar recruitment efforts going forward. This feedback will help workforce development stakeholders best apply the knowledge gained from the NTO demonstration on treatment content to work in the field.

Treatment Content. The South Seattle and Central New Mexico grantees and training providers all reported that the recruitment materials for both groups were high quality—and that the gender-themed materials motivated women jobseekers to consider and get more information about the training opportunities offered. All who provided feedback were interested in using the gender-themed materials in the future, and felt that the materials, as adjusted for site-specific characteristics, would be very useful to other training providers seeking to recruit women into their NTO training programs. A suggestion to improve the content asked for even more stories, testimonials, and quotes from women who are either actively in or recently completed the *training* programs be included in the materials.

Implementation Approach. Although the South Seattle training providers found the materials to be high quality, they expressed concern about the reliance on recruitment materials alone to successfully recruit women to NTO training programs. Training providers noted that a recruitment campaign is not enough to get women to take the longer-term steps of enrolling in an NTO training program—especially in construction and manufacturing, with ingrained barriers to entry and retention for women (including gender discrimination and sexual harassment).

Staff suggested working to incorporate into the implementation approach more phone follow-up with women who completed the interest form, to increase direct connection with women. One training provider suggested offering financial supports to help cover the costs of transportation, child care and other expenses as part of a recruitment strategy.

5.3 Recommendations

The evaluation team offers six comprehensive recommendations to DOL for effectively recruiting women into NTOs:

- **Use a Multi-pronged Approach.** Recruitment efforts for NTOs should use a multi-pronged approach that repeatedly exposes women jobseekers to gender-themed recruitment content and reminds them to take specific actions.
- **Customize Recruitment Materials.** Recruitment content should be customized as much as possible to take into account the target population, training program industry, and regional context. NTO training programs seeking to recruit women should:
  - Develop materials that incorporate language, images, and testimonials that align with recruitment themes addressing the needs and concerns of women.
  - Consider the age, education, and ethnicity, as well as the employment, disability, and veteran status of the target population, when developing recruitment materials—because women's perceptions of NTO industries, and the occupations within those industries, vary by subgroup.
  - Customize recruitment content to the specific industry (ies) for which the training is offered. The content should highlight the benefits of the respective industry for women and address any unique concerns and/or misperceptions associated with that industry.
  - Take into account region-specific factors that might influence a community's view of an NTO industry or a specific NTO, and/or the community's demand for such programs.
- **Include Testimonials Specific to the Training Program(s) Offered.** Recruitment content should include images, quotes, and testimonials from women who have participated in the actual training program being offered.
- **Incorporate Personal Follow-up.** Recruitment efforts should include as much personal follow-up and interaction, such as by telephone, with potential participants as possible, to enable program staff to quickly address concerns, answer questions, and identify individuals' barriers to participation.
- **Combine Recruitment Efforts with Other Strategies.** Recruitment efforts should be combined with other strategies to address additional barriers to NTO careers for women. This could include offering financial supports or offering support services like child care or transportation assistance during the training period.
- **Implement Recruitment Best Practices to Increase Apprentices Nationally.** DOL is working to help facilitate the placement of 1 million new apprentices over the next several years. The promising recruitment practices identified through this study should be used to bring women into apprenticeship programs, many of which are NTOs, to help DOL achieve this goal.

CHAPTER 1. INTRODUCTION

In June 2013, the U.S. Department of Labor (DOL) contracted with IMPAQ International (IMPAQ) to implement the "Feasibility Study and Evaluation of the Non-Traditional Occupation (NTO) Demonstrations." This report is the Final Evaluation Report of the NTO Demonstration study. NTOs are occupations where specific populations and subpopulations are traditionally under-represented. DOL defines underrepresented occupations as those in which individuals from one gender constitute less than 25 percent of the individuals employed in such occupations.[12] The overall purpose of the NTO study was threefold: (1) to identify barriers to NTOs and promising strategies for addressing those barriers, (2) design and implement a demonstration of a promising strategy, and (3) evaluate the effectiveness of the strategy implemented under the demonstration. After an initial literature review, DOL and the demonstration's evaluation team agreed to focus the demonstration and its evaluation on the barriers to NTO entry that women face.

Addressing women's barriers to NTO entry is important for two reasons. First, studies have shown that employment in NTOs can lead to higher paying jobs for women, especially for those without a four-year college degree.[13] NTOs, including those with opportunities to acquire skills and knowledge in occupations with sustainable and innovative career pathways, also have the potential to address the gender wage gap.[14,15] Thus, barriers that discourage or prevent women from entering NTOs limit their access to these high-paying jobs. Exhibit 1.1 shows the top 10 fastest growing, high-paying NTOs. All these occupations offer wages far above the 2016 U.S. median annual wage of $37,040, promising high levels of financial security for entrants. In 2016, women represented less than 15 percent of workers among six of those 10 NTOs.

Exhibit 1.1: Top 10 Fast-Growing, Highest-Paying NTOs, 2016–2026

Occupation Title	Percent of Female Workers in Occupation	2016 Employment (in thousands of jobs)	Percent of Predicted Growth in Jobs 2016-2026	2016 Median Annual Wage (in U.S. Dollars)
All occupations[#]	**46.8**	**151,436**	**7.4**	**$37,040**
Architectural and engineering managers	5.3	136	5.5	$134,730
Computer hardware engineers	24.7	69	5.5	$115,080
Aerospace engineers	7.8	130	6.1	$109,650
Computer network architects	9.7	115	6.4	$101,210
Chemical engineers	20.1	79	7.6	$98,340
Engineers, all other	12.2	539	6.2	$97,300
Electrical and electronics engineers	10.8	293	6.5	$96,270

[12] See https://www.dol.gov/wb/stats/nontra_traditional_occupations.htm. Retrieved on 12/29/2016.

[13] Mastracci, S. H. (2003). Employment and training alternatives for non-college women: Do redistributive policies really redistribute? *Policy Studies Journal*, *31*(4), 585-601.

[14] Blau, F.D. and L. M. Kahn. 2017. "The Gender Wage Gap: Extent, Trends, and Explanations" *Journal of Economic Literature* 55(3), 789-865.

[15] Hegewisch, A., M. Bendick, B. Gault, and H. Hartmann, H. (2016). *Pathways to Equity: Narrowing the Wage Gap by Improving Women's Access to Good Middle-Skill Jobs.* Washington, DC: Institute for Women's Policy Research.

Occupation Title	Percent of Female Workers in Occupation	2016 Employment (in thousands of jobs)	Percent of Predicted Growth in Jobs 2016-2026	2016 Median Annual Wage (in U.S. Dollars)
Information security analysts	21.8	89	28.4	$92,600
Construction managers	7.4	812	11.4	$89,300
Transportation, storage, and distribution managers	17.1	299	6.7	$89,190

Source: Bureau of Labor Statistics. Employment Projections.
Includes both NTOs and non-NTOs.

The second reason for concentrating on barriers to NTO entry for women is that the Workforce Innovation and Opportunities Act (WIOA)[16,17] and the Carl D. Perkins Vocational Career and Technical Education Improvement Act of 2006 (Perkins Act) [18] include requirements pertaining to underserved populations and NTOs. WIOA requires that training practitioners and programs ensure equal opportunity and participation for underserved populations, including racial minorities, ethnic minorities, and women. The Perkins Act requires that funding recipients increase student participation and completion in NTO fields of study.

Among the many barriers that women face in entering NTOs, limited awareness of and misperceptions about these occupations prevent them from considering several high-paying jobs in NTOs. Targeted, gender-themed recruitment content has been shown to be effective in encouraging women to consider NTOs.[19,20] But while many studies reported success of gender-themed recruitment content, the studies did not implement rigorous evaluations that were able to validate or quantify the effectiveness of gender-themed interventions.[21] The study reported on here provides the first rigorous evaluation of gender-themed recruitment content and represents an easy-to-implement recruitment approach for NTO training programs. In addition to adding to the limited rigorous research related to workforce related barriers to NTOs, the results advance DOL and training practitioner knowledge of the effectiveness of using a gender-themed, multi-mode outreach approach to encourage women to enter traditionally male occupations and related training programs.

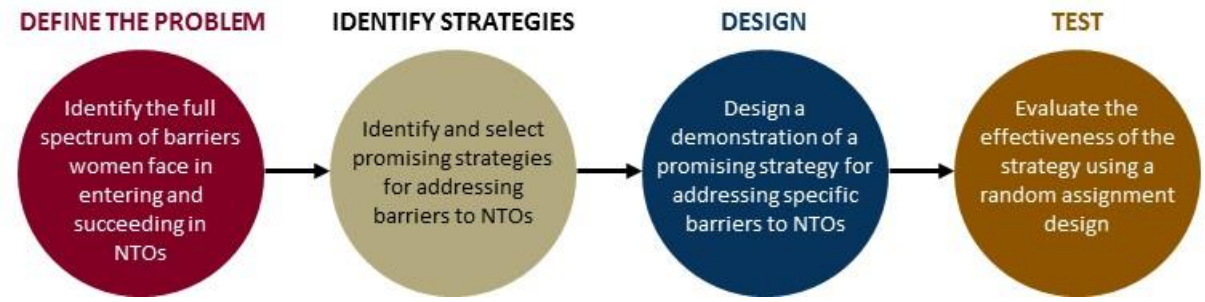
To implement this study, IMPAQ partnered with the Institute for Women's Policy Research (IWPR), the National Alliance for Partnerships in Equity (NAPE), and the communications firm Reingold, Inc., referred to collectively as the evaluation team.

[16] WIOA Job Corps equal opportunity requirements (P.L. 113-128, 128 Stat. 1553, codified as amended at 29 USC § 3208(a))
[17] WIOA YouthBuild equal opportunity requirements (P.L. 113-128, 128 Stat. 1580, codified as amended at 29 USC §3226(c)(3)(B)(viii))
[18] Accountability requirements of Carl D. Perkins Vocational and Technical Education Act (P.L. 109-270)
[19] Milgram, D. (2009). *The CalWomenTech Project: Increasing Recruitment and Retention of Female College Students in Technology Courses.* In WEPAN 2009 Conference. Alameda, CA: Institute for Women in Trades, Technology and Science (IWITTS), pp. 1–5.
[20] Puerto, C., Guggemos, A, Shane, J., (2011). *Exploration of strategies for attracting and retaining female construction management students*. 47th ASC Annual International Conference Proceedings.
[21] Glass, C., & Minnotte, K. L. (2010). Recruiting and hiring women in STEM fields. *Journal of Diversity in Higher Education*, Vol. 3, No. 4, pp. 218–229.

1.1 THE NON-TRADITIONAL OCCUPATION (NTO) STUDY IN BRIEF

To achieve the study's objectives, the research team worked through a strategic implementation process (Exhibit 1.2). The study began with an extensive literature review of barriers to entering NTOs and promising strategies for addressing those barriers. The findings from the literature review, combined with recommendations from DOL and the project's subject matter experts, led to the decision to develop a treatment intervention designed to increase awareness of NTOs among women and to address misperceptions women may have about NTOs. More specifically, to encourage participation in NTO-related training, the intervention incorporated into the outreach content literature-based themes designed to reduce these barriers to NTO participation. In addition, the NTO demonstration used behavioral techniques designed to encourage women to take steps towards entering an NTO training program.

Exhibit 1.2: Study Implementation Process



To implement the demonstration, we engaged two American Apprenticeship Initiative (AAI) grantees—Seattle, Washington (South Seattle Community College) and Albuquerque, New Mexico (Central New Mexico Community College). Both grantees provide entry-level training in industries that are NTOs for women. The South Seattle grantee provides training in advanced manufacturing and construction; the Central New Mexico grantee provides training in information technology (IT).

To evaluate the demonstration, the evaluation team utilized a study sample comprising female jobseekers engaged with the local public workforce system. The team initiated a randomized-control trial (RCT), in which a treatment group received gender-themed recruitment content and a control group received generic-themed recruitment content. A total of 16,401 female jobseekers were randomized in South Seattle and 20,857 in Central New Mexico to either a gender-themed treatment group or generic-themed control group. Content was delivered to individuals assigned to each group through multiple emails and a postcard, all of which directed the jobseeker to a website containing additional recruitment content. Each contact encouraged the jobseeker to take specific steps towards enrolling in an NTO training program. As an example, Exhibit 1.3 presents the content of the messaging contained in the postcard distributed to the gender-themed treatment and generic-themed control groups, respectively, in the Central New Mexico demonstration site. See Appendix A for a selection of gender-themed and generic-themed materials developed for both sites.

Exhibit 1.3: Postcards Used in Central New Mexico Demonstration

Treatment Postcard: Gender-themed

Control Postcard: Generic-themed

The study answers the following research questions:

- Is customized/women-themed recruitment content more effective in encouraging women to take short-term steps toward applying to an NTO training program compared to non-customized/non-themed, generic recruitment content?
- Do the differences in responses to the recruitment messages vary across different subgroups of women (defined by age, ethnicity, education, veteran status, etc.)?

The evaluation was designed to measure and compare the effectiveness of the two sets of recruitment content in encouraging women to take short-term actions towards applying to an NTO training program. The actions or behaviors the multi-mode content nudged female jobseekers to take included: (1) opening the email, (2) clicking on a link to be directed to a recruitment website, (3) completing an interest form, (4) gathering more information on the training program, and (5) applying for the training program. Because women generally face additional barriers to employment in NTOs, a test focusing on targeted recruitment content cannot be tied to completion of longer-term outcomes such as program retention, completion, and employment.

1.2 PURPOSE AND STRUCTURE OF REPORT

The findings presented in this Final Evaluation Report of the NTO Demonstration contribute to the evidence base pertaining to strategies that address barriers to women entering NTOs. Specifically, the report presents findings from a rigorous, random assignment impact evaluation of a multi-mode recruitment demonstration designed to encourage women to consider enrolling in NTO training programs.

Chapter 2 provides important context for the study findings. The chapter first describes the key components and activities associated with the project demonstration overall, and then describes the specific intervention/treatment to be tested through implementation of the

demonstration.[22] Chapter 3 describes the evaluation design—including the research questions, data sources, and methodology. Chapter 4 presents the baseline characteristics of the study participants. Chapter 5 describes the intervention characteristics and program impacts. Finally, Chapter 6 discusses opportunities for future research to build on the findings from the NTO study and further explores the issue of NTOs.

[22] The project's Interim Report provides extensive detail on the intervention and demonstration design process.

CHAPTER 2. THE PROJECT DEMONSTRATION AND INTERVENTION

This chapter provides an overview of the key components and activities associated with the project demonstration. Included are descriptions of the outreach delivery modes, target population, and geographical setting for implementing the demonstration. Chapter 2 also describes the specific treatment tested as a result of implementing the demonstration.

Critical to informing the demonstration design and intervention selection was a thorough literature review of the barriers to NTO entry for women and minorities and strategies designed to address those barriers. While the review's primary purpose was to help select an intervention designed to increase entry into NTOs among women, the review also served to document the existing evidence base as it pertains to strategies/programs that have successfully addressed barriers to NTO entry.

Barriers to NTO Entry. The literature review identified a spectrum of barriers that prevent women from pursuing careers in and entering NTOs, as well as from remaining in such occupations. These barriers fall into two main categories: (1) workplace/career-related barriers, and (2) education barriers. Workplace/career-related barriers refer to the characteristics and perceptions of certain occupations that make women less inclined to enter and remain in those occupations. Education barriers relate to the issues women face in the K-12 and postsecondary education programs that are the basis for entry into NTOs—particularly in science, technology, engineering, and mathematics (STEM) fields. The types of barriers that fall into these two categories, along with examples of studies on each one, are presented in Appendix B.

Strategies. The promising strategies the literature review identified for addressing barriers to NTO entry and retention fall into the same two general categories, as described below. Further information on strategies in these two categories is presented in Appendix B.

Workplace/career-related strategies are typically implemented by career guidance professionals, training providers, and employers. Outcomes typically include increased NTO employment among women and minorities; and increased access to, and retention and advancement in, NTOs. These strategies generally address barriers associated with: (1) bias in career materials, mechanisms, and policy; (2) workplace and training culture that are nonresponsive or hostile to women; (3) individual perceptions and responses to the characteristics of NTOs; and (4) lack of support services. Examples of workplace/career-related strategies include targeted recruitment materials, supportive services, employer policies and training to ensure a less imbalanced work environment, and professional development for career counselors.

Education strategies, in contrast, are typically implemented by education professionals. While highly correlated with addressing barriers associated with NTO entry, outcomes for these strategies typically include increased enrollment, retention, and graduation rates in STEM fields, rather than employment-related outcomes. Typical strategies address barriers related to the delivery of academic material, as well as interventions related to student proficiency, academic interest, and

self-efficacy to pursue STEM-related academic programs. Examples of education strategies include student mentoring programs and professional development for educators.

While both workplace/career-related and education strategies are critical to success in NTO entry and retention, the strategies most relevant to DOL's objectives are primarily from the literature on workplace/career-related strategies. Given the relevance of strategies to DOL's objectives, the NTO demonstration and its evaluation focused on the workplace/career-related approach.

Existing Evidence Base. While informative, the evaluation team's review of the literature revealed that most evaluation research investigating the barriers to NTO entry and retention, as well as strategies designed to address these barriers, was largely qualitative, relying on case-studies, semi-structured interviews, and focus groups. Of the few rigorous quantitative evaluations on the effectiveness of these strategies, most evaluate the effectiveness of education-related strategies, rather than workplace/career-related strategies. Thus, the NTO demonstration and associated evaluation adds to the existing evidence base pertaining to the effectiveness of strategies for addressing barriers to NTO entry and retention through workplace/career-related approaches.

2.1 THE PROJECT DEMONSTRATION

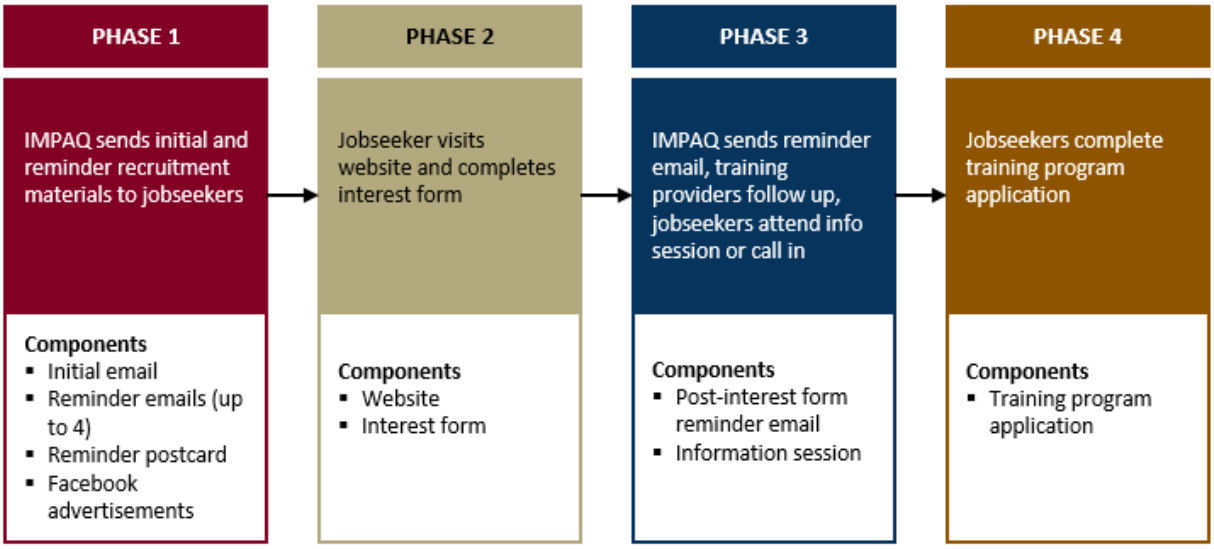
Informed by the literature review and in consultation with subject matter experts and DOL, the evaluation team assessed the feasibility of conducting a demonstration and evaluation of 11 potential workplace/career-related strategies, addressing a range of barriers. The evaluation team sought feedback on which strategies were feasible, which would be most effective, and which were of greatest interest to DOL. The team selected a multipronged outreach approach to create more awareness and reduce misperceptions of NTOs.

2.1.1 Multipronged Outreach

The NTO outreach demonstration had four phases, as shown in Exhibit 2.1. This section describes the demonstration components and activities associated with each phase. The section also outlines the outreach modes used, as well as the actions taken by the evaluation team, training providers, and jobseekers.

As discussed in more detail below, the demonstration was implemented at each participating site in very similar ways, though certain design differences were incorporated to ensure customization to the specific characteristics of the site. In each site, content was differentiated: the treatment group received information highlighting themes directed specifically at women (gender-themed content) and the control group received information with generic content. Differences in the content developed for the treatment versus control group at each phase of the demonstration are described in detail in section 2.2.

Exhibit 2.1: Multi-pronged Outreach Demonstration Phases



Phase 1: **The evaluation team sent the initial recruitment email and up to four reminder emails,[23] Facebook advertisements and a final follow-up postcard (each in two versions, depending on the jobseeker's treatment/control status) to the jobseekers in the study sample**:

- **Initial Email**. The initial email provided information on NTO industries and their benefits, as well as the specific grant training programs available at the site. This email also encouraged recipients to visit the appropriately linked demonstration website that provided more information.
- **Follow-up/Reminder Emails.** The evaluation team sent up to four follow-up/reminder emails to recipients.[24] These emails provided information similar to that in the initial email using new content. All emails were sent using a domain created under the training provider's names (nto@southseattle.edu and nto@cnm.edu).
- **Follow-up/Reminder Postcard.** For the last step in phase 1, the evaluation team sent a postcard reminder. The two versions of this postcard repeated the information provided in the emails and provided the link to the appropriate demonstration website.[25] This step aimed to reach individuals who did not regularly check or use the email account we had for them, by providing them with the same information through a different outreach mode. Appendix A provides emails, reminder emails and postcards sent for both sites.
- **Facebook Advertisements.** The evaluation team used Facebook advertisements to help drive the jobseekers to the program websites and increase the number of individuals completing the interest form. The team could not implement the ads in the Central New Mexico site, however, since using Facebook ads targeted to the women jobseekers in the

[23] Subject lines for the initial email and all follow-up/reminder emails for both sites are presented in Exhibit A.1 in Appendix A.

[24] Individuals in South Seattle's sample received six reminder emails and individuals in Central New Mexico's sample received five reminder emails. This difference is due to New Mexico SWA's budgeting and administrative constraints.

[25] Only non-respondents in South Seattle's sample received a postcard, but all individuals in Central New Mexico's sample received a postcard. This difference is due to New Mexico SWA's administrative procedures in Albuquerque.

demonstration sample required the evaluation team to have direct access to sample members' email addresses, which we had only for South Seattle.

Phase 2: **The jobseeker visited the appropriate (treatment or control) website and completed an interest form.** As noted above, the Phase 1 outreach directed recipients to the appropriate demonstration website given their treatment/control status. The website included more detail on NTO industries, jobs available, and the benefits of those jobs, including pay. The website also provided details about available training programs, including start dates and program services. Both websites also directed visitors to complete the interest form, which was the same on both websites.[26]

Phase 3: **The evaluation team sent post–interest form reminder emails to individuals who completed the interest form, training providers followed up with individuals who completed the interest form, and jobseekers gathered more information about the program.** In this phase, emails were sent to individuals who completed the interest form, reminding them to attend the training program information sessions and to take other necessary steps toward applying to the program. Training providers were notified when a jobseeker completed an interest form related to the respective provider's program. Training providers then followed up with individuals who expressed interest via phone or email, provided those individuals with more in-depth program information, outlined the application steps required, and informed the interested individuals when and where information sessions on the training programs were held. Final email reminders were also sent prior to the enrollment deadline, encouraging recipients to complete the interest form and/or attend an information session.[27]

Each training provider held in-person information sessions prior to beginning the training program, which both treatment and control group members attended. During these sessions, training provider staff talked to attendees about what the training entailed, program requirements, and the application process.

Phase 4: **Jobseekers completed the program application.** Each demonstration phase encouraged individuals to take specific actions leading to completing an application to a training program. These actions equated to the outcomes associated with each phase of the demonstration, as detailed in the next section. After completing an application to one or more of the training programs, individuals were able to enroll in the program.

2.1.2 Target Population—Low-to-Medium Skilled Women

The literature review discussed barriers to NTO entry and strategies to encourage a wide variety of populations to enter NTOs—including women, men, African Americans, Hispanics, individuals with disabilities, veterans, and lesbian, gay, bisexual, transgender (LGBT) individuals. In

[26] Individuals in South Seattle could also select among the three programs they wanted to learn more about; Central New Mexico offered only one training program.

[27] In South Seattle, two different reminders were sent: one version to sample individuals who had already completed the interest form, the other to those who did not complete it. In Central New Mexico, the same final reminder email was sent to all sample individuals.

collaboration with DOL, the evaluation team determined that the outreach associated with the NTO demonstration should target women. Four major factors contributed to this decision:

- The literature review showed that women faced overwhelming barriers to entry into and retention in NTOs.
- Most articles on NTOs that the evaluation team reviewed pertained to women, providing the most evidence in support of strategies for increasing NTO participation among women.
- Increasing participation in NTOs among women is of great interest to DOL, because these occupations often pay higher wages and offer more benefits than do more traditional occupations for women.
- Increasing the representation of women in occupations within high-demand, high-growth industries can further help bridge the gender pay gap.

The evaluation team then made the decision to specifically target low-to-medium skilled women, because, among women, they: (1) have the greatest need for improved workplace skills, and (2) are the most appropriate fit for an entry-level training program.

2.1.3 Sites—American Apprenticeship Initiative (AAI) Grantees

The site setting is the organizational, demographic, and geographic backdrop that supports where a demonstration is implemented. Seven criteria proved critical in evaluating the suitability of potential site settings of the NTO Demonstration:

- **Target Industry.** Involvement of potential implementing partner organizations in training programs that lead to NTO employment for women.
- **Timeline.** Overlap between the timelines for the training programs and the study period.
- **Target Population.** Implementing partner organization interest in and plans to target low-to-medium skilled women for their training programs.
- **Training Provider Capacity.** Capacity of training programs to receive new enrollees.
- **Data Availability.** Ability of partners to share jobseeker contact and demographic data, as well as information at the individual level on study outcomes.
- **Data Systems**. Existence of adequate data collection systems to collect the necessary data for the evaluation.
- **Buy-in.** Implementing partner's organizational buy-in and willingness to participate in the study.

The setting that emerged as most suitable for implementation of the NTO demonstration and evaluation was the AAI grantee setting. See box below for how this setting scored on the above criteria.

- Almost all AAI grantees include training programs that lead women into NTOs.
- AAI grantees are required to serve 300 to 1,000 apprentices over their five-year grants. To meet these goals, many AAI grantees needed to expand their program's capacity to serve additional apprentices, irrespective of Demonstration and evaluation needs-giving the grantees adequate capacity to accommodate any additional enrollment from the Demonstration's recruitment efforts.
- Several AAI grantees have minority recruitment goals that include recruiting women into their training programs.
- The AAI grantees' recruitment timeline coincided with the timeframe of the study intervention.
- The AAI grant performance reporting requirements already required grantees to develop the types of data collection systems the NTO Demonstration's evaluation required.

Exhibits 2.2 and 2.3 present program summaries for both AAI grant programs, detailing how well they met the site selection criteria. Appendix C presents a detailed summary of AAI grant programs.

Exhibit 2.2: South Seattle Program Summary

Site Selection Criteria	South Seattle Characteristics
Target Industry	South Seattle provides training in advanced manufacturing and construction, both NTOs for women.
Target Population	South Seattle planned to recruit and serve at least 300 women and other minority populations for its training programs.
Training Providers	South Seattle training providers were offering pre-apprenticeship programs and other entry-level training and education opportunities appropriate for low- to-medium skilled participants. Three of the training providers were selected for the demonstration and its evaluation: Apprenticeship & Nontraditional Employment for Women (ANEW), Aerospace Joint Apprenticeship Committee (AJAC), and Clover Park Technical College (CPTC).
Sample Size	The South Seattle program is being implemented in the Seattle metropolitan area, which provided a large sample of women for the evaluation.
Data Availability	Washington Department of Employment Security, the Washington State Workforce Agency (SWA), entered into a data sharing agreement with the evaluation team under which they provided the required jobseeker contact and demographic data.
Grantee and Partner Buy-in	The grant lead and training provider partners committed to support the study activities.

Exhibit 2.3: Central New Mexico Program Summary

Site Selection Criteria	Central New Mexico Characteristics
Target Industry	Central New Mexico provides training in Information Technology, an NTO field for women.
Target Population	Central New Mexico planned to recruit 65 percent of program participants from under-represented populations, including women.
Training Providers	Central New Mexico was offering entry-level training and apprenticeship opportunities appropriate for low-to-medium skilled participants.
Sample Size	Central New Mexico is being implemented in the Albuquerque metropolitan area, which provided a large sample of women for the evaluation.

Site Selection Criteria	Central New Mexico Characteristics
Data Availability	The New Mexico Department of Workforce Solutions (DWS) signed a contract with the evaluation team. While they did not share personally identifying information (PII), including contact information needed to reach a sample of women, DWS conducted the demonstration outreach and provided de-identified data on initial demonstration outcomes.
Grantee and Partner Buy-in	The grantee was committed to supporting the study activities.

2.2 THE TREATMENT INTERVENTION

As mentioned above, for each demonstration site, the evaluation team developed both gender-themed treatment and generic-themed control recruitment content for each outreach mode (i.e., email, website, and postcard). As shown in Exhibit 2.4, the team developed content for seven emails (initial, reminder, and follow-up) in South Seattle and six emails in New Mexico.[28] In addition, for each demonstration site, the team developed content for each of the two websites—gender-themed treatment and generic-themed control. The content included information for each website's home, industries/industry, Find a Program/About Program, and a Frequently Asked Questions (FAQs) page. The gender-themed treatment group websites included an additional page titled "Her Story," which provided testimonials from women who work in NTOs. All content was provided in both English and Spanish.

Exhibit 2.4: Types of Outreach Content Developed by Mode and Demonstration Site

Site	Number of Emails	Number of Postcards	Number of Websites
South Seattle			
Gender-themed	7	1	1 (English & Spanish), 5 pages
Generic-themed	7	1	1 (English & Spanish), 4 pages
Central New Mexico			
Gender-themed	6	1	1 (English & Spanish), 5 pages
Generic-themed	6	1	1 (English & Spanish), 4 pages
Total	**26**	**4**	**4**

2.2.1 Gender-themed Treatment vs. Generic-themed Control Content

The "treatment" materials associated with the NTO demonstration were differentiated from "non-treatment" or control materials through the material's content. The evaluation team developed the content for the generic, control versions to reflect the "typical" outreach materials used to recruit participants for workforce training programs operated through community/technical colleges. Generally, these generic materials were designed to encourage participation and provide pertinent logistical information, but not to include themes identified to reduce barriers to female participation. The treatment versions of content were differentiated from the control versions in the following ways:

Use of themes designed to reduce barriers to participation. The evaluation team developed and included themes that address barriers associated with lack of awareness and misperception of

[28] The site difference in number of emails was due to New Mexico SWA's budgeting and administrative constraints.

NTOs.[29] The following five recruitment themes were incorporated into the gender-themed treatment content:

- Higher wages in NTOs
- Taking pride in the work product
- Women in NTOs as role models
- Work-life balance
- Countering NTO misperceptions (e.g., work in NTOs is not for women, one has to be physically strong to work in construction, etc.)

Use of female images. Whereas the vast majority of the photos included in the control content were of men, the treatment content included primarily photos of women. In a few cases, the treatment content included images with men in the background.

Use of testimonials. IMPAQ conducted phone interviews with women working in or training for work in NTOs to gather testimonials and quotes on their experiences. The testimonials and quotes highlight NTO themes that appeal particularly to women—such as higher wages in NTOs, taking pride in the work product, and countering misperceptions about NTOs (see Exhibit 2.5 for examples).

Exhibit 2.5: Example Testimonials by Women-Recruitment Theme

Women-Recruitment Theme	Example Testimonials
Higher Wages in NTOs	▪ "There's security in knowing that — no matter what happens — you have benefits, you have insurance. I'm able to take care of my family without worry." ▪ "Before this, I worked at a blood bank. There was no upward mobility. I was making on average about $30,000 a year. As an electronics technician, I can make up to $53,000."
Taking Pride in the Work Product	▪ "Being in [IT] support, you are supporting the people that need you most — and that is everyone! On a day-to-day basis, we are helping hundreds and hundreds of people." ▪ There's joy and pride in creating something that people have to use every day. I finished working on the 520 Bridge in Seattle that people are going to be driving over. I can take my daughters and show them and say 'your mom helped build that'."
Women in NTOs as Role Models	▪ "I have had a lot of female role models [in this field]." ▪ "Things have changed, there are a lot more women in this field than there used to be."
Work-life Balance	▪ "A lot of IT support work can be done from home. That actually might work better if you can't get a babysitter when your kid is home sick." ▪ "Work-life balance is really important in this industry. I have bosses who value that in their life and mine. Lots of people have families, and we get to work from home two days a week."
Countering NTO Misperceptions	▪ "You don't have to be physically strong to be in construction. Not everything is heavy lifting. In fact, most companies don't want you lifting over 40 to 50 pounds." ▪ "Coding is really creating. You're creating things, and that's really fun!"

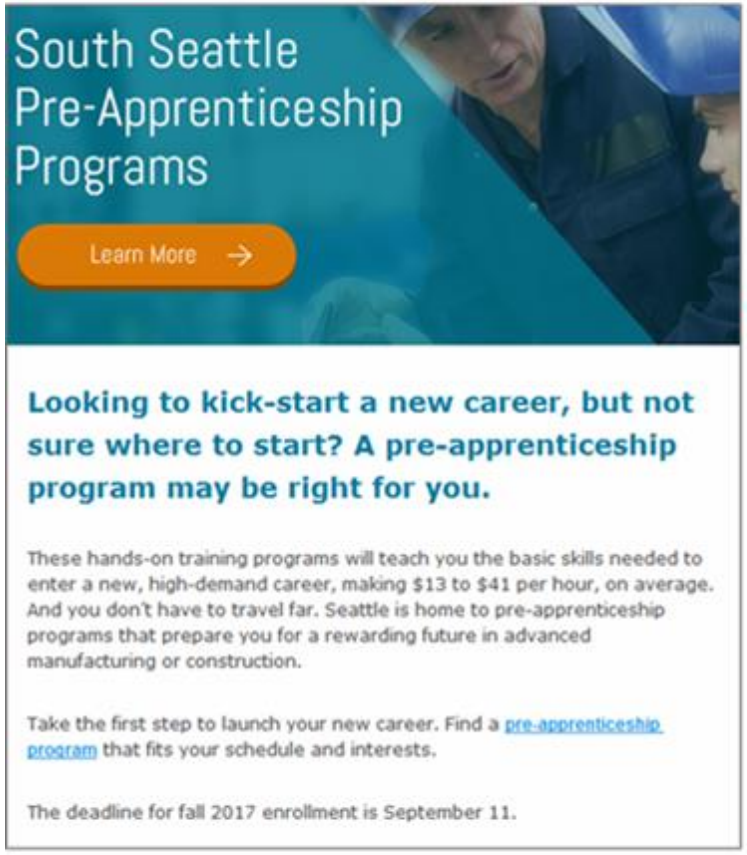
[29] The evaluation team worked with DOL, the Technical Working Group (TWG), and the study partners (NAPE and IWPR) to develop recruitment themes. The themes are based on this group's collective knowledge and subject matter expertise regarding recruitment messages that resonate with women and address their concerns about NTOs.

Notes: With the grantees' help, the evaluation team conducted phone interviews to obtain testimonials from up to nine women who either worked in one of the target industries or were enrolled in/had completed the training programs in Central New Mexico and South Seattle.

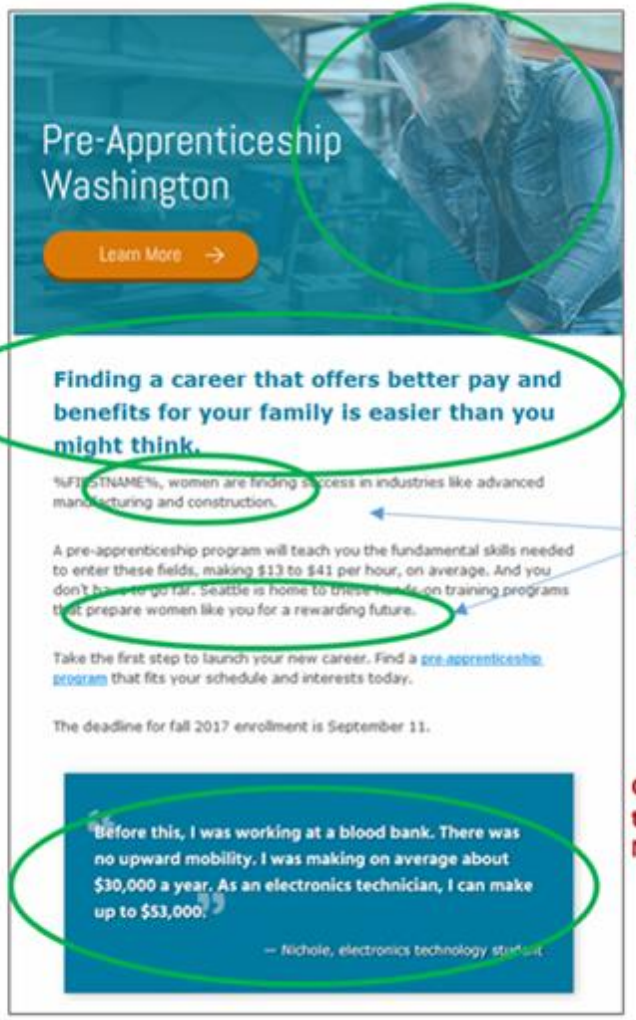
The evaluation's generic-themed control content was designed to be as similar as possible to the treatment content—except that it was not targeted towards recruiting women, and thus did not include the content that aligned with the specific NTO recruitment themes. Exhibit 2.6 presents examples of how the evaluation team contrasted the gender-themed treatment and generic control group materials. For example, the highlighted selections of the gender-themed treatment email include an image of a woman working in an NTO and show how NTO themes were incorporated into the content. See Appendix A for a selection of gender-themed treatment and generic-themed control materials for both sites.

Exhibit 2.6: Customization of Gender-themed Treatment Group Materials

Generic Control Email



Gender-Themed Treatment Email



Images of women

Use of NTO theme – Supporting your family

Use of NTO theme – Other women are doing it

Quotes from women in the industry, Use of NTO theme - Wages

2.2.2 Other Content

Common to both treatment and control groups, the evaluation team also developed recruitment content that contained information on the training program industries and incorporated behavioral techniques to obtain a higher response rate. This content is described below:

Industry. The evaluation team customized all content to align with the industries specific to each demonstration site (IT for Central New Mexico and advanced manufacturing and construction for South Seattle). The recruitment materials provided detailed information on the industries, including job type available and entry-level wages. The evaluation team also included personal testimonials from individuals currently working in the industries and descriptions of each training program, as well as dates and locations of the training sessions. Finally, the team highlighted any specific program benefits (such as free tuition and available support services).

Behavioral Techniques. The evaluation team incorporated a set of behavioral techniques (nudges) designed to encourage completion of short-term outcomes (such as completing an interest form). The evaluation team chose the following applicable and evidence-based behavioral techniques from the existing literature:[30,31,32]

- **Implementation Prompts** – Prompts that assist people in planning next steps or forming intentions. The evaluation team incorporated these into the recruitment materials using checklists that outlined the steps for getting more information and applying to the program.
- **Deadlines** – Deadlines to encourage action. The evaluation team included in all the materials deadlines for applying to the programs.
- **Personalization** – Communications that incorporate recipient-specific information. The evaluation team incorporated the recipient's name into all email communication.
- **Benefit Highlights** – Content that frames a next step as a way to gain a benefit. In many cases, the evaluation team noted that if recipients applied to the program they could receive specific benefits (including funding for the training or support services).
- **Urgency** – Language that creates a sense of urgency for taking the next steps. The evaluation team used language such as "last chance," for example, to create a sense of urgency to take the next step towards applying to the program.
- **Loss Aversion** – Content that frames a next step as a way to avoid a loss. The evaluation team used language such as "don't miss out," for example, to encourage recipients to take the next step towards applying to the program.

[30] Chojnacki, G., Amin, S., Perez-Johnson, I., Darling, M., Moorthy, A., Lefkowitz, J. *Single Email Prompts Individuals to Increase Retirement Savings.* Washington, DC: DOL Behavioral Interventions Project Brief.

[31] OPRE Report 2016-02. *Framing the Message: Using Behavioral Economics to Engage TANF Recipients.* Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

[32] OPRE Report 2015-75. *The Power of Prompts: Using Behavioral Insights to Encourage People to Participate*. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

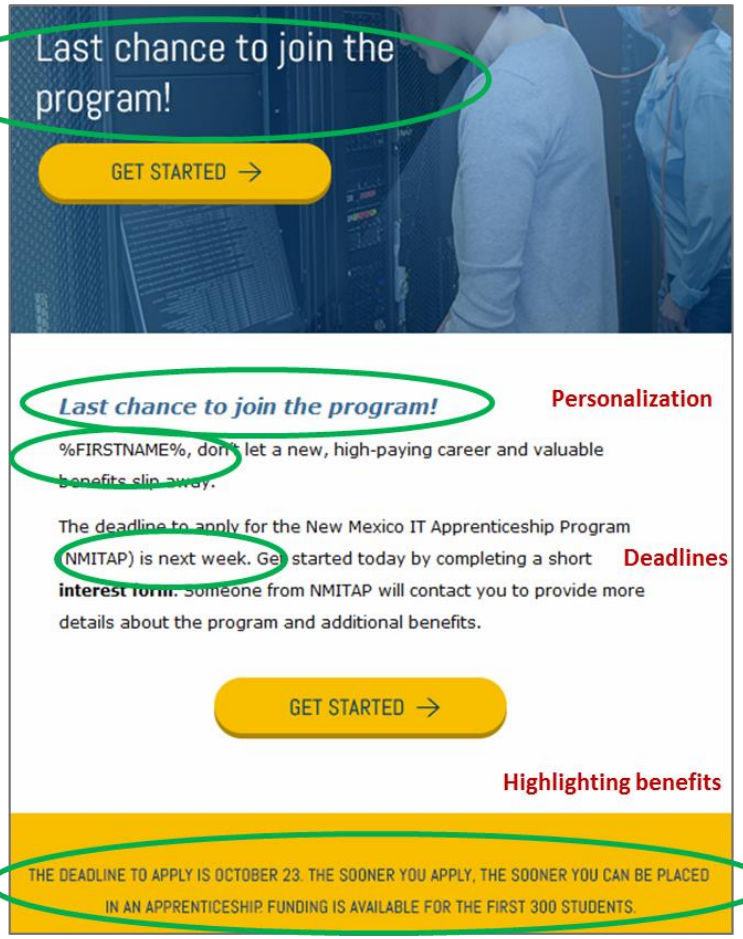
Exhibit 2.7 presents examples of how these behavioral techniques were incorporated into different components of the recruitment content. Although the exhibit highlights these behavioral techniques as used in the treatment content, the same general techniques (though not with the same specific content) were also incorporated into the control content. See Appendix A for gender-themed treatment and generic-themed control materials for both sites.

Exhibit 2.7: Behavioral Techniques in Recruitment Content

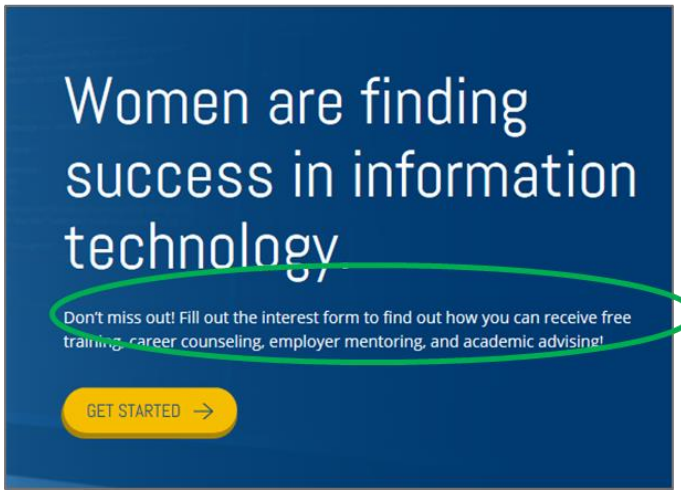
Postcard:

Implementation Prompts

Email:



Website:



Highlighting benefits

2.3 PROGRAM AND DEMONSTRATION COMPARISON

Exhibit 2.8 presents a comparison of the training programs and demonstration across the two sites. This comparison points to important differences that may have influenced how women responded to the recruitment materials. For example, women may have been more interested in the apprenticeship program offered in Central New Mexico that included paid on-the-job training compared to the pre-apprenticeship programs offered in South Seattle that did not include paid work-experience. Additionally, a training program in advanced manufacturing or construction, industries that require more physical work, may have been viewed differently by women compared to a training program in IT, an industry that generally does not require physical work.

Exhibit 2.8: Site Program and Demonstration Comparison

Characteristic/Component	South Seattle Site	Central New Mexico Site
Program		
Grant Program Value	$5 Million	$2.9 Million
Grant Training Goal	1000 Individuals	300 Individuals
Number of Training Providers	3	1
New or Existing Training Program(s)	Existing	New
Women-Oriented Program	1 training provider program is women-oriented program	Not a women-oriented program
Industry	Advanced Manufacturing, Construction	Information Technology
Training Program Model	Pre-Apprenticeship	Apprenticeship with paid on-the-job training
Program Benefits	Tuition-free training, linkages with support services including childcare, unemployment insurance, and transportation assistance	Tuition-free training, career coaching, academic advising, and employer mentoring
Location	Seattle, WA Metropolitan Area	Albuquerque, NM Metropolitan Area
Demonstration		
Demonstration Modes	Email, Postcard, Website, and Facebook Advertisements	Email, Postcard, and Website
Number of Emails Sent	7	6

Notes: The South Seattle grantee is working with a number of training providers to implement the AAI grant. The grant funding and training goal is not limited to the three training providers involved with this demonstration.

CHAPTER 3. EVALUATION DESIGN

This chapter describes the general evaluation design for the NTO demonstration study. The demonstration treatment was designed to create greater awareness of NTO occupations among women, correct women's misperceptions about NTOs, and encourage women to consider NTO careers. As described in Chapter 2, the demonstration developed and distributed two distinct sets of recruitment content for each of the outreach modes (emails, a postcard, and a website) depending on treatment/control status. After these initial outreach efforts, however, both gender-themed treatment and generic-themed control group members completed an identical form noting their interest in training for NTO careers and received the same training provider follow-up.

The evaluation design is a random control trial (RCT), in which a sample of women was randomly assigned to either the gender-themed treatment group (who received materials specifically designed to encourage women to enter and remain in NTO careers), or the generic-themed control group (who received a generic set of materials that do not target women particularly or mention characteristics that might make NTOs particularly attractive to women).

3.1 RESEARCH QUESTIONS

The NTO study addressed two research questions:

1. Is gender-themed recruitment content more effective in encouraging women to take short-term steps towards applying to an NTO training program compared to generic recruitment content?
2. Do responses to these messages vary across different subgroups of women (defined by age, ethnicity, education, veteran status, etc.)?

The results provide the first rigorous evidence on the value of using gender-themed recruitment content to encourage women to seek training in NTOs. Study findings inform future efforts to recruit women into NTOs and help workforce and training provider practitioners seeking to meet the mandatory equal opportunity federal requirements described in Chapter 1 (Public Law 109-270 and 113-128).

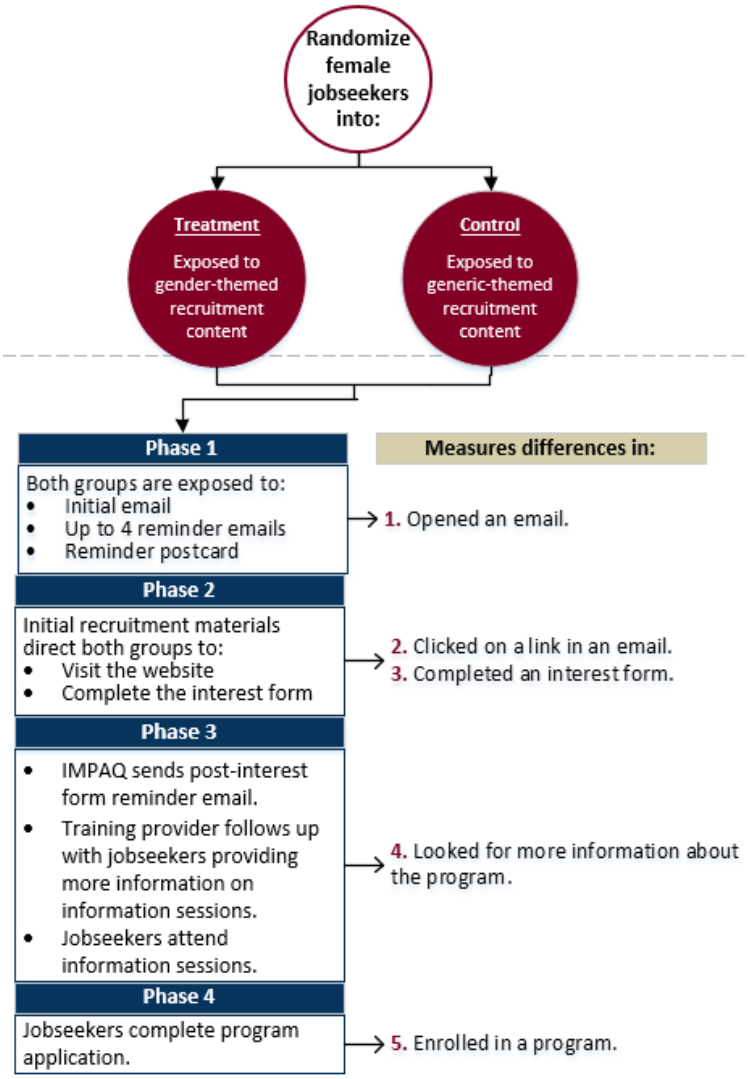
3.2 RANDOM ASSIGNMENT

Random assignment was selected as the evaluation methodology because it ensures that no systematic differences exist between the treatment and control groups. Any treatment-control differences in outcomes can be attributed to the intervention itself with a known degree of statistical confidence.

Individuals were randomly assigned to either the gender-themed treatment group or the generic-themed control group through a batch randomization process that gave each individual a 50 percent chance of being assigned to the treatment or control group. Since the demonstration was implemented in two cohorts (cohort 1, program enrollment in Fall 2017; and cohort 2, program enrollment in Spring 2018), the randomization was also conducted in two cohorts, once before each demonstration wave. Over the course of the demonstration (June 2017 to March

2018), the evaluation team randomly assigned about 20,000 jobseekers from Central New Mexico and 16,000 from South Seattle.

Exhibit 3.1: Evaluation Design Summary



The overall summary of the evaluation design in Exhibit 3.1 includes the anticipated outcomes for each phase. As shown, the first step is randomizing selected females registered with the state workforce system (demonstration sample) into either the gender-themed treatment or the generic-themed control group. Randomization ensured that any differences in observed outcomes are attributable solely to the recruitment strategies that constitute the treatment. Each group was either further exposed to the gender-themed treatment or the generic-themed control recruitment content associated with each of the four demonstration phases.

The demonstration's evaluation analysis compares the differences between the two groups on short-term behavioral outcomes—numbers (1), (2), and (3) in Exhibit 3.1 (opening an email, which included all email waves together and did not track the postcard; clicking on the link in any of the emails; and completing an interest form). Two longer-term outcomes are also explored—numbers (4) and (5), which refer to gathering more information on the training program and applying for the training program, respectively.

MAINTAINING INTEGRITY OF RANDOM ASSIGNMENT

- One of the most critical aspects of implementing the NTO demonstration is maintaining the integrity of random assignment (ensuring the treatment and control groups do not receive the other group's intervention). Should such integrity be compromised, the outcomes measured in the evaluation can no longer be attributed solely to the treatment intervention.
- The evaluation team took three major steps to ensure the treatment group received only the gender-themed treatment recruitment content and the control group only the generic-themed control recruitment content:
    - Mass modes of recruitment (such as posters) were excluded because they could not be controlled as a treatment component.
    - Treatment emails were linked only to the treatment website, and control emails only to the control website.
    - The websites were not accessible by search engines, to prevent treatment and control group members from ending up on the other group's website accidentally through search engine results.
- The evaluation team also performed three checks during implementation, to ensure no crossover between the treatment and control groups:
    - Conducted thorough quality assurance checks of demonstration procedures to ensure all recruitment emails were consistently delivered to the correct group.
    - Monitored interest form completers on a weekly basis to ensure their completed forms are on the appropriate website and correspond to their originally assigned treatment/control group status.
    - Monitored outcome completion rates throughout, investigating any anomalies to ensure crossover is not the cause.
- The evaluation team did not detect any signs of systematic crossover. A total of 13 jobseekers had duplicated records in Central New Mexico: five of these women had a record in each group (treatment and control), and thus all ten records were deleted; eight of these women had two records in the same group, and thus one record was deleted at random. Only one jobseeker had a duplicated record in South Seattle - one in each group - and thus both records were deleted.

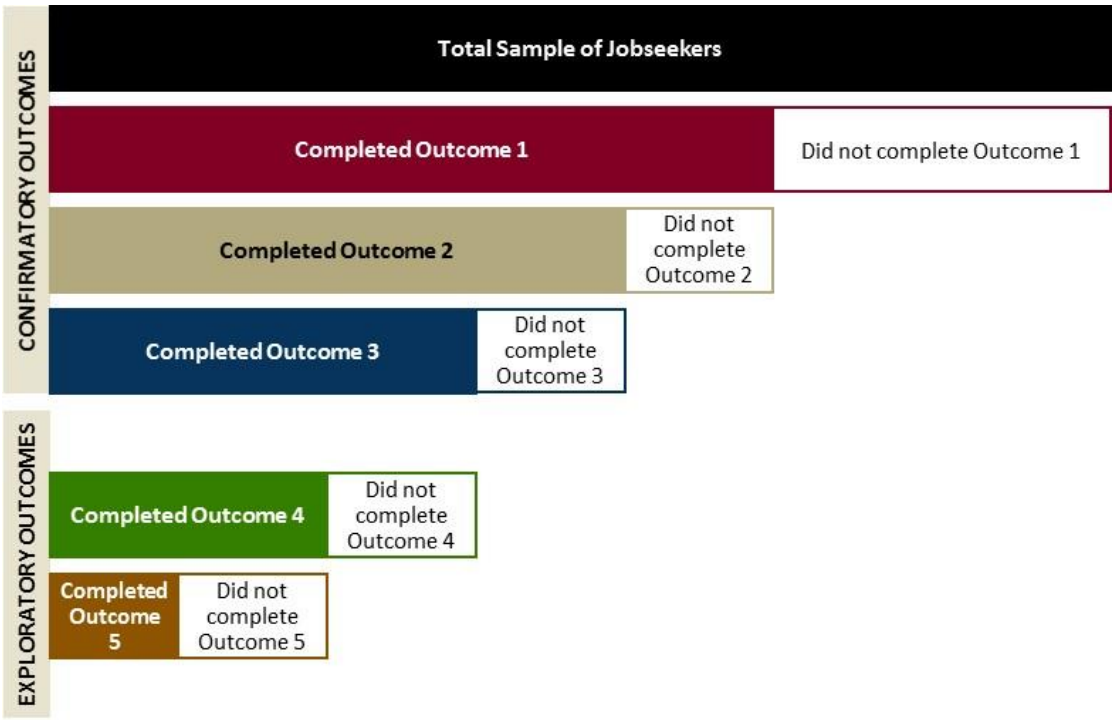
3.3 EVALUATION OUTCOMES

The evaluation measured the effectiveness of the intervention based on the degree to which it achieves specific outcomes, which are categorized as either confirmatory or exploratory (see Exhibit 3.2). Confirmatory outcomes are those for which causal impacts of the intervention can be estimated. Exploratory outcomes are those that are less likely to be able to attribute to the intervention itself: the fact that they are further removed from the delivery/receipt of the intervention makes it harder in principle to separate their impact from the impact of non-

intervention factors, a constraint that is exacerbated by the limited sample size of the evaluation, given that expected low response rates diminished the sample size at each of the first three confirmatory stages.

Exhibit 3.2 also visually demonstrates the sample attrition at each outcome resulting in a very small sample for some of the later outcomes. Confirmatory outcomes — (1) Opening an Email, (2) Clicking on Link, and (3) Completing an Interest Form—are those for which we can estimate the impact of the intervention with known statistical confidence, given sample size, available data, and study constraints. Exploratory outcomes — (4) gathering more information on the training program and (5) applying for the training program — are those for which we can look for suggestive relationships in the data, but no conclusions can be drawn on the intervention's impact.

Exhibit 3.2: Evaluation Outcomes



Outcomes (4) and (5) are considered exploratory for three reasons:

- First, a behavioral intervention focusing on immediate, short-term actions can seldom be linked to longer-term outcomes. In the case of the NTO demonstration, an intervention that is restricted only to *recruitment* may not directly impact longer-term outcomes—such as attending an information session, contacting the training provider, and most importantly, completing an application for a program.
- Since these outcomes are further removed from the intervention itself and held at the training provider site, they are more likely than earlier outcomes to be impacted by non-intervention influences (such as availability of supportive services like transportation and

childcare; timing of training; interactions with training program staff, or with family and friends) that might also affect an application decision.

- Third, outcomes (4) and (5) are also deemed exploratory due to sample size constraints. Differences between the treatment and control groups for outcomes can only be detected if there is sufficient statistical power. However, as the diminishing size of the colored bars depicting the sequence of outcomes in Exhibit 3.2 indicates,[33] the number of jobseekers expected to complete these outcomes progressively shrinks, leading to lower statistical precision of the outcome estimates.

3.4 DATA SOURCES AND COLLECTION

The study required data for multiple purposes. Jobseeker contact information was needed for implementing the intervention (sending emails and postcards); baseline and outcomes data were needed for evaluation purposes. Accordingly, the evaluation team collected two main types of data on the study sample:

- State workforce participant data
- Outcomes data

SAMPLE SELECTION CRITERIA

The demonstration sample consisted of:

- All female jobseekers who either: (1) registered in the workforce system in the previous 14 months for South Seattle or (2) logged into the workforce systems account in the previous 18 months for New Mexico.
- Jobseekers were de-duplicated in the dataset using SSNs, leaving only one record of each woman (the earliest record in case of multiple records).
- Those jobseekers who had received the intervention in Cohort 1 were removed from the Cohort 2 sample.
- Individuals with no email address listed were removed from the sample.
- All remaining email addresses were run through a third-party validation service to remove individuals with invalid email address.

Random assignment was conducted after the sample for each cohort was determined.

State Workforce Participant Data. The demonstration and its evaluation relied on jobseeker contact and demographic information on women for several purposes: (1) to select a study sample of participants for the demonstration (the demonstration sample), (2) to extract baseline data for the demonstration sample, and (3) to compile contact information, such as emails and home addresses, for distributing the recruitment content to the demonstration sample. The evaluation team worked with the South Seattle and Central New Mexico State Workforce Agencies (SWAs) to access jobseeker contact information for all women who received workforce system services within the local area.[34]

[33] This exhibit demonstrates that sample attrition occurs at each outcome. It does not reflect the proportion of individuals that complete/do not complete each outcome.

[34] New Mexico Department of Workforce Solutions, Albuquerque for Central New Mexico; Employment Security Department, Seattle and the surrounding areas for South Seattle.

The evaluation team worked closely with state workforce agencies[35] in both South Seattle and Central New Mexico to identify data for the demonstration sample. These data, which were selected from state workforce records just before the demonstration start date, include all female jobseekers who accessed local workforce system services prior to the beginning of the demonstration. To maximize the statistical power of the demonstration, all females with a valid email address who received workforce system services within a specific timeframe prior to the start of the demonstration were included in the study and randomly assigned to either the gender-themed treatment group or generic-themed control group (together, the demonstration sample).[36] The South Seattle demonstration sample included women who received workforce services 14 months prior to the start of the demonstration; the Central New Mexico sample included women who received services 18 months prior. Exhibit 3.3 summarizes the sample size and dates of eligible sample selection for each demonstration cohort and for the demonstration as a whole.

Exhibit 3.3: Sample Selection Timeline and Sample Size

Activity/Criteria	South Seattle Site	Central New Mexico Site
Cohort 1		
Demonstration Date Period	07/31/2017 to 09/11/2017	09/18/2017 to 10/23/2017
Total sample randomized	**10,352 jobseekers** (5,199 in the treatment group, 5,153 in the control group)	**18,178 jobseekers** (9,090 in the treatment group, 9,088 in the control group)
Cohort 2		
Demonstration Date Period	02/05/2018 to 03/19/2018	01/16/2018 to 02/20/2018
Total sample randomized	**6,049 jobseekers** (3,025 in the treatment group, 3,024 in the control group)	**2,679 jobseekers** (1,340 in the treatment group, 1,339 in the control group)
Overall Sample (Cohorts 1 and 2)		
Eligible Sample[37]	All women who *registered* for a workforce systems account any time between the demonstration start date and 14 months prior to that date.	All women that *logged into* their workforce systems account at least once any time between the demonstration start date and 18 months prior to that date.
TOTAL SAMPLE RANDOMIZED	**16,401 jobseekers** (8,224 in the treatment group, 8,177 in the control group)	**20,857 jobseekers** (10,430 in the treatment group, 10,427 in the control group)

[35] For South Seattle, as noted, the IMPAQ team developed a data sharing agreement with the ESD to provide workforce data with personally identifiable and contact information that enables us to implement the demonstration directly (i.e., distribute the recruitment emails and postcards). However, for Central New Mexico, IMPAQ's agreement with NMDWS specified providing us with de-identified data only. Thus, NMDWS conducted the demonstration on our behalf and with our support.

[36] Eligibility criteria for South Seattle's sample differed from New Mexico's in two ways: (1) in Seattle, individuals were selected based on their registration data rather than their last login date, due to data availability; and (2) in Seattle, individuals were selected from the past 14 months rather than 18 months, due to unavailability of data earlier than 14 months prior to the demonstration due to recent data migration.

[37] A total of 700 jobseekers in South Seattle and 67 in Central New Mexico were included in Cohort 2 sample in spite of being eligible for Cohort 1 sample, due to a time lag between registration/login and the date the information was added to the workforce system dataset.

Notes: In South Seattle, due to data availability, individuals were selected based on their registration date rather than their last login date, and from the past 14 rather than 18 months. The first difference is due to difference in data availability, because Seattle did not have last login date available in their data. The second difference is due to unavailability of jobseeker data earlier than 14 months prior to the demonstration. Due to a recent data migration, ESD was not able to extract any contact information data earlier than May 2016.

Outcomes Data. As discussed in section 3.3, the outcome information needed for the evaluation consisted of confirmatory and exploratory outcomes. For both sites, the three confirmatory outcomes were tracked using data available from email distribution software, Active Campaign, and built-in website analytic tools, which tracked whether each email was opened. In addition, each email had the appropriate unique link to either the gender-themed treatment or generic-themed control website, which allowed the website's analytic tools to track who visited the website. Data on outcomes (1) and (2) were collected differently across the two sites. For South Seattle, the evaluation team tracked these outcomes directly. For Central New Mexico, the SWA collected the data on outcomes (1) and (2) as part of conducting the demonstration outreach, and then transferred the data to the evaluation team. For outcome (3), the evaluation team tracked the relevant data for both sites without site involvement.[38] Since the form and form submission button on each website were linked to an email automation platform named Active Campaign, every time a jobseeker submitted an interest form, the data they entered in the form would be passed into the corresponding contact fields in Active Campaign.

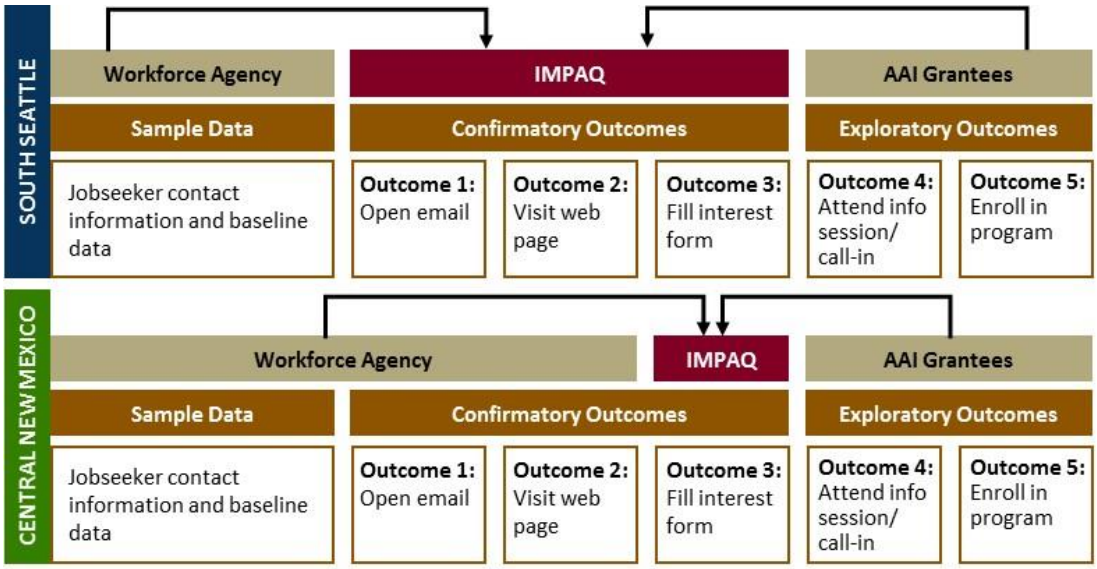
Date for exploratory outcomes (4) and (5) were collected by training providers, since interested jobseekers reached out directly to them expressing interest in the program and/or to complete the application. Both grantee sites collected these data as part of implementing the demonstration, and then transferred the data to the evaluation team on an agreed-upon schedule. The evaluation team linked attendance and application/enrollment records to the original sample using identifiers such as name, contact information, and Social Security Number (SSN).[39,40] Exhibit 3.4 summarizes data collection for demonstration data, baseline data, and all outcomes data.

[38] A crucial difference between the South Seattle and Central New Mexico sites is that the Washington SWA was willing to share contact information for all jobseekers required for the demonstration, enabling the evaluation team to conduct the outreach and collect data on all confirmatory outcomes. For the Central New Mexico demonstration, the SWA chose not to share the jobseeker contact information and instead chose to send all emails and postcards on their end, with the evaluation team's guidance and support. The main implication of this difference for the evaluation is that the SWA in New Mexico, rather than the evaluation team, collected data on outcomes 1 and 2. Outcome 3 information (completed interest forms) was collected by the evaluation team from the websites.

[39] For Central New Mexico, the evaluation team shared attendance and application/enrollment records with the New Mexico SWA; the SWA, in return, matched the data back to the study sample.

[40] Although SSNs are the ideal identifier, the grantees did not collect SSNs for outcome (4). For this outcome, the evaluation team had to use alternate identifiers and conduct checks for matches. The team used a string matching process that matches imperfect identifiers such as last name, date of birth, email address, or phone number. However, matching using imperfect identifiers can be prone to erroneous false positive (incorrectly identifying a match) and false negative matches (incorrectly not identifying a match). To address this, the evaluation team examined all possible matches derived from these identifiers to determine which matches to accept or reject. The team's matching algorithm only deemed those with the utmost confidence as matches (for instance, when last name, date of birth, email address and phone number all matched. If only last name and date of birth matched, it was not deemed a match.). After identifying all matches, the team recorded any applicable outcomes achieved for individuals in the original sample. Not all individuals were matched back to the demonstration's original sample, since AAI grantees were also recruiting from other sources; thus, the team identified and dropped records when a match was considered inappropriate.

Exhibit 3.4: Data Collection Summary



CHAPTER 4. BASELINE CHARACTERISTICS

The previous chapters introduce the reader to the multi-mode outreach intervention and the NTO demonstration's evaluation design. This chapter describes the demonstration samples of female jobseekers in the two implementing sites.

When implementing the demonstration, the evaluation team randomly assigned a total of 16,401 female jobseekers in South Seattle and 20,857 in Central New Mexico to either a gender-themed treatment group or generic-themed control group. As shown in Exhibit 4.1, random assignment of the samples resulted in virtually equal numbers of control and treatment group members within and across cohorts.

Exhibit 4.1: Treatment-Control Distribution of Jobseekers across Cohorts

South Seattle	Cohort 1	Cohort 2	Overall
Treatment	5,199 (50.2%)	3,025 (50.0%)	8,224 (50.1%)
Control	5,153 (49.8%)	3,024 (50.0%)	8,177 (49.9%)
Total	**10,352 (100%)**	**6,049 (100%)**	**16,401 (100%)**
Central New Mexico	**Cohort 1**	**Cohort 2**	**Overall**
Treatment	9,090 (50.0%)	1,340 (50.0%)	10,430 (50.0%)
Control	9,088 (50.0%)	1,339 (50.0%)	10,427 (50.0%)
Total	**18,178 (100%)**	**2,679 (100%)**	**20,857 (100%)**

The next sections describe the demographic (section 4.1) and socioeconomic (section 4.2) composition of the two site samples and the samples' representativeness of the overall population of their respective sites. Section 4.3 concludes the chapter.

4.1 DEMOGRAPHIC CHARACTERISTICS – SOUTH SEATTLE AND CENTRAL NEW MEXICO

Exhibits 4.2 and 4.3 provide the demographic profile of jobseekers in South Seattle and Central New Mexico by treatment status across cohorts 1 and 2. Examining baseline characteristics by treatment status is particularly important for determining whether or not the random assignment was conducted successfully. The theoretical and statistical appeal of an RCT for evaluating the effectiveness of policy interventions lies in the fact that a carefully conducted experiment can remove the selection bias inherent in causal inferences drawn from non-experimental data.

The randomization procedure was successful in producing an even distribution of demographic characteristics across treatment and control groups.[41] For the South Seattle intervention, very few characteristics exhibited a statistically significant difference, meaning that the two groups were similar in most characteristics; the exceptions were that individuals in the control group were more likely to live in Pierce County, be from two or more races or ethnicities, and be more

[41] It should be noted that when examining a fairly large number of variables, one would expect to observe statistically significant differences in means for a certain number of variables, due to chance.

likely to be Hispanic. Similarly, for the New Mexico demonstration, most differences in demographic characteristics were not statistically significant; the exceptions were that individuals in the control group were less likely to be ages 45-54 years old and more likely to be 55 years or older. Also, the New Mexico treatment group was more likely to have ethnicity missing than the control group.[42]

Exhibit 4.2 shows the county of residence for treatment and control groups. About half of jobseekers in the South Seattle sample live in King County; about three-fourths of jobseekers in the Central New Mexico sample live in Bernalillo County.

Exhibit 4.2: Counties of Residence by Treatment-Control Status

Intervention Site	County of Residence	Treatment	Control	Overall
South Seattle	King	49.9% (4,104)	49.5% (4,045)	**49.7% (8,149)**
	Pierce	21.2%***(1,739)	23.0%*** (1,877)	**22.1% (3,616)**
	Snohomish	29.0%* (2,381)	27.6%* (2,255)	**28.3% (4,636)**
	Total	**100% (8,224)**	**100% (8,177)**	**100% (16,401)**
Central New Mexico	Bernalillo	74.1% (7730)	73.8% (7694)	**74.0% (15,424)**
	Sandoval	16.9% (1758)	17.1% (1782)	**17.0% (3,540)**
	Valencia	9.0% (942)	9.1% (951)	**9.1% (1,893)**
	Total	**100% (10,430)**	**100% (10,427)**	**100% (20,857)**

Notes: All Ns are reported in parenthesis. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01.

Exhibit 4.3 shows that female jobseekers in South Seattle tended to be older than their counterparts in Central New Mexico: 32 percent were 34 years old or younger in South Seattle versus 43 percent in Central New Mexico. Only 17.5 percent of jobseekers in Central New Mexico were 55 or older, compared to 22.7 percent in South Seattle.

The race/ethnicity[43] distribution of the sample also differed across sites—although the high proportion of jobseekers without race/ethnicity information in Central New Mexico (46 percent) compared to South Seattle (9.6 percent) warrants caution in comparing the two sites on this characteristic. A majority (55 percent) of the South Seattle sample identified as White only, followed by African Americans only (11.8 percent), Asians only (10.7 percent), and individuals who identified themselves as having two or more races/ethnicities (7.8 percent). In contrast, while a sizable proportion of jobseekers in Central New Mexico identified as White only (40.5 percent), a mere 2.7 percent identified as African American only, and only 0.9 percent as Asian

[42] The results of more baseline equivalence tests are presented in Chapter 5.

[43] In South Seattle, data sent by ESD combined information on ethnicity and race, and respondents were able to choose multiple races/ethnicities. The first five rows (White only, African American only, Hispanic only, Asian only, Pacific Islander or Native American only) refer to individuals that only picked one race/ethnicity, while "two or more races" refers to individuals who picked any two or more races. In Central New Mexico, information on ethnicity and race was provided under two separate categories, and thus the exhibit does not include statistics for the row "Hispanic only" for Central New Mexico.

only—statistics that need to be interpreted with great caution given that upwards of 45 percent of the New Mexico sample had race data missing.

The two sites also differed substantially in ethnicity.[44] Only 7.5 percent of the South Seattle's sample was Hispanic, compared to 31 percent in Central New Mexico—also a difference that should be interpreted with caution given that about 40 percent of Hispanic data were missing in Central New Mexico.

Exhibit 4.3: Treatment-Control Differences in Demographic Characteristics

Demographic Characteristics	South Seattle			Central New Mexico		
	Treatment	Control	Total	Treatment	Control	Total
Age Groups#						
Less than 18 years	0.9% (70)	0.7% (58)	**0.8% (128)**	0% (0)	0% (0)	**0% (0)**
18-24 years	8.7% (717)	8.2% (674)	**8.5% (1,391)**	14.8% (1,541)	14.7% (1,536)	**14.8% (3,077)**
25-34 years	22.1% (1,813)	23.1% (1,887)	**22.6% (3,700)**	28.6% (2,979)	28.5% (2,969)	**28.5% (5,948)**
35-44 years	20.2% (1,660)	20.5% (1,678)	**20.4% (3,338)**	21.2% (2,209)	21.0% (2,186)	**21.1% (4,395)**
45-54 years	22.7% (1,863)	22.6% (1,848)	**22.6% (3,711)**	18.6%* (1,936)	17.7%* (1,842)	**18.1% (3,778)**
55 or older	23.0% (1,889)	22.2% (1,811)	**22.7% (3,700)**	16.9%** (1,765)	18.2%** (1,894)	**17.5% (3,659)**
Missing	2.6% (216)	2.7% (222)	**2.6% (433)**	0% (0)	0% (0)	**0% (0)**
Average age	42.7 (13.6)	42.6 (13.3)	**42.6 (13.5)**	39.3 (13.5)	39.5 (13.6)	**39.4 (13.6)**
Race						
White only	55.4% (4,559)	54.5% (4,460)	**55.0% (9,019)**	40.5% (4,225)	40.5% (4,222)	**40.5% (8,447)**
African American only	11.7% (963)	11.8% (966)	**11.8% (1,929)**	2.5% (262)	2.9% (299)	**2.7% (561)**
Hispanic only	2.9% (234)	3.0% (248)	**2.9% (482)**	-	-	**-**
Asian only	11.0% (903)	10.5% (858)	**10.7% (1,761)**	0.8% (88)	1.0% (104)	**0.9% (192)**
Pacific Islander or Native American only	2.0% (167)	2.1% (172)	**2.1% (339)**	7.5% (782)	7.7% (807)	**7.6% (1,589)**
Two or more races/ethnicities	7.5%** (618)	8.4%** (686)	**7.8% (1,304)**	1.8% (189)	2.0% (213)	**1.9% (402)**
Missing	9.5% (780)	9.6% (787)	**9.6% (1,567)**	46.8% (4,884)	45.9% (4,782)	**46.3% (9,666)**

	South Seattle	Central New Mexico

[44] For South Seattle, anybody who considered themselves Hispanic was assigned *Hispanic* status (regardless of whether they only considered themselves Hispanic or a combination of Hispanic and a race).

Demographic Characteristics	Treatment	Control	Total	Treatment	Control	Total
Ethnicity						
Hispanic	7.0%** (578)	7.9%** (645)	**7.5% (1,223)**	30.4% (3,172)	31.1% (3,240)	**30.7% (6,412)**
Not Hispanic	80.3% (6,607)	79.5% (6,501)	**79.9% (13,108)**	28.0% (2,921)	28.7% (2,993)	**28.4% (5,914)**
Missing	12.6% (1,039)	12.6% (1,031)	**12.6% (2,070)**	41.6%** (4,337)	40.2%** (4,194)	**40.9% (8,531)**
Disability Status						
Not disabled	6.6% (544)	6.8% (553)	**6.7% (1,097)**	6.8% (713)	6.6% (685)	**6.7% (1,398)**
Disabled	88.8% (7,300)	88.9% (7,273)	**88.9% (14,573)**	89.4% (9,327)	89.6% (9,346)	**89.5% (18,673)**
Missing	4.6% (380)	4.3% (351)	**4.5% (731)**	3.7% (390)	3.8% (396)	**3.8% (786)**

Notes: All Ns are reported in parenthesis. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01.
[#] Jobseekers age-range 14-88 in South Seattle, 18-87 in Central New Mexico

4.2 SOCIOECONOMIC CHARACTERISTICS – SOUTH SEATTLE AND CENTRAL NEW MEXICO

Exhibits 4.4 describes the socioeconomic characteristics of jobseekers in South Seattle and Central New Mexico by treatment status across both cohort samples. Data on education status, dislocated worker, family size, family income and homelessness was not available for South Seattle. Just as in Exhibit 4.3, very few socioeconomic characteristics were statistically significantly different between treatment and control groups across either site.[45] None of the characteristics had statistically significant differences in South Seattle; a higher proportion of control group members were likely to have an employment status of other compared to the treatment group in Central New Mexico. Also, the proportion of treatment group members in Central New Mexico who did not provide information on their educational status and on their employment when they completed the workforce application differed significantly from the proportion of control group members who did not provide this information.

Jobseekers in Central New Mexico averaged higher education levels compared to their counterparts in South Seattle. A larger proportion of jobseekers in South Seattle lacked a high school degree (29 percent) compared to Central New Mexico (5.5 percent). Additionally, about 63 percent of Central New Mexico's sample had some post-secondary or higher education (through a vocational or Associate's degree, some college education, or a bachelor's degree or higher) compared to 40 percent in South Seattle. Once again, these numbers should be interpreted with caution giving the differential missing data between the two sites (16 percent of South Seattle's data on highest education level completed were missing, compared to virtually none missing in Central New Mexico).

[45] The results of more baseline equivalence tests are presented in Chapter 5.

The proportion of veterans in each site was very small (2.4 percent in South Seattle and 4.3 percent in Central New Mexico). Also, a substantial proportion of both samples were not employed at baseline (86.3 percent in South Seattle and 75.6 percent in Central New Mexico).

With respect to economic status, in Central New Mexico the typical household had one or two other people in addition to the jobseeker, with an average income of $6,265 six months prior to completing an application for the workforce agency. Also, 7.5 percent were TANF recipients, approximately one-third were food stamp recipients and 11 percent were homeless.

Exhibit 4.4: Treatment-Control Differences in Socioeconomic Characteristics

Socioeconomic Characteristics	South Seattle			Central New Mexico		
	Treatment	Control	Total	Treatment	Control	Total
Highest Educational Level Completed						
Less than High School	28.9% (2,379)	28.4% (2,322)	**28.7% (4,701)**	5.5% (571)	5.6% (581)	**5.5% (1,152)**
Completed High School/GED[46]	15.3% (1,254)	15.0% (1,223)	**15.1% (2,477)**	31.2% (3,251)	31.3% (3,265)	**31.2% (6,516)**
Some College[47]	13.1% (1,077)	13.2% (1,075)	**13.1% (2,452)**	42.2% (4,398)	42.0% (4,384)	**42.1% (8,782)**
Bachelor's Degree or Higher	27.1% (2,232)	27.2% (2,220)	**27.1% (4,452)**	21.2% (2,206)	21.0% (2,192)	**21.1% (4,398)**
Missing	15.6% (1,282)	16.4% (1,337)	**16.0% (2,619)**	0.0% (4)	0.0% (5)	**0% (9)**
Education Status						
Attending school	-	-	-	15.9% (1,653)	15.2% (1,582)	**15.5% (3,235)**
Not attending school	-	-	-	83.9% (8,751)	84.7% (8,833)	**84.3% (17,584)**
Missing	-	-	-	0.3%** (26)	0.1%** (12)	**0.2% (38)**
Veteran Status						
Veteran	2.4% (194)	2.4% (196)	**2.4% (390)**	3.5% (364)	3.3% (345)	**3.4% (709)**
Not Veteran	92.1% (7,576)	92.1% (7,528)	**92.1% (15,104)**	96.5% (10,066)	96.7% (10,082)	**96.6% (20,148)**
Missing	5.5% (454)	5.5% (453)	**5.5% (907)**	3.5% (364)	3.3% (345)	**3.4% (709)**
Employment Status at the Time of Application						
Employed	13.9% (1,144)	13.4% (1,098)	**13.7% (2,242)**	22.3% (2,323)	21.6% (2,247)	**21.9% (4570**
Not Employed	86.1% (7,080)	86.6% (7,079)	**86.3% (14,159)**	75.5% (7,873)	75.8% (7,902)	**75.6% (15,775)**

[46] Due to data availability of data, this variable was constructed slightly differently in the two sites. For South Seattle, the category included women who had a High School Diploma, Disability IEP, or GED. For Central New Mexico, the category included women who had a High School Diploma or Equivalent, Disability IEP, GED, High School Equivalency Diploma, or if they were a High School Graduate.

[47] Vocational Degree, Associate's Degree, or Some College

Socioeconomic Characteristics	South Seattle			Central New Mexico		
	Treatment	Control	Total	Treatment	Control	Total
Other	-	-	-	2.1%** (222)	2.6%** (275)	**2.4% (497)**
Missing	-	-	-	0.0%** (12)	0.0%** (3)	**0.1% (15)**
Participant Received a Layoff Notice						
Yes	-	-	-	35.5% (3,698)	35.7% (3,717)	**35.5% (7,415)**
No	-	-	-	64.5% (6,732)	64.3% (6,710)	**64.5% (13,442)**
Participant is Looking for Work						
Yes	-	-	-	90.3% (9,419)	90.8% (9,472)	**90.6% (18,891)**
No	-	-	-	9.7% (1,011)	9.2% (955)	**9.4% (1,966)**
Household Characteristics[48]						
Family Size (Number of People)	-	-	-	1.5 (1.1)	1.5 (1.1)	**1.5 (1.1)**
Family Income Six Months Prior to Workforce Application (in U.S. dollars)	-	-	-	6,243.8 (21,389.8)	6,286.6 (21,471.1)	**6,265.2 (21,430.0)**
Food Stamps Recipient						
Yes	-	-	-	31.0% (3,230)	31.6% (3,293)	**31.3% (6,523)**
No	-	-	-	69.0% (7,200)	68.4% (7,134)	**68.7% (14,334)**
TANF Recipient						
Yes	-	-	-	7.3% (762)	7.7% (801)	**7.5% (1,563)**
No	-	-	-	92.6% (9,657)	92.2% (9,612)	**92.4% (19,269)**
Missing	-	-	-	0.1% (11)	0.1% (14)	**0.1% (25)**
Participant is Homeless						
Yes	-	-	-	11.4% (1,187)	10.9% (1,133)	**11.1% (2,320)**
No	-	-	-	88.6% (9,243)	89.1% (9,294)	**88.9% (18,537)**

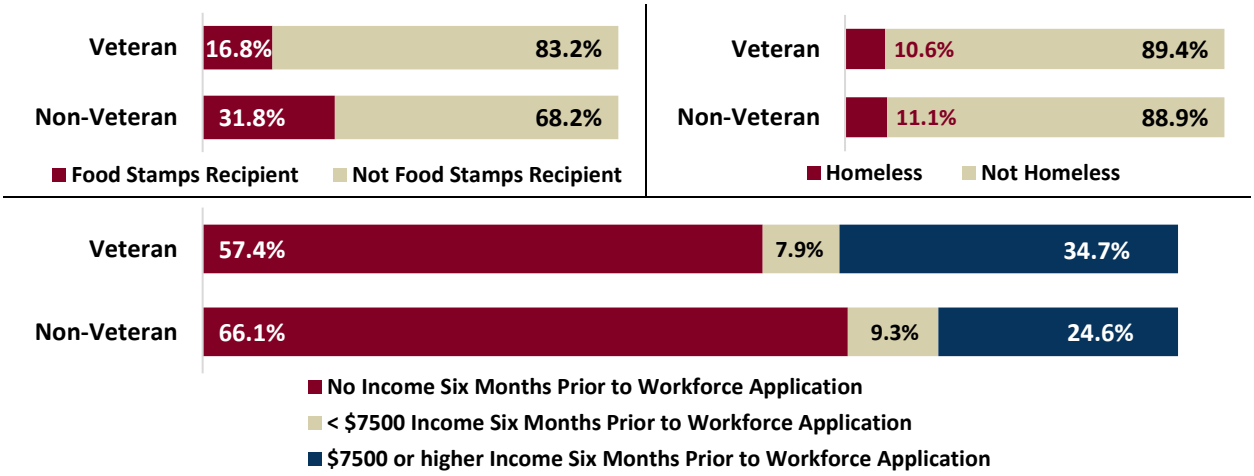
Notes: All Ns are reported in parenthesis. Standard deviations are also reported in parenthesis when applicable. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. – denotes data not available for a variable.

Finally, Exhibit 4.5 describes socioeconomic characteristics for veterans in New Mexico. Veteran jobseekers were nearly half as likely to be a food stamps recipient compared to non-veteran jobseekers (17 percent versus 32 percent). The non-veteran and veteran jobseekers were about

[48] Family size refers to the number of individuals in the household in addition to the jobseeker. Family income refers to the 6-month period prior to answering the questionnaire.

equally likely to have been homeless (about 11 percent). Veterans were also more likely to have earned some income in the six months prior to completing an application at the workforce agency.

Exhibit 4.5: Socioeconomic Characteristics of Veterans and Non-Veterans in Central New Mexico



Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. The statistical tests are done for each demographic category using veterans as the reference category.

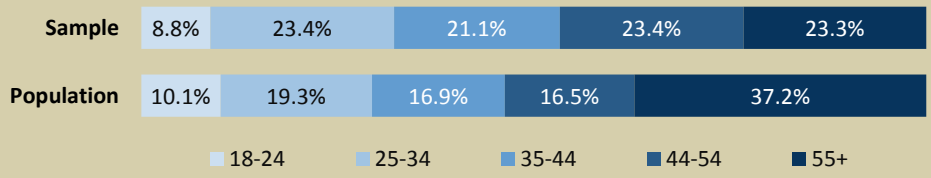
HOW REPRESENTATIVE THE DEMONSTRATION SAMPLES WERE TO THE GENERAL POPULATION IN THE DEMONSTRATION COUNTIES

How representative was the South Seattle demonstration sample of the general population in the demonstration counties?

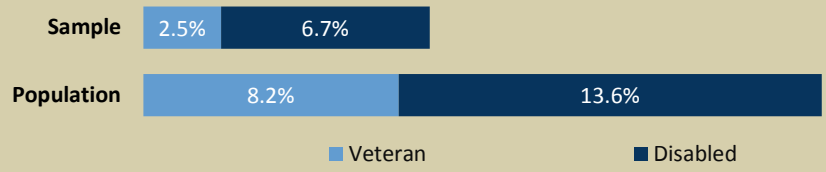
The female jobseeker sample used for the South Seattle demonstration differed from the female population overall in King, Pierce, and Snohomish Counties.

- **Age.** Women in the demonstration sample were more likely to be younger than 54 years compared to the counties' female population overall.
- **Veteran Status.** Veterans constituted a much smaller proportion of the demonstration sample than the counties' overall female population.
- **Disability Status.** The female population in the counties is about twice as likely to be disabled compared to their counterparts in the demonstration sample.
- **Level of Education.** Approximately 48 percent of the demonstration sample has some post-secondary education, making them a less educated group compared to the overall female population in the counties, 65 percent of whom have some post-secondary education.

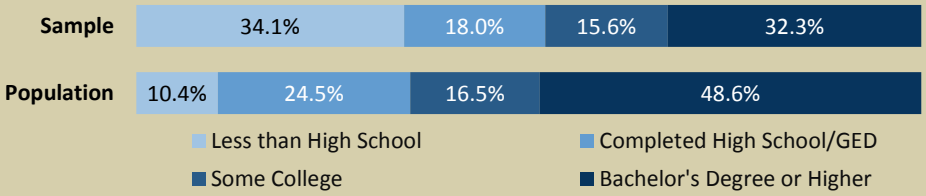
Comparison between South Seattle Sample and Population – by Age Group



Comparison between South Seattle Sample and Population – by Veteran and Disability Status



Comparison between South Seattle Sample and Population – by Education Level



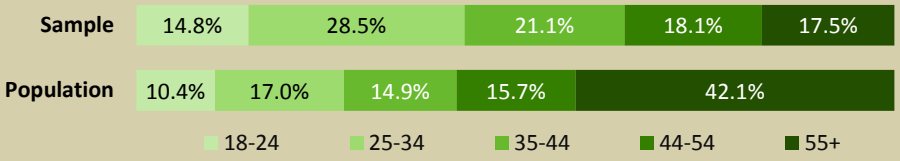
Source: 2016 ACS 1-Year Estimates. Only includes females 18 or above. Missing values for the demonstration sample were excluded from the calculations.

How representative is the Central New Mexico demonstration sample of the general population in the demonstration countries?

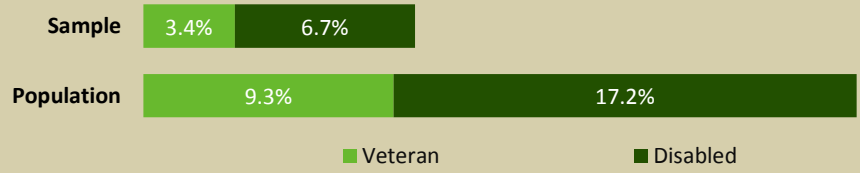
The demonstration sample in Central New Mexico differed from the female population in Bernalillo, Sandoval, and Valencia Counties.

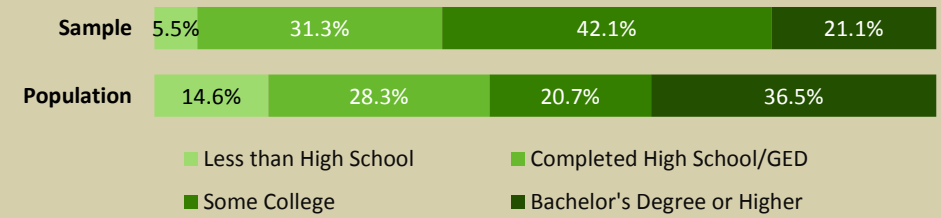
- **Age**. Women in the demonstration sample were more likely to be younger than 45 years old compared to the female population in the counties.
- **Veteran Status**. The Veteran proportion of the demonstration sample was about one-third the veteran proportion of the female population in the counties overall.
- **Disability Status**. Disability rates among the counties' female population were almost three times greater than among the demonstration sample.
- **Level of Education**. Approximately 63 percent of the sample had some post-secondary education compared to about 57 percent for the overall female population in the counties.

Comparison between Central New Mexico Sample and Population – by Age Group



Comparison between Central New Mexico Sample and Population – by Veteran and Disability Status





Source: 2016 ACS 1-Year Estimates. Only includes females 18 or above. Missing values for the demonstration's sample were excluded from the calculations.

4.3 CONCLUSION

This chapter provides a snapshot of the baseline characteristics of the demonstration samples in the South Seattle and Central New Mexico NTO demonstration sites.

About half the jobseekers in the South Seattle sample lived in King County and about three-fourths of the jobseekers in the Central New Mexico sample lived in Bernalillo County. Female jobseekers in South Seattle tended to be older, White, and had a lower level of education compared to their counterparts in Central New Mexico. A larger proportion of women were Hispanic in Central New Mexico compared to South Seattle. The proportions of veterans and disabled jobseekers were small and similar across the two sites.

Compared to the overall women population in the demonstration sites, women in both the Central New Mexico and South Seattle samples were younger and less likely to be veteran and/or disabled. Women in the Central New Mexico sample were more likely to have some post-secondary education compared to overall female population in the New Mexico counties, but the reverse was true for South Seattle.

CHAPTER 5. INTERVENTION CHARACTERISTICS AND PROGRAM IMPACTS

The goal of the NTO demonstration, as noted, is to encourage more women to consider careers in NTOs by addressing awareness and misperception barriers related to women's employment in NTOs. The demonstration's evaluation tests the effectiveness of a woman-specific targeted multi-pronged outreach intervention in nudging women to take short-term actions towards NTO training programs.

This chapter describes key intervention characteristics and provides the impact analysis results. Section 5.1 presents important intervention characteristics associated with the outreach modes the demonstration used to increase awareness of the training programs in the two demonstration sites, South Seattle and Central New Mexico. Section 5.2 describes outcome completion over the demonstration period. Section 5.3 discusses exploratory outcomes. Section 5.4 provides a technical overview of the experimental paradigm in preparation for Section 5.5's discussion of the impact results for South Seattle and Central New Mexico, respectively. Section 5.6 puts the results into context with a discussion of the differing characteristics of the two demonstration regions' different demographic and socioeconomic characteristics. Section 5.7 concludes the chapter.

5.1 INTERVENTION CHARACTERISTICS

The demonstration programs in South Seattle and New Mexico used several outreach modes to increase awareness about the presence of pre-apprenticeship training programs in construction and advanced manufacturing (South Seattle) and in IT (Central New Mexico). These online outreach modes included email waves and a project website (both sites), and Facebook (South Seattle only). This section describes the responses of the demonstration sample to the different modes across both cohorts.

Emails. The multi-mode outreach demonstration involved sending multiple emails to a sample of women jobseekers obtained from the state workforce agencies in Washington state and New Mexico. Understanding the pattern of unsubscribed emails (i.e., the share of recipients who proactively unsubscribed from receiving any further emails from the same source) can help in understanding the potential effectiveness of email as an outreach mode. Exhibits 5.1 and 5.2 show the share of unsubscribed emails for South Seattle and New Mexico for each email wave sent. The unsubscribed share in South Seattle was highest in the week the first email was sent (1.4 and 1.5 percent for treatment and control groups, respectively) and declined rapidly thereafter. In contrast, Central New Mexico had a relatively stable rate throughout the intervention period. In general, the rate of unsubscribed emails was very low across the two sites (between 0.5 and 1.5 percent in South Seattle and 0.2 and 0.7 percent in New Mexico), perhaps because the emails were sent using a domain created under the training provider's names (nto@southseattle.edu and nto@cnm.edu), and because sample members were known to have been interested in seeking a job.

Exhibit 5.1: Share of Unsubscribed Emails in South Seattle

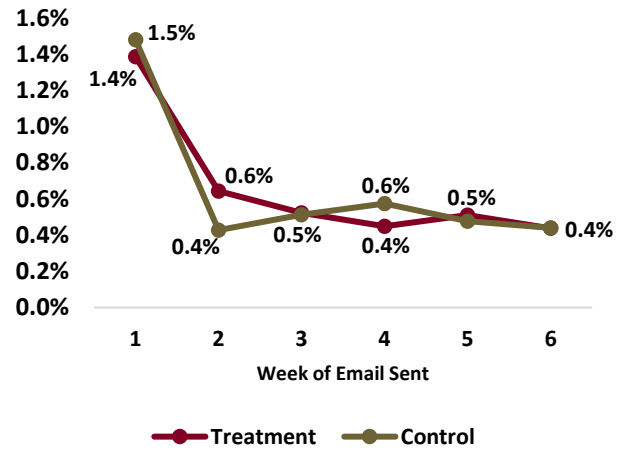
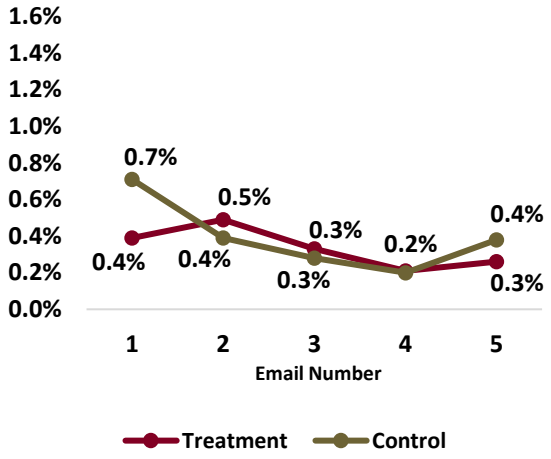


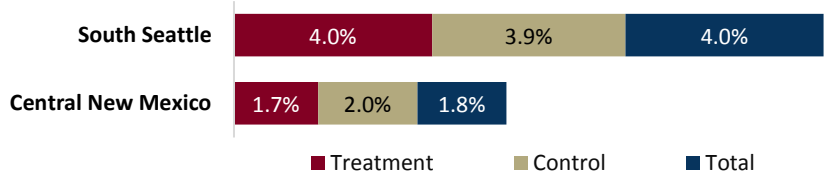
Exhibit 5.2: Share of Unsubscribed Emails in Central New Mexico



Note: Percentages rounded to nearest decimal. The demonstration involved sending seven emails for Seattle and six for New Mexico. For New Mexico, information on unsubscribe rates was collected only for the first five emails. Since DWS was collecting data on unsubscribes for the New Mexico demonstration, this information is collected differently for New Mexico. DWS collected data on jobseekers that unsubscribed by the specific email sent; South Seattle collected the unsubscribe information by the date an individual unsubscribed to any of the emails. Four jobseekers unsubscribed to South Seattle's emails on weeks 7, 8, and 10, but these data points did not alter the total percentages so have been excluded from the graph.

Exhibit 5.3 shows the cumulative share of jobseekers who unsubscribed over the treatment period as a whole. A larger proportion of jobseekers unsubscribed from the emails in South Seattle (4 percent) compared to Central New Mexico (1.8 percent). In Central New Mexico, a relatively higher proportion of those who unsubscribed were in the control than the treatment group (2 percent versus 1.7 percent). In South Seattle, there was virtually no treatment-control difference in the share who unsubscribed.

Exhibit 5.3: Cumulative Share of Unsubscribed Emails

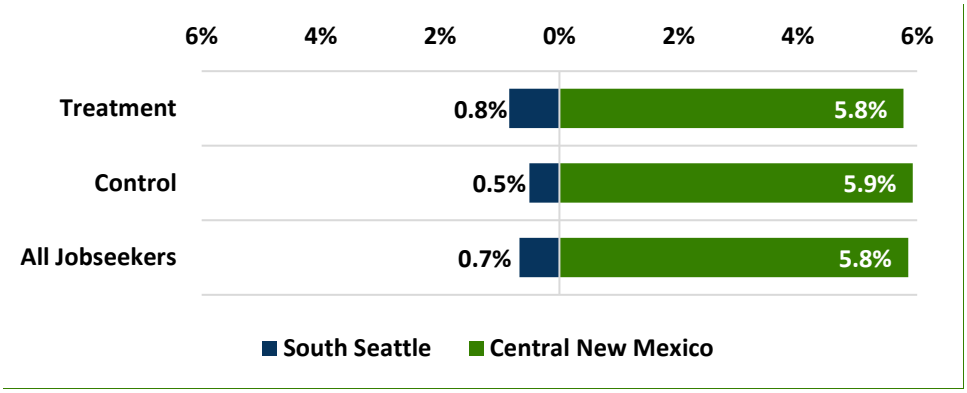


Demonstration Website Visits. The generic-themed group website for South Seattle contained four webpages (home, frequently asked questions, industries, find a program). Since there was only one training provider in New Mexico's demonstration compared to three in South Seattle, for the Central New Mexico generic website the *find a program* was replaced with an *about* page, which provided more detailed information on the industry itself. For both sites, the website for the gender-themed treatment group had an extra webpage called *Her Story* that provided brief testimonials from women who had bridged barriers and had successful careers in the NTOs of construction and advanced manufacturing (South Seattle) and IT (New Mexico). In both

demonstration sites, the gender-themed and generic websites had versions in both English and Spanish.

The evaluation team used Google Analytics[49] to track the jobseekers who visited at least one page of the website. Less than 1 percent of jobseekers in the South Seattle sample visited at least one page of the website compared to nearly 6 percent in Central New Mexico (see Exhibit 5.4).

Exhibit 5.4: Jobseekers Who Visited at Least One Webpage



Facebook Campaign. Facebook advertising was used to increase engagement with the demonstration in South Seattle only. As mentioned in Chapter 2, the team could not implement the ads in the Central New Mexico site, since using Facebook ads targeted to the women jobseekers in the demonstration sample required the evaluation team to have direct access to sample members' email addresses, which we had only for South Seattle. The evaluation team developed both targeted (for the gender-themed treatment group only) and generic (for the generic-themed control group only) Facebook ads that aligned with the other recruitment content (see Exhibit 5.5). By feeding jobseekers' email addresses to Facebook for this particular ad campaign, we made sure that jobseekers in the treatment group could only see gender-themed recruitment materials when they opened their Facebook page, and jobseekers in the control group could only see generic recruitment materials.

REACH OF CONTENT IN SPANISH

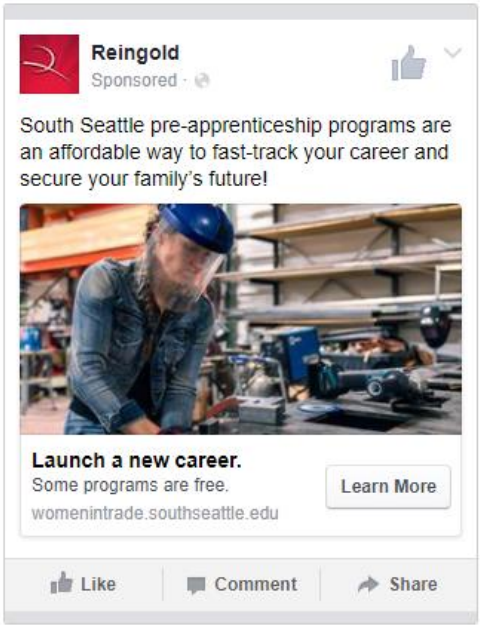
Only 12 jobseekers clicked the Spanish link in one of the emails in **South Seattle**. ***No*** jobseekers visited the Spanish website in Seattle**.**

In **Central New Mexico**, only 26 jobseekers clicked on a link in Spanish in one of the emails. ***Only one*** jobseeker, from the control group, visited the Spanish version of the website.

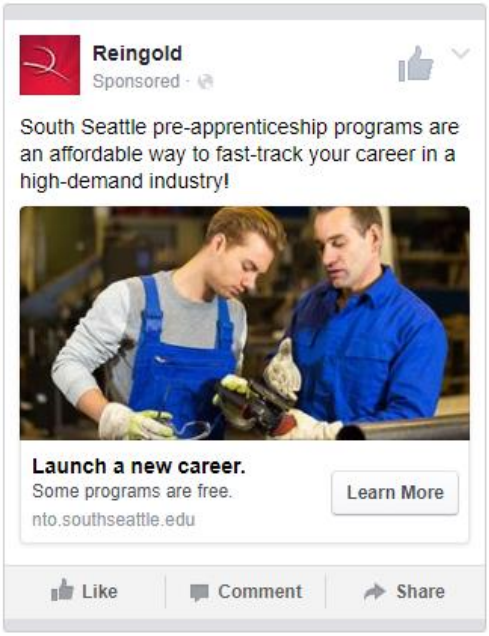
[49] This platform uses cookies to collect data. Therefore, if a visitor deletes or blocks their cookies, the data do not come through to the platform. As a result, the evaluation team might be underestimating the number of jobseekers who visited at least one of the website pages. Since most visitors do not delete or block cookies, any such data loss is not expected to be substantial.

Exhibit 5.5: Example of Facebook Ads

Gender-themed Treatment



Generic-themed Control



Facebook advertising could not generate reported outcomes because Facebook does not provide individually identifiable data on impressions and hits from its ads.[50] The evaluation team was able to gain some information on the effectiveness of the Facebook outreach from Facebook's own statistics, however, as discussed below.

One statistic commonly used to gauge how successful an online campaign is in reaching its audience relates to impressions; that is, the number of times an ad was on screen. According to Facebook's Glossary of Ad Terms[51], "*an impression is counted as the number of times an instance of an ad is on screen for the first time";* that is, an impression is counted every time the ad is on someone's screen as s/he scrolls down their feed (meaning they can actually see the ad) for the first time.[52]

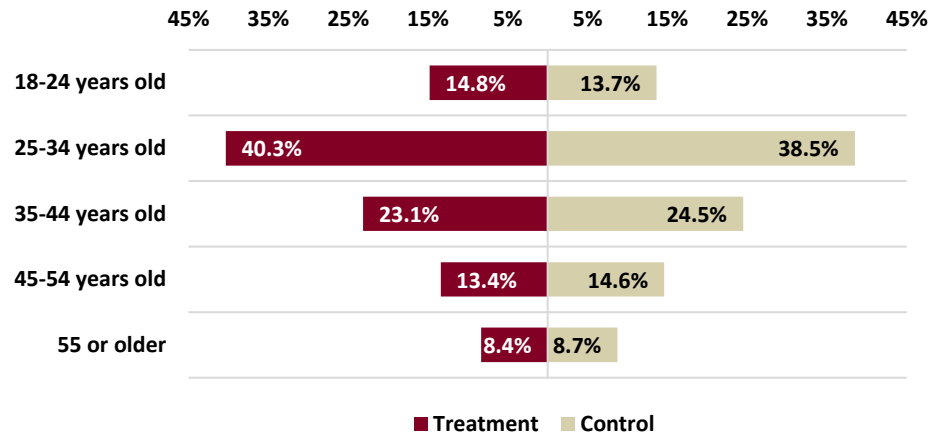
The gender-themed recruitment ad was on screen a total of 65,885 times, while the generic ad was on screen 64,443 times—these numbers translate to each jobseeker having the ad visible on screen for an average of eight times. Except for the very youngest group, younger women (ages 25–34 years) were more likely to observe Facebook content (both treatment and control) compared to their older peers, not surprising since Facebook is more popular among younger audiences. The differences between the shares who saw a gender-themed advertisement versus a generic one are small (less than 3 percentage points) and were not tested for statistical significance (Exhibit 5.6).

[50] While the intent of these ads was to drive more traffic to our demonstration websites, we were not able to track which specific jobseekers visited the website from the Facebook ads due to data limitations, preventing us from measuring the effect of using Facebook on our study outcomes.

[51] Glossary of Ad Terms (Facebook Business): https://www.facebook.com/business/help/447834205249495

[52] If a Facebook user sees the ad twice in the same session by scrolling down and back up again, this is counted as one impression.

Exhibit 5.6: Impressions by Treatment Status and Age-Group in South Seattle



5.2 TRENDS IN OUTCOME COMPLETION RATES OVER TIME

The evaluation team sent a total of seven recruitment emails in South Seattle and six recruitment emails in New Mexico to each of the gender-themed treatment and generic-themed control groups.[53] These emails were sent weekly according to a specified schedule. Please refer to Appendix D for a detailed timeline of each site. This section presents the cumulative and weekly completion rates for South Seattle and Central New Mexico for the three confirmatory outcomes—outcome 1 (opened an email), outcome 2 (clicked on a link in an email), and outcome 3 (completed an interest form). It is important to note that this section presents descriptive findings; results based on a causal analysis are presented in Section 5.4.

Starting with the cumulative completion rate of confirmatory outcomes, Exhibit 5.7 shows that the proportion of women completing outcome 1 is far larger than for outcomes 2 and 3 in both sites, due to the cumulative nature of the intervention (e.g., outcome 2, clicked on a link in an email, cannot be completed if outcome 1, opened an email, has not been completed.) The decrease in outcome 2 completions is sharper in South Seattle compared to Central New Mexico, however, where a higher proportion of jobseekers moved on to completing the next outcome.

[53] This difference is due to New Mexico SWA's budgeting and administrative constraints. These emails include six reminder emails for South Seattle and five for New Mexico. One reminder email for both the sites was a post-interest form completion reminder email sent only to those who completed the interest form.

Exhibit 5.7: Outcome Completion Rate by Group - South Seattle and Central New Mexico

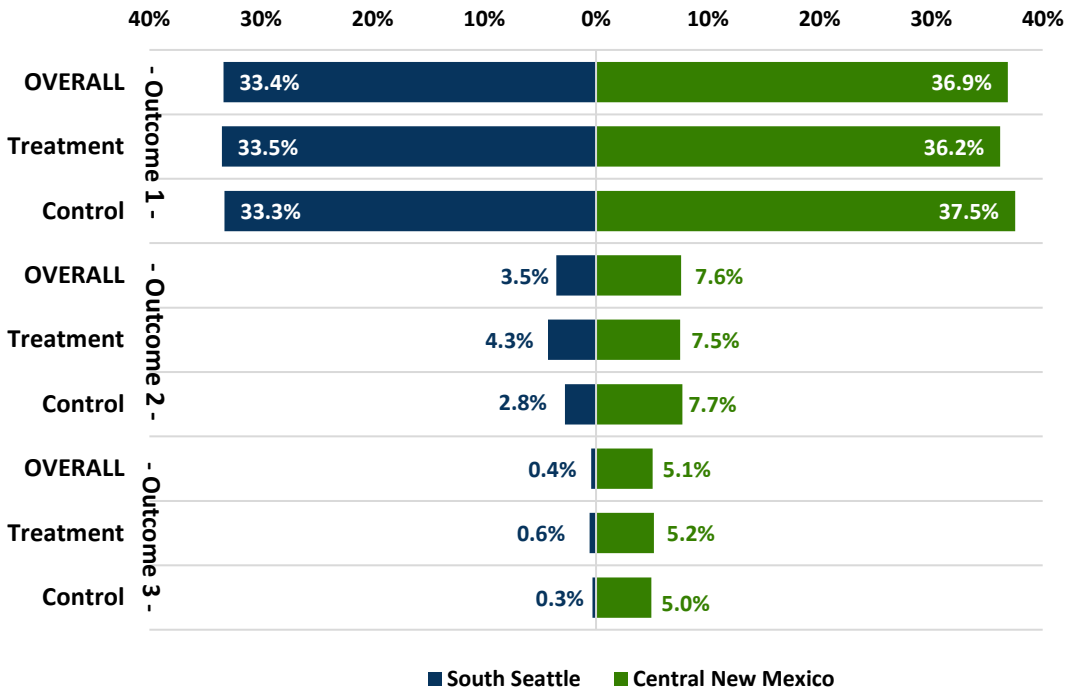


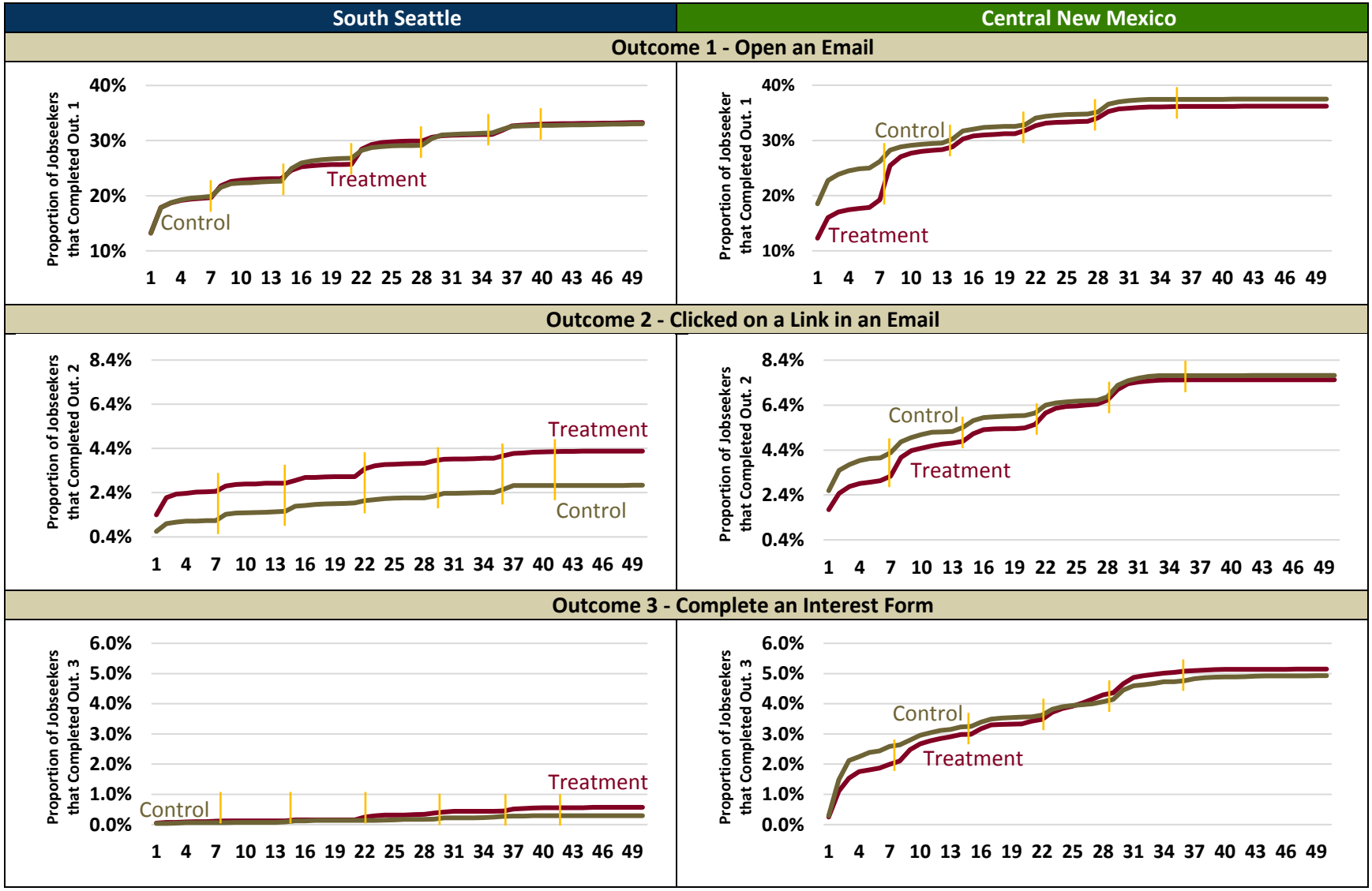
Exhibit 5.8 shows the share of women jobseekers who completed each of the three confirmatory outcomes over the demonstration period. In each graph, the numeral 1 represents the first day of the demonstration, the date the initial email was sent.[54] Follow-up emails (marked by yellow lines) were sent on days 8, 15, 22, 29 and 36 for both sites, with an extra email sent on day 43 for South Seattle. These days all featured distinct jumps in outcome achievement for both groups. Postcards were sent concurrent with the third follow-up email.

The sharp increases in outcomes completion immediately following each reminder point to the potential importance of multiple nudges or reminders to spur action among jobseekers.

The outcomes completion spikes with each follow-up email or postcard demonstrating that a multi-pronged recruitment campaign that includes multiple "touches" may be key to increasing overall participation. This finding offers promising evidence in support of the effectiveness of using a multi-pronged recruitment approach that incorporates multiple modes and repeated reminders that encourage women to take action. These spikes provide valuable information for training practitioners looking to boost the overall effectiveness of their recruitment campaigns, especially given the low cost/burden imposed by these activities.

[54] In South Seattle, the dates of day 1 were 7/31/17 (Cohort 1 sample) and 2/5/18 (Cohort 2 sample). In Central New Mexico, they were 9/18/17 (Cohort 1 sample) and 1/16/18 (Cohort 2 sample).

Exhibit 5.8: Share of Jobseekers that Completed Confirmatory Outcomes by Demonstration Day and Site



Notes: Emails were sent for both demonstration sites on days 1, 8, 15, 22, 29 and 36 in the graphs above, as demonstrated by the yellow lines. An extra email was sent in South Seattle on day 43.

5.3 EXPLORATORY OUTCOMES

In addition to the short-term confirmatory outcomes 1, 2, and 3, the evaluation examined two longer-term exploratory outcomes. Exhibit 5.9 presents the outcome completion rates for outcome 4 (looked for more information about the program) and outcome 5 (enrolled in a program).

The completion rates for exploratory outcomes 4 and 5 were low, both for the treatment and control groups within sites, but particularly in South Seattle. Four jobseekers (0.4 percent) completed outcome 4 (looked for more information about the training programs) in South Seattle—two in each group—and half that number (0.2 percent) completed outcome 5 (enrolled in a program). In Central New Mexico, 241 (2.3 percent) jobseekers completed outcome 4 and 91 (0.9 percent) completed outcome 5. Differences in outcomes 4 and 5 between treatment and control groups for South Seattle were not tested for statistical significance. The differences for Central New Mexico were not statistically significant at conventional levels.

Exhibit 5.9: Outcome Completion Rates for Exploratory Outcomes

	South Seattle			Central New Mexico		
Exploratory Outcomes	**Treatment**	**Control**	**Total**	**Treatment**	**Control**	**Total**
Looked for more information about the program (Outcome 4)	2 (0.2%)	2 (0.2%)	**4 (0.2%)**	116 (1.1%)	125 (1.2%)	**241 (1.1%)**
Enrolled in a program (Outcome 5)	1 (0.1%)	1 (0.1%)	**2 (0.1%)**	47 (0.5%)	44 (0.4%)	**91 (0.4%)**
Total Sample	**8,224 (100%)**	**8,177 (100%)**	**16,401 (100%)**	**10,427 (100%)**	**10,430 (100%)**	**20,857 (100%)**

Note: No significance test was conducted for South Seattle due to the low sample size for outcomes 4 and 5. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01.

As noted earlier, these outcomes were exploratory, in part, because women face other barriers to training and employment in NTOs—making it unlikely that targeted recruitment content would address all the barriers that could prevent women from completing the study's longer-term outcomes. In addition, outcomes 4 and 5 were both further removed from the intervention itself and more likely than outcomes earlier in the chronological sequence to be impacted by non-intervention influences. For instance, women may have experienced transportation barriers preventing them from attending an information session or seeking more information about the program (outcome 4) or lack affordable childcare causing them not to enroll in a program (outcome 5).

The South Seattle demonstration site did not see nearly as many women complete outcomes 4 and 5 (see Exhibit 5.9) as the Central New Mexico site. The higher response rate in Central New Mexico could be due to a range of contextual and program differences between the two sites—including industry, type of program, and demographics—all of which may have influenced how the community generally, as well as the specific women in the demonstration sample, viewed the programs. For example, on-the-job training programs in an industry like IT that is expected to grow at the local and national level may pique more interest compared to training programs

in industries considered stagnant or shrinking.[55,56] Along similar lines, residents of a region with higher unemployment and lower median household income, like Central New Mexico, may be more likely to be interested in training programs generally than residents of a more economically advantaged area. See Section 5.6 for an in-depth discussion of site and program differences.

In Central New Mexico, the number of women who enrolled in the program (91) through the demonstration accounted for almost one-third of the available 300 program slots. The Central New Mexico program staff also credited the demonstration with a surge of women interested in the program, noting that after the demonstration more of the applicants were women than men. Program staff reported, in addition, that among the women jobseekers whom staff had spoken with, some of the women explained that they would not have known about the program had it not been for the demonstration recruitment materials they received. Some women jobseekers attending the information sessions even brought with them the demonstration postcards they had received.

5.4 EXPERIMENTAL PARADIGM AND BASELINE EQUIVALENCE

An impact study aims to estimate the effects of a program by comparing participant outcomes to what would have happened in the absence of the program. Since it is not possible to examine the same individual in both states at the same time—because the individual, by design, is either exposed to the program or not—a comparison group composed of similar non-participants is used to mimic (i.e., provide the counterfactual to) what would have happened to program participants had they not accessed the program's services.

In non-experimental (observational) studies, program participants are likely to differ in observed and unobserved ways from those who do not participate (a condition termed selection bias). As a result, the causal effects of the program can only be distinguished from differences between participants and non-participants (i.e., selection bias removed) by the imposition of often unverifiable assumptions about the process by which the participation/non-participation status is determined.

In a well-executed RCT, by contrast, the treatment and control groups are comparable *by design*. From the same applicant pool, applicants randomly assigned to either the program or non-program group have, on average, the same observable and unobservable characteristics—making it intuitively and analytically straightforward to identify the effect of the program as any differences in post–random assignment outcomes between treatment and the control groups. The equivalence between the two groups enables evaluators to estimate the average impact of the program being tested on a group of individuals in the program (the treatment group), by

[55] New Mexico's Projected Growth in Employment (2014-2024) in Data Processing, Hosting, and Related Services is +6.7% (source: https://www.dws.state.nm.us/Portals/0/DM/LMI/2014_2024_NM_Industry_Projections_Report.xlsx). Data Processing, Hosting, and Related Services is a specific occupation of the "Information" industry that is more related to the type of training jobseekers receive in Central New Mexico.

[56] Washington State's Projected Growth in Employment (2015-2025) in Manufacturing and Construction is -1.6% and +0.6%, respectively (source: https://fortress.wa.gov/esd/employmentdata/docs/industry-reports/2017-projections-report.pdf).

comparing them to a group that has identical characteristics on average but is either not exposed to the program, or exposed to a different one (i.e., the control group). [57]

The appeal of RCTs is that random assignment makes transparent the causal inference assumptions. This, in a nutshell, is the critical value of randomization in program evaluation.[58]

5.4.1 Baseline Equivalence

Even in RCTs, evaluators cannot verify directly the equality between treatment and control group for the *unobservable* characteristics (such as motivation, preferences, or ability). But, as a test of whether random assignment was successfully implemented, evaluators can verify whether control and treatment group members are similar in observed, baseline characteristics. If few to no significant differences are detected, any subsequent treatment-control differences in outcomes can be attributed to the program with a known degree of statistical confidence. We used the two methods described below to confirm that random assignment in the NTO demonstration's RCT was successful.

T-Test. First, the evaluation team compared averages of baseline characteristics across treatment and control groups. Successful implementation of randomization implies small (in magnitude) treatment-control differences that are not statistically significant. As shown in Chapter 4, only four out of 37 baseline variables in South Seattle and six out of 48 baseline variables in New Mexico were statistically significantly different between treatment and control groups at conventional levels. These results indicate that the randomization procedure was successful in producing an even distribution of demographic and socioeconomic characteristics across the gender-themed treatment group and the generic-themed control group.

Linear Probability Model. To further confirm the results from the t-tests, the evaluation team used a linear probability model (LPM) to regress the likelihood of being assigned to the gender-themed treatment group using all the baseline characteristics as explanatory variables. In addition to these baseline characteristics, the LPM included dummy variables for number of days between the intervention start date and the woman jobseeker's last registration/login date to the workforce development system.[59] The LPM also included zip-code fixed-effects (FEs) to capture any regional variation that might be correlated with outcomes. If randomization had been done effectively, only a very small number of variables would be statistically significant by chance.[60]

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[57] Rubin, D. B. "Estimating causal effects of treatments in randomized and nonrandomized studies." *Journal of Educational Psychology* 66.5 (1974): 688-701.

[58] Experiments have limitations as well. While they can have very high internal validity, they can have other challenges, such as difficulties generalizing from the experimental results to a broader setting (external validity). (See Deaton, Angus, and Nancy Cartwright. *Understanding and misunderstanding randomized controlled trials*. No. w22595. NBER, 2016; and Rothstein, Jesse, and Till Von Wachter. Social experiments in the labor market. No. w22585. NBER, 2016.)

[59] Due to differential availability of data on registration or login dates, the research team uses registration date for South Seattle and login date for New Mexico. Also, refer to Exhibit 3.3.

[60] The statistical inference approach used throughout this report's statistical analysis is heteroskedasticity-robust and accounts for within-zip code (clusters) correlation across individuals.

Exhibit 5.10 shows the results of the LPM regression across the two cohorts.[61] Only one baseline variable in South Seattle's model (two or more races) and six variables in Central New Mexico (55 years old or older, African American only, Employment Status-Other, family size missing, family income less than $7500 in the six months since completing program application and last login between 61 and 90 days) are significant at conventional statistical levels. Given the large number of variables, a few statistically significant differences can be expected simply by chance.

Overall, the t-tests and results from the LPM regression point to the same conclusion: *the baseline characteristics in the NTO demonstration's evaluation were independent of treatment assignment, implying that randomization was successfully implemented*.[62]

Exhibit 5.10: Baseline Equivalence Using LPM

Explanatory Variables	South Seattle	Central New Mexico
Geography		
Pierce County resident	0.010 (0.084)	-
Snohomish County resident	-0.068 (0.063)	-
Sandoval County resident	-	-0.116 (0.133)
Valencia County resident	-	-0.059 (0.134)
Age Group		
18-24 years	-0.030 (0.046)	-
25-34 years	-0.064 (0.045)	-0.006 (0.012)
35-44 years	-0.060 (0.046)	-0.007 (0.013)
45-54 years	-0.058 (0.046)	0.000 (0.013)
55 or older	-0.050 (0.046)	-0.033** (0.013)
Missing (age)	-0.062 (0.050)	-
Race		
African American only	-0.000 (0.014)	-0.038* (0.022)
Hispanic only	-0.014 (0.024)	-
Asian only	0.009 (0.014)	-0.050 (0.037)
Pacific Islander or Native American only	-0.001 (0.028)	-0.013 (0.015)
Two or more races/ethnicities (South Seattle), Two or more races (Central New Mexico)	-0.029* (0.015)	-0.040 (0.026)
Missing (race)	-0.003 (0.014)	-0.002 (0.009)
Ethnicity		
Hispanic	-	-0.007 (0.010)

[61] Baseline variables are measured at the time of application or based on the calendar year prior to the application date. In the exhibit, all variables are measured at application date.

[62] A drawback of the LPM is that the predicted probability can be outside the [0,1] interval. The alternative option is to use a logistic model ("logit") or a probit regression. However, a logit/probit may suffer from misspecification due to the distributional assumptions needed for modeling—which could bias the estimates. LPM methods are widely used and preferred in economics papers and policy reports, since the main focus is not on the "prediction" aspect of the model (e.g., the specific predicted probability of the event), but rather on the validity of the causal inference (i.e., that the impact study produces an unbiased effect of the program).

Explanatory Variables	South Seattle	Central New Mexico
Missing (Hispanic)	-	0.011 (0.011)
Disability Status		
Disabled	-0.004 (0.016)	0.014 (0.014)
Missing (disability status)	0.019 (0.019)	-0.006 (0.018)
Highest Educational Level Completed		
Completed High School/GED	0.001 (0.013)	-0.002 (0.016)
Some College	-0.005 (0.013)	-0.000 (0.016)
Bachelor's Degree or Higher	-0.009 (0.011)	-0.001 (0.018)
Missing (education)	-0.018 (0.013)	-0.051 (0.176)
Veteran Status		
Veteran	0.002 (0.026)	0.017 (0.020)
Missing (veteran status)	0.002 (0.017)	-
Employment Status at the Time of Application		
Employed	0.009 (0.012)	-0.005 (0.009)
Other	-	-0.061** (0.024)
Participant is Looking for Work		
Yes	-	-0.012 (0.013)
Participant Received a Layoff Notice		
Yes	-	-0.005 (0.008)
Household Characteristics		
Family size	-	-0.002 (0.004)
Missing (family size)	-	-0.104** (0.045)
Family income: less than $7,500	-	-0.024* (0.013)
Family income: $7,500 or more	-	-0.006 (0.010)
Economic Assistance Status		
Food Stamps Recipient	-	-0.015 (0.009)
TANF Recipient	-	-0.009 (0.015)
Participant is Homeless	-	0.016 (0.011)
Other Characteristics		
Cohort 2 participant	0.000 (0.009)	-0.017 (0.074)
Last login/registration between 61 and 90 days before the intervention started	0.025 (0.018)	0.064** (0.025)
Last login/registration between 91 and 120 days before the intervention started	-0.014 (0.019)	0.017 (0.026)
Last login/registration more than 120 days before the intervention started	0.004 (0.015)	-0.002 (0.075)
Zip Code Fixed Effects	***Yes***	***Yes***
Sample size	***16,401***	***20,796***

Notes: Standard errors are reported in parentheses. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. Omitted categories for the South Seattle regression include: King County resident; less than 18 years old; White only; not Hispanic; not disabled; less than high school; not veteran; not employed; cohort 1 participant; last login in the workforce development system was 60 days or less before the intervention started. Omitted categories for the New Mexico regression include: Bernalillo County resident; 18 to 24 years old; White only; not Hispanic; not disabled; less than high school; not veteran; not employed;

participant not looking for work; participant did not received a layoff notice; family income is zero dollars; not food stamps recipient; not TANF recipient; not homeless; cohort 1 participant; last login in the workforce development system was 60 days or less before the intervention started. – refers to data not available.

5.5 IMPACT ANALYSIS

This section presents findings from the impact evaluation of confirmatory outcomes 1 (opened an email), 2 (clicked on a link in an email), and 3 (completed an interest form) for both South Seattle and Central New Mexico across the two cohorts. For each site and each outcome, the analysis presents the estimated *average* treatment effect among all women jobseekers in the sample for whom complete data is available, as well as the estimated treatment effects across subgroups of interest. Section 5.5.1 provides a summary of the methodologies used to estimate the impacts of the gender-themed treatment, explaining how the impact of each outcome was estimated. More technical details that are not necessary for this summary are discussed in Appendix E. Section 5.5.2 discusses the overall program impacts for both sites for all three confirmatory outcomes. Section 5.5.3 discusses subgroup impacts.

5.5.1 Methodology

Even though unbiased estimates of the treatment effect on outcomes can be obtained by contrasting the outcomes between the gender-themed treatment and generic-themed control groups, the evaluation team used multivariate regressions that control for baseline characteristics for two reasons: (1) to improve statistical power by removing variation in the outcome of interest due to observed characteristics; (2) to correct for any observable differences in the sample members' characteristics that occurred by chance between the two groups.

The impact analysis reported here used the following specification:

$$Y_i = \alpha + \beta T_i + X_i\delta + \varepsilon_i \qquad (1)$$

where

- Y_i is the outcome of interest (e.g., opening an email, clicking on a link in an email, and completing an interest form) for individual i;
- T_i is a dummy variable that equals one if individual i was assigned to the treatment group and 0 if assigned to the control group;
- X_i represents a vector of control variables that includes all baseline characteristics and also year and region fixed-effects;
- ε_i is the regression zero-mean error-term;
- α represents the intercept of the regression.

The parameter β, the parameter of interest, is the regression-adjusted treatment effect: it captures the relationship between the treatment and the outcome under consideration, after removing the common effects of control variables X_i. Our statistical inference is

heteroskedasticity-robust and accounts for within-zip code (clusters) correlation across individuals.[63]

Outcome 1. Given the above considerations, the evaluation team used Ordinary Least Squares (OLS) to estimate the gender-themed treatment effect by controlling for a comprehensive list of covariates. Exhibit 5.11 reports the list of covariates used for estimation of treatment effects in South Seattle and New Mexico. For covariates considered in one site only, the last column reports the reasons for exclusion in the other site, many due to missing data, which carry the risk of introducing bias. Race and ethnicity are not considered for Central New Mexico, for example, since over 40 percent of individuals in that site's sample were missing race/ethnicity data. The evaluation team used the email domain (such as gmail.com, yahoo.com, etc.) to control for potential association between preference of email service provider, and email use and web browsing behavior. Several socioeconomic variables like household income, TANF recipient status were not available for South Seattle.

For easy interpretation of the estimates, the results are from a linear probability model (LPM) for which the estimated coefficients can be directly interpreted as the effect, measured in percentage points, of the relevant variable on the likelihood of a positive outcome.

Exhibit 5.11: Covariates Controlled for in Estimation of Treatment Effects, both Sites

List of Covariates	South Seattle	New Mexico	Reason for Exclusion
Cohort	✓	✓	
Age, Age Squared	✓	✓	
Highest Education Level Completed	✓	✓	
Veteran Status	✓	✓	
Employment Status	✓	✓	
Disability Status	✓	✓	
Days between Intervention Start and Last Login/Registration in the Workforce System	✓	✓	
Geographic Region	✓	✓	
Race	✓		Too many missing
Hispanicity	✓		Too many missing
Email Domain	✓		Not available
Household Income, Household Income Squared		✓	Not available
TANF Recipient		✓	Not available
Food Stamp Recipient		✓	Not available
Participant is Looking for Work		✓	Not available
Participant Received a Layoff Notice		✓	Not available
Participant is Homeless		✓	Not available

[63] Geographic region is represented by ZIP code if at least 50 individuals in the sample resided in that ZIP, by county code otherwise.

Note: Geographic region is represented by ZIP code if at least 50 individuals in the sample reside in that ZIP, and by county code otherwise. Email domains are coded separately for the top 9 most frequently used domains, and all the rest domains are coded as one category. In South Seattle, due to data availability, individuals were selected based on their registration date rather than their last login date.

Outcomes 2 (clicking on a link in an email) and 3 (completing an interest form). The aforementioned approach to measuring treatment-control differences used above only works for outcome 1 (opened an email). Since outcomes 2 (clicked on a link in an email) and 3 (completed an interest form) are only observed for those who completed the previous outcome, the analysis should correct for the fact that jobseekers are self-selecting themselves into outcomes 2 and 3 completion—thus undermining the simple equivalence of randomness of assignment between treatment and control groups. Selection bias will occur if any unobserved individual characteristics that affect the likelihood of observing a positive outcome 1 or 2 (such as a preference for seeking job opportunities online) are different between treatment and control group individuals.

To correct the potential selection bias associated with outcomes 2 and 3, the evaluation team used propensity score matching (PSM), a predictive modelling–based quasi-experimental method that enables matching treatment and control group individuals using their predicted propensity scores.[64,65,66] Propensity scores measure the probability of responding with a positive outcome *at the previous stage or outcome* for both treatment and control groups. Thus, the propensity of each sample individual responding with a positive outcome 1 is estimated to correct for selection bias in estimating the impact of outcome 2. Similarly, the propensity of each sample individual responding with a positive outcome 2 is estimated to correct for selection bias in estimating the impact of outcome 3. Logistic models were used to estimate the propensity scores or probabilities of response to the previous outcomes. The treatment group individuals were then matched with control group individuals who had similar propensity scores, and the differences between the two groups estimated.[67] This technique reduces selection bias to the extent that the propensity scores closely represent the unobserved tendency of selection from the previous outcome to the current one.

The validity of PSM heavily relies on the preservation of randomization in the post-matching sample. The balancing property ensures random assignment to treatment and guarantees that women jobseekers with the same probability of treatment can be paired for comparison. The randomization can be evaluated by a series of balancing tests, which usually consist of (1) a single Chi-squared test for the joint distribution of the entire set of covariates between treatment and

[64] Heckman, J. J., Ichimura, H., & Todd, P. (1998). Matching as an econometric evaluation estimator. *Review of Economic Studies*, *65*(2), 261-294.

[65] PSM relies on the conditional independence assumption: the counterfactual outcome (the participants' outcomes if they had not participated in the program) is independent of participation, controlling for observed characteristics.

[66] We also considered the method of Analysis of Symmetrically Predicted Endogenous Subgroups (ASPES, Peck, 2003), an alternative method to propensity score matching (PSM) that addresses the sample selection issue. However, the validity of ASPES heavily relies on an additional strong assumption that can easily fail in this analysis. See: Peck, L. R. (2003). Subgroup analysis in social experiments: Measuring program impacts based on post-treatment choice. *The American Journal of Evaluation*, 24(2), 157-187.

[67] For matching in PSM, we use 5 nearest neighbors of propensity scores. We also conducted the same analysis with 1 and 2 nearest neighbors. The results remain essentially unchanged. See Appendix E for details.

control group individuals, and (2) a set of t-tests for individual covariates between treatment and control group individuals. While the Chi-squared test reveals the overall similarity between treatment and control groups, the individual t-tests identify any covariates that are particularly different between the two groups—thus flagging the covariates that contribute most to the loss in randomization.[68] The Chi-squared statistics from the test are presented in the next section. The individual t-test results are reported in Appendix E, which also provides a thorough technical documentation of the evaluation team's PSM approach.

The sample for the final impact evaluation then consists of pairs of matched treatment and control group individuals who have similar propensity scores. Impact estimates for outcome 2 are estimated on the pair of matched treatment and control groups with a similar propensity of completing outcome 1. The estimated treatment effect on outcome 2 is then interpreted as the effect of gender-themed outreach content on women jobseekers' likelihood of clicking on a link in an email, *conditional on* opening the email. For outcome 3, the estimated treatment effect is interpreted as the effect of gender-themed content on women jobseekers' likelihood of completing the interest form, *conditional on* clicking on a link in an email.

5.5.2 Overall Program Impacts

This section presents the impact of the multi-pronged recruitment intervention for the three confirmatory outcomes for South Seattle and Central New Mexico. The PSM correction is applied to the South Seattle and Central New Mexico samples separately, yielding the PSM-based estimates of treatment effects for outcome 2 for both sites. Outcome 3 is only estimated for Central New Mexico, because the small sample of 24 South Seattle sample individuals who completed outcome 3 and had no missing data on baseline covariates was too small for meaningful statistical inference. Given this limitation in sample size, for the South Seattle sample the estimated treatment effect on outcome 3[69] must be interpreted as the effect of gender-themed content on outcome 3 (completed an interest form) *unconditional* on either email opening or link clicking.

Exhibit 5.12 presents the results of the impact analyses for both South Seattle and Central New Mexico. Full regression results are provided in Appendix F. The **South Seattle** estimates suggest that the gender-themed content had an overall positive impact. While there is essentially no impact on outcome 1 (opened an email), the impact on outcome 2 (clicked on a link in an email) is statistically significant and positive. Compared to the matched control group who received generic recruitment content, South Seattle women jobseekers who received targeted gender-themed outreach materials were 5.6 percentage points more likely to click a link in an email. This impact translates to a 72 percent increase relative to the 7.8 percent mean probability of clicking the link in the email among the matched control group individuals.

[68] Caliendo, M. and Kopeinig, S. "*Some Practical Guidance for the Implementation of Propensity Score Matching*," IZA Discussion Paper No. 1588, May 2005.

[69] We assigned valid values for outcome 3 to all individuals in the entire South Seattle sample. For those who did not open the email (outcome 1) or did not click the link in an email (outcome 2), we define their outcome 3 as zero, the same as those who clicked the link but did not complete the form. Since we can use the entire randomized sample for this purpose, we simply use LPM for estimating the treatment effect.

The Chi-square statistic of the balance test is equal to 1, the maximum value, suggesting that treatment and control groups in the matched sample were highly similar based on the distribution of the covariates. This result verifies the randomization of the matched sample used for deriving the PSM-based estimates.

The impact appears to continue to the next outcome. The *unconditional* probability of completing the interest form is 0.3-percentage points higher among women who received the gender-themed content, compared to the control group who received the generic content.

Exhibit 5.12: Multi-Mode Outreach Intervention Impacts

	South Seattle			Central New Mexico		
	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing the Interest Form	Outcome 1, Opening an Email	Outcome 2, Clicking a Link	Outcome 3, Completing the Interest Form
Treatment	0.004 (0.009)	0.056** (0.019)	0.003*** (0.001)	-0.013* (0.006)	-0.022 (0.017)	-0.008 (0.079)
Mean Completion Rates among Control Group	0.333	0.078	0.002	0.375	0.217	0.603
Balance Test: Probability > Chi-squared	*N.A.*	*1.000*	*N.A.*	*N.A.*	*1.000*	*1.000*
Geographic Region Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Sample Size	*11,550*	*1,265*	*11,550*	*20,004*	*2,430*	*272*

Note: Standard errors are reported in parentheses and are clustered at the geographic region level. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. Balancing test is not required without the propensity score matching correction. Independent variables controlled in all LPM regressions for South Seattle include age and age squared, number of days between the intervention start date and the jobseeker's registration date, and following indicators: second cohort, African American, Asian, Native American or Pacific Islander, mixed race, Hispanic ethnicity, high school degree, partial college education, college degree or higher, veteran status, employment status, disability status, email domain, and geocode. Geocode is defined as ZIP code for individuals with ZIP codes that have at least 50 individuals in the sample, as county code otherwise. Email domain is defined as the domain of the jobseekers' email address' domains, such as Gmail, Yahoo!, and AOL. Email domain is categorized into 10 groups, with the first 9 groups representing the top 9 domains in the sample, and the last group representing all the other domains. Independent variables controlled in all LPM regressions for Central New Mexico include age, age squared, household income, household income squared, number of days between the intervention start date and the jobseeker's last login date, and following indicators: second cohort, high school degree, partial college education, college degree or higher, veteran status, employment status, job-seeking status, status of receive layoff notice, disability status, TANF recipient status, food stamp recipient status, homelessness status, and geocode. Regressions for outcome 2 for both sites and outcome 3 for Central New Mexico are weighted, with weight for treatment group observations equal to 1, and weight for control group observations equal to the sum of contribution to all matches in the sample where contribution in a given match is defined as the inverse of number of matches the associated treatment group individual has under propensity score matching. Propensity score is predicted using logistic regression with the same list of covariates. Matching is identified for the five nearest neighbors measured by difference in propensity cores, with no restriction of maximum difference.

The right-hand side of Exhibit 5.12 presents the impact estimates of the multi-mode outreach intervention on outcomes 1 through 3 for the **Central New Mexico** sample. Here, with a larger sample, the evaluation team applied the PSM-based LPM to analyze the *conditional* treatment effect on both outcomes 2 (clicked on a link in an email) and 3 (completed an interest form). The Chi-square statistics of the balance tests for both outcomes show good preservation of randomization of the post-matching sample.

The impact estimates are notably different from those derived from the South Seattle sample. First, there is a statistically significant *negative* impact of 1.3 percentage points on outcome 1 (opened an email). Note that, at this phase of the intervention, the jobseekers had been exposed *only* to the subject lines in emails. The evaluation team suspects that the negative effect is driven by the revelation of some information in the email subject line that is misaligned with career preference among women jobseekers in Central New Mexico (see Exhibit A.1 in Appendix A).

The negative effect of 2.2 percentage points continues for outcome 2 (clicked the link in an email), and 0.8 percentage point on outcome 3 (completed an interest form). However, the statistical significance associated with these estimates *disappears*, suggesting the negative effects are largely driven by data noise. In particular, for outcome 3, once jobseekers who clicked a link in an email were exposed to the interest form, the impact estimate is essentially zero. Not only is the magnitude of the point estimate much smaller, but there is also a large increase in the standard error.

The evaluation team suspects that negative effects across the three outcomes in Central New Mexico and the disappearance of significant negative effects over the course of the recruitment treatment are plausibly driven by: (i) a misalignment effect at an early stage (outcome 1)—that the gender-themed subject lines may have signaled some features of the program the women jobseekers perceived as unappealing compared to the generic program content; and (ii) a learning effect at later stages (outcome 2 and 3)—that conditional on exposure to the targeted email content and websites, jobseekers updated their knowledge about the program and became more willing to participate.

The positive and significant results in South Seattle following exposure to the targeted email content and websites indicate the significance of developing gender-themed recruitment materials in encouraging them to consider NTOs. More specifically, these results indicate that barriers associated with lack of information about NTOs, in general, and negative perceptions women may have about working in NTOs can be reduced by providing corrective information that addresses their misperceptions.

5.5.3 Subgroup Impacts

The impact estimates based on the full sample of women jobseekers represent the average impacts of the gender-themed content on all treatment individuals taken together. Since these estimates could potentially mask underlying impacts on key subgroups, the evaluation team also estimated program impacts across selected subgroups. Exhibit 5.13 presents a selected set of subgroup analysis results. The first row repeats the average treatment effects from Exhibit 5.12 for reference; each subsequent panel reports the estimated treatment effects for the respective subgroups of interest. Based on the methodology laid out in Section 5.5.1, subgroup impacts on outcome 2 in South Seattle and outcomes 2 and 3 in Central New Mexico are based on PSM corrected models.

To estimate subgroup effects, the evaluation team implemented the following specification separately for each subgroup:

$$Y_i = \alpha + \sum_{k=1}^{K} \beta_k T_i SUBGROUP_i^k + X_i\delta + \varepsilon_i$$

where $SUBGROUP_i^k = 1$ if individual i is in subgroup k (e.g., veteran) and 0 otherwise. This specification allows us to directly estimate separate program impacts for each subgroup compared to the control group, referred to as β_k's from the equation above.

Exhibit 5.13: Multi-Mode Outreach Intervention Impacts among Subgroups

Covariates	South Seattle			Central New Mexico		
	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing the Interest Form	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing the Interest Form
Treatment						
Treatment	0.004 (0.009)	0.056*** (0.019)	0.003*** (0.001)	-0.013* (0.006)	-0.022 (0.017)	-0.008 (0.079)
Treatment x						
Age Groups						
18-24 years	-0.031 (0.028)	0.098 (0.076)	0.006 (0.004)	0.019 (0.014)	0.048 (0.039)	-0.152 (0.251)
25-34 years	-0.009 (0.014)	0.043 (0.036)	0.004* (0.002)	-0.027*** (0.008)	-0.024 (0.033)	-0.129 (0.103)
35-44 years	-0.010 (0.015)	0.011 (0.035)	0.005** (0.002)	-0.040*** (0.011)	-0.053* (0.029)	0.012 (0.098)
45-54 years	0.006 (0.016)	0.091** (0.036)	0.003 (0.002)	-0.009 (0.016)	-0.064** (0.027)	0.095 (0.126)
55 or older	0.037** (0.015)	0.067* (0.040)	0.002 (0.002)	0.014 (0.013)	0.023 (0.037)	0.000 (0.164)
Highest Education Level Completed						
Less than High School	0.014 (0.015)	0.093** (0.036)	0.003 (0.002)	0.008 (0.023)	-0.090 (0.083)	-
Completed High School/ GED	-0.026 (0.021)	0.056 (0.043)	0.004 (0.002)	-0.005 (0.011)	-0.002 (0.033)	-0.080 (0.166)
Some College	-0.007 (0.023)	-0.017 (0.061)	-0.001 (0.003)	-0.015 (0.010)	-0.027 (0.024)	-0.004 (0.070)
Bachelor's Degree or Higher	0.017 (0.017)	0.060* (0.032)	0.006*** (0.002)	-0.023 (0.015)	-0.024 (0.033)	0.055 (0.230)
Veteran Status						
Not veteran	0.004 (0.009)	0.056*** (0.019)	0.003*** (0.001)	-0.012* (0.006)	-0.020 (0.018)	-0.013 (0.081)
Veteran	0.001 (0.053)	0.071 (0.117)	-0.000 (0.001)	-0.027 (0.032)	-0.060 (0.064)	0.197 (0.282)
Disability Status						
Not disabled	0.004 (0.009)	0.063*** (0.020)	0.003** (0.001)	-0.008 (0.006)	-0.029 (0.020)	-0.028 (0.086)
Disabled	0.011 (0.033)	-0.034 (0.080)	0.005 (0.004)	-0.073*** (0.026)	0.070 (0.066)	0.186 (0.256)
Employment Status at the Time of Application						

Covariates	South Seattle			Central New Mexico		
	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing the Interest Form	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing the Interest Form
Not Employed	0.003 (0.009)	0.054*** (0.019)	0.002** (0.001)	-0.012* (0.006)	-0.016 (0.020)	-0.022 (0.091)
Employed	0.011 (0.023)	0.070 (0.050)	0.011* (0.006)	-0.016 (0.015)	-0.043 (0.037)	0.034 (0.151)
Ethnicity						
Not Hispanic	0.006 (0.009)	0.054*** (0.018)	0.003*** (0.001)	-	-	-
Hispanic	-0.075 (0.050)	0.181 (0.188)	0.008 (0.007)	-	-	-
Household Characteristics						
Household Income: $0	-	-	-	-0.016** (0.008)	-0.026 (0.019)	-0.007 (0.088)
Household Income: $1 to $7,499	-	-	-	-0.005 (0.013)	-0.014 (0.031)	0.161 (0.104)
Household Income: $7500+	-	-	-	-0.007 (0.014)	-0.015 (0.030)	-0.067 (0.153)
Household Size: 1 person	-	-	-	-0.140** (0.064)	0.131 (0.208)	-
Household Size: 2 people	-	-	-	-0.012* (0.007)	-0.030 (0.020)	0.051 (0.091)
Household Size: 3 people	-	-	-	-0.008 (0.013)	0.036 (0.032)	-0.239 (0.174)
Household Size: 4+ people	-	-	-	-0.016 (0.020)	-0.036 (0.038)	-0.188 (0.150)
Mean among control group	0.333	0.078	0.002	0.375	0.217	0.603
Balance Test: P > χ^2	-	1.000	-	-	1.000	1.000
Sample Size	11,550	1,265	11,550	20,004	2,430	272

Note: Standard errors are reported in parentheses and clustered at the geographic region level. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. Treatment is interacted with indicators for subgroups, generating interaction terms as covariates. Balancing test is not required without the PSM correction. Independent variables controlled in all LPM regressions for South Seattle include age and age squared, number of days between intervention start date and jobseeker's registration date, and the following indicators: second cohort, African American, Asian, Native American or Pacific Islander, mixed race, Hispanic ethnicity, high school degree, partial college education, college degree or higher, veteran status, employment status, disability status, email domain, and geocode. Geocode is defined as ZIP code for individuals with ZIP codes that have at least 50 individuals in the sample, and as county code otherwise. Email domain is defined as the domain of the jobseekers' email address' domains, such as Gmail, Yahoo!, and AOL. Email domain is categorized into 10 groups, with the first nine groups representing the top nine domains in the sample, and the last group representing all other domains. In South Seattle, data sent by ESD combined information on ethnicity and race, and respondents, were able to choose multiple races/ethnicities, and thus "Hispanic" refers to any jobseeker that declared herself as Hispanic, regardless if she also said she is White or African American. Independent variables controlled in all LPM regressions for Central New Mexico include age, age squared, household income, household income squared, number of days between the intervention start date and the jobseeker's last login date, and following indicators: second cohort, high school degree, partial college education, college degree or higher, veteran status, employment status, job-seeking status, status of receive layoff notice, disability status, TANF recipient status, food stamp recipient status, homelessness status, and geocode. Geocode is defined as ZIP code for individuals with ZIP codes that have at least 50 individuals in the sample, and as county code otherwise. For outcome 3 in Central New Mexico, treatment is not interacted with indicator for the household size 1 category, due to zero observations of such individuals in the treatment group in the post-PSM sample. Regressions for outcome 2 for both sites and outcome 3 for Central New Mexico were weighted, with weight for treatment group observations

equal to 1, and weight for control group observations equal to the sum of contribution to all matches in the sample, where contribution in a given match is defined as the inverse of number of matches the associated treatment group individual has under PSM. Propensity score was predicted using logistic regression with the same list of covariates. Matching was identified for the five nearest neighbors measured by difference in propensity cores, with no restriction of maximum difference. - denotes data not available.

Starting with **South Seattle** on the left-hand side of Exhibit 5.13, for outcome 1, the subgroup analyses show that opening an email—although the overall impact estimate is not significant and small in magnitude—had significant effects among certain subgroups. The oldest age group (age 55 and above) experienced a treatment effect of 3.7 percentage points compared to the control group. Also, Hispanic women jobseekers experienced a *negative* treatment effect of 7.5 percentage points compared to the control group, with a relatively small standard error of 0.050.[70] One possible explanation, as noted earlier, is that the gender-themed subject lines turned out to *misalign* with the career preferences of women Hispanic jobseekers in South Seattle area, while the generic subject lines did not signal such misalignment. Such a difference could cause this subgroup to have been *more* likely to disregard the email with the gender-themed materials, leading to no effect on outcomes 2 and 3 for women Hispanic jobseekers in Central New Mexico.

For outcome 2 (clicked on a link in an email), the sizable overall impact estimate from Exhibit 5.12 is also apparent across numerous subgroups. In particular, the effect of being exposed to gender-themed content is statistically significant at 9.1 percentage points for jobseekers ages 45-54 and 6.7 percentage points for those ages 55 or above compared to the matched control group. The effect is also significant for the least educated (less than high school) and the most educated (with a college degree) jobseekers, at 9.3 and 6.0 percentage points, respectively. Non-veterans and non-Hispanics in the gender-themed treatment group are 5.6 and 5.4 percentage points significantly more likely to complete outcome 2 (click on a link in an email), compared to the matched control group. The other notable subgroup results among the gender-themed treatment group include a 6.3 percentage point impact on women jobseekers with no disability, and a 5.4 percentage point impact on jobseekers that are not employed.

For outcome 3, the *unconditional* interest form completion, the subgroup results are qualitatively similar to those found for outcome 2, except that the effects among age groups are now driven by women jobseekers ages 25-34 and 35-44, and the effect becomes non-significant for the least educated women jobseekers. Positive effects remain among the gender-themed treatment group women in the non-Hispanic group, the most educated group, non-veterans, non-disabled, and those not employed, with magnitudes ranging from 0.2 to 0.6 percentage points. Additionally, there is a positive effect on outcome 3 among employed jobseekers in the gender-themed treatment group, who are 1.1 percentage points more likely to complete the form. This emergence of a positive treatment effect for outcome 3 suggests a learning effect—that employed women jobseekers are likely to consider training programs in NTOs when they *have had the chance* to be exposed to the actual gender-themed content from the websites and emails.

[70] Although not significant at the 10 percent level, the p-value of the coefficient estimate of treatment effect on the Hispanic jobseekers is only 0.132.

The right-hand side of Exhibit 5.13 displays the effects of the intervention on confirmatory outcomes among subgroups in **Central New Mexico**. The treatment subgroups among women jobseekers that contribute most to the overall negative treatment effect on outcome 1 (opened an email) are those ages 25-34 (-2.7 percentage points), and 35-44 (-4.0 percentage points), those with no income (-1.6 percentage points), non-veterans (-1.2 percentage points), those living in one-person household (-14.0 percentage points), those who are disabled (-7.3 percentage points), and those not employed (-1.2 percentage points).

For outcome 2 (clicked on a link in an email), the non-significance of the overall impact estimate carries over across all subgroups, except for the negative effects of 5.3 and 6.4 percentage points found among those with ages between 35-44 and 45-54, respectively, compared to the matched control groups.

For outcome 3 (completed an interest form), non-significant treatment effects continue to prevail across subgroups. The most noteworthy results relate to the subgroups for which the negative treatment effects on outcomes 1 and/or 2 disappear. These subgroups of women jobseekers include three age groups (25-34, 35-44, and 45-54), non-veterans, those who are disabled, those not employed, those with zero income, and those in two-person households. Overall, the evaluation team considers this disappearance of significantly negative impacts as evidence of a learning effect across several of the different subgroups among Central New Mexico women jobseekers. In other words, the Central New Mexico reversal of the sign of effect for the later outcomes supports a learning effect theory—that women jobseekers in the treatment group within these subgroups were more likely to consider training programs in NTOs when they *had had the chance* to be exposed to the actual targeted content from the websites and emails.

5.6 PUTTING THE RESULTS IN CONTEXT

This section provides economic, industry, and demographic context for the differences in impact analysis results and response rates across the two demonstration sites. The discussion in this section provides suggestive evidence of factors that may plausibly have driven different response rates between sites; they cannot be interpreted, however, to infer any causality.

5.6.1 Economic Context

Examining economic context of both regions is critical to understanding differences in impact analysis results and completion rates across the two sites. Jobseekers in poorer regions with higher unemployment rates and lower median household income are more likely to consider training opportunities regardless of content used to conduct outreach for these opportunities. The South Seattle and Central New Mexico regions differ across a number of economic measures that can influence a community's demand for workforce training programs (Exhibit 5.14). The South Seattle region has a lower unemployment rate, significantly higher median household income, more residents with high school degrees or higher, and fewer residents living below the

poverty line compared with the Central New Mexico region.[71] All these characteristics are likely to influence the demand for, and possibly the perception of, the AAI training programs participating in the demonstration. In addition, the higher overall response rate observed in Central New Mexico could be due, in part, to a greater economic need among families in Central New Mexico to find new sources of income—given the higher unemployment rate, higher poverty rate, and lower median household income compared with their counterparts in South Seattle.

Exhibit 5.14: Regional Economic Indicators

Economic Indicators	South Seattle	New Mexico
Unemployment Rate	6.5%	8.8%
Median Household Income	$71,265	$50,313
Living Below Poverty Line	10.9%	18.8%
High School Graduate or Higher	91.8%	86.9%

Source: U.S. Census Bureau, 2016 American Community Survey (ACS) 5-year estimates.

5.6.2 Industry Context

In addition to the economic indicators, the NTO industries associated with the training programs could influence the communities' perceptions of occupations in these industries, as suggested by differences across the industries related to: (1) recent and projected growth and (2) occupational characteristics (see exhibit 5.15).

Exhibit 5.15: Industry Indicators

Industry Indicators	South Seattle		New Mexico
	Construction	Advanced Manufacturing	Information Technology
Industry Establishments			
Number of Establishments (2012)[72]	17,747	6,992	457
Percent Change in Number of Establishments (2007-2012) [72]	-20.7%	-8.6%	+0.7%
Industry Employment			
Total Employment (April 2018) [72]	124,000	176,700	7,500
Percent Change in Total Employment (2007-2012) [72]	-30.3%	-8.0%	+2%
Percent of Total Employment (April 2018) [73]	6.1%	8.6%	1.9%

[71] South Seattle region refers to King, Pierce, and Snohomish Counties. Central New Mexico region refers to Bernalillo, Sandoval, and Valencia Counties.

[72] Source: 2012 Economic Census: https://www.census.gov/econ/snapshots/index.php. NAICS codes used: 23 (Construction), 31-33 (Manufacturing), 5415 (Computer Systems Design and Related Services). Data points relate to Washington State and New Mexico.

[73] Source: Albuquerque Area Economic Summary (https://www.bls.gov/regions/southwest/summary/blssummary_albuquerque.pdf) and Seattle Area Economic Summary

Industry Indicators	South Seattle		New Mexico
	Construction	Advanced Manufacturing	Information Technology
Projected Growth in Employment (2024 in New Mexico, 2025 in Washington State) [74]	+0.6%	-1.6%	+6.7%

Recent and Projected Growth. Both the construction and manufacturing industries in Washington State lost establishments between 2007 and 2012, in contrast to the IT industry in New Mexico, which saw a small increase in the number of establishments during the same timeframe. Employment in construction and manufacturing in Washington also decreased between 2007 and 2012, whereas IT in New Mexico saw employment increase. Further, employment in New Mexico's IT industry is projected to grow more than five percent over the next several years, compared to minimal growth expected in construction and negative growth expected in manufacturing. Both recent and projected growth in IT may have contributed to the higher response rate observed in the Central New Mexico demonstration site.

Occupation Characteristics. Each of the three industries associated with the demonstration training include a wide range of occupations. And while there is great variation in characteristics across specific occupations, general perceptions may prevail that may influence a decision to pursue a career in these industries. Work in the trades is very physical, and often outdoors. While employers point out that advance manufacturing jobs are now high tech and in clean and controlled environments, the industry continues to suffer from a DDD reputation: dirty, dangerous, and difficult. Additionally, construction and manufacturing typically require an early start time, as well as overtime work; manufacturing is often associated with shift work, while varying job sites are often associated with construction. These occupational characteristics are especially negative for working mothers and may have contributed to the lower response rates in South Seattle. While some jobs in IT may have similar negative characteristics, the industry as a whole is less likely to be seen as dominated by them.

5.6.3 Demographic Context

The demographic make-up of the local areas may have influenced the responses and overall impact estimates across the two sites. The evaluation team's review of the relevant literature[75] makes it clear, for example, that gender plays a major role in how individuals perceive occupations in non-traditional industries. And a number of other studies have shown that men

(https://www.bls.gov/regions/west/summary/blssummary_seattle.pdf). Industries selected: Construction, Manufacturing, Information. Data points relate to Albuquerque and Seattle Areas. Percentages calculated from nonfarm employment.

[74] Source: 2015-2025 employment growth forecast in Washington State (https://fortress.wa.gov/esd/employmentdata/docs/industry-reports/2017-projections-report.pdf) and 2014-2024 industry projections report in New Mexico (https://www.dws.state.nm.us/Portals/0/DM/LMI/2014_2024_NM_Industry_Projections_Report.xlsx). Industries selected: Construction, Manufacturing, Data processing, hosting, and related services.

[75] Nanda, N., Corea, C., Roy, M., Patterson, L.., Poe-Yamagata E., (2018). *Feasibility Study and Evaluation of Non-Traditional Occupation Demonstrations - Literature Review Report.*

and women express greater interest in occupations that traditionally employ their gender.[76] There is also evidence that race and age may influence how individuals think about different industries, occupations, and training programs. This section considers how the age and race of the South Seattle and Central New Mexico demonstration samples may have influenced the respective response rates in the two demonstration sites.

Age. The South Seattle sample tended to be older than their peers in Central New Mexico, with 22.7 percent of the South Seattle sample ages 55 or older versus only 17.5 percent in the Central New Mexico sample. Older workers face a unique set of barriers to training and employment, including age discrimination and skill deficiencies specifically linked to technology.[77] The larger share of jobseekers younger than 35 years in Central New Mexico (43.3 percent) compared to South Seattle (31.1 percent) may have contributed to the relatively higher response rate in the Central New Mexico site. In contrast, participation in some physically demanding jobs declines with age,[78] making it plausible that South Seattle's relatively older sample may help explain the overall lower response rate in the South Seattle demonstration site.

Exhibit 5.16: Age, Race, and Ethnicity Breakdown by Demonstration Site

Characteristics	South Seattle	Central New Mexico
Age Groups		
18-24 years	8.5%	14.8%
25-34 years	22.6%	28.5%
35-44 years	20.4%	21.1%
45-54 years	22.6%	18.1%
55 or older	22.7%	17.5%
Race/Ethnicity		
White only	55.0%	40.5%
African American only	11.8%	2.7%
Asian only	10.7%	0.9%
Hispanic	7.5%	30.7%

Notes: sample proportions were calculated excluding missing values. Race and ethnicity are not mutually exclusive, and thus someone may be counted in the "White only" category as well as in the "Hispanic" category.

Race and Ethnicity. Perceptions of occupations as well as perceived career opportunities/barriers are influenced by race, with research indicating that minorities perceive greater barriers to

[76] Crawley, D. (2014). Gender and perceptions of occupational prestige: Changes over 20 years. *SAGE Open, 4,* 1–11. https://doi.org/10.1177/2158244013518923.

[77] Lee, C. C., Czaja, S. J., Sharit, J. Training older workers for technology-based employment. *Educational Gerontology*. 2008;35(1):15–31. doi: 10.1080/03601270802300091.

[78] Vendramin, P. and Valenduc, G. *Occupations and Ageing at Work - An Analysis of the Findings of the Fifth European Working Conditions Survey (October 30, 2012).* ETUI Working Paper 2012.09. Available at SSRN: https://ssrn.com/abstract=2202794 or http://dx.doi.org/10.2139/ssrn.2202794

occupations compared to their White counterparts. [79,80,81] As shown in Exhibit 5.16, South Seattle's sample had a larger share of White only jobseekers (55 percent) compared to the Central New Mexico sample (40.5 percent), and nearly one-fourth of the South Seattle sample was African American or Asian only (compared to less than 4 percent in Central New Mexico). This differential racial composition may also have affected the overall response rate.

5.6.4 Training Programs

The difference in type of training program (i.e., apprenticeship vs. pre-apprenticeship) offered through each demonstration site may have led to different completion rates as well as different impacts of the gender-themed content. While both sites offered entry-level programs, South Seattle offered only pre-apprenticeship programs while Central New Mexico offered an apprenticeship program, including paid on-the-job work experience. The extent to which the paid on-the-job learning nature of Central New Mexico's program was more appealing to recipients compared to South Seattle's pre-apprenticeship option may have contributed, not only to a higher response rate, but also to lack of statistically significant treatment-control differences in completion for outcomes 2 (clicked on a link in an email) and 3 (completed an interest form) in South Seattle.

5.7 CONCLUSION

This chapter provides the results of the impact analysis of the multi-pronged outreach intervention in South Seattle and Central New Mexico. The evaluation team tested the effectiveness of gender-themed recruitment content on short-term behavioral outcomes aimed at encouraging more women to consider careers in the NTOs of construction and advanced manufacturing in South Seattle and IT in Central New Mexico. Four major conclusions can be drawn from the impact analyses presented in this chapter.

- **Importance of Multiple Modes and Reminders** – Analysis of outcome completion rates over time suggested that the sharp increases in outcome completion following each reminder could point to the importance of multiple nudges using multiple modes and reminders to spur action among jobseekers.
- **Exploratory Outcomes** – Completion rates for the two exploratory outcomes—outcome 4 (looked for more information about the program) and outcome 5 (enrolled in a program)—were low overall in the two demonstration sites as well as for both treatment and control groups within sites. Despite this, the multi-mode outreach intervention was successful in encouraging many women to seek more information about the programs, and in Central New Mexico, enroll in the program. The number of women jobseekers who applied for the program (91) in Central New Mexico accounted for almost a third of the

[79] Bigler, R. S. and Averhart, C. J. *Race and the Workforce: Occupational Status, Aspirations, and Stereotyping Among African American Children*. The University of Texas at Austin and Lynn S. Liben, The Pennsylvania State University; *Developmental Psychology,* Vol. 39, No. 3.

[80] Fouad, N. A.. and Byars-Winston, A. M. (2005). Cultural Context of Career Choice: Meta-Analysis of Race/Ethnicity Differences. *The Career Development Quarterly*, 53: 223-233. doi:10.1002/j.2161-0045.2005.tb00992.x

[81] McWhirter, E. H. (1997). Perceived barriers to education and career: Ethnic and gender differences, *Journal of Vocational Behavior,* 50, 124-140

300 available program slots, perhaps due to the on-the-job training with an opportunity to earn and learn offered by this site.

- **Overall Impact Estimates** – Below, we summarize the estimated impacts of the NTO demonstration in the two demonstration sites, as measured by the differences in outcomes between the gender-themed treatment group and the generic-themed control group:

South Seattle (Construction and Advanced Manufacturing)

- The evaluation team found no statistically significant impact of receiving gender-themed content on completion of outcome 1 (opened an email).
- Women jobseekers who received gender-themed content and opened the emails were 5.6 percentage points more likely than those in the matched control group who received generic content to complete outcome 2 (clicked on a link to an email).
- The *unconditional (on either email opening or link clicking)* probability of completing outcome 3 (completed an interest form) was 0.3 percentage points higher among women who received gender-themed content compared to the control group.

Central New Mexico (Information Technology)

- The evaluation team found a statistically significant negative impact of 1.3 percentage points on outcome 1 (opened an email). It is noteworthy that at this phase of the intervention, the jobseekers had been exposed *only* to the email subject lines.
- Women jobseekers who received gender-themed content and completed outcome 1 (opened an email) experienced a statistically insignificant positive impact (2.2 percentage points) on completing outcome 2 (clicked on a link in an email) compared to the matched control group.
- Women jobseekers who received gender-themed outreach materials and completed outcomes 1 (opened an email) and 2 (clicked on a link in an email) experienced a small, statistically non-significant negative impact (-0.8 percentage points) on completing outcome 3 (completed an interest form) compared to the matched control group.

- **Subgroup Impact Estimates** – The evaluation team's impact analyses detected highly heterogeneous treatment effects among subgroups of interest in both sites.

South Seattle (Construction and Advanced Manufacturing)

- Women 55 or older experienced a positive and significant gender-themed treatment effect of 3.7 percentage points on outcome 1 (opened an email) compared to the control group.
- For outcome 2 (clicked on a link in an email), the *conditional* effect of being exposed to gender-themed content is statistically significant at 9.1 percentage points for women jobseekers ages 45-54 and 6.7 percentage points for women jobseekers ages 55 or older. Women jobseekers who were non-Hispanic and not employed were both 5.4 percentage points significantly more likely to complete outcome 2 compared to the matched control group. Other notable subgroup results among the gender-themed treatment group include a 5.6 percentage points higher likelihood of

completing outcome 2 (clicked on a link in an email) for non-veterans, as well as those without a disability (6.3 percentage points), and those without a high school degree (9.3 percentage points) or with college education or higher (6.0 percentage points).

- For outcome 3 (completed an interest form), *unconditional* on having completed outcome 2 (among all women who received the intervention), women jobseekers ages 25-34 and 35-44 who were exposed to the gender-themed content were significantly more likely to complete the interest form compared to the control group. Positive and statistically significant effects remained among women jobseekers who were non-Hispanic women jobseekers, who had a college degree or higher, who were non-veterans, who were non-disabled, who were not employed, and who were employed, with magnitudes ranging from 0.2 to 1.1 percentage points.

Central New Mexico (Information Technology)

- Female jobseekers in the following subgroups were the main contributors to the negative effect on outcome 1 (opened an email) among the gender-themed treatment group: ages 25-34 (-2.7 percentage points), ages 35-44 (-4.0 percentage points), with no income (-1.6 percentage points), non-veterans (-1.2 percentage points), living in one-person households (-14 percentage points), living in two-person households (-1.2 percentage points), disabled (-7.3 percentage points), and not employed (-1.2 percentage points).
- Women jobseekers among the gender-themed treatment group ages 35-44 and 45-54 were less likely to complete outcome 2 (clicked on a link in an email) by 5.3 and 6.4 percentage points, respectively, compared to the matched control group.
- For outcome 3 (completed an interest form), the non-significance of the overall impact estimate *conditional* on completing outcomes 1 and 2 carries over across all subgroups.

CHAPTER 6. STUDY IMPLICATIONS AND NEXT STEPS

The previous chapter presented impact findings related to the NTO demonstration's intervention, which implemented gender-themed recruitment materials within the evaluation context of an RCT. Section 6.1 discusses the implications these impact findings have for DOL, as well as for workforce development stakeholders. Section 6.2, based on qualitative feedback from program staff in the South Seattle and Central New Mexico demonstration sites, discusses the potential usefulness of the demonstration's recruitment materials and the intervention model for workforce development stakeholders. Section 6.3, evolving from that discussion as well as from grantee program staff feedback, provides recommendations for improving the recruitment of women into NTOs. Section 6.4, building on findings from the NTO demonstration's evaluation, considers opportunities for future research.

6.1 STUDY IMPLICATIONS

The NTO demonstration implemented a research-based strategy designed to reduce barriers to NTO careers associated with women jobseekers' limited awareness and misperceptions about NTOs. Implemented in two sites reflecting a range of socio-economic and programmatic differences, the intervention's impact differed by site. Individually, and, in some cases together, the site findings point to important implications to evidence-based methods of conducting outreach that can encourage women to take early steps towards NTO participation. Study findings highlight the importance of:

- Developing gender-themed recruitment materials to encourage women jobseekers to consider NTOs,
- Developing an intervention that includes repeated exposure to recruitment content, and
- Customizing content to the specific industry and women jobseeker subgroups of interest.

STUDY IMPLICATIONS AND RECOMMENDATIONS

Key Implications:

- Customized, women-themed content can be effective in recruiting women jobseekers into NTO training programs depending on the program features, local economy, and industry of training.
- Repeated exposure to content is important in increasing receptivity to recruitment messages.
- Understanding the target population's career preferences is essential for effective messaging.
- Exposure to women-themed content appears to educate women and effectively address their concerns.

Recommendations:

- Use a multi-pronged approach that repeatedly exposes women to content.
- Customize recruitment materials for the target population, training program industry, and regional context.
- Include relevant testimonials, images, and direct quotations from women.
- Incorporate personal follow-up through phone or one-on-one meetings to quickly answer questions and address concerns.
- Combine recruitment efforts with other strategies to address additional barriers to NTO entry for women jobseekers.
- Implement best practices for recruiting women to NTOs to increase apprentices nationally.

6.1.1 Key Implications

- **Gender-themed Content Can Be Effective.** The overall positive impact of implementing a gender-themed recruitment intervention in South Seattle indicates that gender-themed content, that addresses women's concerns and misperceptions and highlights the benefits of NTO careers, can reduce negative perceptions among women jobseekers about working in NTOs.
- **Repeated Exposure to Content Is Important.** A multi-pronged recruitment campaign that includes multiple modes and multiple "touches" may be key to increasing overall participation. Sharp increases in outcome completion among both treatment and control groups immediately following each reminder constitute promising evidence supporting the effectiveness of using a multi-pronged recruitment approach.
- **Understanding the Target Population's Career Preferences is Essential.** The difference in impacts across demonstration sites and several subgroups demonstrates that the recruitment content may be misaligned with the career preferences of women jobseekers within those subpopulations. This variation highlights the need to ensure recruitment content reflects a clear understanding of the career preferences and perceived occupational barriers of different subgroups (such as age, ethnicity, veteran status, disability status, income, and household size) to more effectively attract these jobseekers and address their concerns about NTOs.
- **Program Context Likely Influences Responses.** The differences in outcome completion rates and impact findings across sites demonstrates that the industries, economic context, demographics, and training programs specific to a region likely influenced the impacts of the NTO demonstration. For example, the expected growth of the IT industry in Central New Mexico along with the *paid* on-the-job training component of the IT apprenticeship program may have contributed to an *overall* enthusiasm among both the treatment and control groups for pursuing occupations in IT, resulting in no statistically significant differences in the responses between the gender-themed treatment group and the generic-themed control group.

6.1.2 Subgroup Implications

Findings from the subgroup analyses demonstrate the importance of understanding the unique perceptions of women jobseekers within different subgroups when developing effective recruitment materials.

- **Women in Different Age Groups Responded Differently to Gender-themed Content.** For outcome 2 (clicking on a link in an email), the *conditional* effect of being exposed to gender-themed content was statistically significant and positive for women ages 45-55 and over in South Seattle. However, the significant treatment effects disappear in that site for outcome 3 (completing the interest form). This may suggest that, as women in the 45-55 and older age group learned more about these training programs and/or occupations, they were less likely to pursue them. The motivating factor could be the physical nature of the work, which in Seattle consisted of construction and advanced

manufacturing. In contrast, women ages 35-44 in South Seattle were more likely to complete outcome 3. This is consistent with the belief that older women (45 years and above) are less likely to consider new career opportunities in occupations requiring more physical work, such as construction and advanced manufacturing.

- **Less Educated Women May Perceive More Barriers to NTOs.** In South Seattle, women with a college degree or higher were more likely to complete outcomes 2 (clicking on a link in an email) and 3 (completing an interest form). In contrast, among women with less than a high school degree, positive and significant treatment effects were found in outcome 2 but not for outcome 3. These differences reflect that repeated and consistent exposure to gender-themed content appears to be successful in encouraging women with higher education to consider new career opportunities in construction and advanced manufacturing.

  Central New Mexico showed a somewhat similar pattern. The overall negative and non-significant treatment effects on outcome 3 changed to positive, though still not statistically significant, among gender-themed treatment group members with more education.

- **Gender-themed Content May Be More Appropriate for Non-veterans.** In South Seattle, non-veteran women jobseekers were more likely than veteran women jobseekers to respond positively to the gender-themed recruitment content, with strong positive treatment effects for outcomes 2 and 3. These findings indicate that non-veteran women may be more inclined to consider NTOs, at least in construction and manufacturing, when exposed to themed outreach content. This explanation is certainly plausible, since women veterans will have already demonstrated a preference for NTOs by entering the military, and may have chosen the occupations for which the demonstration was recruiting *despite* the typical perceptions of NTOs that the demonstration materials were intended to counteract.

- **Gender-themed Content May Be More Effective for Women that are Not Employed.** Positive and significant treatment effects of gender-themed content for women that are not employed for outcomes 2 (opened a link in an email) and 3 (completed an interest form) in South Seattle show that the gender-themed emails and website content were effective in peaking their interest. This is not surprising given that women who are not employed but actively seeking employment, are more likely to pursue a training program when the recruitment materials market the program using gender-themed content that directly addresses concerns they may have about the industry.

- **Ethnicity May Influence Women Jobseekers' Perceptions of NTOs.** Non-Hispanic women jobseekers in South Seattle responded much more favorably to the gender-themed content, with positive and significant treatment effects for both outcomes 2 and 3. No significant effects were found among Hispanic women. These differences in the treatment effects between non-Hispanic and Hispanic women in South Seattle highlight the need to better understand the career preferences among different subgroups of women. Women

from different ethnicities may embody substantially different perceptions of barriers to occupations in certain industries.

DEMONSTRATION AND EVALUATION LIMITATIONS

- **Intervention.** The recruitment intervention was limited to addressing awareness and perception barriers to NTOs. While these are the initial barriers women face in entering NTOs, there remain significant education and workplace barriers to NTOs for women that a recruitment intervention cannot address.
- **Mode Options.** The intervention design was limited to outreach modes that allowed for tracking the receipt of and exposure to the recruitment materials. This prevented the use of broad, sweeping recruitment tools such as radio ads, flyers, billboards, and posters.
- **Sample Data.** The state workforce sample data sets for both sites were missing data for multiple variables, limiting the factors that could be controlled for in the overall, and subgroup, impact analyses.
- **Sample Size.** The demonstration treatment was a four-phase intervention design, with completion of each subsequent phase dependent on completion of the previous phase. Thus, a woman jobseeker could not complete a subsequent outcome (e.g., clicking on a link in an email) if she had not completed the previous outcome (opening an email). This constraint substantially limited the sample size for estimating longer-term outcomes.
- **Evaluation Methods.** This study was limited to a quantitative evaluation and did not include a qualitative evaluation component. Conducting interviews and focus groups with women that received the targeted or generic recruitment content could be helpful in understanding which themes, components and techniques were most effective in encouraging women to take action, and what other strategies can be most useful in encouraging more women to consider careers in NTOs

6.2 RECRUITMENT CONTENT AND IMPLEMENTATION GOING FORWARD

In addition to implications derived from the impact study findings, it is important to consider qualitative lessons learned during the implementation phase of the NTO demonstration, to further improve similar recruitment efforts going forward. This section presents feedback from South Seattle and Central New Mexico grantees and training providers about the gender-themed recruitment content and the implementation approach used. The discussion also presents feedback from training providers on changes they would make when implementing this type of recruitment approach if they were not constrained by the evaluation requirements—in particular, the mode restrictions and need to track outcomes. This feedback will help workforce development stakeholders best apply the knowledge gained from the NTO demonstration on treatment content to work in the field.

Grantees and training providers found the recruitment materials to be effective in motivating women to seek more information about the programs.

Treatment Content. The South Seattle and Central New Mexico grantees and training providers all reported that the recruitment materials developed as part of the NTO demonstration were high quality. Both grantees and training providers noted that the gender-themed materials motivated women jobseekers to consider the training opportunities offered and get more information about the programs. All who provided feedback were interested in using the gender-themed materials in the future, and felt that the materials, with appropriate

site-specific adjustments, would be very useful to other training providers seeking to recruit women into their NTO training programs. Central New Mexico staff specifically noted their belief that the materials were very effective in increasing women jobseekers' awareness of the New Mexico IT training program. Many women who expressed interest in the program told Central New Mexico staff they had not been aware of the opportunity before the demonstration and would not have considered a career in IT prior to receiving the recruitment materials.

One suggestion for content improvement was to incorporate even more stories, testimonials, and quotes from women who are either actively in or recently completed the *training* programs. The materials developed for the NTO demonstration included some testimonials and quotes from trainees, but the timing of the demonstration necessitated supplementing these with available quotes and testimonials from women already working in the relevant industry. Training program staff said that they would have liked to include contact information in the materials, to allow interested women jobseekers to directly connect with a specific program staff member for more program information. This could not be done in this demonstration as implemented, however, because the evaluation required women to take specified steps towards each outcome that could be tracked to collect the necessary data for the impact analysis.

Implementation Approach. Although the South Seattle training providers found the materials to be high quality, they expressed concern about the reliance on recruitment materials alone to successfully recruit women to NTO training programs. Training providers noted that a recruitment campaign is not enough to get women to take the longer-term steps towards enrolling an NTO training program—especially programs in construction and manufacturing with ingrained barriers to entry and retention for women, including gender discrimination and sexual harassment.

Training providers noted that a recruitment intervention is limited in its ability to address the whole range of barriers women face in entering NTOs. They suggested implementing a recruitment intervention in combination with other strategies such as financial supports and support services.

Staff from both sites noted ways they would incorporate more active recruitment efforts going forward, without the constraints of the NTO demonstration's evaluation design and their own staffing limitations. One major change they suggested was to incorporate into the implementation approach more phone follow-up with women who completed the interest form—to enable program staff to directly connect with more women, address their specific concerns about the program and/or occupation(s) quickly, and guide them through the application process. This more direct approach would also enable program staff to identify barriers to participation and work to link potential participants with available services to address those barriers. Program staff noted, however, that they currently face staffing limitations that prevent this type of follow-up, irrespective of the demonstration.

One training provider suggested offering financial supports to help cover the costs of transportation, child care, and other expenses as part of a recruitment strategy. Providing financial support to women while they participate in a program or an entry-level job, in

combination with a gender-themed recruitment strategy, might be more effective at encouraging women to achieve the longer-term outcomes related to enrollment and retention in training programs, as well as actual employment, especially in lower-paid entry level positions. As noted previously, the Central New Mexico program included a paid on-the-job component which may have contributed to the overall enthusiasm for the program across both the treatment and control groups.

6.3 RECOMMENDATIONS

This section presents recommendations for DOL and stakeholders, based not only on the impact findings but also on feedback received from the participating AAI grantees and the study's literature review.[82]Note that some of the recommendations are supported by findings from a single site, given that several impact findings reported in Chapter 5 differed by site.

The evaluation team offers five comprehensive recommendations to DOL for effectively recruiting women into NTOs:

- **Use a Multi-pronged Approach.** Recruitment efforts for NTOs should use a multi-pronged approach that repeatedly exposes women jobseekers to gender-themed recruitment content and reminds them to take specific actions.
- **Customize Recruitment Materials.** Recruitment content should be customized as much as possible to take into account the target population, training program industry, and regional context.
  - Training programs seeking to recruit women should develop materials that incorporate language, images, and testimonials that align with recruitment themes addressing the needs and concerns of women.
  - Training programs should consider the age, education, and ethnicity, as well as the employment, disability, and veteran status of the target population, when developing recruitment materials—because women's perceptions of NTO industries, and the jobs within those industries' occupations, vary by subgroup.
  - Training programs should customize recruitment content to the specific industry(ies) for which the training is offered. The content should highlight the benefits of the industry and address any unique concerns and/or misperceptions associated with that industry.
  - Training programs should take into account region-specific factors—such as the area's unemployment and poverty rates—that might influence a community's view of an industry or a specific occupation, and/or the community's demand for such programs.
- **Include Testimonials Specific to the Training Program(s) Offered.** Recruitment content should include images, quotes, and testimonials from women that have participated in the actual training program.
- **Incorporate Personal Follow-up.** Recruitment efforts should include as much personal follow-up and interaction, such as by telephone, with potential participants as possible, to

[82] Nanda, N., Corea, C., Roy, M., Patterson, L., Poe-Yamagata E. (2018). *Feasibility Study and Evaluation of Non-Traditional Occupation Demonstrations - Literature Review Report.*

enable program staff to quickly address concerns about the program, answer questions, and identify individuals' barriers to participation.

- **Combine Recruitment Efforts with Other Strategies.** Recruitment efforts should be implemented in combination with other strategies to address additional barriers to NTO careers for women. This could include offering financial supports or offering support services like child care or transportation assistance during the training period.
- **Implement Recruitment Best Practices to Increase Apprentices Nationally.** DOL is working to help facilitate the placement of 1 million new apprentices over the next several years. The promising recruitment practices identified through this study should be used to bring women into apprenticeship programs, many of which are NTOs, to help DOL achieve this goal.

6.4 OPPORTUNITIES FOR FUTURE RESEARCH

The *Feasibility Study and Evaluation of Non-Traditional Occupations Demonstration* provides a rigorous evaluation and builds on the evidence-base to address barriers to NTOs for women. Significant research remains to be done to help build a comprehensive understanding of effective strategies for encouraging women to enter NTOs and for supporting their retention in these occupations. This section outlines opportunities for future research related to recruitment for NTOs, as well as other strategies for addressing barriers to NTOs that stakeholders identified as promising.

6.4.1 Further Exploration of Recruitment for NTOs

Many opportunities exist for examining how to make recruitment materials and other approaches more effective in addressing women's awareness and perception barriers of NTOs. Four specific activities would effectively build on the specific findings of the NTO demonstration and its evaluation:

- **Evaluate multi-pronged recruitment in other geographic areas**. As noted, program context likely played a significant role in the impact study findings. Conducting similar evaluations of a multi-pronged recruitment intervention in different geographic areas would contribute to our understanding of how program context including socio-economic, demographic, and industry characteristics influence responses to this type of recruitment intervention.
- **Evaluate multi-pronged recruitment with different training program characteristics.** In addition to program context, training program characteristics including the industry, training program model (pre-apprenticeship vs. apprenticeship), components (paid on-the-job work experience), and available support services likely influence responses to recruitment intervention. Conducting rapid-cycle evaluations starting with the evaluation of a multi-pronged recruitment intervention that recruits for training programs with a range of these characteristics would contribute to our knowledge of which components are most enticing and encourage women to pursue careers in NTOs.
- **Conduct qualitative research on effective recruitment materials.** Findings from interviews and focus groups with women to gather feedback and input on the materials

used for this demonstration would help build a better understanding of which components of the materials are effective in addressing concerns women have about NTO careers. Addressing concerns and questions women have—both as a group and among demographic and socioeconomic subgroups—about NTO industries and NTO training programs would be valuable in encouraging women to take action. This qualitative work could also identify which specific outreach modes are preferred by the target population and its subgroups.

- **Evaluate outreach components and techniques for effective recruitment.** Building on what was learned from the NTO demonstration and evaluation, as well as knowledge gained from additional qualitative research, rapid-cycle evaluations of outreach components and techniques would further advance the evidence-base on how to conduct women-specific recruitment for NTOs. Rapid-cycle evaluations could test the effectiveness of incorporating specific components (such as pictures, testimonials, and behavioral techniques) into recruitment materials, as well as the effectiveness of combining targeted recruitment efforts with other interventions such as financial incentives for participation. This type of evaluation could also examine the effectiveness of using the above-mentioned components and techniques with specific subgroups of women.

Rapid-cycle evaluations could test the effectiveness of: (1) incorporating specific components into materials for recruiting women into training programs for NTOs, as well as (2) combining recruitment efforts with additional strategies to help achieve the same purpose.

6.4.2 Strategy Evaluations

In addition to conducting research around outreach and recruitment, DOL and stakeholders in the field may also benefit from evaluations of other promising strategies for addressing barriers to NTOs for women.

Focus on Barriers in Specific Industries. DOL may want to consider conducting both quantitative and qualitative research to better understand the unique barriers to women's entry and retention in high demand and high growth industries. Conducting research and evaluation activities around promising strategies for addressing identified barriers to entry and retention in high growth/high demand industries may be an effective way to prioritize resources. Each NTO industry has unique barriers that prevent women from pursuing and staying in NTO careers. As one example of an opportunity to evaluate an industry-specific strategy, Central New Mexico staff said many women do not consider IT as a career because they lack the basic computer literacy skills required even for entry-level jobs in the IT field. As a strategy for addressing this barrier, these staff members suggested offering a free basic computer literacy course prior to an IT apprenticeship.

Barriers and Strategies of Interest. A wide range of promising strategies for addressing barriers to NTOs for women can be applied across industries, many of which were identified in this study's literature review. These promising strategies of interest also offer ample opportunities for future

research and evaluation.[83] The feasibility memorandum developed as part of this study highlighted a number of promising strategies for future research and evaluation—including professional development for career counselors and offering supportive services like childcare to women in NTOs and NTO training programs.

South Seattle training providers recommended evaluating strategies aimed at post-training retention in NTOs—specifically, strategies that address the hostile work environment found in physical labor–intensive NTOs such as construction. Recommended strategies included mentoring for women in NTOs, incentivizing employers to change the workplace culture, and offering supports for women in entry-level NTO positions to meet the higher costs of child care and transportation due to early starts, shift work, and changing work sites, that are common characteristics of work in construction and manufacturing.

[83] Nanda, N., Corea, C., Roy, M., Patterson, L.., Poe-Yamagata E., (2018). *Feasibility Study and Evaluation of Non-Traditional Occupation Demonstrations - Literature Review Report.*

APPENDICES

APPENDIX A. OUTREACH MATERIALS

Exhibit A.1: Subject Lines of Initial and Reminder Emails - South Seattle and Central New Mexico

Gender-Themed Treatment	Generic-Themed Control
South Seattle	
Email 1: [Name], training in a high-paying career is waiting for women like you.	**Email 1:** A new career in construction or advanced manufacturing is waiting for you.
Email 2: Dream big. A rewarding career awaits.	**Email 2:** Get trained for a high-demand career without a four-year degree.
Email 3: Make a difference in a new, high-demand career. Get started today	**Email 3:** Launch your new career through a pre-apprenticeship program.
Email 4: Last Chance: Join other women in a pre-apprenticeship program today	**Email 4:** Hurry, launch a career in advanced manufacturing or construction today.
Email 5: Act now. Slots are filling up.	**Email 5:** Time's running out. Complete an interest form today.
Email 6: Don't miss the chance of a lifetime to earn a higher income: Get more info about a pre-apprenticeship today!	**Email 6:** Last chance to request more info about Pre-Apprenticeship Washington programs!
Email 7: [AJAC's Advanced Manufacturing Prep] or [CPTC's Fundamental Skills for Manufacturing and Engineering Program] or [ANEW's Trades Rotation Training Program] is looking for candidates like you.	**Email 7:** [AJAC's Advanced Manufacturing Prep] or [CPTC's Fundamental Skills for Manufacturing and Engineering Program] or [ANEW's Trades Rotation Training Program] is looking for candidates like you.
Central New Mexico	
Email 1: [Name], training for a new career is waiting for women like you.	**Email 1:** A new career in information technology is waiting for you.
Email 2: Dream big. A rewarding career awaits.	**Email 2:** Get trained for a high-demand career without a four-year degree.
Email 3: Make a difference in a new, high-demand career. Get started today.	**Email 3:** Launch your new career through an apprenticeship program.
Email 4: Last Chance: Join other women in information technology today.	**Email 4:** Hurry, slots are limited! Launch a career in information technology today.
Email 5: Don't miss the chance of a lifetime. Get started today!	**Email 5:** Time is running out for free training. Complete an interest form today!
Email 6: Join other women in the New Mexico IT Apprenticeship Program.	**Email 6:** The New Mexico IT Apprenticeship Program is looking for candidates like you.

Exhibit A.2: South Seattle: Generic-themed Control, Email 1

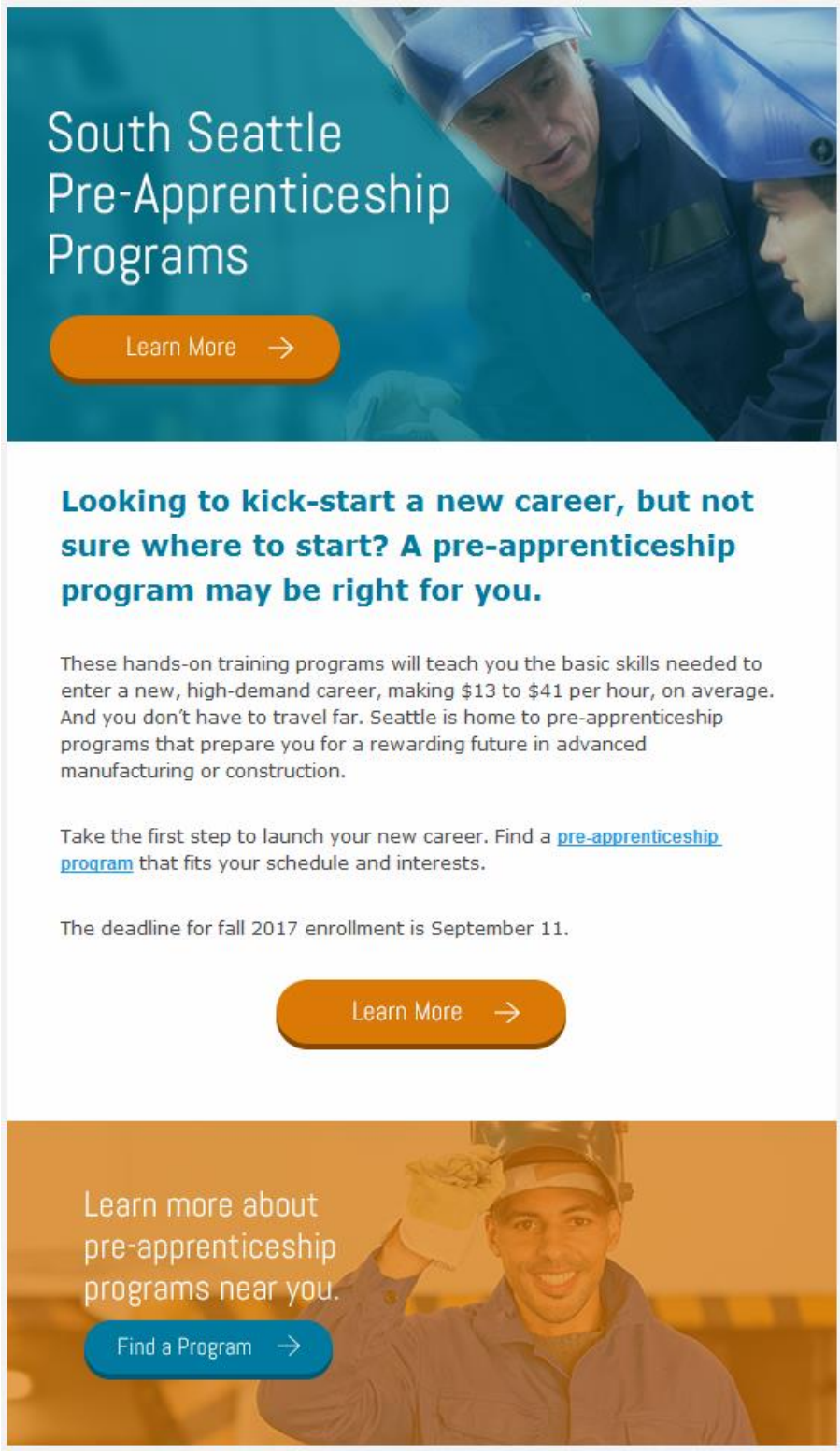

Exhibit A.3: South Seattle: Generic-themed Control, Email 2

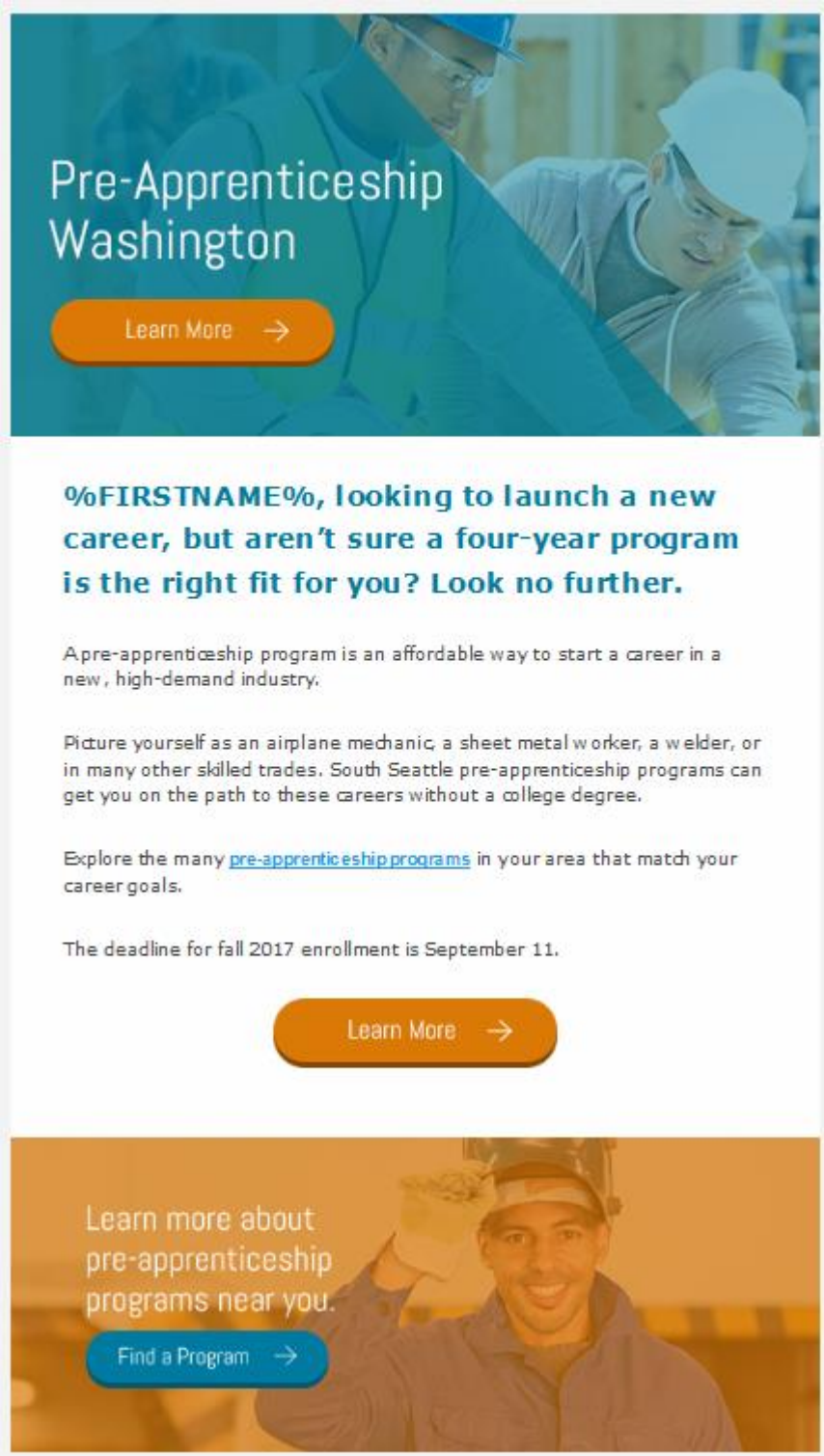

Exhibit A.4: South Seattle: Generic-themed Control, Email 3

Launch a new career today!

%FIRSTNAME%, a pre-apprenticeship program can help you launch the career of your dreams. Hands-on training will teach you the skills needed to work in advanced manufacturing or construction.

A new career is within reach. Get started today!

The deadline for fall 2017 enrollment is September 11.

> **"I was getting tired of my original job. There was just no climbing up the ladder, so I decided that before I turned 27 I was going back to school. But I needed to find a career program that was short and sweet."**
>
> — Electronics technology student

Learn More

Exhibit A.5: South Seattle: Generic-themed Control, Email 4

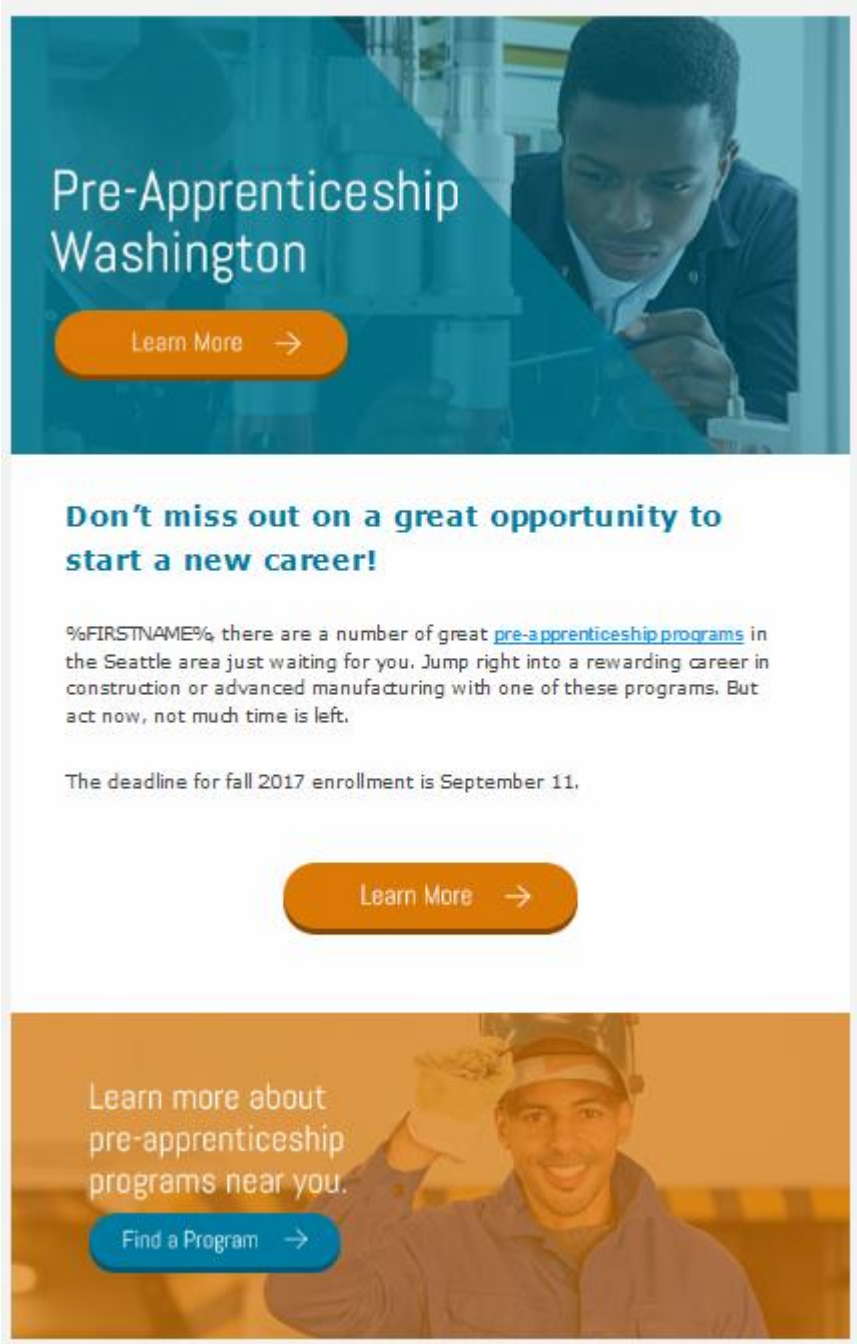

Exhibit A.6: South Seattle: Generic-themed Control, Email 5

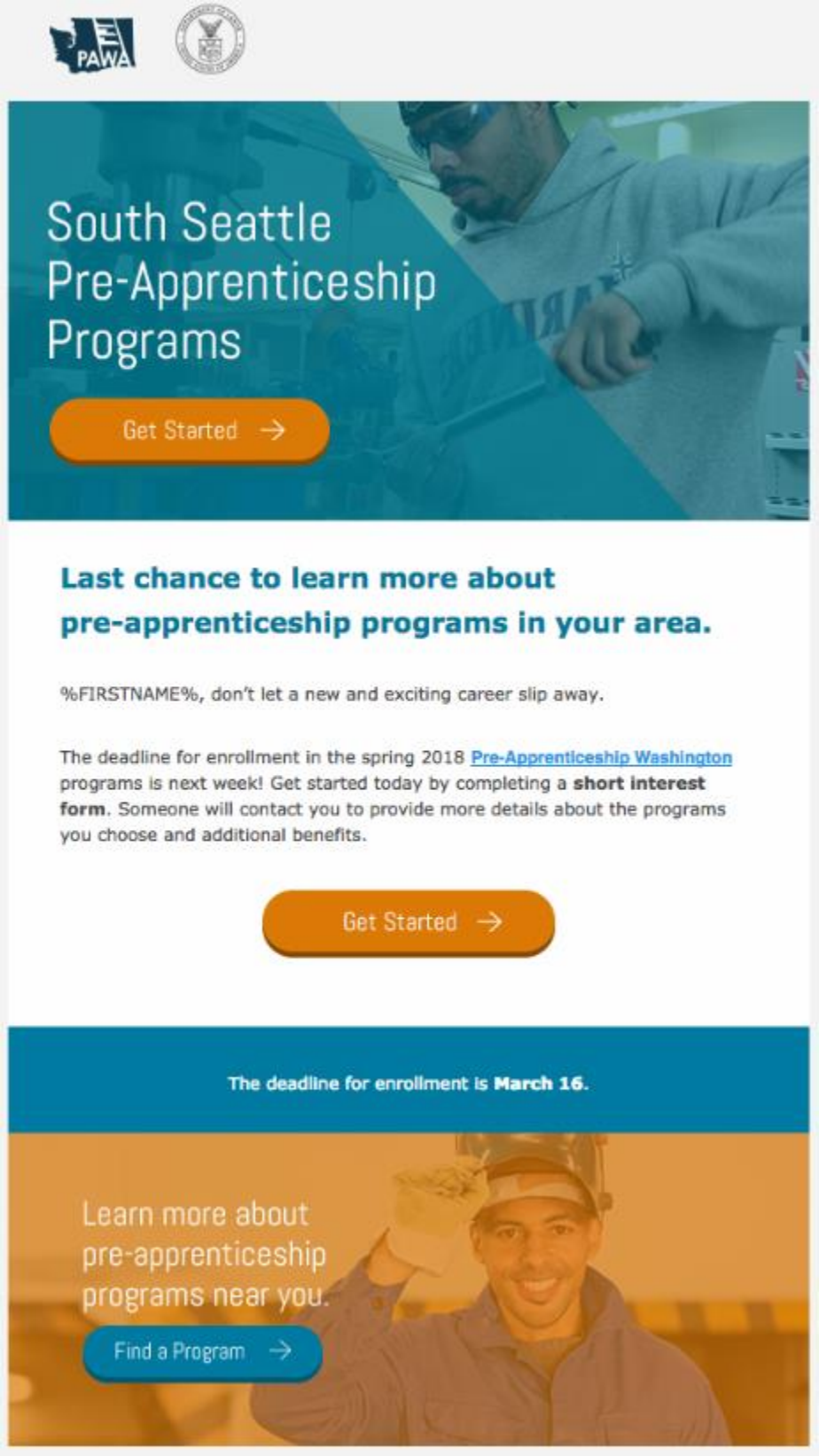

Exhibit A.7: South Seattle: Generic-themed Control, Email 6

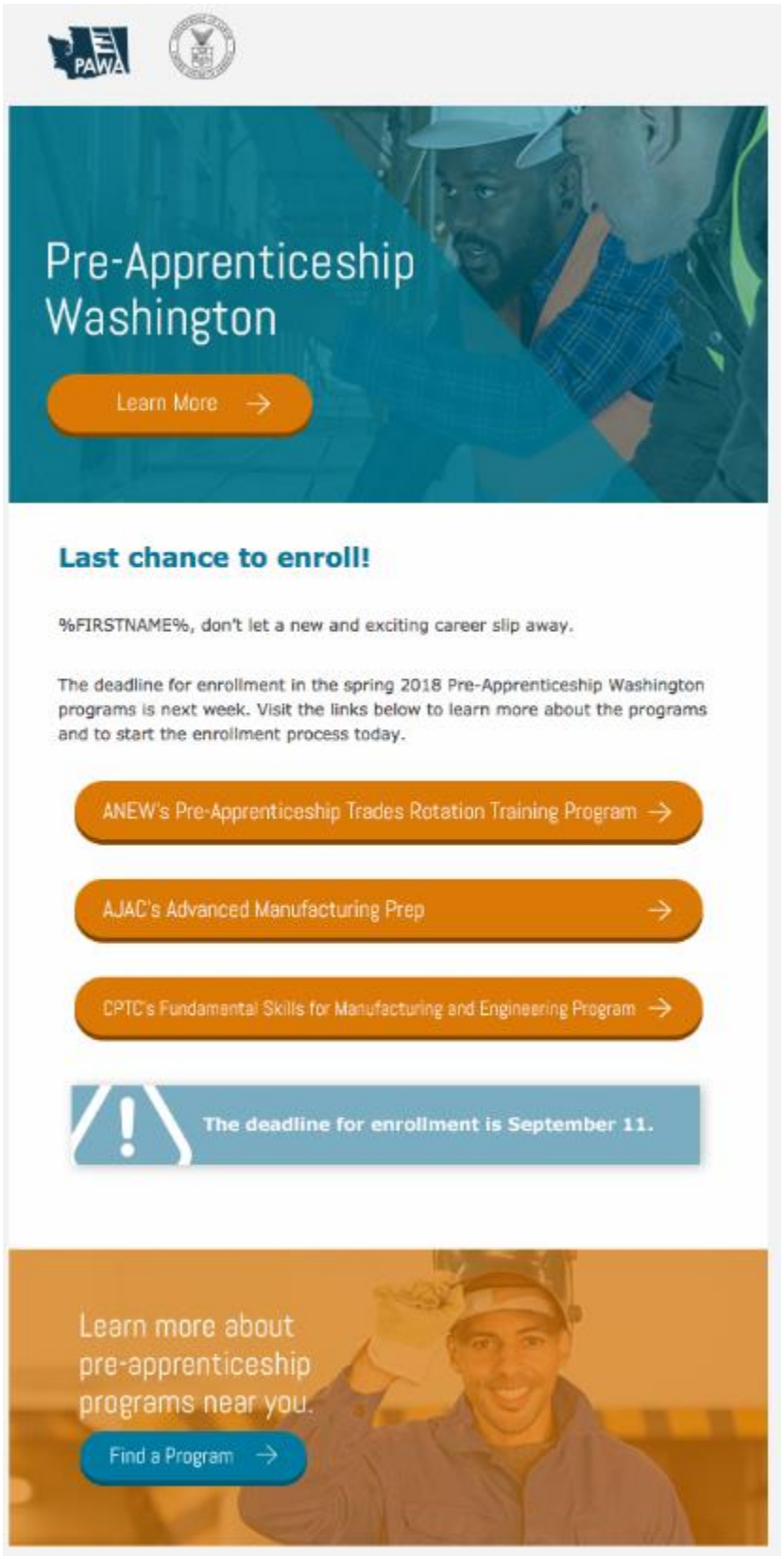

Exhibit A.8: South Seattle: Generic-themed Control, Email 7

Exhibit A.9: South Seattle: Generic-themed Control, Postcard

Exhibit A.10: South Seattle: Generic-themed Control, Website's Homepage

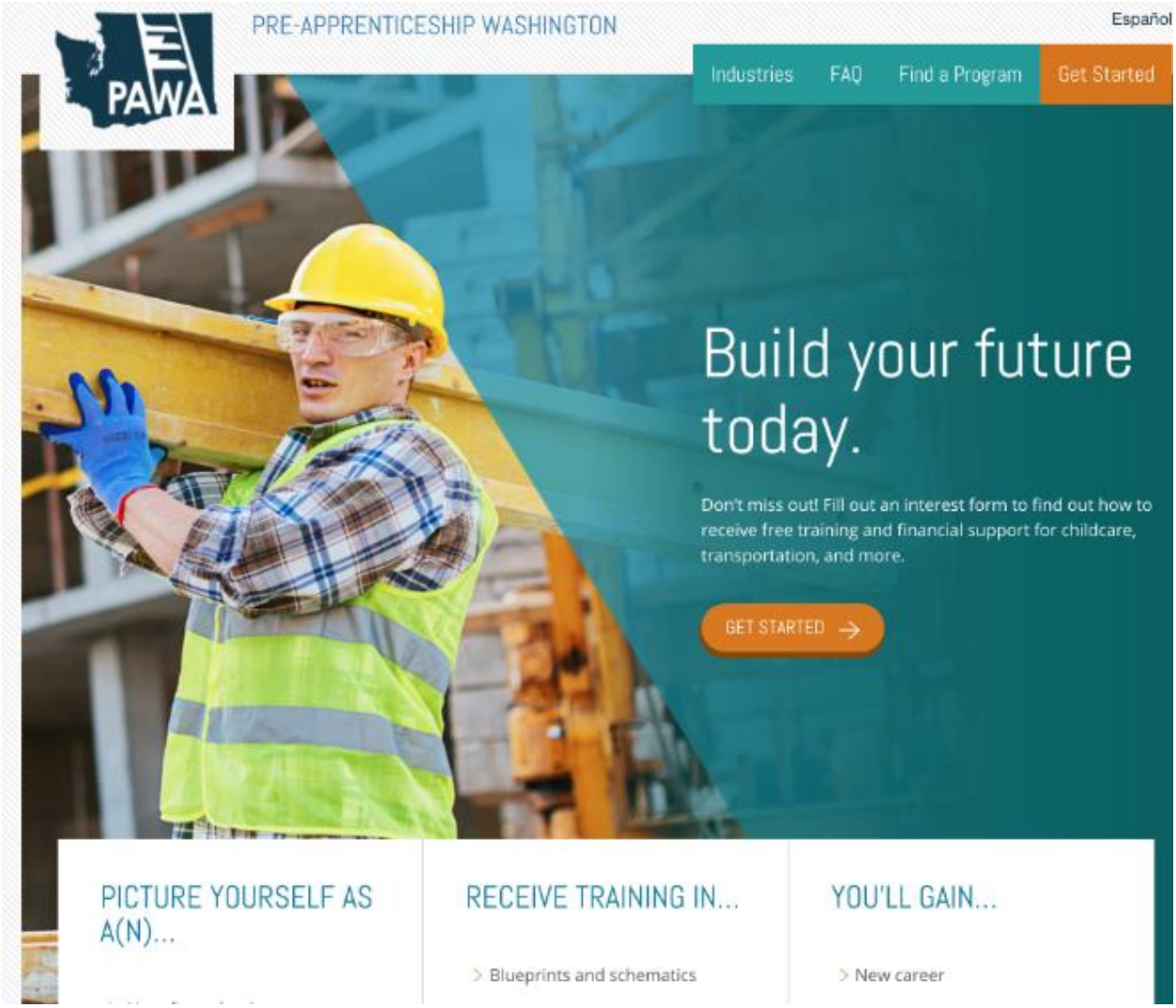

Exhibit A.11: South Seattle: Generic-themed Control, Website's Page - Industries

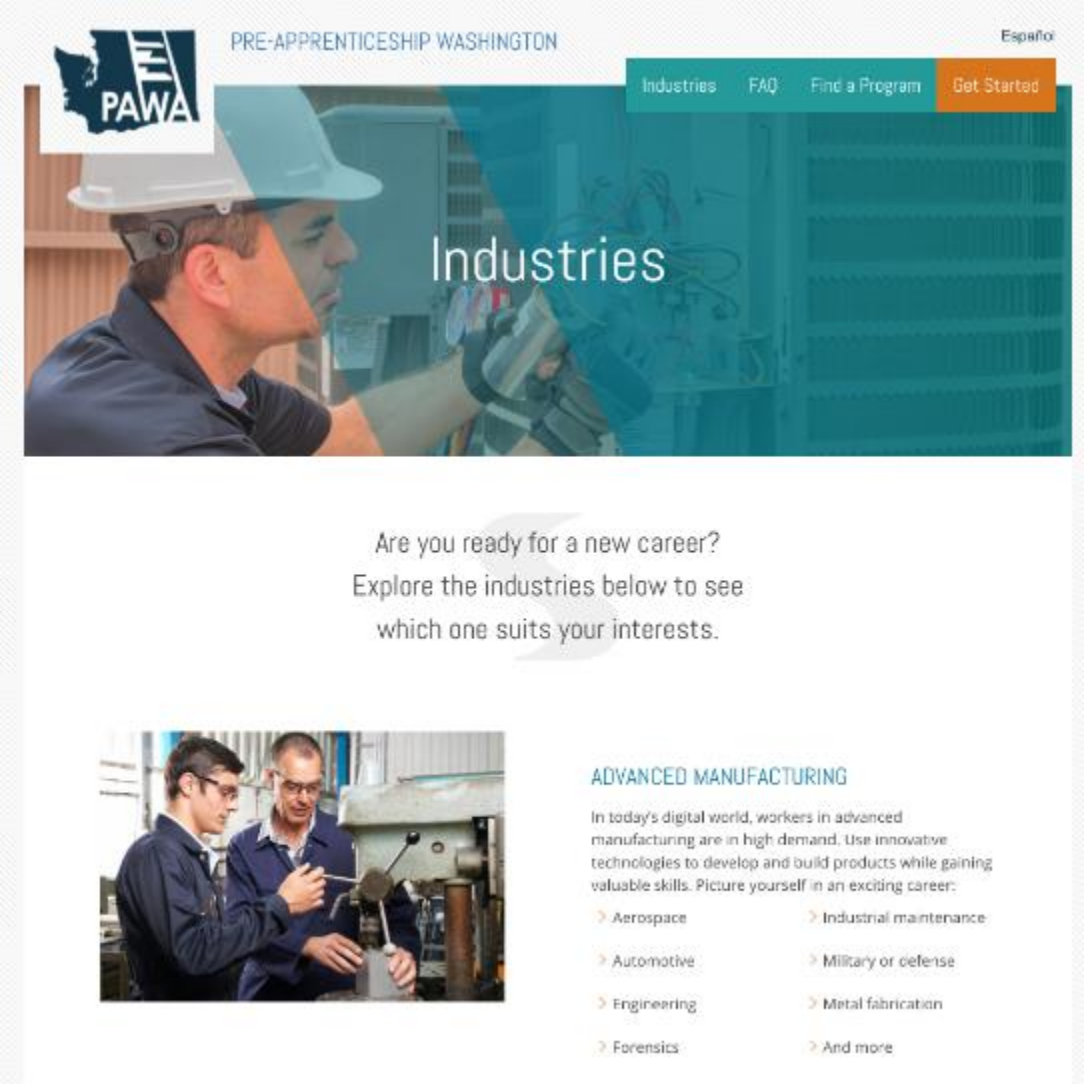

Exhibit A.12: South Seattle: Generic-themed Control, Website's Page - Program

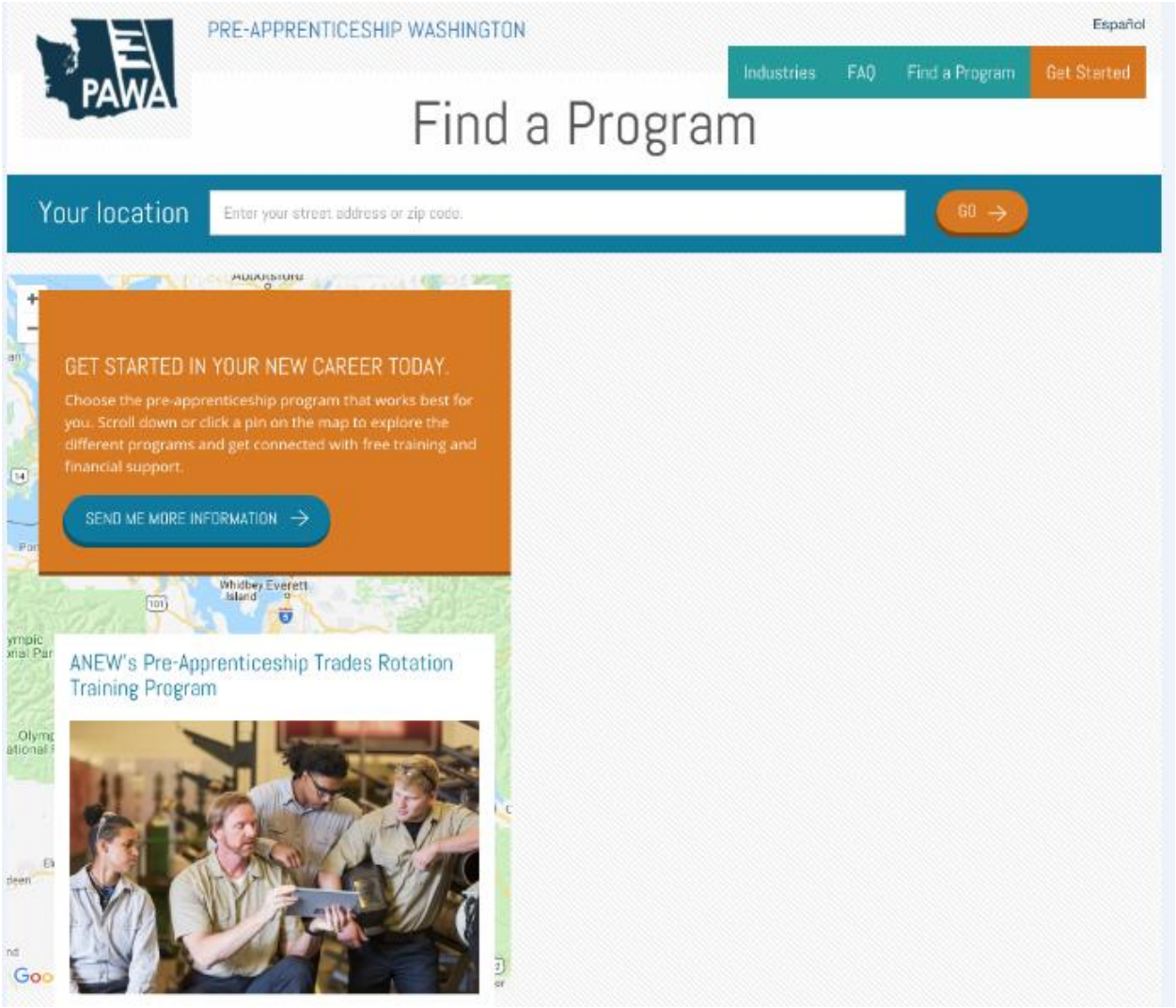

Exhibit A.13: South Seattle: Gender-themed Treatment, Email 1

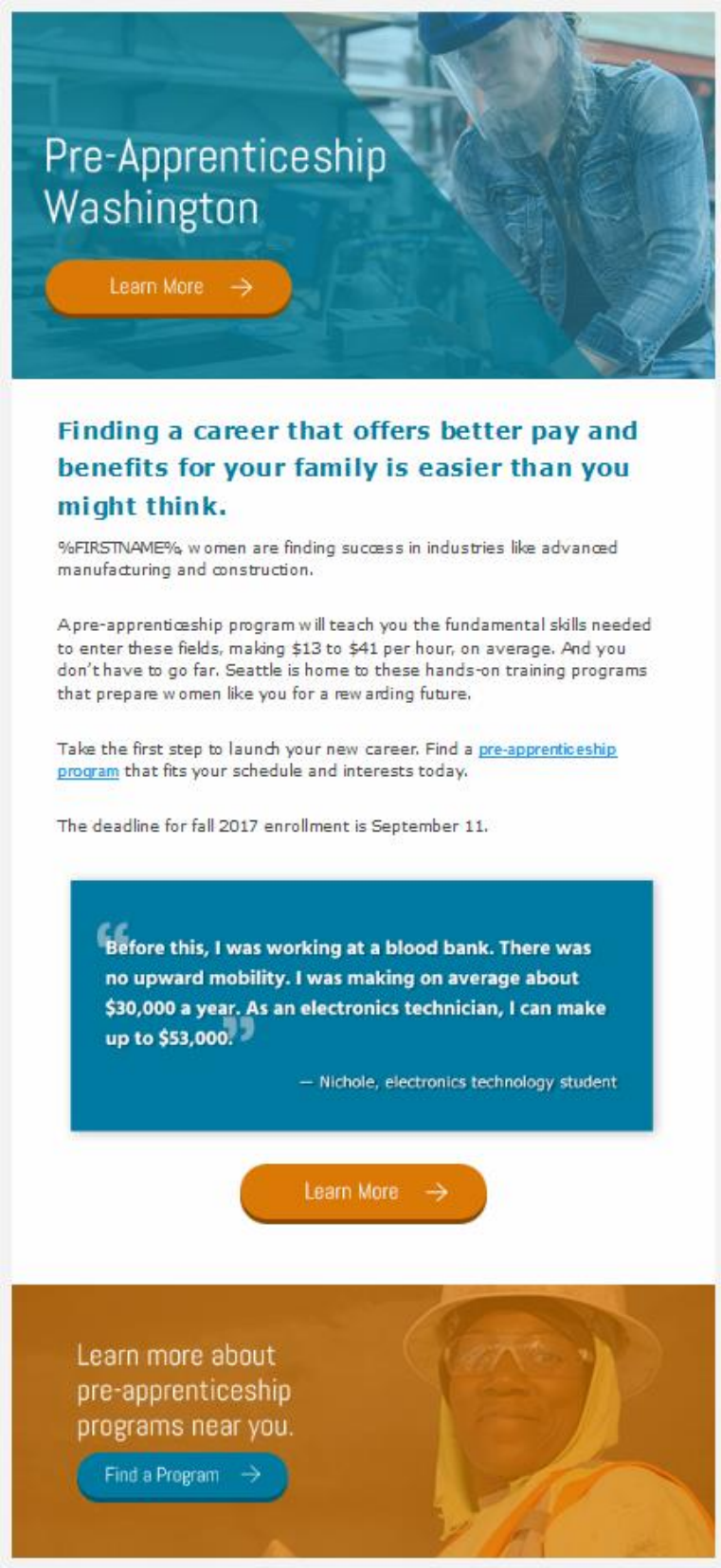

Exhibit A.14: South Seattle: Gender-themed Treatment, Email 2

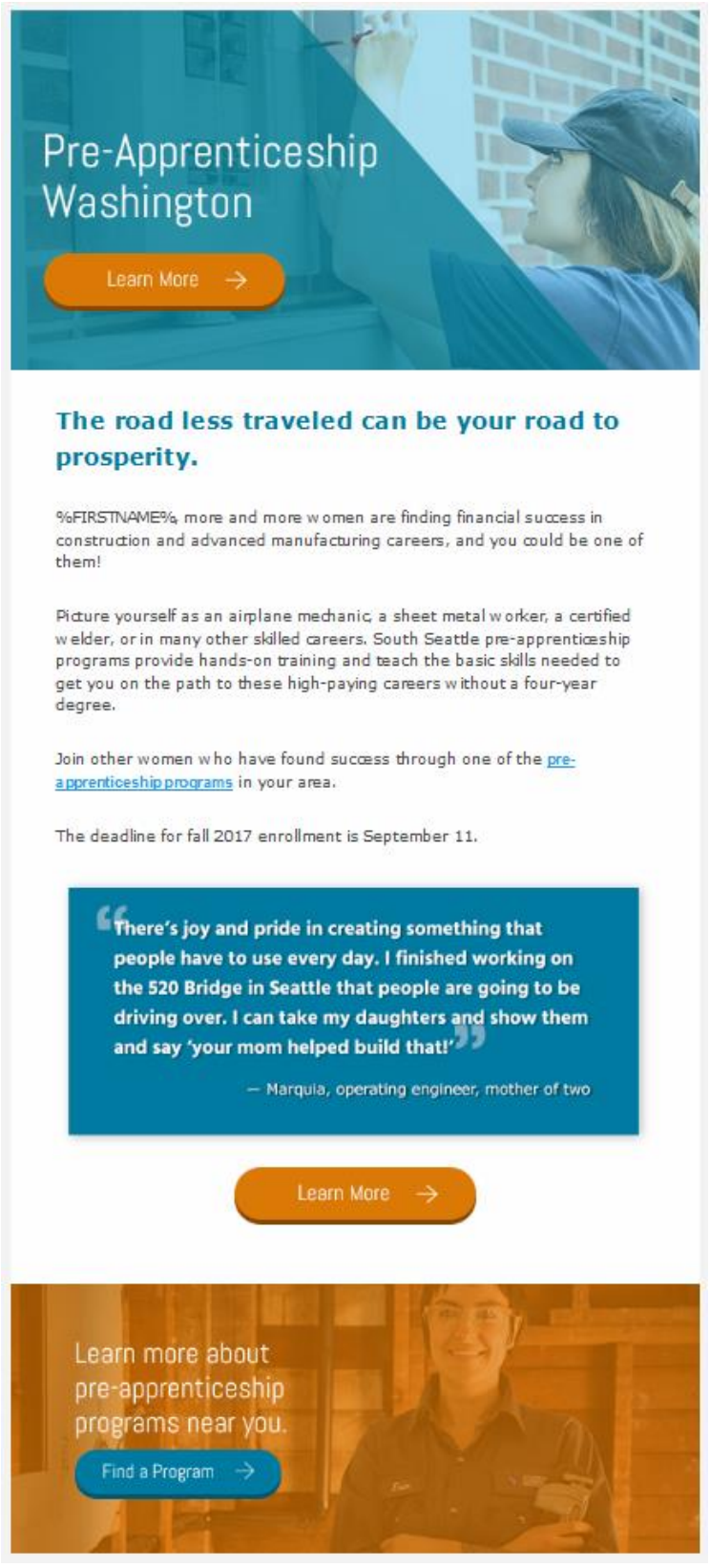

Exhibit A.15: South Seattle: Gender-themed Treatment, Email 3

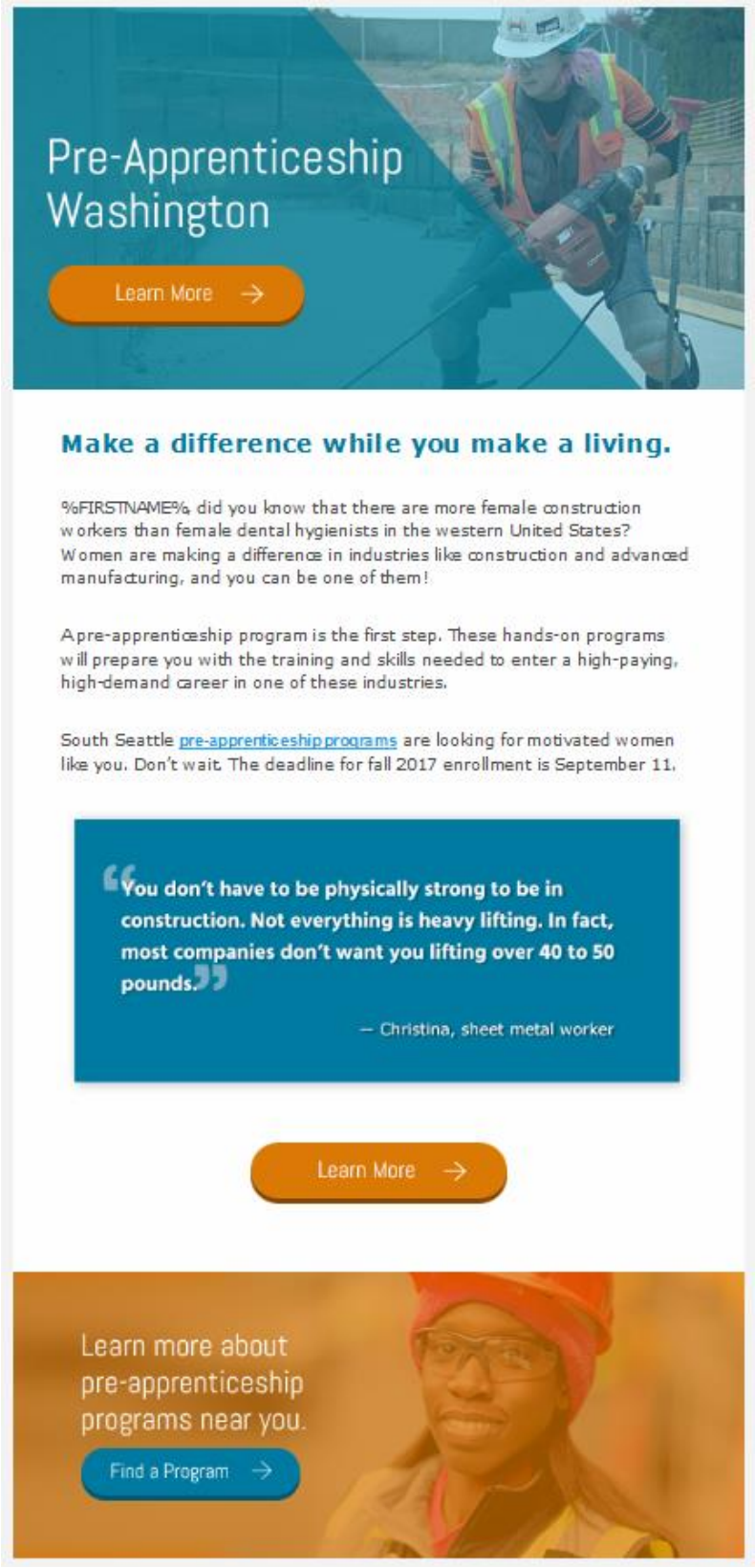

Exhibit A.16: South Seattle: Gender-themed Treatment, Email 4

Exhibit A.17: South Seattle: Gender-themed Treatment, Email 5

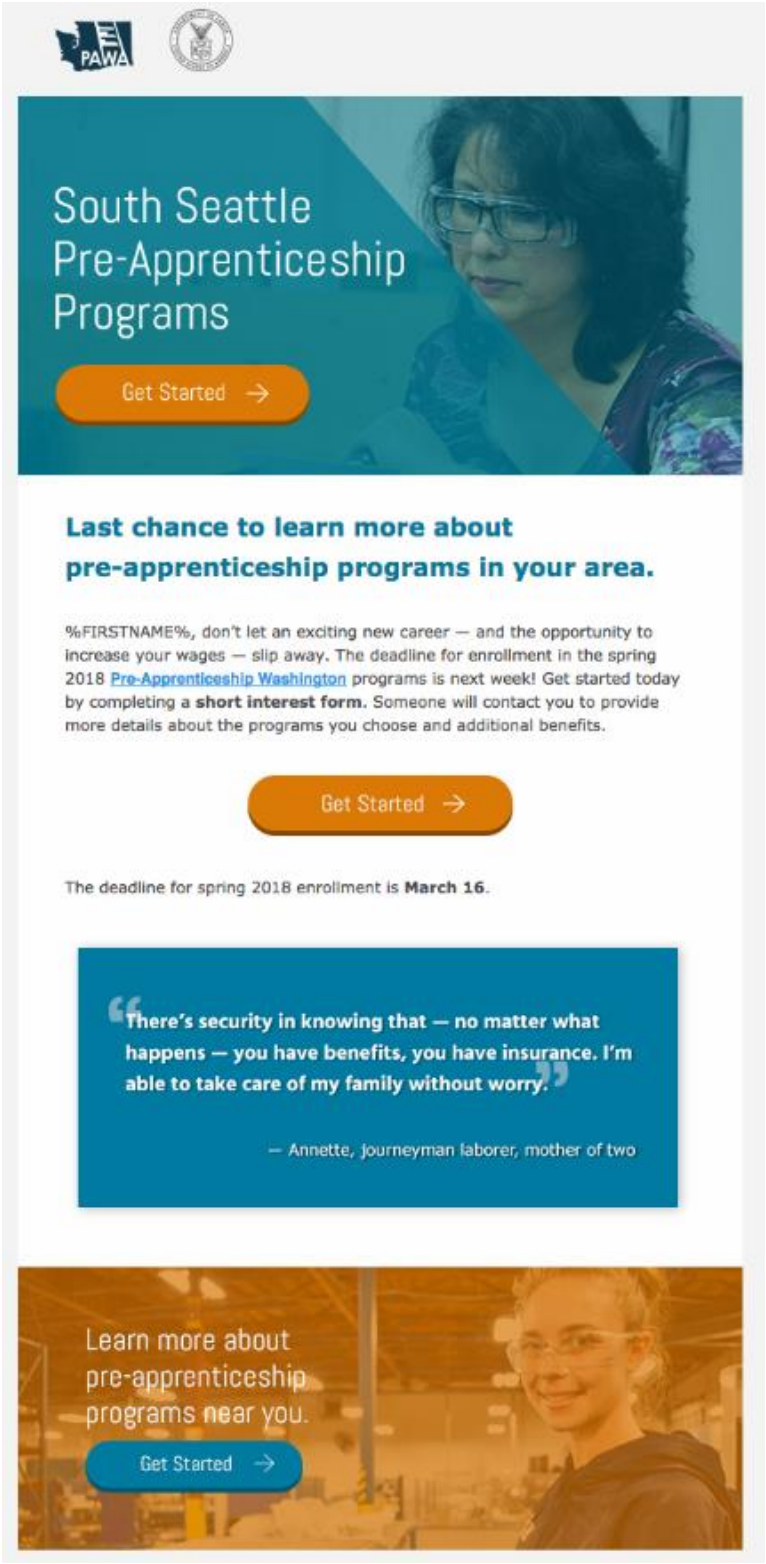

Exhibit A.18: South Seattle: Gender-themed Treatment, Email 6

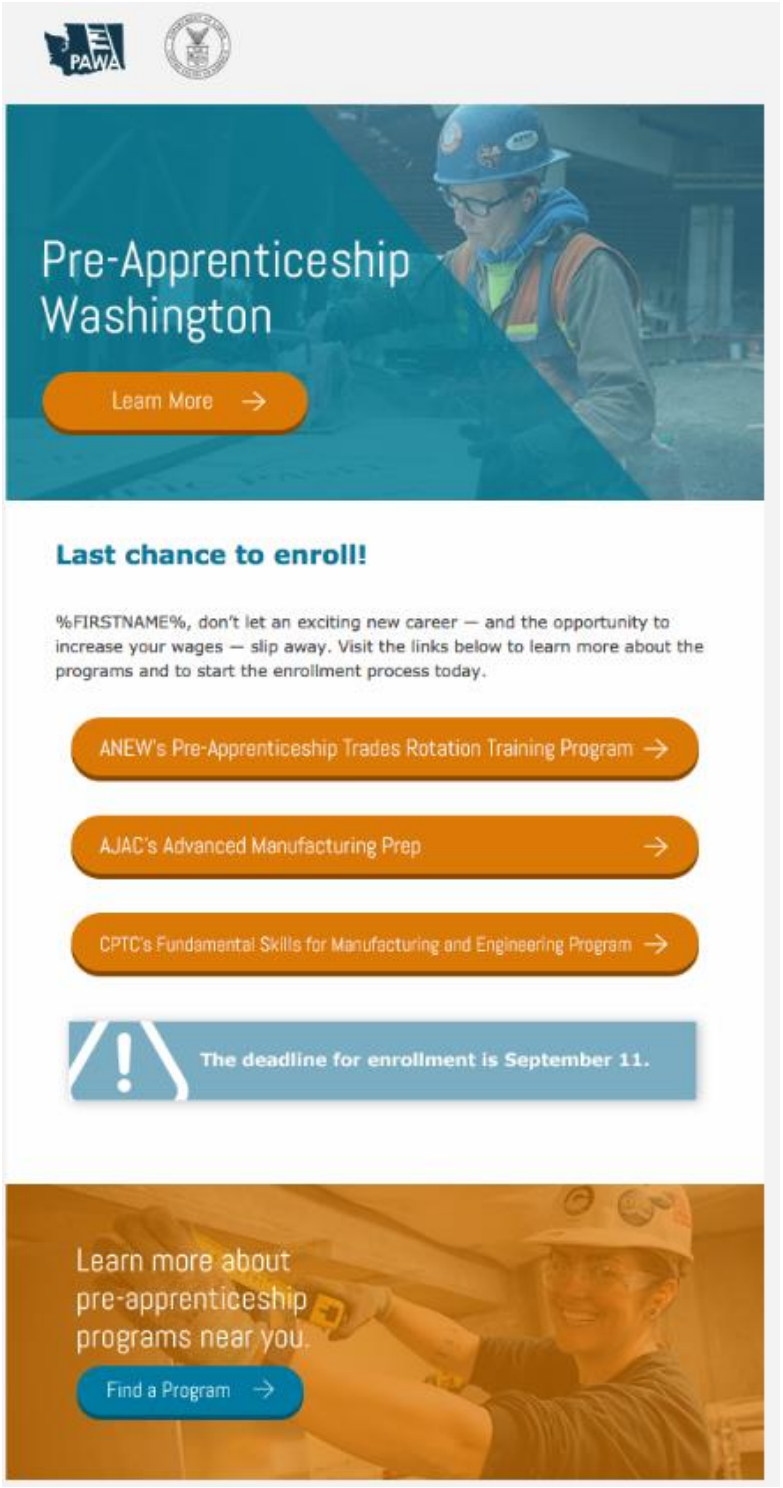

Exhibit A.19: South Seattle: Gender-themed Treatment, Email 7

Exhibit A.20: South Seattle: Gender-themed Treatment, Postcard

Exhibit A.21: South Seattle: Gender-themed Treatment, Website's Homepage

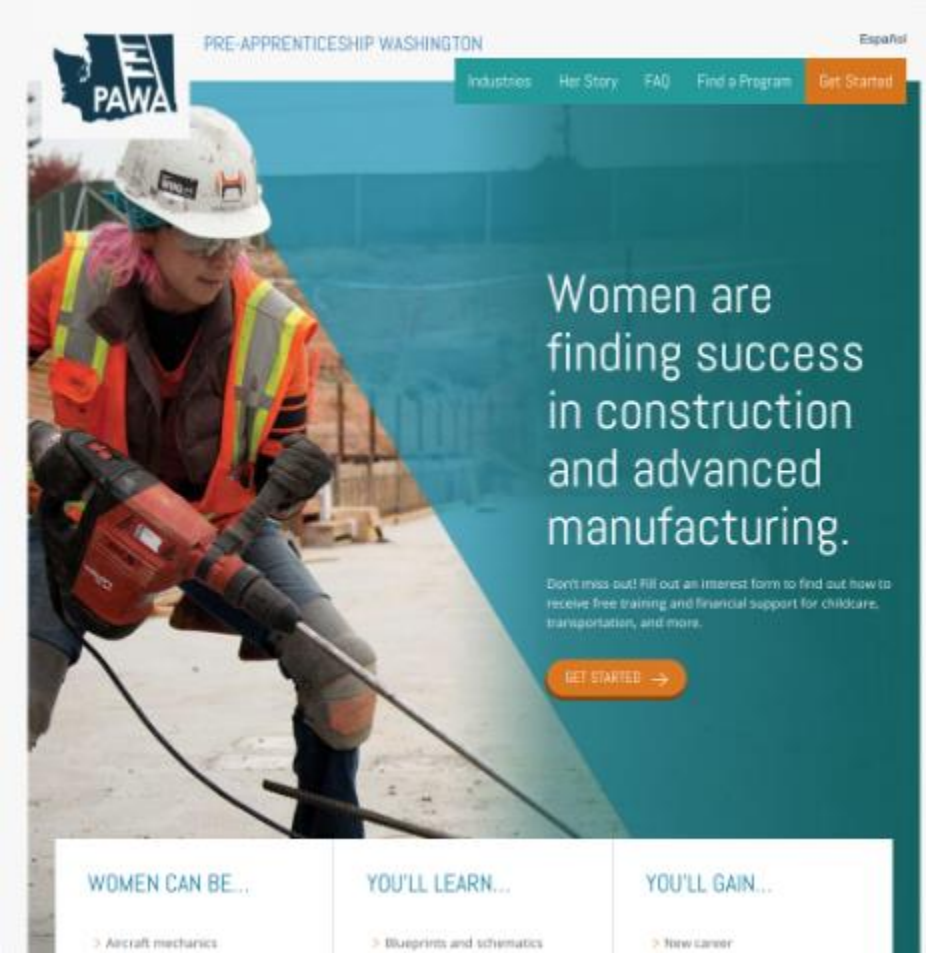

Exhibit A.22: South Seattle: Gender-themed Treatment, Website's Page - Industries

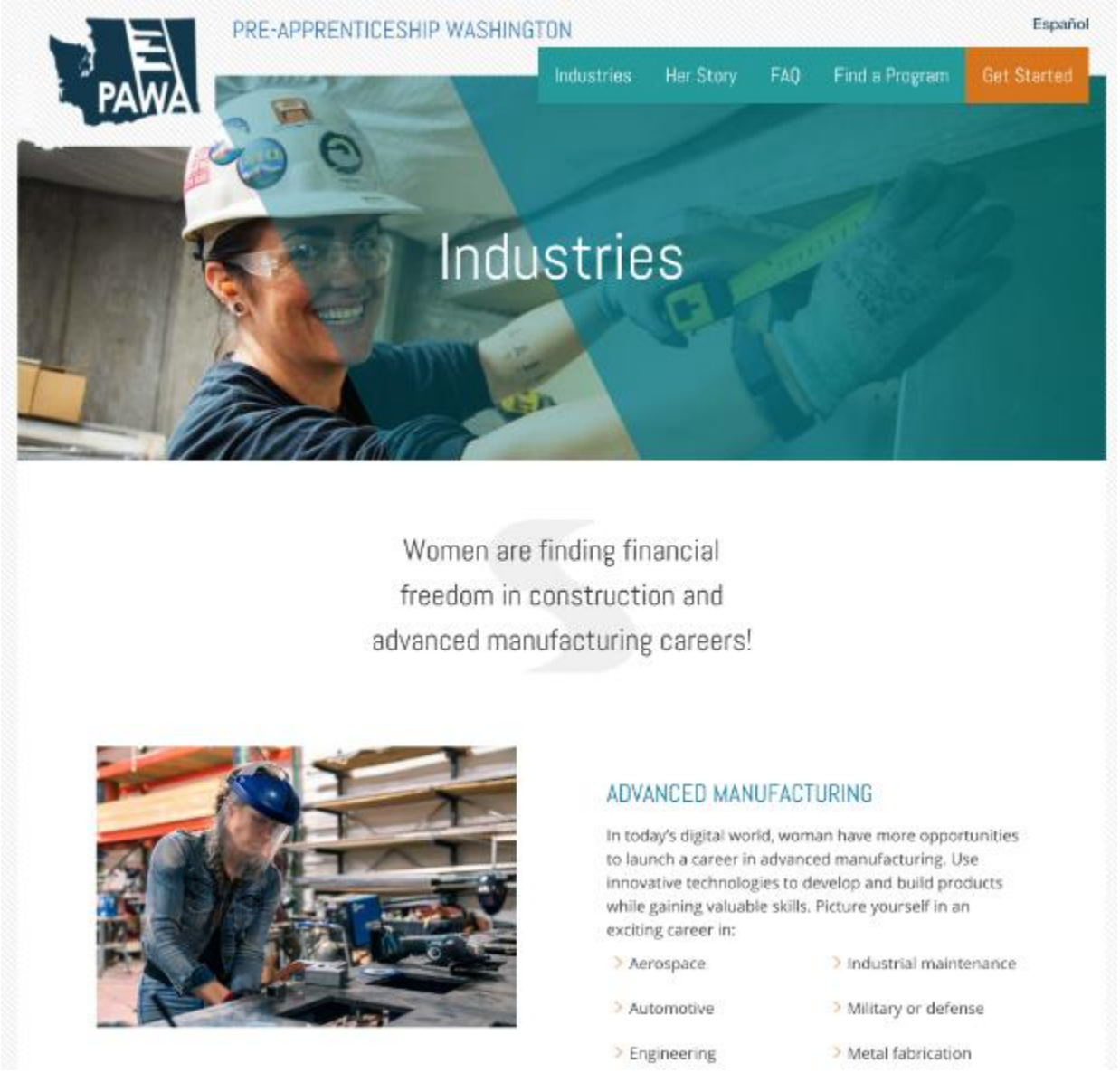

Exhibit A.23: South Seattle: Gender-themed Treatment, Website's Page - Programs

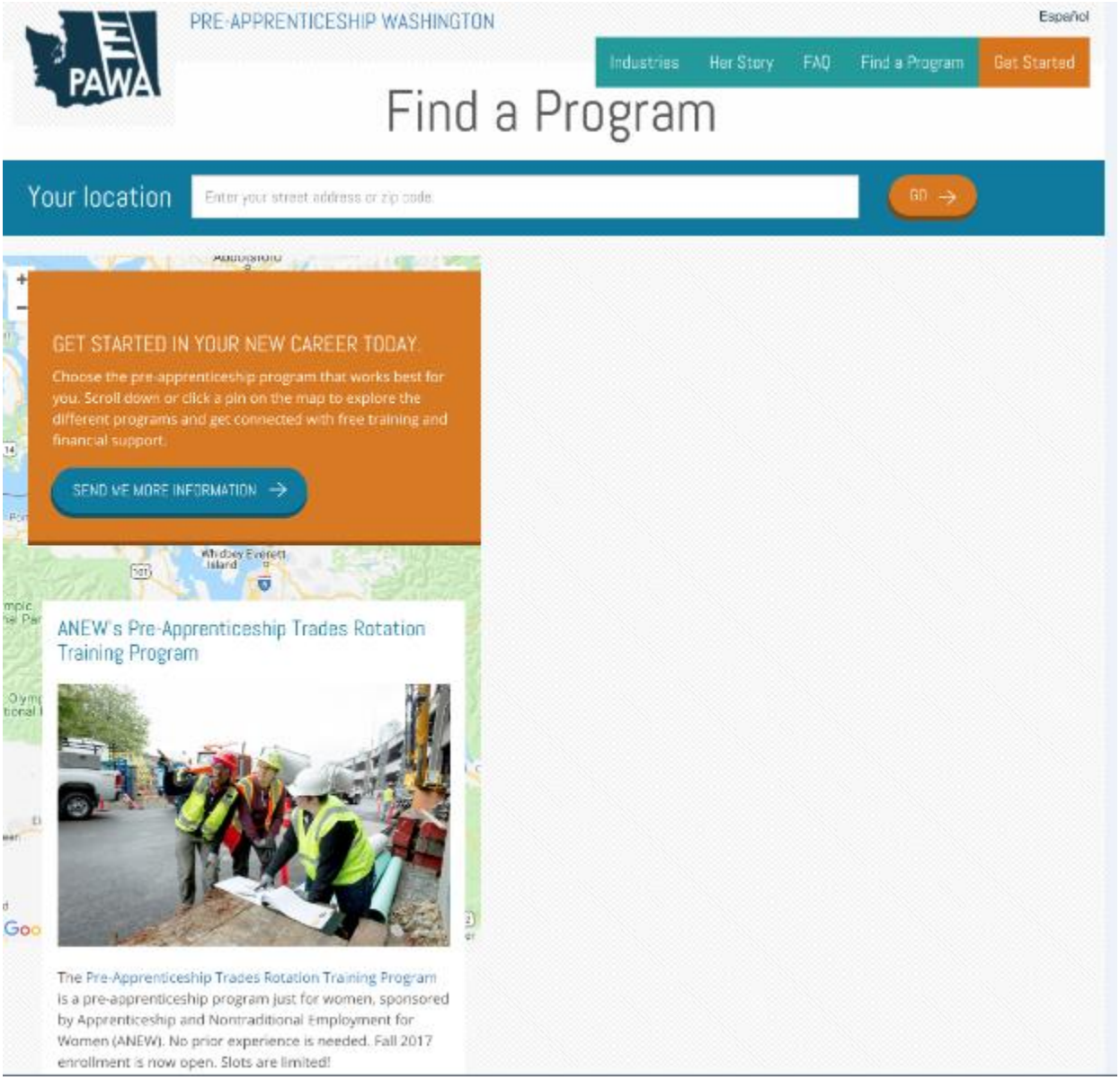

Exhibit A.24: Central New Mexico: Generic-themed Control, Email 1

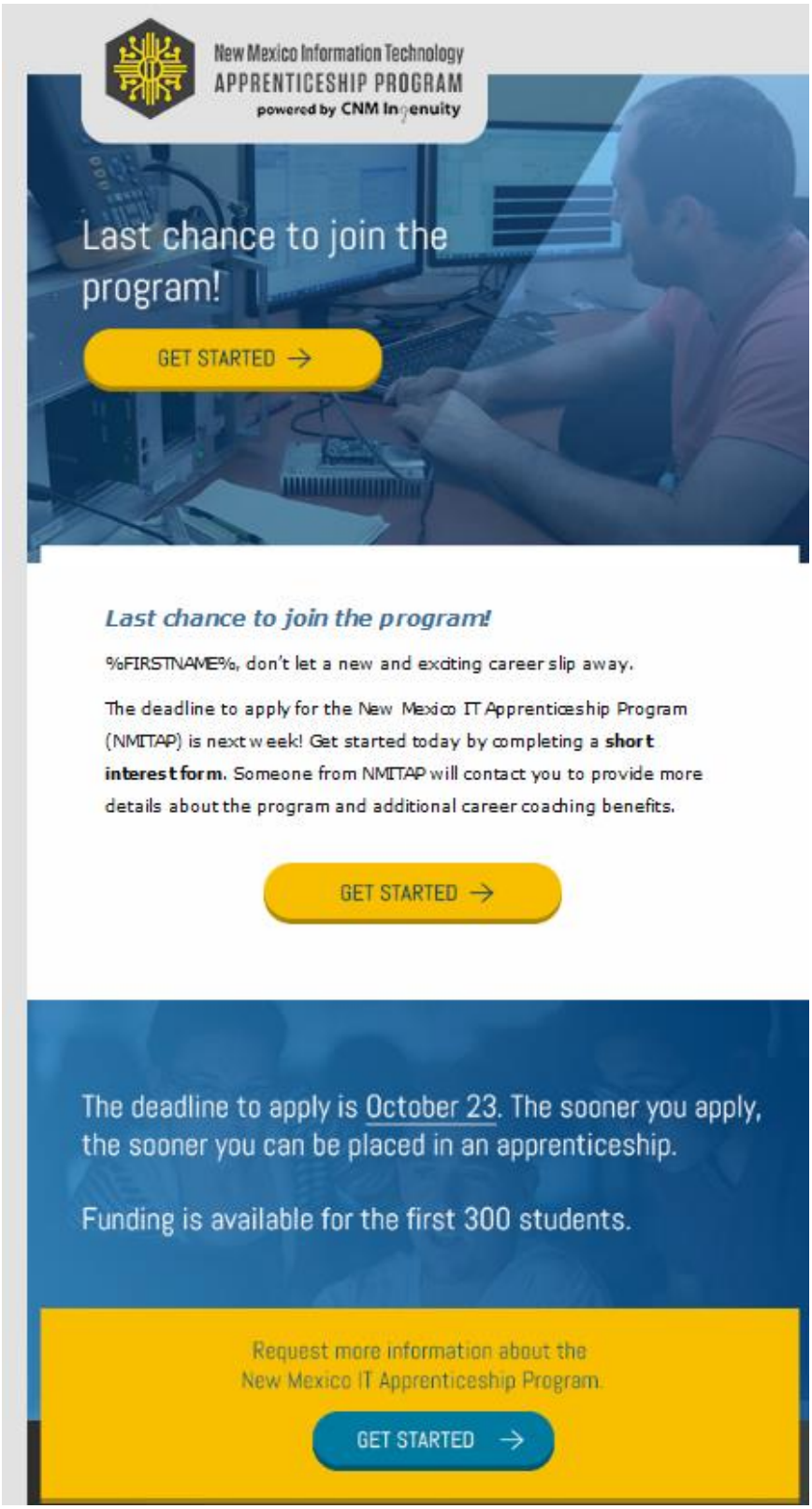

Exhibit A.25: Central New Mexico: Generic-themed Control, Email 2

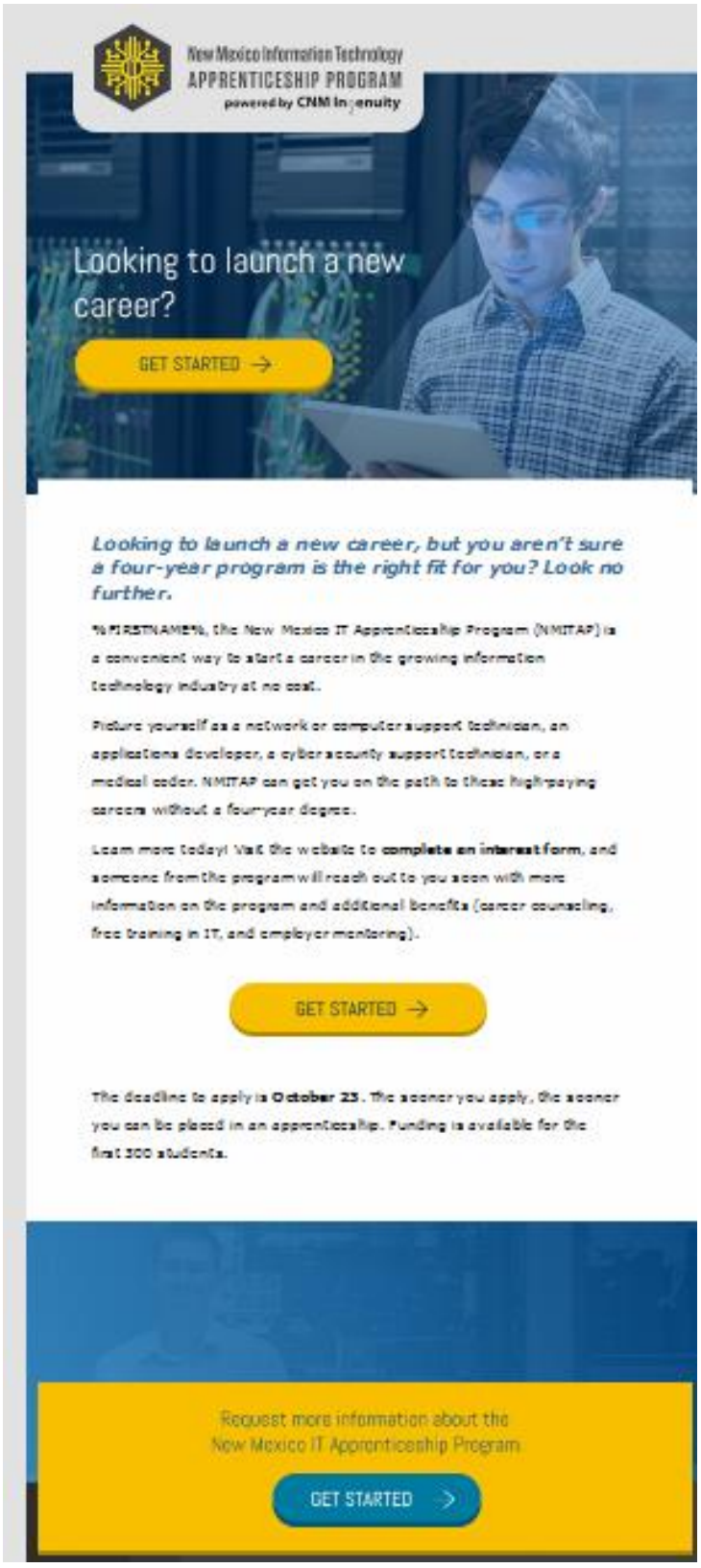

Exhibit A.26: Central New Mexico: Generic-themed Control, Email 3

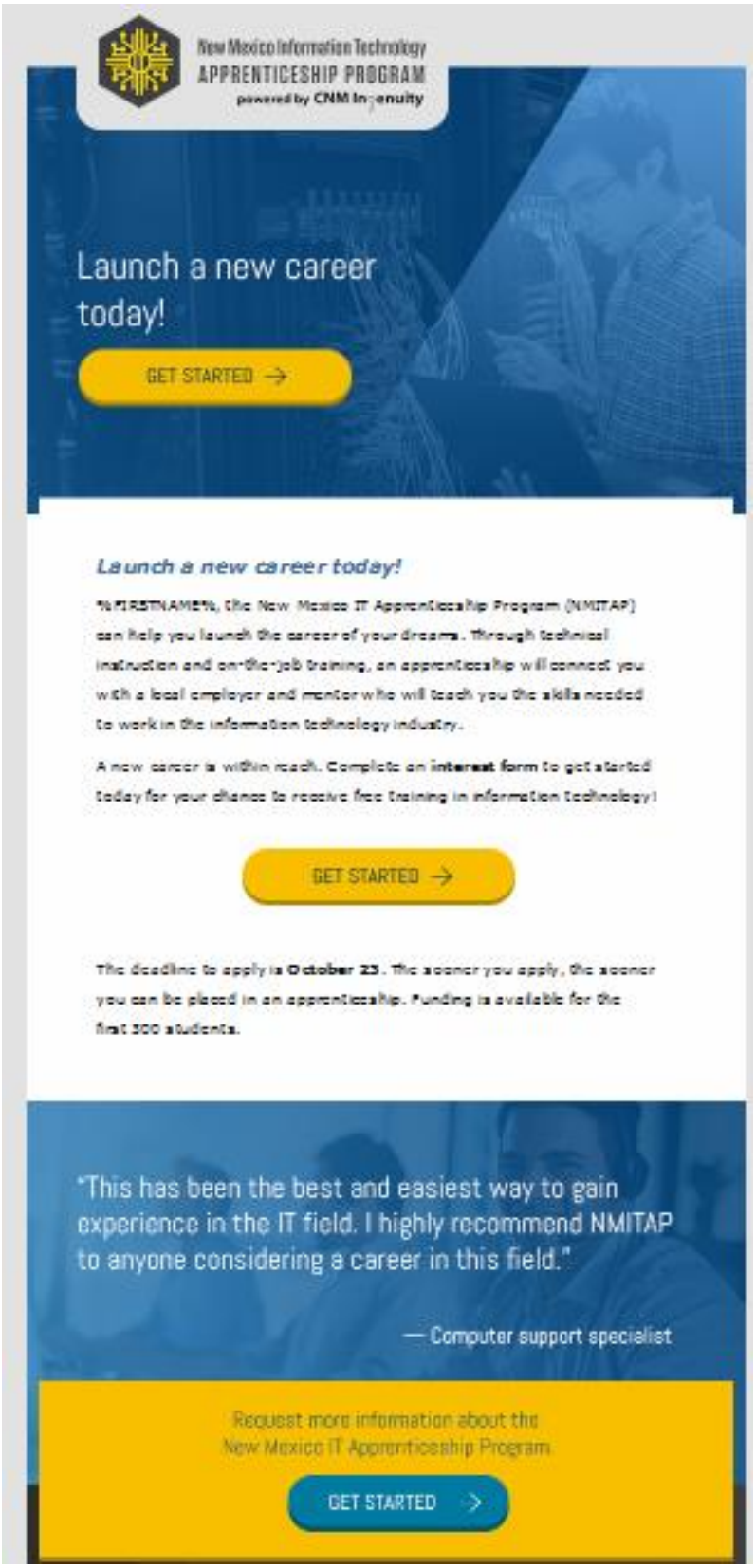

Exhibit A.27: Central New Mexico: Generic-themed Control, Email 4

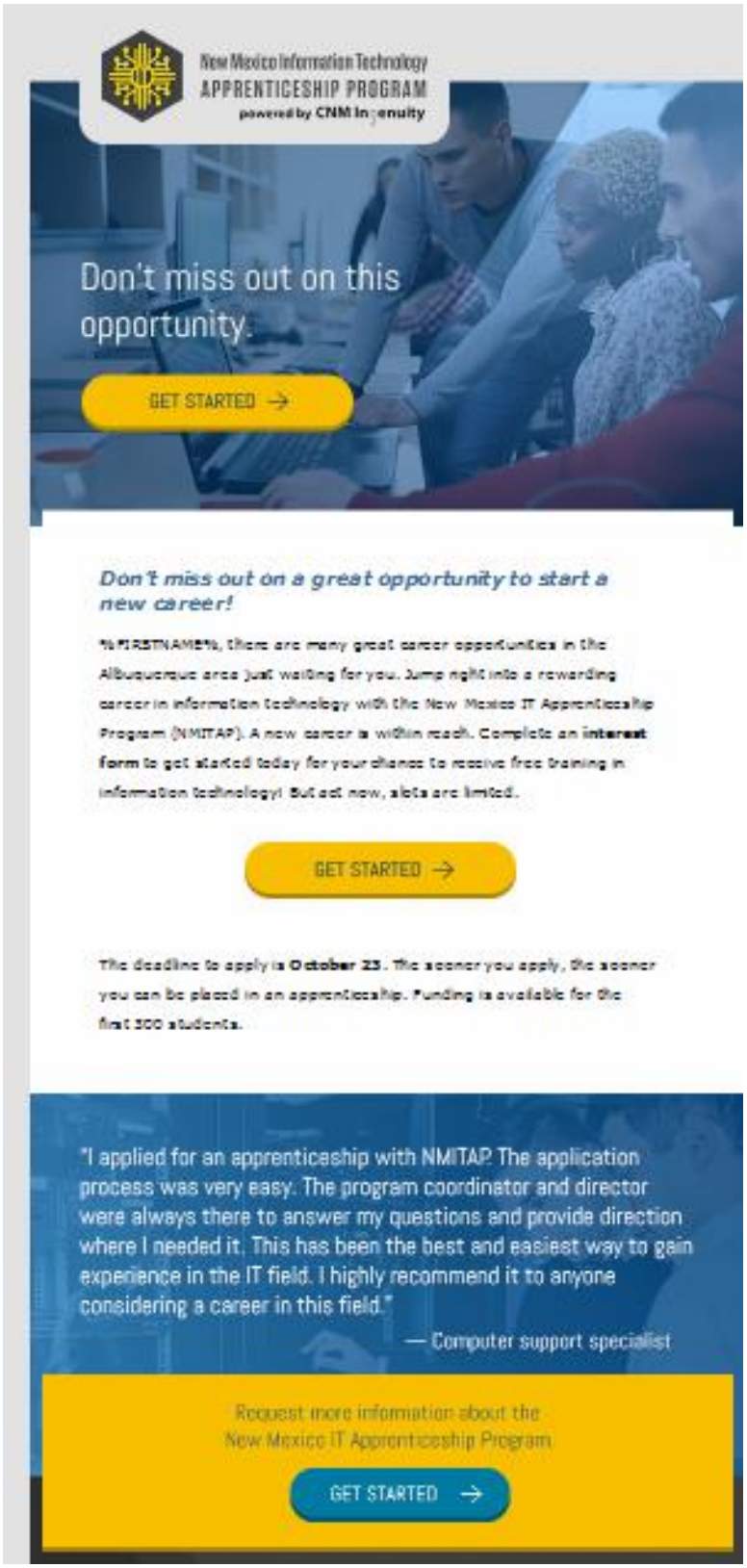

Exhibit A.28: Central New Mexico: Generic-themed Control, Email 5

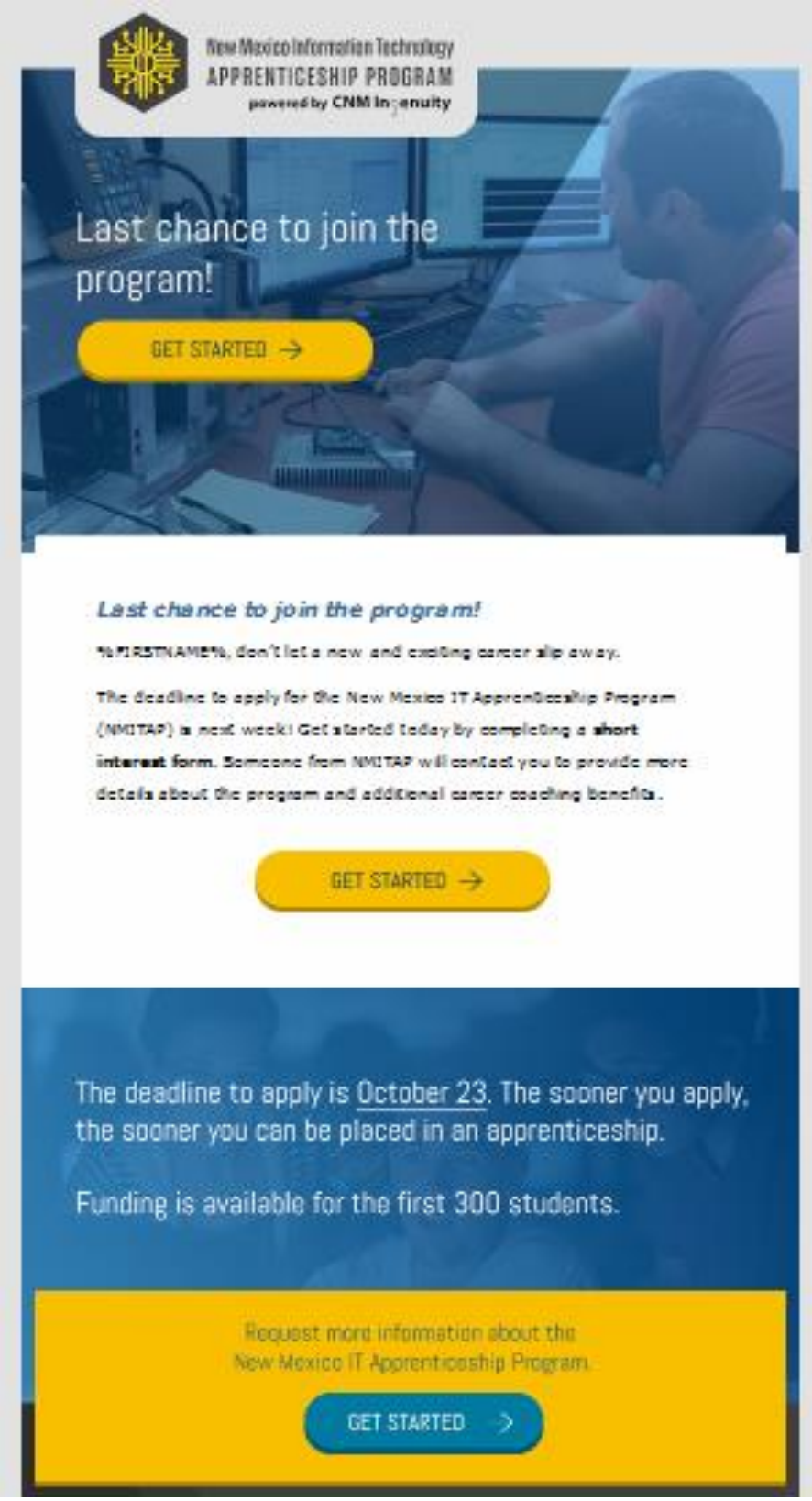

Exhibit A.29: Central New Mexico: Generic-themed Control, Email 6

Apply to NMITAP today!

Congratulations, %FIRSTNAME%! You've taken the first step toward a rewarding, new career by requesting information on the New Mexico IT Apprenticeship Program (NMITAP). Through on-the-job training and classroom instruction, this program will provide you with the technical skills needed to begin a rewarding career in information technology. Someone from NMITAP will follow up with you soon to provide more information on the program and application process.

- **Step 1: Find an apprenticeship program.**

- **Step 2: Decide whether NMITAP is right for you.**

  Attend a free, optional information session to learn about the program, possible career paths, and application process. Choose a session that works with your schedule.

  When: Thursday, October 5
  Thursday, October 12
  Thursday, October 19

  Where: Central New Mexico Workforce Training Center
  5600 Eagle Rock Ave. NE
  Albuquerque, NM 87113

- **Step 3: Apply and launch your new career!**

  The deadline to apply is **October 23**.

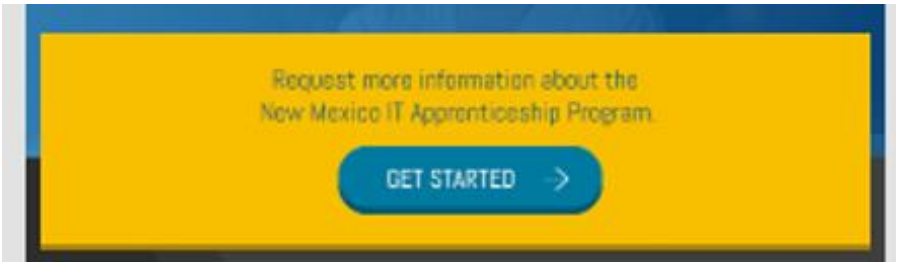

Exhibit A.30: Central New Mexico: Generic-themed Control, Postcard

Exhibit A.31: Central New Mexico: Generic-themed Control, Website's Homepage

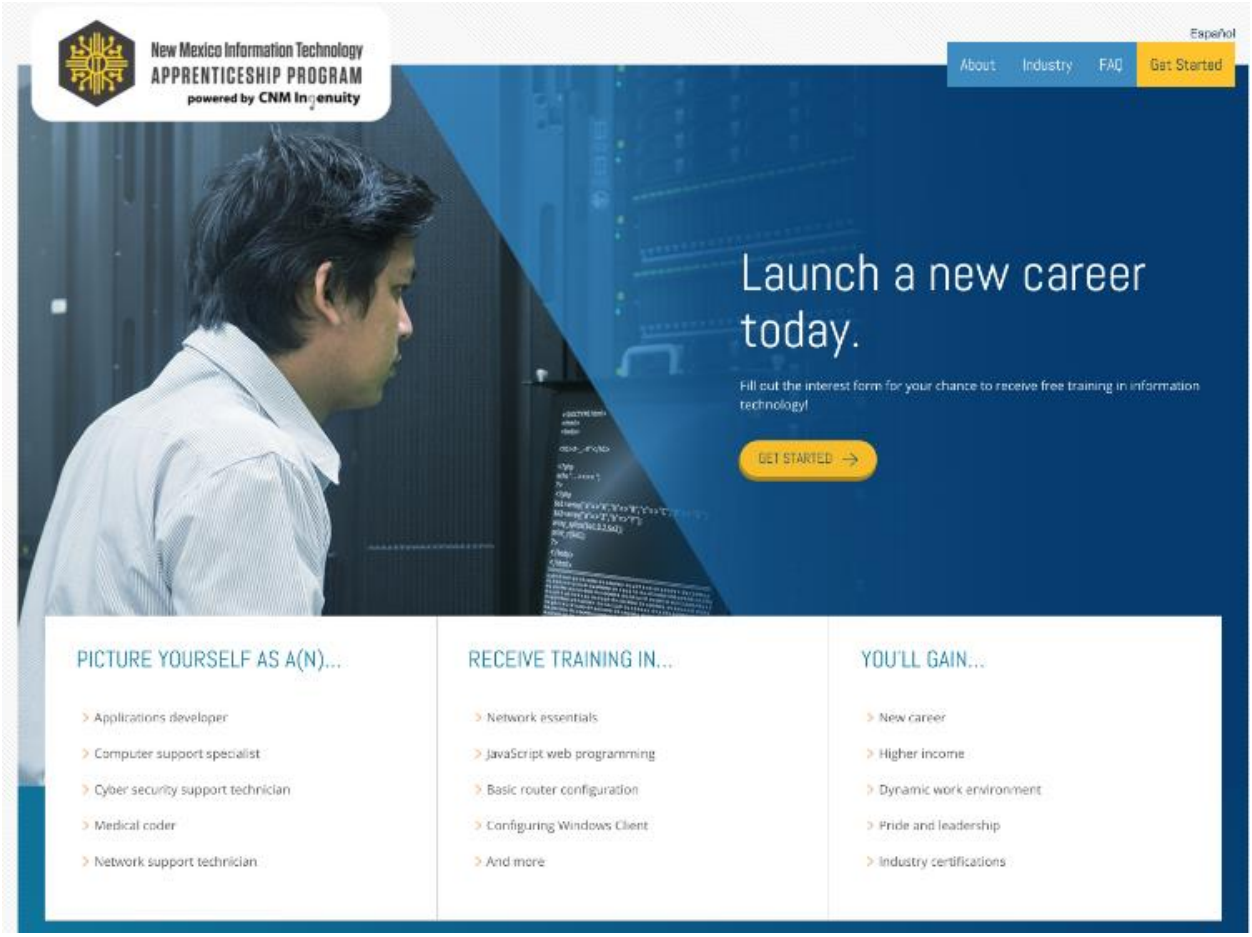

Exhibit A.32: Central New Mexico: Generic-themed Control, Website's Page - About

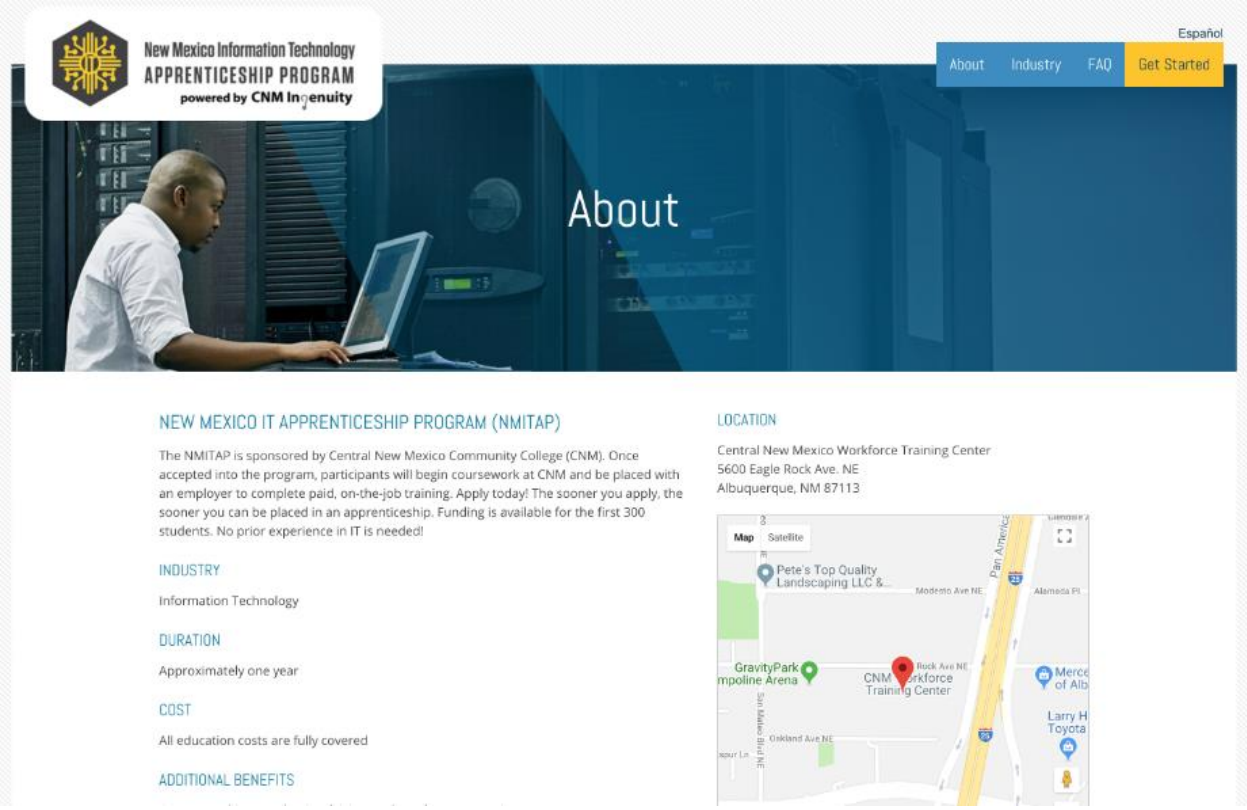

Exhibit A.33: Central New Mexico: Generic-themed Control, Website's Page - Industry

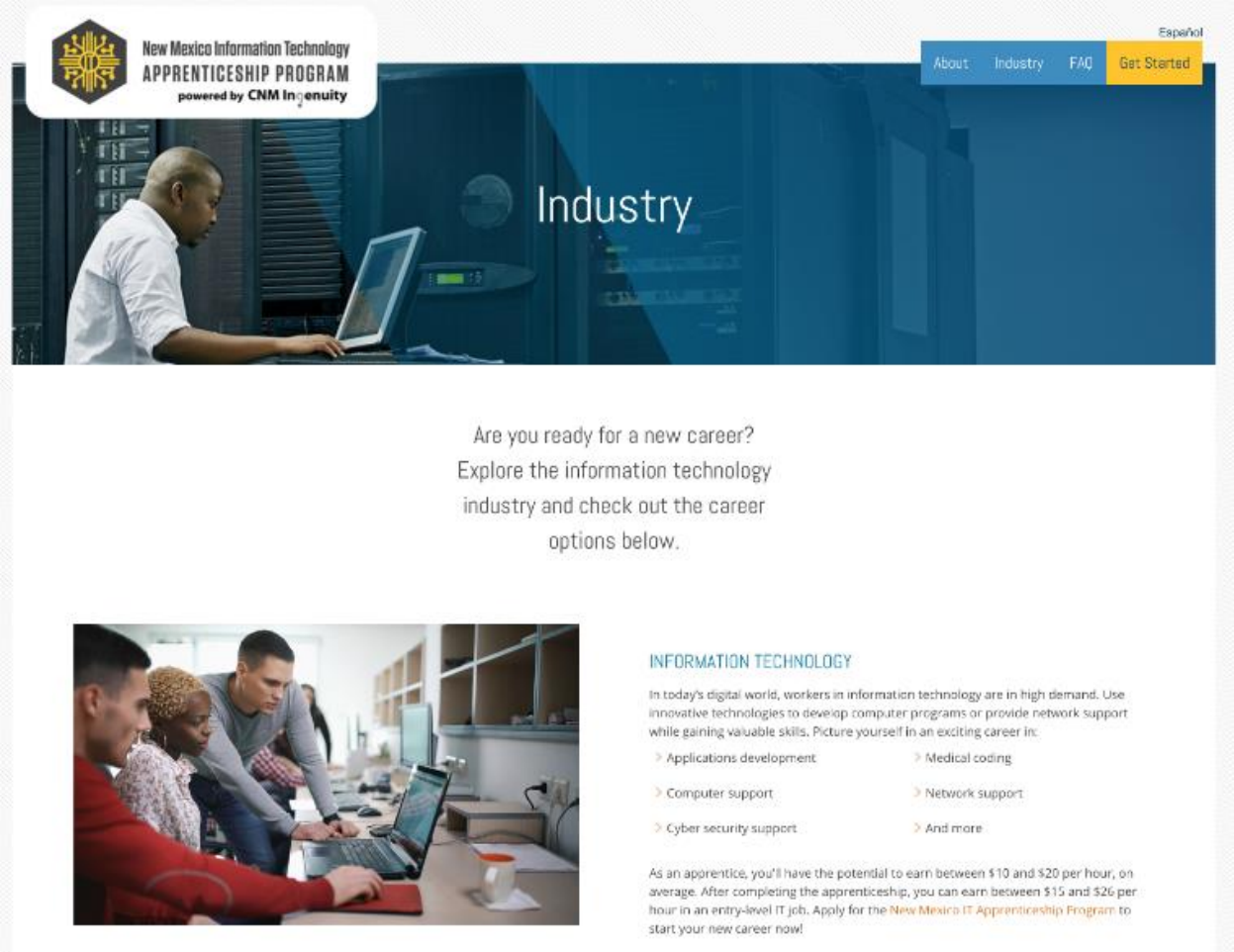

Exhibit A.34: Central New Mexico: Gender-themed Treatment, Email 1

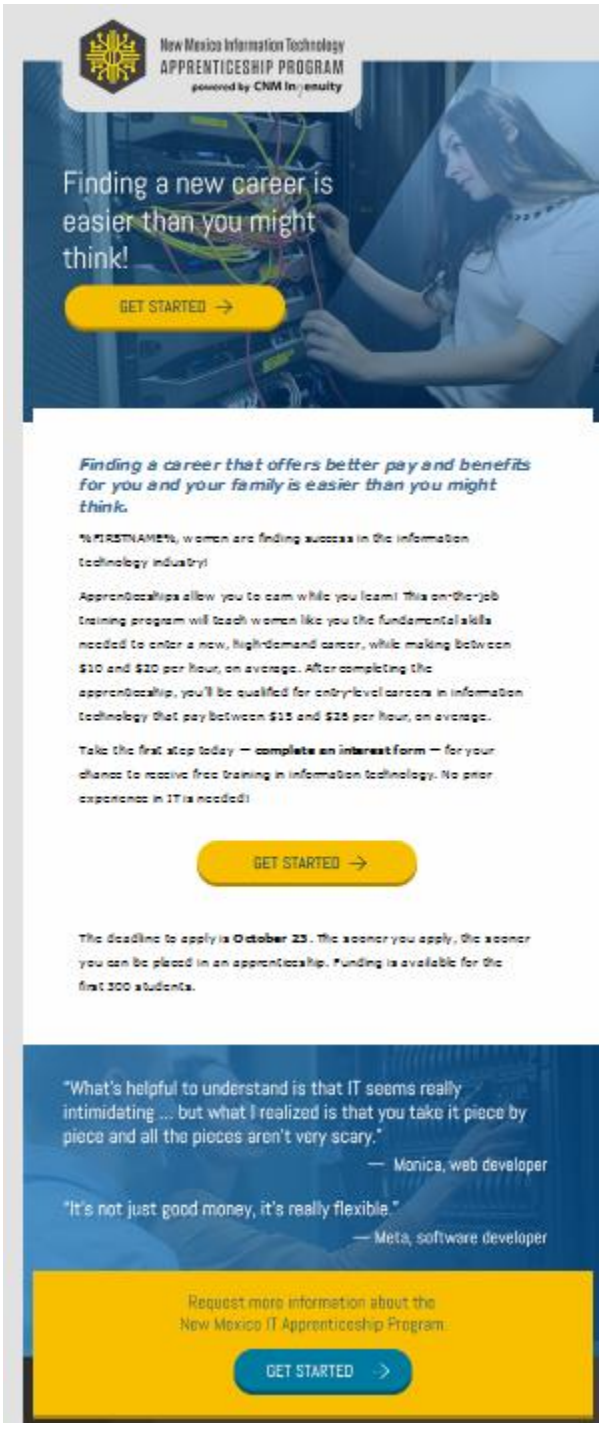

Exhibit A.35: Central New Mexico: Gender-themed Treatment, Email 2

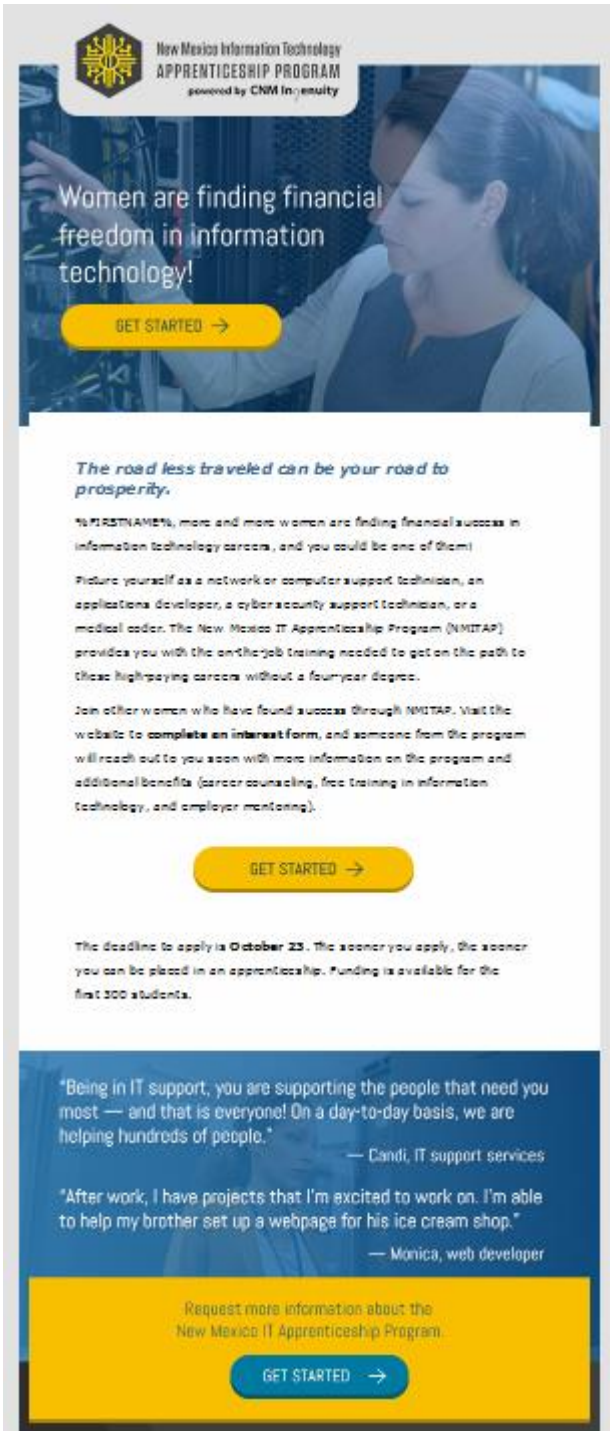

Exhibit A.36: Central New Mexico: Gender-themed Treatment, Email 3

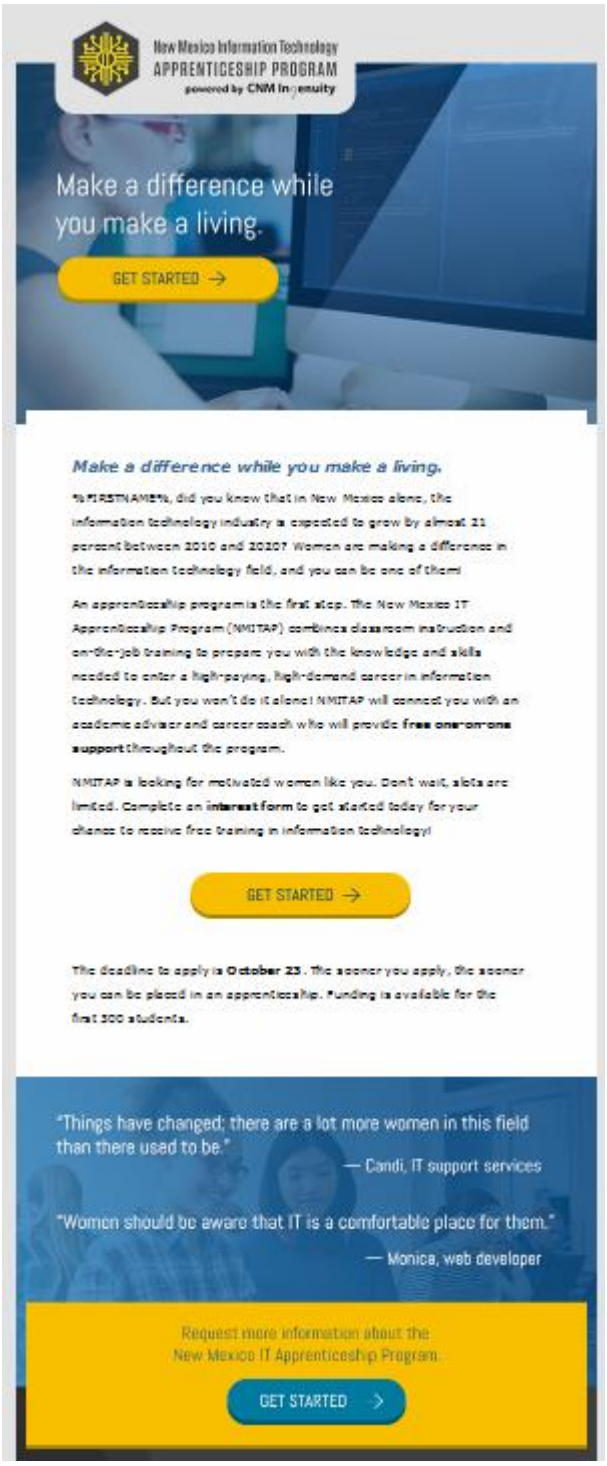

Exhibit A.37: Central New Mexico: Gender-themed Treatment, Email 4

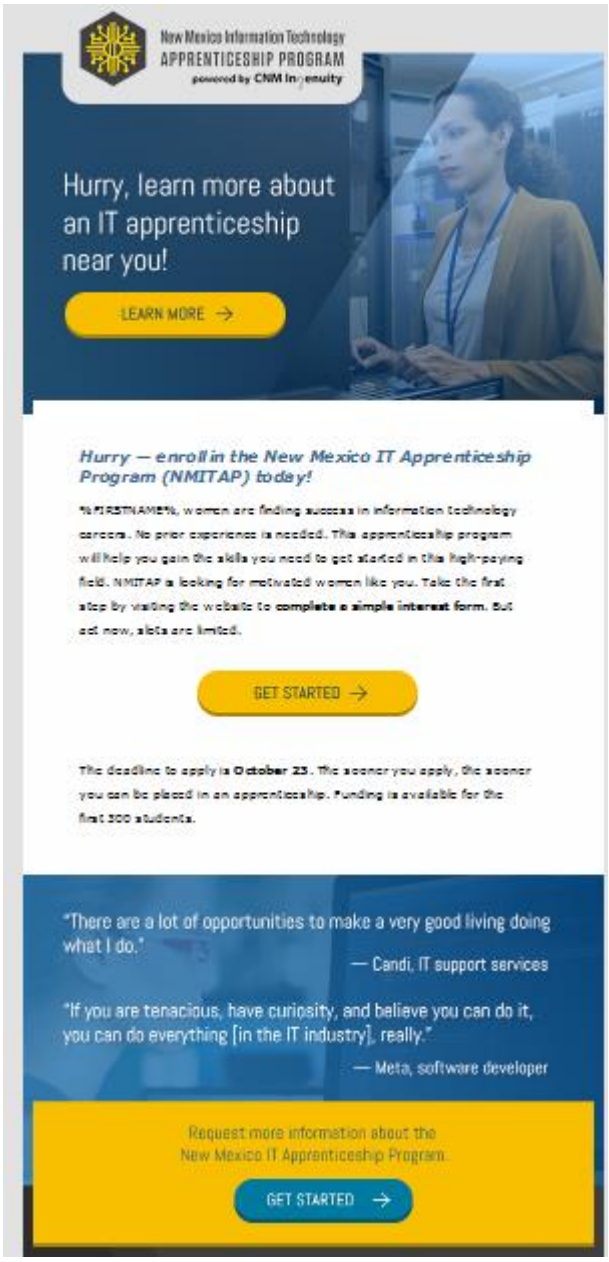

Exhibit A.38: Central New Mexico: Gender-themed Treatment, Email 5

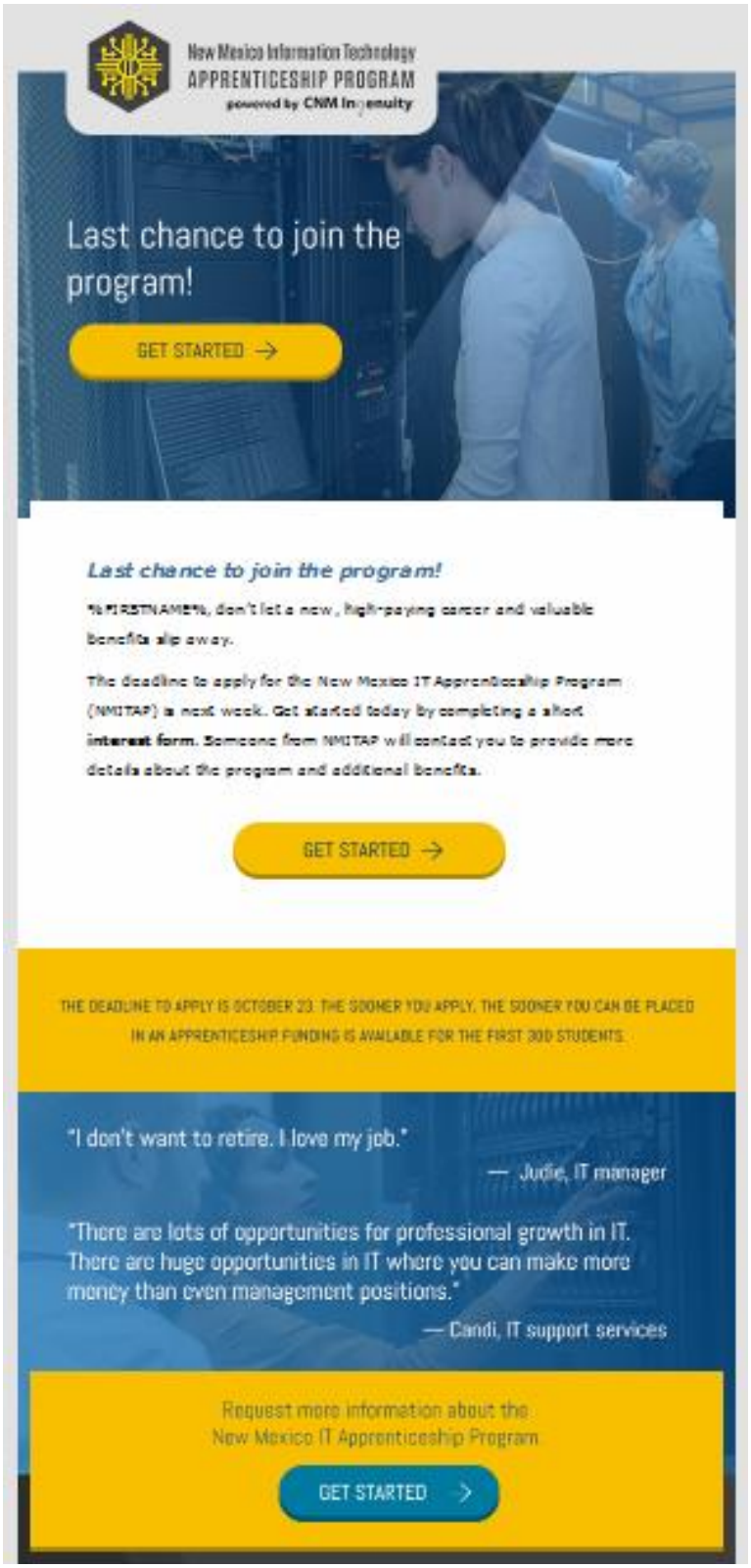

Exhibit A.39: Central New Mexico: Gender-themed Treatment, Email 6

Apply to NMITAP today!

Congratulations, %FIRSTNAME%! Like many women before you, you've taken the first step toward a rewarding, high-paying new career by requesting information on the New Mexico IT Apprenticeship Program (NMITAP). Through on-the-job training and classroom instruction, this program will prepare you with the technical skills needed to begin a rewarding career in information technology. Someone from NMITAP will follow up with you to provide more information on the program and application process.

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  Thursday, October 12
  Thursday, October 19

  Where: Central New Mexico Workforce Training Center
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  Albuquerque, NM 87113

- **Step 3: Apply and launch your new career!**

  The deadline to apply is **October 23**.

Exhibit A.40: Central New Mexico: Gender-themed Treatment, Postcard

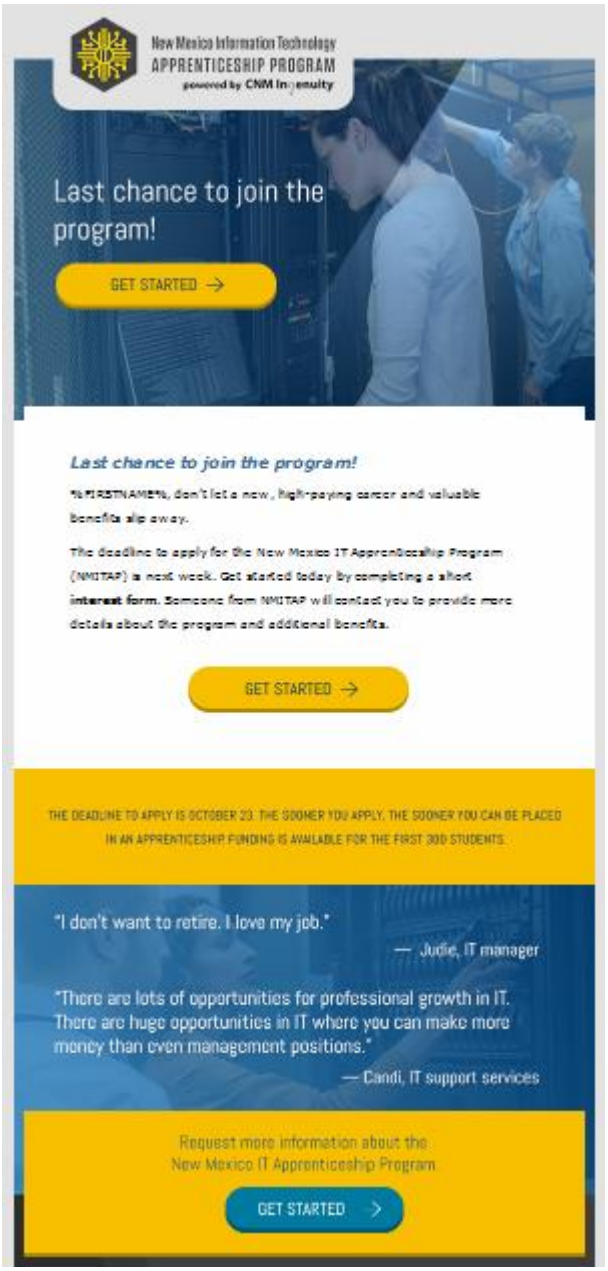


Exhibit A.41: Central New Mexico: Gender-themed Treatment, Website's Homepage

Exhibit A.42: Central New Mexico: Gender-themed Treatment, Website's Page - About

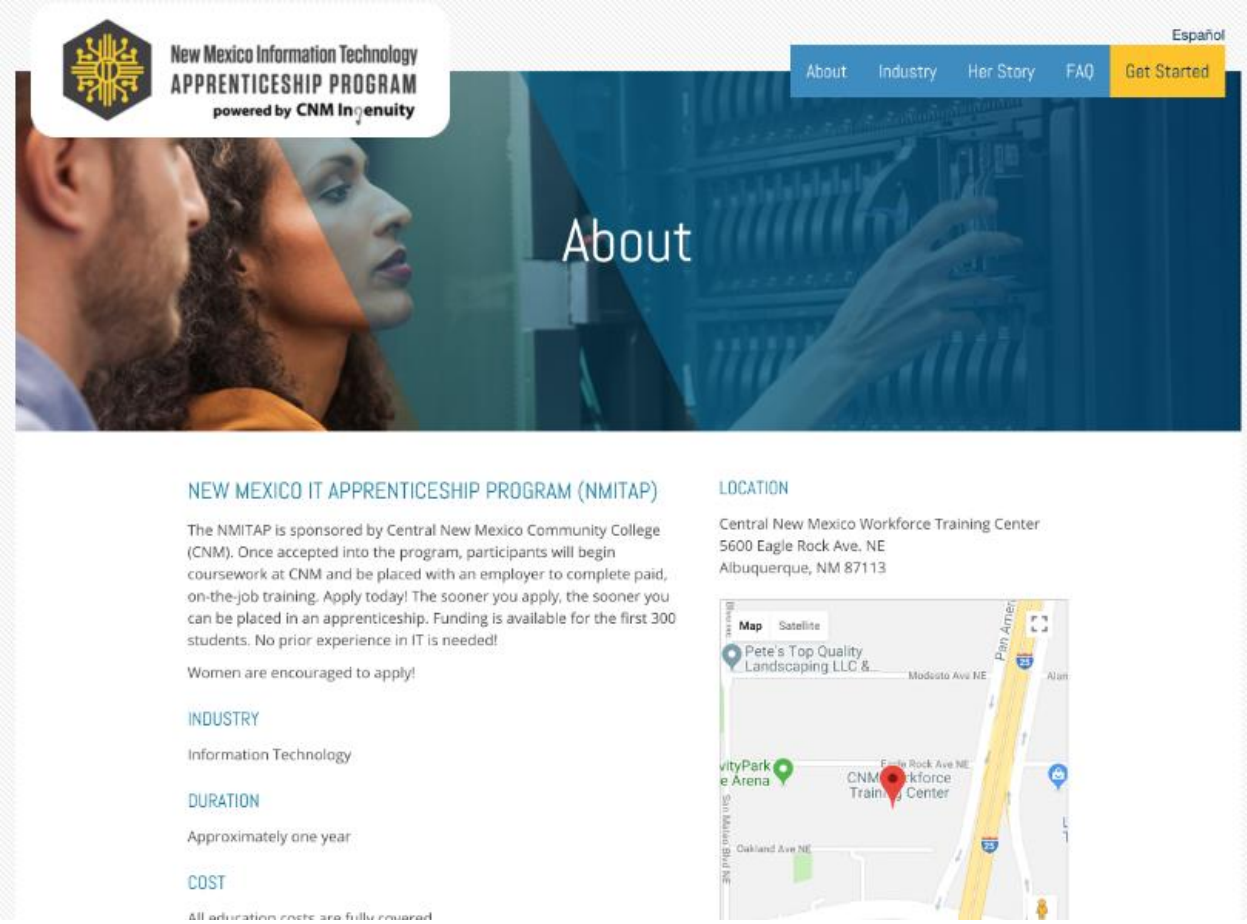
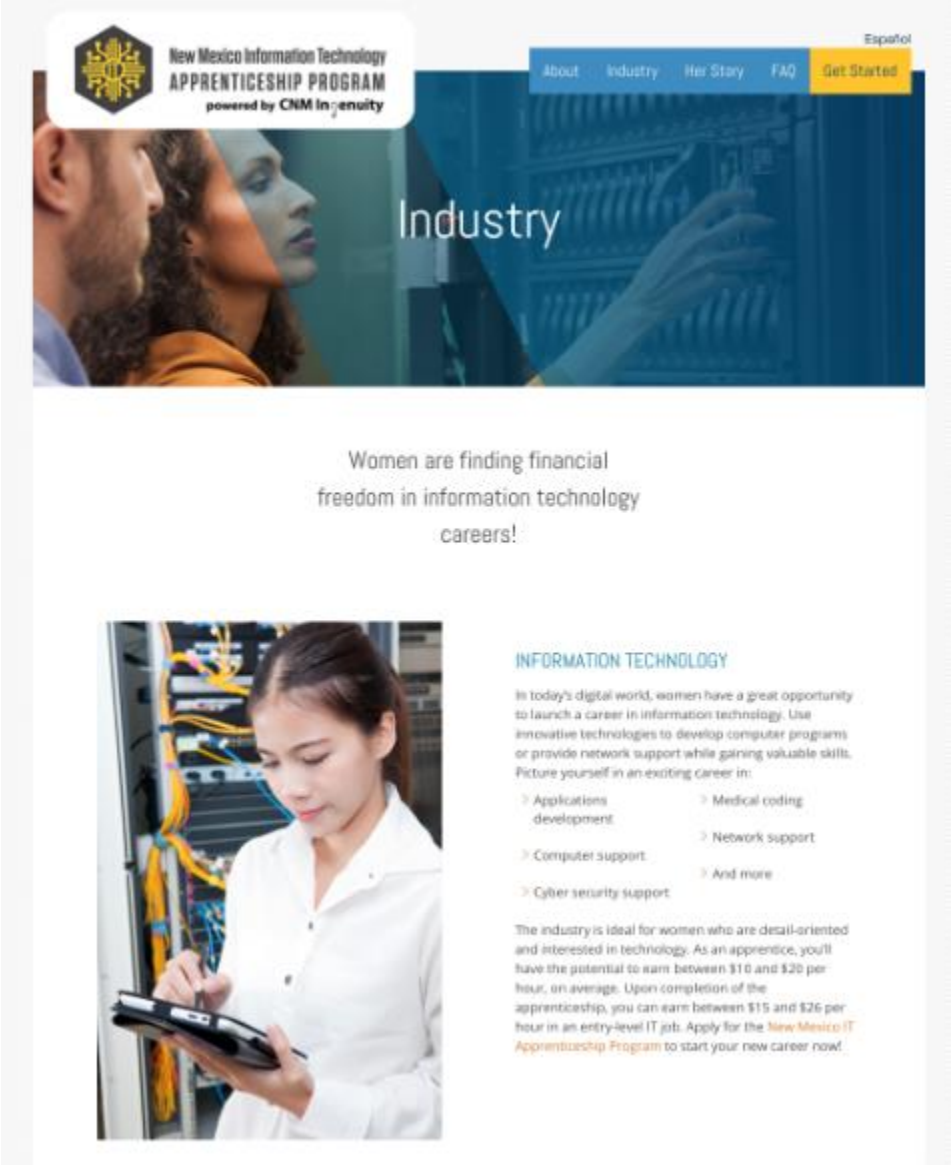


Exhibit A.43: Central New Mexico: Gender- themed Treatment, Website's Page - Industry



APPENDIX B. NON-TRADITIONAL OCCUPATIONS BARRIERS AND STRATEGIES

This appendix presents additional detail on the barriers to NTO entry and retention identified through the literature review, as well as the strategies identified for addressing such barriers.

B.1 BARRIERS TO NTO ENTRY

Barriers to entry into NTOs prevent women from accessing employment in certain occupations and from realizing the benefits of that employment, including economic self-sufficiency, higher wages, improved benefits, broader job opportunities and advancement potential, and job satisfaction.

The review of the literature identified a spectrum of barriers that prevent women from pursuing and entering NTOs, as well as being retained in these occupations. These barriers fall into two main categories: workplace and career-related barriers, and education barriers. Workplace and career-related barriers relate to the characteristics and perceptions of certain occupations that make women less inclined to enter and remain in these NTOs. Education barriers relate to the issues women face in K-12 and postsecondary education programs that are the basis for entry into NTOs, particularly those in the STEM fields: science, technology, engineering, and mathematics. The evaluation team identified the following types of barriers in these two categories (examples of studies for each barrier are cited in the notes):

- Workplace and career-related barriers:
  - Lack of awareness and inaccurate perceptions of NTOs[84]
  - Biased career recruitment materials and practices[85]
  - Lack of occupational training/inadequate skill set[86]
  - Negative training/occupational characteristics[87]
  - Discrimination during training and in access to employment[88]
  - Biased career mechanisms and practices in the workplace[89]
- Education-related barriers:
  - Access to and participation in STEM education[90]
  - Biased curriculum structure and instructional attitudes[91]
  - Stereotype threat[92]

[84] An example from the aviation mechanic industry: Clark, P. J., Newcomer, J. M., & Jones, A. M. (2015). Overcoming gender barriers in aircraft maintenance: Women's perceptions in the United States. *Collegiate Aviation Review*, *33*(2), 66.

[85] Kmec, J. A. (2003). Minority job concentration and wages. *Social Problems*, *50*(1), 38-59.

[86] Taylor, C. J. (2010). Occupational sex composition and the gendered availability of workplace support. *Gender & Society*, *24*(2), 189-212.

[87] Clark, et al. (2015).

[88] Kelly, M., Wilkinson, L., Psiciotta, M., and Williams, L.R. (2015) When Working Hard Is Not Enough for Female and Racial/Ethnic Minority Apprentices in the Highway Trades. *Sociological Forum* 30 (2), 415-438

[89] Kmec (2003).

[90] Griffith, A. L. (2010). Persistence of women and minorities in STEM field majors: Is it the school that matters? *Economics of Education Review*, *29*(6), 911-922.

[91] Gunter, R. (2009). The emergence of gendered participation styles in science-related discussions: Implications for women's place in science. *Journal of Women and Minorities in Science and Engineering*, *15*(1), 53-75.

[92] Fogliati, V. J., & Bussey, K. (2013). Stereotype threat reduces motivation to improve. *Psychology of Women Quarterly*, *37*(3), 310-324.

- Lack of self-efficacy.[93]

B.2 STRATEGIES

The literature review also identified promising strategies for addressing barriers to NTO entry. These strategies fall into the same two categories as the barriers: workplace and career-related strategies, and education strategies. While both are critical, the strategies most relevant to DOL objectives are drawn primarily from the literature on workplace and career-related strategies.

Workplace and career-related strategies are typically implemented by career guidance professionals, training providers, and employers. Outcomes typically include increased NTO employment among women and minorities, and increased access to and retention and advancement in NTOs. These strategies generally address barriers associated with: (1) bias found in career materials, mechanisms, and policy; (2) individual perceptions and responses to the characteristics of NTOs; and (3) lack of support services. Exhibit B.1 presents the types of workplace and career-related strategies identified in the literature review.

Exhibit B.1: Workplace and Career-Related Strategies

Strategy Category	Description
Targeted Apprenticeships/ Pre-apprenticeships[1]	Paid on-the-job learning generally resulting in a nationally recognized credential that offers job seekers immediate employment opportunities in high-wage, high-skilled occupations. Pre-apprenticeship programs provide exposure to a wide variety of high-skill, high-wage careers.
Institutional Changes in NTOs[2]	Changes that reshape organizational structure and policy to create a culturally responsive environment for one or more NTO populations.
Targeted Recruitment Practices and Materials[3]	Targeted recruitment materials and practices tailored specifically to the workplace issues and needs of women and minorities.
Family-Friendly Policies and Supportive Practices[4]	Policies such as subsidized child care and maternity leave that encourage parents to stay in the workforce.
Professional Development for Career Counselors[5]	Interventions sensitizing counselors to the specific challenges and job trends facing women and minorities professionally.
Professional Mentoring Programs[6]	New hires from NTO populations are given an equity-trained mentor, often of the same gender/race as the mentee, to guide their career development and provide support in various ways.

[1] Simon, L., & Clarke, K. (2016). Apprenticeships should work for women too! *Education + Training*, *58*(6), 578-596.

[2] Dainty, A. R. J., Bagilhole, B. M., Ansari, K. H., & Jackson, J. (2004). Creating equality in the construction industry: An agenda for change for women and minorities. *Journal of Construction Research*. *5*(1), 75-86.; U.S. Department of Labor Office Office of Apprenticeship (2018) "Equal Employment Opportunity: Anti-Harassment Resources" <https://doleta.gov/oa/eeo/anti_harassment_resources/>

[3] Puerto, C., Guggemos, A. A., & Shane, J. (2011). *Exploration of strategies for attracting and retaining female construction management students.* Proceedings of the 47th International Conference of the Associated Schools of Construction, Omaha, NE, 187-194.

[4] Reed, D., Liu, A. Y.-H., Kleinman, R., Mastri, A., Reed, D., Sattar, S., & Ziegler, J. (2012). *An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States.* ETAOP 2012-10. Washington, DC: U.S. Department of Labor, Employment and Training Administration.

[93] Quimby, J. L. and O'Brien, K. M. (2004). Predictors of student and career decision-making self-efficacy among nontraditional college women. *Career Development Quarterly*, *52*(4), 323-339.

[5] Coogan, P. A. & Chen, C. P. (2007). Career development and counselling for women: Connecting theories to practice. *Counseling Psychology Quarterly*, *20*(2), 191-204.

[6] Byrd, B. (1999). Women in carpentry apprenticeship: A case study. *Labor Studies Journal, 24*(3), 3-22.

In contrast, *education strategies* are typically implemented by education professionals. While highly correlated with addressing barriers associated directly with NTO entry and retention, outcomes for these strategies typically include increased enrollment, retention, and graduation rates in STEM fields, rather than directly employment-related outcomes. Strategies typically address barriers related to the delivery of academic material as well as those related to student proficiency, academic interest, and self-efficacy to pursue STEM-related academic programs. Exhibit B.2 presents the types of education-related strategies identified through the literature review.

Exhibit B.2: Education Strategies

Strategy Category	Description
Supplemental Education Programs[1]	Extracurricular activities that encourage women and minorities to take an interest in STEM fields through community-based and interactive exercises
Curriculum Development[2]	Expanding the cultural lens of educational curricula to create a warmer classroom environment for women and/or minorities in STEM programs
Student Mentoring Programs[3]	Assignment of women and minority students in STEM to a mentor for academic counseling and support
Professional Development for Educators[4]	Programs seeking to alter the way teachers teach STEM subjects, to be more sensitive to the needs and perceptions of women and minorities
Self-Affirmation Techniques[5]	Programs that build on students' existing skills and abilities to build confidence early in the career decision-making process

[1] Frost J. H, & Wiest, L. R. (2007). Listening to the girls: Participant perceptions of the confidence-boosting aspects of a girls' summer mathematics and technology camp. *Mathematics Educator*, 17(2), 31-40.

[2] Knight, M. T., & Cunningham, C. M. (2004). Building a structure of support: An inside look at the structure of women in engineering programs. *Journal of Women and Minorities in Science and Engineering*, *10*(1), 1-20.

[3] Boldyreff, C. & Massey, E. M. (2009). Evolution of a cross-year mentoring scheme. *International Journal of Gender, Science and Technology*, *1*(1), 138-144.

[4] Hodges, J., Pearson, A., & Reese, D. (2011). WomenLEAD: Leadership development for female faculty in business and engineering. *International Journal of Gender, Science and Technology, 3*(2), 331-337.

[5] Cech, E., Rubineau, B., Silbey, S., & Seron, C. (2011). Professional role confidence and gendered persistence in engineering. *American Sociological Review*, *76*(5), 641-666.

APPENDIX C. AAI GRANT PROGRAMS OVERVIEW

C.1 SOUTH SEATTLE COMMUNITY COLLEGE

South Seattle is working with its partners to implement the Partnership for Advanced Technology Apprenticeships in Manufacturing and Marine Engineering (PATAM) program. The Partnership aims to create three new apprenticeship programs and expand 12 existing programs in advanced manufacturing, construction, and marine engineering. These programs, together, intended to serve at least 1,000 apprentices. The main goal is to scale and sustain apprenticeships by focusing on both ends of the apprenticeship pipeline (entry into apprenticeships at one end and employer hiring at the other).

To improve *pathways into apprenticeships*, the Partnership is working to develop common competencies for advanced manufacturing and construction pre-apprenticeships, implement new and revised pre-apprenticeship programs, and create an apprenticeship navigator system. To *improve and expand its employer base*, the Partnership planned to pilot and demonstrate the effectiveness of on-the-job-training consultants, work to introduce new employers to apprenticeship, and use employer feedback to enhance training curricula.[94]

Training Partners. The evaluation team worked directly with South Seattle's three training partners to implement the demonstration in that site: Apprenticeship & Nontraditional Employment for Women (ANEW), Aero-space Joint Apprenticeship Committee (AJAC), and Clover Park Technical College (CPTC). These partners were involved in developing the recruitment content and supporting specific demonstration and evaluation activities. As shown in Exhibit C.1, as part of the AAI grant, all three of South Seattle's training partners offer entry-level training or educational options that will enable low-to-medium skilled women to enter the fields of advanced manufacturing or construction. The training providers are all located within the Seattle-Tacoma metropolitan area (see Exhibit C.2), making each a viable option for anyone living in this region of Washington State.

Exhibit C.1: Programs Offered by South Seattle Training Partners

Training Provider	Training/Education Program
Apprenticeship & Nontraditional Employment for Women (ANEW)	ANEW, a women-focused training and support services provider, is offering a women-only pre-apprenticeship program in construction and advanced manufacturing.
Aerospace Joint Apprenticeship Committee (AJAC)	AJAC, an aerospace and advanced manufacturing registered apprenticeship program, is offering a pre-apprenticeship program in aerospace and advanced manufacturing.
Clover Park Technical College (CPTC)	CPTC, a community/technical college, is offering an entry-level training program called the Fundamental Skills for Manufacturing and Engineering or FSME.

[94] South Seattle Grant Summary, https://www.dol.gov/opa/media/press/eta/20150909/Wash%20-%20South%20Seattle%20College.pdf. Accessed on 03/08/2018.

Exhibit C.2: South Seattle Training Provider Locations

1. Apprenticeship & Non-Traditional Employment for Women (ANEW)
2. Aerospace Joint Apprenticeship Committee (AJAC)
3. Clover Park Technical College (CPTC)

C.2 CENTRAL NEW MEXICO COMMUNITY COLLEGE

Central New Mexico is implementing the New Mexico Information Technology Apprenticeship Program (NMITAP), which offers On the Job Learning (OJL) and Job Related Technical Instruction (JRTI). This combination aligns with five information technology (IT) career paths: 1) IT Developer, 2) IT Security, 3) IT Systems, 4) IT User Support, and 5) Health IT. Central New Mexico is providing the JRTI directly and is working with a range of local employers to offer the OJL or apprenticeship opportunities. A major goal of NMITAP is to help employers in the Albuquerque metropolitan area meet their growing need for IT workers.[95]

On behalf of DOL, the evaluation team worked with Central New Mexico and New Mexico Department of Workforce Solutions, the New Mexico State Workforce Agency (SWA), to implement the demonstration and evaluation in that site. Demonstration activities included developing the recruitment content and collecting data on specific evaluation outcomes. New Mexico SWA preferred not to share jobseekers' contact information and agreed to conduct the demonstration outreach in that site and collect data on specific evaluation outcomes. Central New Mexico Community College is the sole training provider under this grant, and training is readily accessible to jobseekers living in northern Albuquerque (see Exhibit C.3).

Exhibit C.3: Central New Mexico Community College Location

[95] Central New Mexico Grant Summary, https://www.dol.gov/opa/media/press/eta/20150909/N.M.%20-%20Central%20New%20Mexico%20CC.pdf. Accessed on 03/08/2018.

APPENDIX D. DEMONSTRATION SITES TIMELINES

Exhibit D.1: Activities and General Timeline of Activities for South Seattle

Activity	Timeline	Action Required from Training Partner[50]	Fall 2017 Cohort	Spring 2018 Cohort
Confirm enrollment dates for cohort	**8 weeks before school enroll deadline**	**Yes – Provide or Confirm dates**	**7/17/2017**	**1/21/2018**
Request jobseeker data from ESD (due one week later)	8 weeks before school enroll deadline	None	7/17/2017	1/21/2018
Send Initial Recruitment Email	6 weeks before school enroll deadline	None	7/31/2017	2/5/2018
Send 1st Reminder Email	5 weeks before school enroll deadline	None	8/7/2017	2/12/2018
Send 2nd Reminder Email	4 weeks before school enroll deadline	None	8/14/2017	2/19/2018
Mail Recruitment Postcard	3 weeks before school enroll deadline	None	8/21/2017	2/26/2018
Send 3rd Reminder Email	3 weeks before school enroll deadline	None	8/21/2017	2/26/2018
Send 4th Reminder Email	2 weeks before school enroll deadline	None	8/28/2017	3/5/2018
Send post-interest form reminder email to those who have completed interest form	To be sent between 1 week after start of emailing and up to the enroll deadline (emails are sent automatically 1-2 days after completing form)	None	7/31-9/11	2/4-3/18
Share interest forms with case manager or training provider	**Weekly between start of emailing and class start date**	**Yes – Follow-up with interested jobseekers on a weekly basis**	**Weekly 7/31 to 9/25**	**Weekly 2/4 to 4/1**
Send final reminder email, different versions to those that completed and did not complete the interest form	1 week before school enroll deadline	None	9/5/2017	3/12/17
Activity	**Timeline**	**Action Required from Training Partner**	**Fall 2017 Cohort**	
Training provider submits outcomes data	**Monthly**	**Yes – Send IMPAQ outcomes data**	**See Exhibit B.2 below**	
Deadline to Enroll in School	2 weeks before Class Start Date	None	9/11/2017	3/18/2018
Class Start Date	Based on training partner schedule	None	9/25/2017	4/2/2018
Classes End Date	Based on training partner schedule	None	12/15/2017	6/19/2018

Note: IMPAQ will share interest form data with the case manager on a continual basis outside of the current cohort recruitment window.
The case manager should provide any interested individuals that complete the interest form with information on the program and the next available program dates.
The training partners were: Apprenticeship & Nontraditional Employment for Women (ANEW), Aerospace Joint Apprenticeship Committee (AJAC), and Clover Park Technical College (CPT).

Exhibit D.2: South Seattle Data Transmission Schedule

Data Transmission	Data Transmission to IMPAQ Date	Date Range
1st transmission	9/05/2017	7/01/2017 - 8/31/2017
2nd transmission	10/05/2017	9/01/2017 - 9/30/2017
3rd transmission	11/06/2017	10/01/2017 – 10/31/2017
4th transmission	12/05/2017	11/01/2017 – 11/30/2018
5th transmission	1/05/2018	12/01/2017 – 12/31/2017
6th transmission	2/05/2018	1/4/2018 – 1/31/2018
7th transmission	3/05/2018	2/01/18 – 2/28/2018
8th transmission	4/05/2018	3/01/18 – 3/31/2018
9th transmission	4/20/2018	4/01/18 – 4/15/2018

Exhibit D.3: Activities and General Timeline of Activities for Central New Mexico

Activity	Timeline	Acting Party	Fall 2017 Cohort	Spring 2018 Cohort
Implementation Activities				
Pull cohort sample and sends de-identified data to IMPAQ	7 weeks before school enroll deadline	**DWS**	8/29/2017	1/2/2018
Conduct RA and sends it back	Two days after receiving data	**IMPAQ**	9/5/2017	1/4/2018
Merge RA variable back into restricted dataset	6 weeks before school enroll deadline	**DWS**	9/7/2017	1/9/2018
Send final materials to DWS to send out	6 weeks before school enroll deadline	**IMPAQ**	9/11/2017	1/9/2018
Send Initial Recruitment Email	5 weeks before school enroll deadline	**DWS**	9/18/2017	1/16/2018
Send 1st Reminder Email	4 weeks before school enroll deadline	**DWS**	9/25/2017	1/23/2018
Evaluation team begins to print the postcard for the entire sample and sends to DWS	5 weeks before school enroll deadline	**IMPAQ**	9/18/2017	1/16/2018
Begin holding information sessions	3 weeks before school enroll deadline (3 sessions per cohort)	**CNM**	10/05/2017 10/12/2017 10/19/2017	2/1/2018 2/8/2018 2/15/2018
Send 2nd Reminder Email	3 weeks before school enroll deadline	**DWS**	10/2/2017	1/30/2018
Receive postcards	3 weeks before school enroll deadline	**DWS**	10/2/2017	1/30/2018
Affix addresses/postage and mails to the entire sample.	2 weeks before school enroll deadline	**DWS**	10/10/2017	2/6/2018
Send 3rd Reminder Email	2 weeks before school enroll deadline	**DWS**	10/10/2017	2/6/2018
Send post-interest form reminder email to those who have completed interest form	To be sent between the start of emailing and up to the enroll deadline, (emails are sent automatically 1-2 days after completing form)	**IMPAQ**	9/18-10/23	1/16-2/20
Share interest forms with case manager	Weekly between start of emailing and enroll deadline	**IMPAQ**	Weekly 9/18 to 10/23	Weekly 1/16 to 2/20
Follow up with interest form completers	Weekly between start of emailing and enroll deadline	**CNM**	Weekly 9/18-10/23	Weekly 1/16-2/20
Send final reminder email to all individuals	1 week before school enroll deadline	**IMPAQ**	10/16/2017	2/13/18
Deadline to Enroll in School	IMPAQ decision	**IMPAQ**	10/23/2017	2/20/2018

Activity	Timeline	Acting Party	Fall 2017 Cohort	Spring 2018 Cohort
Data Collection Activities				
First data submission: Submits Outcomes Data (Outcome 3, 4, and 5)	See Exhibit 3	**CNM**	10/12/2017	2/5/2018
Second data submission: Submits Outcomes Data (Outcome 3, 4, and 5)	See Exhibit 3	**CNM**	10/27/2017	3/5/2018
Third data submission: Submits Outcomes Data (Outcome 3, 4, and 5)	See Exhibit 3	**CNM**	11/13/2017	4/20/2018
Status update transmissions (Outcomes 1 & 2 only) with demographics and other data elements as agreed	Weekly between start of emailing and enroll deadline	**DWS**	Weekly 9/18 to 10/23	Weekly 1/16 to 2/20
First data submission: Evaluation team compiles interest form data (Outcome 3,4,5) and sends to DWS for merging	Three days after a CNM transmission	**IMPAQ**	10/18/2017	3/9/2018
First data submission: DWS merges and returns the de-identified dataset to evaluation team (All Outcomes)	1 week after receiving data from IMPAQ	**DWS**	11/2/2017	3/16/2018
Second data submission: Evaluation team compiles interest form data (Outcome 3,4,5) and sends to DWS for merging	Three days after a CNM transmission	**IMPAQ**	11/3/2017	4/23/2018
Second data submission: DWS merges and returns the de-identified dataset to evaluation team (All Outcomes)	1 week after receiving data from IMPAQ	**DWS**	11/10/2017	4/30/2018
Third data submission: Evaluation team compiles interest form data (Outcome 3,4,5) and sends to DWS for merging	Three days after a CNM transmission	**IMPAQ**	11/16/2017	-
Third data submission: DWS merges and returns the de-identified dataset to evaluation team (All Outcomes)	1 week after receiving data from IMPAQ	**DWS**	11/22/2017	-

APPENDIX E. CORRECTING SELECTION BIAS IN RANDOMIZED CONTROL TRIALS

This appendix discusses two potential economic methods to correct for selection bias in the context of a randomized control trial (RCT), as used in the evaluation of the NTO demonstration. The first section describes the issue of selection bias. The second section describes the propensity score matching (PSM) approach to correcting for selection bias, which is the approach the evaluation team used in analyzing the impact of the NTO demonstration on women jobseekers.

E.1 WHAT IS SELECTION BIAS?

During an RCT, a sample may become biased when the composition of the treatment and control groups deviates from the original randomization imposed by the RCT. This type of bias can occur for three reasons: (i) biased sample attrition (i.e., sample members drop out of the randomly selected treatment and control groups at non-random rates); (ii) self-selection of the treatment group into different stages of the same program; and (iii) self-selection into different treatment components of the same overall program. In the NTO demonstration's evaluation, the potential bias issue was self-selection into different stages of the same program. The first round of self-selection occurred when jobseekers made a choice at the stage of outcome 1 (i.e., between opening and not opening an email). As a result, the relevant sample for estimating the impact on outcome 2 (sample members who clicked on a link in an email) consisted only of those who opened an email—which may no longer be random if sample members who made the decision to open an email differ systematically from those who chose not to open an email.

Among the subsample of jobseekers with observable outcome 2, the original RCT randomization may have been significantly undermined for two potential reasons: (i) unobserved (latent) individual characteristics among sample members that affect the likelihood of observing a positive outcome 1 (opening an email), and (ii) different distributions of those latent characteristics between treatment and control group individuals with observable outcome 2. An example of a latent characteristic is a preference for seeking job opportunities online. Directly using the subsample of jobseekers with observable outcome 2 to perform a traditional regression analysis without correcting for potential selection bias yields the following regression equation:

$$y_i = \alpha + \beta T_i + X_i \delta + \varepsilon_i$$

where T_i is the treatment indicator and β is the coefficient of interest. Any unobserved characteristics correlated with T_i will be hidden in the error term ε_i(e.g., treatment group individuals with observable outcome 2 could be, on average, more inclined to seek job opportunities online compared to the control group). This will lead, in turn, to a biased estimate of β.[96]

E.2 CORRECTING SELECTION BIAS USING PROPENSITY SCORE MATCHING

PSM is a well-established method to address the sample selection bias issue in econometric models. To address the sample selection issue, propensity score matching (PSM) leverages the idea that a simple regression analysis can be estimated without yielding a biased estimate for β,

[96] For a detailed discussion of omitted variable bias, see Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT press.

if the individuals in the treatment and control groups can remain similar to the extent that the difference in distribution of the error term ε_i between treatment and control groups can be completely explained by randomness. As long as ε_i is not correlated with T_i, analysts can directly estimate the regression equation above to obtain an unbiased estimate for β.[97]

In the NTO demonstration's RCT evaluation, the key is to ensure that treatment and control group individuals are similarly likely to respond positively for outcome k, when the impact of that outcome $(k+1)$ is to be estimated. For example, for estimating the treatment effect on outcome 2 (clicking on a link in an email), the goal is to ensure that treatment and control group individuals are similarly likely to open an email (i.e., respond positively to outcome 1).

Propensity score matching, as its name suggests, uses a 'propensity score' to measure the similarity in likelihood of responding to an outcome during the stage when selection into the next stage occurs. Upon obtaining the scores, treatment group members are 'matched' pairwise with control group individuals with sufficiently similar likelihoods of responding to the same outcome to preserve randomness. The goal of this process is to make the distribution of the error term ε_i among the two groups as similar as possible.

Computation of the propensity score, therefore, is fundamental to the validity of the PSM approach. The NTO demonstration's evaluation team used a logistic regression to estimate the propensity of responding with a positive outcome 1 to correct for selection bias in estimating the impact of outcome 2. Similarly, the team estimated the probability of responding with a positive outcome 2 to correct for selection bias in estimating the impact of outcome 3.

In this process, a logistic regression model is specified by

$$y_i = \begin{cases} 1 & \text{if } X_i b + \epsilon_i > 0 \\ 0 & \text{otherwise} \end{cases}$$

where y_i is the binary choice (e.g., whether to open an email or not) of individual i, $X_i b$ is a compact form representing the linear combination of all predictor variables including the constant, the treatment dummy, and all other covariates, and ϵ_i is distributed as standard type-1 extreme value. Denote $p_i = Prob(y_i = 1|X_i) = Prob(\epsilon_i > -X_i b)$, the unobserved probability that the response is positive during the selection stage (e.g., sample members opened an email, thus completing outcome 1). It can be shown that, by plugging in the cumulative density function $F(X_i b)$ of the type-1 extreme value distribution, the following logistic regression equation holds:

$$ln\left(\frac{p_i}{1-p_i}\right) = X_i b$$

in which the probability p_i is the propensity score to be used for matching.[98]

[97] For a full introduction to propensity score matching, see Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, *39*(1), 33-38.

[98] The cumulative density function (CDF) of standard type-1 extreme value is $F(x) = \exp(-\exp((-x-\mu)/\beta))$ where $\mu \in \mathbb{R}$ is the parameter governing the location, and $\beta > 0$ is the parameter governing the scale of the CDF.

Matching after Computing Propensity Scores. Matching is performed once propensity scores have been computed for all observations in the sample. In the NTO demonstration's case, each individual in the treatment group was matched with the group of individuals in the control group with the most similar propensity scores. The evaluation team used nearest-neighbor matching, which can be customized by two important parameters—the number of matches per each treatment group individual, and the maximum allowable difference in propensity scores between matched treatment-control pairs. For all PSM-based estimation in the NTO demonstration's evaluation, the team specified at least five matches from the control group with smallest differences in propensity score from the score of the treatment group jobseeker under consideration (i.e., five nearest neighbors), and used unrestrictive maximum difference (or caliper) in propensity scores. Five or more matches improve the prospect of a good match. No caliper or distance was imposed during the matching process because of the small sample sizes for outcomes 2 and 3.[99]

Post-Matching Balance Test. A crucial step after matching and before conducting post-matching regression analysis is to check the extent to which propensity scores are 'balanced' in treatment and control groups. The balancing property ensures random assignment to treatment and guarantees that sample members with the same probability of treatment can be paired for comparison. Randomization can be evaluated by a series of balancing tests, which usually consist of (i) a single Chi-squared test for the joint distribution of the entire set of covariates between treatment and control group individuals, and (ii) a set of t-tests for individual covariates between treatment and control group individuals. The Chi-squared test reveals the overall similarity between treatment and control groups; the individual t-tests identify any covariates that are unusually different between the two groups, thus flagging the covariates that contribute the most to the loss in randomization.[100]

We present the results of the balancing tests below in Exhibit E.1 through Exhibit E.3. All t-test and Chi-squared test statistics show that the mean of covariates is equal between control and treatment groups, strongly suggesting plausible balanced post-matching samples in all three PSM-based estimations (outcome 2 in South Seattle and in Central New Mexico, and outcome 3 in Central New Mexico).

Exhibit E.1: T-test Results for Outcome 2 in South Seattle

	Treatment	Control	t	Prob. > |t|
Cohort	0.435	0.487	-1.290	0.198
Age	44.74	43.92	0.790	0.427
Age squared	2160.0	2102.2	0.620	0.536
African American	0.106	0.111	-0.210	0.835
Hispanic	0.013	0.020	-0.750	0.456
Asian	0.166	0.110	1.920	0.056
Pacific Islander or Native American	0.018	0.023	-0.420	0.675
Two or more races/ethnicities	0.090	0.086	0.190	0.851

[99] Heckman, J. J., Ichimura, H., & Todd, P. (1998). Matching as an econometric evaluation estimator. *Review of Economic Studies*, *65*(2), 261-294.

[100] Caliendo, M. and Kopeinig, S. "*Some Practical Guidance for the Implementation of Propensity Score Matching*," IZA Discussion Paper No. 1588, May 2005.

	Treatment	Control	t	Prob. > |t|
Completed High School/GED	0.142	0.176	-1.150	0.249
Some College	0.130	0.176	-1.640	0.102
Bachelor's Degree or Higher	0.441	0.383	1.440	0.151
Veteran	0.021	0.027	-0.500	0.615
Employed	0.154	0.121	1.120	0.265
Disabled	0.068	0.070	-0.120	0.904
Number of Days between Intervention Start and Last Login/Registration	179.15	176.16	0.390	0.699

Notes: Chi-squared statistic = 1.000. T-test results are omitted for email domain dummies and geographic region dummies for brevity. Among all these variables, only the indicators for two email domains (@comcast.net, and @yahoo.com) have significantly different means between the two groups at significance level of .10. For @yahoo.com, the treatment and control group means are respectively 0.55493 and 0.5705, t=-2.88, and Prob.>|t| = 0.004. For @comcast.net, the means are respectively 0.10845 and 0.06276, t=1.88, and Prob.>|t| = 0.060.

Exhibit E.2: T-test Results for Outcome 2 in Central New Mexico

	Treatment	Control	t	Prob. > |t|
Cohort	0.218	0.202	0.630	0.529
Age	42.15	42.49	-0.420	0.672
Age squared	1970.5	1978.6	-0.110	0.910
Completed High School/GED	0.252	0.267	-0.620	0.534
Some College	0.432	0.424	0.270	0.784
Bachelor's Degree or Higher	0.282	0.279	0.110	0.915
Veteran	0.044	0.038	0.500	0.615
Employed	0.228	0.223	0.180	0.861
Disabled	0.077	0.077	-0.030	0.976
Number of Days between Intervention Start and Last Login/Registration	255.77	266.89	-1.010	0.311
Family Size	1.546	1.559	-0.200	0.843
Household Income	8050.7	7540.7	0.490	0.622
Household Income Squared	400,000,000	290,000,000	0.580	0.564
TANF Recipient	0.065	0.057	0.550	0.584
Food Stamp Recipient	0.281	0.291	-0.350	0.727
Participant is Looking for Work	0.915	0.917	-0.130	0.895
Participant is Homeless	0.116	0.117	-0.060	0.955
	0.392	0.377	0.540	0.591

Notes: Chi-squared statistic = 1.000. T-test results are omitted for geographic region dummies for brevity. All t-tests for geographic region dummies yield Prob. > |t| strictly over 0.10. Email domain dummies are not included for analyses in the Central New Mexico sample since jobseekers' email addresses are not available in the data.

Exhibit E.3: T-test Results for Outcome 3 in Central New Mexico

	Treatment	Control	t	Prob. > |t|
Cohort	0.223	0.232	-0.110	0.915
Age	44.032	44.000	0.010	0.990

	Treatment	Control	t	Prob. > |t|
Age squared	2104.5	2076.6	0.130	0.900
Completed High School/GED	0.255	0.225	0.340	0.732
Some College	0.395	0.550	-1.580	0.116
Bachelor's Degree or Higher	0.312	0.225	0.950	0.341
Veteran	0.070	0.020	1.050	0.297
Employed	0.223	0.219	0.050	0.958
Disabled	0.127	0.093	0.530	0.596
Number of Days between Intervention Start and Last Login/Registration	255.39	251.96	0.090	0.927
Family Size	1.369	1.609	-1.240	0.218
Household Income	5237.5	8118.7	-1.040	0.301
Household Income Squared	220,000,000	260,000,000	-0.160	0.871
TANF Recipient	0.057	0.086	-0.600	0.551
Food Stamp Recipient	0.318	0.351	-0.350	0.728
Participant is Looking for Work	0.936	0.974	-0.800	0.425
Participant is Homeless	0.127	0.099	0.430	0.669
Participant Received a Layoff Notice	0.325	0.404	-0.840	0.402

Notes: Chi-squared statistic = 1.000. T-test results are omitted for geographic region dummies for brevity. All t-tests for geographic region dummies yield Prob. > |t| strictly over 0.10. Email domain dummies are not included for analyses in the Central New Mexico sample since jobseekers' email addresses are not available in the data.

Post-Matching Regression Analysis. Upon verification of post-matching balancing, simply comparing the mean of outcomes should yield unbiased estimates. Nonetheless, analysts typically use multivariable regressions in their impact analyses, which control for baseline characteristics to improve statistical power by removing variation in the outcome of interest due to variation among sample members in those characteristics.

Since each treatment group individual is now matched with a set of control group individuals who have similar propensity scores, the expectation is that the two groups consist of jobseekers who are *ex ante* similarly inclined to participate (e.g., opened an email)—implying that the distribution of the unobserved characteristics that may affect the selection process would also be similar between treatment and control groups. Hence, the evaluation team used a linear probability model (LPM) to estimate the following post-matching equation:

$$y_i = \alpha + \beta T_i + X_i\delta + \varepsilon_i$$

where y_i is the outcome to be analyzed *after selection* (e.g., for outcome 2, choosing to click on a link in an email or not, after opening an email [outcome 1]).

Weighting the observations used for the post-matching analysis regression is also important, especially in the NTO demonstration's evaluation, where each treatment group member was matched with multiple control group members (at least some of whom may have been used in more than one match). Since the validity of PSM heavily relies on the assumption that the empirical distribution of covariates is highly similar between the treatment and control groups in

the post-matching sample, it is also important to use weights that ensure proper contribution of each post-matching observation to the empirical distributions. The following weighting scheme achieves this:

- For each treatment group member i, weight is equal to 1.
- For each control group member j, weight is equal to $\sum_{i \in M_j} \left(\frac{1}{m_i}\right)$. That is, the sum of the weight shares that control group member has from all matchings $\{i_1 j, i_2 j, \dots, i_{m_j} j\}$. The set $M_j = \{i_1, i_2, \dots, i_{m_j}\}$ is the set of treatment group jobseekers to whom j is matched. The weight share j derives from matching with i is $\frac{1}{m_i}$. m_i, the number of matches found for treatment group jobseeker i.

APPENDIX F. FULL REGRESSION RESULTS FOR IMPACT ANALYSES

Exhibit F.1 presents the full set of regression coefficients for the impact analyses for all three confirmatory outcomes and both sites.

Exhibit F.1: Full Regression Results from Overall Impact Analyses

Covariates	South Seattle			Central New Mexico		
	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing Interest Form	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing Interest Form
Treatment	0.004 (0.009)	0.056*** (0.019)	0.003*** (0.001)	-0.013* (0.006)	-0.022 (0.017)	-0.008 (0.079)
Cohort	0.076*** (0.009)	-0.061** (0.024)	0.002* (0.001)	0.220*** (0.016)	0.001 (0.024)	-0.245* (0.138)
Age	0.003 (0.002)	0.012** (0.006)	0.000 (0.000)	0.010*** (0.001)	0.017*** (0.003)	0.027 (0.029)
Age squared	-0.000 (0.000)	-0.000** (0.000)	-0.000* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)
African American only	0.007 (0.014)	0.006 (0.037)	0.002 (0.003)	-	-	-
Hispanic only	0.023 (0.029)	0.065 (0.120)	-0.000 (0.003)	-	-	-
Asian only	0.033** (0.013)	-0.034 (0.032)	-0.000 (0.002)	-	-	-
Pacific Islander or Native American only	0.016 (0.031)	0.022 (0.079)	0.000 (0.004)	-	-	-
Two or more races/ethnicities	0.028 (0.017)	-0.006 (0.037)	-0.003** (0.001)	-	-	-
Completed High School/GED	-0.030*** (0.011)	0.017 (0.034)	-0.000 (0.001)	0.062*** (0.017)	0.107** (0.041)	0.405** (0.152)
Some College	0.028* (0.015)	-0.003 (0.036)	0.002 (0.002)	0.113*** (0.016)	0.119*** (0.036)	0.506*** (0.151)
Bachelor's Degree or Higher	0.110*** (0.012)	-0.006 (0.031)	0.001 (0.001)	0.187*** (0.017)	0.103** (0.044)	0.465** (0.170)
Veteran	-0.026 (0.030)	0.000 (0.072)	-0.004*** (0.001)	0.025* (0.014)	-0.032 (0.051)	0.223* (0.124)
Employed	-0.002 (0.013)	0.002 (0.031)	0.008*** (0.003)	0.032*** (0.008)	0.002 (0.027)	0.026 (0.076)
Disabled	-0.011 (0.016)	-0.037 (0.040)	-0.001 (0.002)	-0.005 (0.013)	0.060 (0.041)	0.083 (0.097)
Number of Days between Intervention Start and Last Login/ Registration	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)
Family size	-	-	-	0.003 (0.003)	-0.001 (0.007)	0.035 (0.045)

Covariates	South Seattle			Central New Mexico		
	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing Interest Form	Outcome 1, Opening Email	Outcome 2, Clicking Link	Outcome 3, Completing Interest Form
Household Income	-	-	-	0.000**	-0.000	-0.000
				(0.000)	(0.000)	(0.000)
Household Income Squared	-	-	-	-0.000*	0.000	0.000
				(0.000)	(0.000)	(0.000)
TANF Recipient	-	-	-	-0.009	-0.014	-0.114
				(0.011)	(0.033)	(0.160)
Food Stamps Recipient	-	-	-	-0.016*	0.060**	0.121*
				(0.008)	(0.024)	(0.064)
Participant is Looking for Work	-	-	-	0.013	0.016	0.270
				(0.011)	(0.023)	(0.179)
Participant is Homeless	-	-	-	-0.011	0.097**	-0.225***
				(0.010)	(0.042)	(0.078)
Participant Received a Layoff Notice	-	-	-	-0.000	-0.038*	-0.002
				(0.006)	(0.020)	(0.074)
Constant	0.253***	-0.182	-0.004	0.045	-0.345***	-0.111
	(0.056)	(0.141)	(0.006)	(0.032)	(0.077)	(0.756)
Mean among control group	0.333	0.078	0.002	0.375	0.217	0.603
Balance Test: P > χ^2	-	1.000	-	-	1.000	1.000
Sample Size	11,550	1,265	11,550	20,004	2,430	272

Note: Standard errors are reported in parentheses and are clustered at the geographic region level. Statistical significance: *p-value < 0.1, **p-value < 0.05, ***p-value < 0.01. Outcome 2 and 3 are defined as completion status conditional on completion of previous outcome. For South Seattle, outcome 3 is defined as unconditional completion. *Treat* indicates treatment of receiving gender-themed materials in comparison to the general program material received by the control group. Other control variables include age and age squared, number of days between the intervention start date and the jobseeker's last login date, and following indicators: second cohort, high school degree, partial college education, college degree or higher, veteran status, employment status, disability status, and geocode. For South Seattle, covariates further include indicators for African American, Asian, Native American or Pacific Islander, mixed race, Hispanic ethnicity, and email domain. For Central New Mexico, covariates further include household income and income squared, household size, active job-seeking status, status of receive layoff notice, TANF recipient status, food stamp recipient status, and homelessness status. For race groups, the reference group is *White*. For educational attainment groups, the reference group is *less than High School.* Geocode is defined as ZIP code for individuals with ZIP codes that have at least 50 individuals in the sample, and defined as county code otherwise. Email domain is defined as the domain of the jobseekers' email address' domains, such as Gmail, Yahoo!, and AOL. Email domain is categorized into 10 groups, with the first 9 groups representing the top 9 domains in the sample, and the last group representing all the other domains. Geocode and email domain fixed effects are not reported for brevity. Regressions for outcome 2 for both sites and outcome 3 for Central New Mexico are weighted, with weight for treatment group observations equal to 1, and weight for control group observations equal to the sum of contribution to all matches in the sample where contribution in a given match is defined as the inverse of number of matches the associated treatment group individual has under propensity score matching. Propensity score is predicted using logistic regression with the same list of covariates. Matching is identified for the 5 nearest neighbors measured by difference in propensity cores, with no restriction of maximum difference. - denotes data not available.