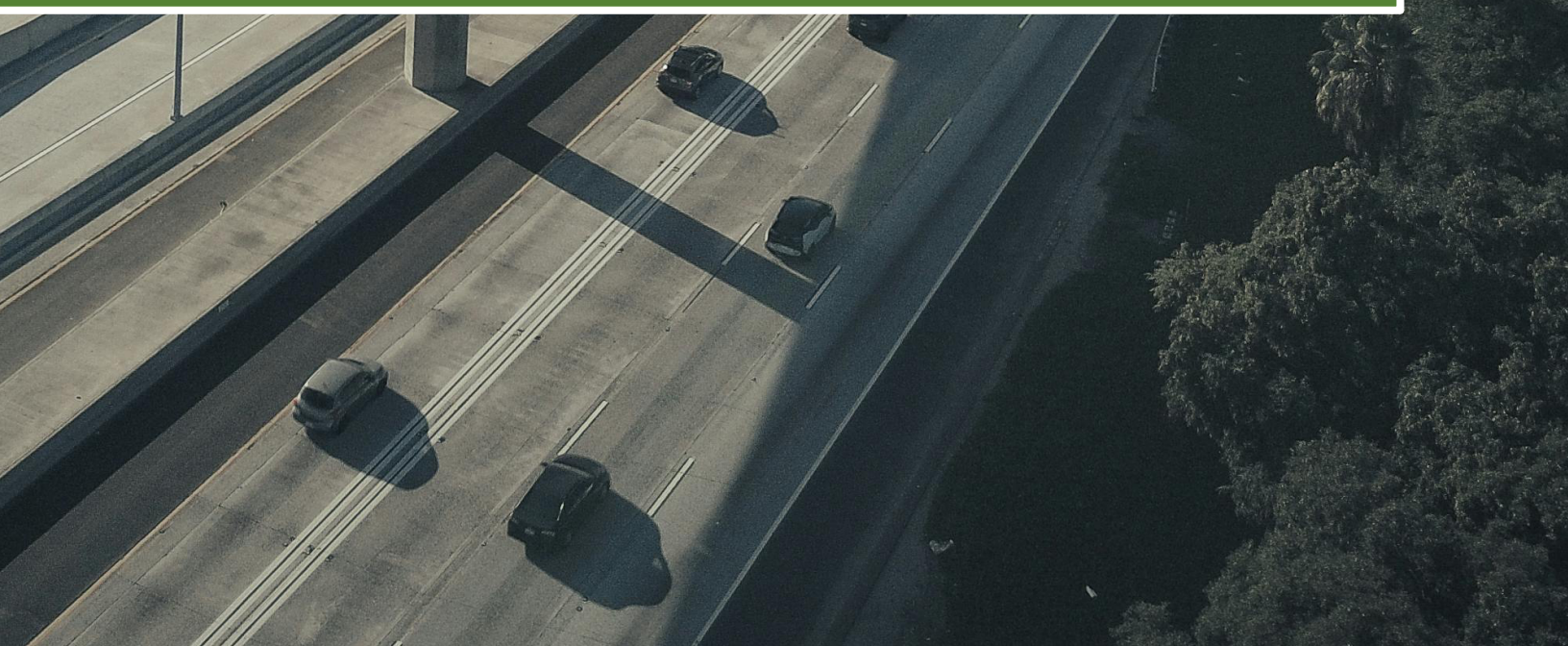




# Evaluation of the Highway Construction Workforce Development Program

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## REPORT AUTHORS

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## Executive summary

**Finding 1:** The Oregon highway construction workforce continues to become more diverse, with increased integration of women and people of color in apprenticeships (see Figure ES1).

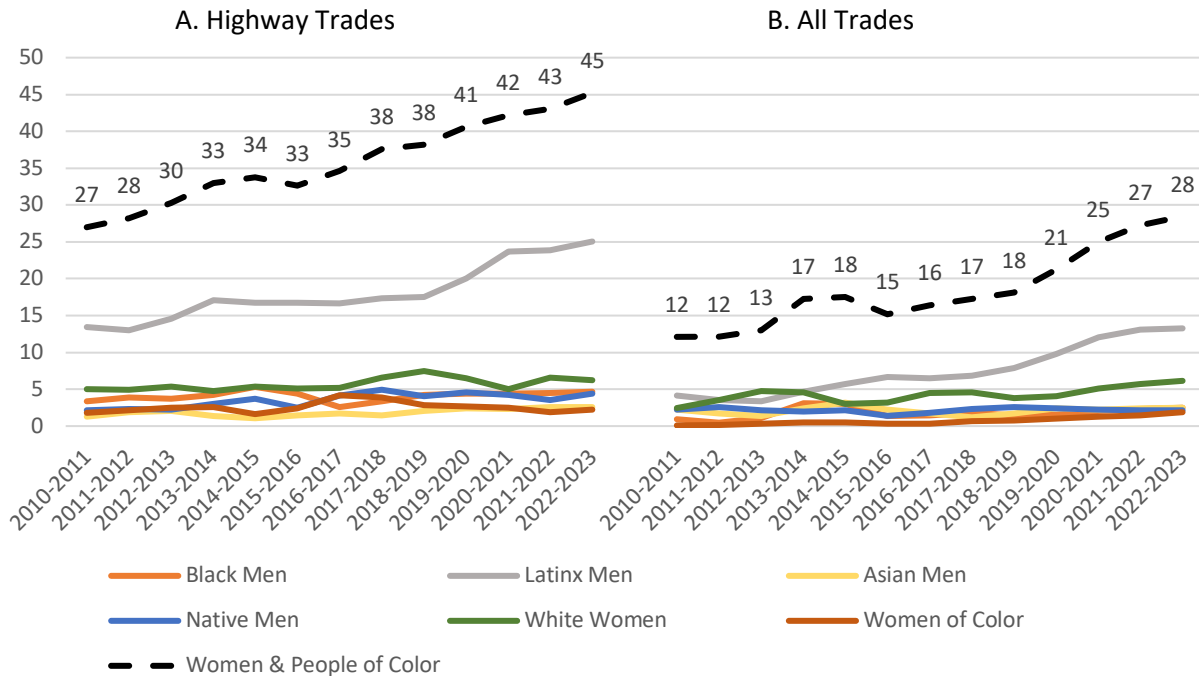


Figure ES1. Percentage of apprentices completing who are women or people of color, 2010-2023.

**Finding 2:** The Highway Construction Workforce Development Program improves completion rates for apprentices in eligible trades who receive services. Among apprentices in the 2016-17 cohorts, on average, those receiving services were 10% more likely to complete their apprenticeship than those who did not receive services. This percentage varies across race/ethnicity and gender.

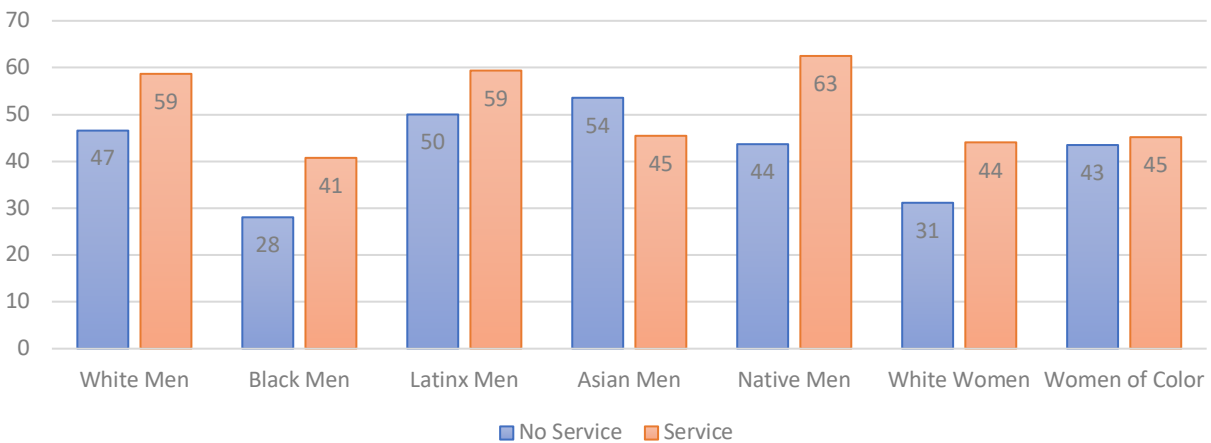


Figure ES2. Percentage of apprentices in highway trades completing by service receipt and race/ethnicity and gender, 2016-2017 cohorts.

**Finding 3:** The findings presented here demonstrate the effectiveness of the Program’s supportive services. Among all apprentices in the 2016-17 cohorts, those receiving child care; “ready items” (work clothes, tools, and protective equipment); non-financial assistance; and hardship funds were more likely to complete rather than cancel, relative to those not receiving services. The impact of childcare and hardship funds on completion was positive for men but not women. Only travel funds did not have a demonstrable impact on completion for any race/gender groups. The findings also demonstrate that the likelihood of completion increased when apprentices received both financial and non-financial services, indicating the effectiveness of the “coordinated services” approach.

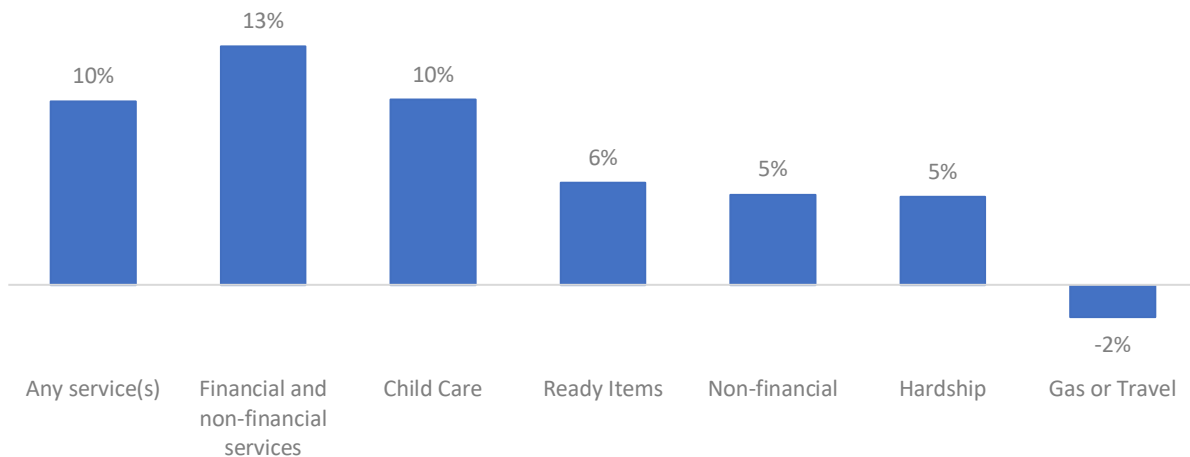


Figure ES3. Estimated adjusted marginal effects of receiving services on completion by race/ethnicity and gender, 2016-17 cohorts.

**Finding 4:** Pre-apprenticeship programs have contributed to diversifying the construction workforce, in particular by increasing numbers of women.

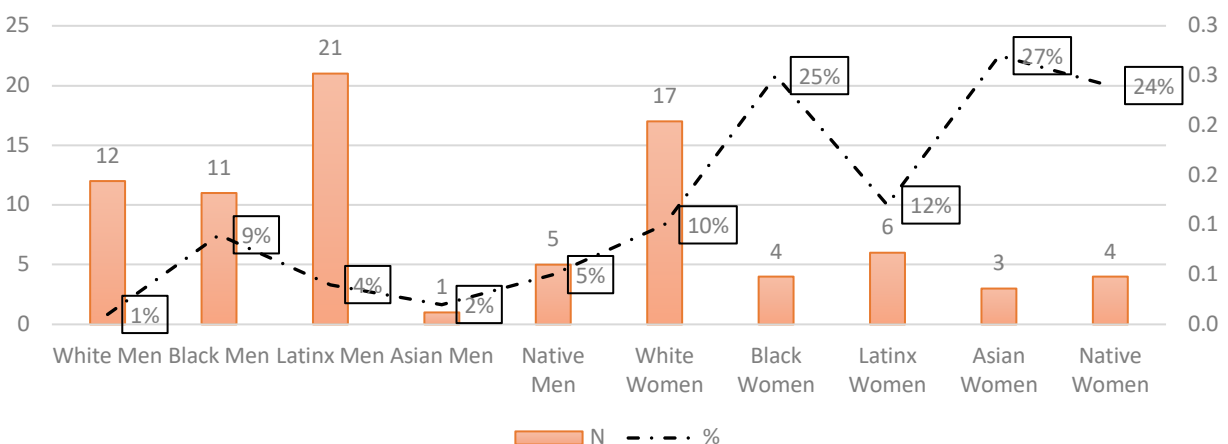


Figure ES4. Number and percentage of apprentices in highway construction trades completing a pre-apprenticeship by race/ethnicity and gender, 2022-23 cohorts.



**Finding 5:** Women, Native men, and Black men apprentices are less likely than white men to complete their apprenticeship in six years, but progress continues to be made in increasing the completion rates of women and people of color. Among Black men in the 2016-17 cohorts, for example, 33% completed an apprenticeship within six years; this is compared to 21% of Black men in the 2014-15 cohorts completing an apprenticeship within six years.

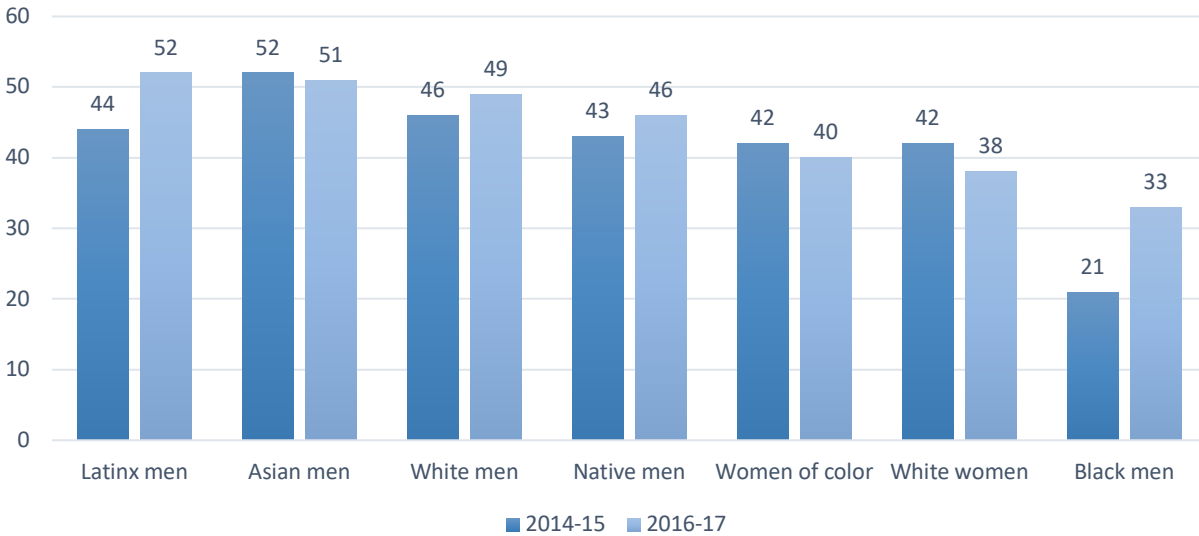


Figure ES5. Percentage of apprentices in highway trades completing within six years by race/ethnicity and gender, 2014-2017 cohorts.

**Finding 6:** The Highway Construction Workforce Development Program reaches a diverse group of apprentices. While the demographic group with the largest number of participants continues to be white men, Latinx women and Native women are being served at the highest rates.

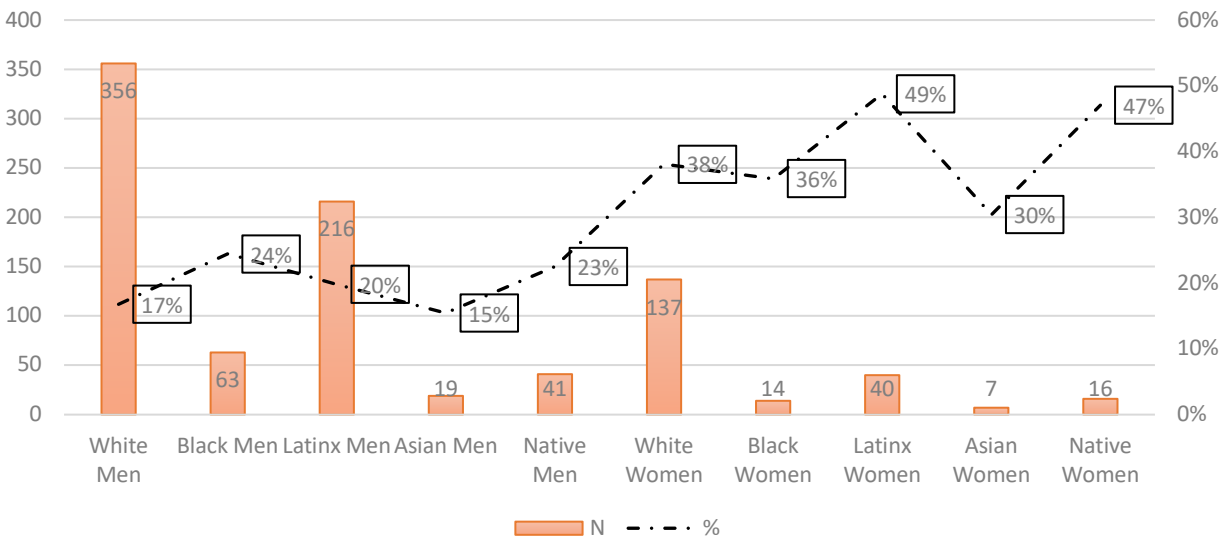


Figure ES6. Percentage and number of apprentices in highway trades receiving services by race/ethnicity and gender, among apprentices active in 2022-23.

## Introduction

The Oregon Department of Transportation and Oregon Bureau of Labor and Industries have partnered in a statewide effort—the Highway Construction Workforce Development Program—to recruit, train, and employ a diverse workforce for highway construction jobs throughout the state. This program, which began in 2010, supports a variety of initiatives designed to improve the recruitment and retention of women and people of color in Oregon’s highway construction trades. The total budget for the Program was 1.9 million dollars for 2022-2023. About one million dollars were spent on supportive services and 570 thousand dollars on pre-apprenticeship. The Program additionally funded career exploration (e.g. career and trades fairs, advertising) and research (including the current evaluation).

The services evaluated in this report include: pre-apprenticeship programs, supportive services providing financial assistance (i.e., fuel assistance and support for overnight travel; child care; work clothes, tools, and protective equipment; hardship assistance funds), and supportive services providing non-financial assistance (e.g., counseling, budget class). This report provides findings based on data from the Oregon Apprenticeship System (OAS) from 2010-2023 and from administrative records collected from staff implementing the Highway Construction Workforce Development Program.

In this biennium, the report provides additional information on trends in age at start of apprenticeship by completion, cancellation by term, and time to completion, and provides greater focus on two financial services: child care and hardship funds. In this biennium, the Program prioritized child care and hardship funds and de-emphasized funding pre-apprenticeship programs because many pre-apprenticeship programs are now being funded through Future Ready Oregon. In August 2022, the Program changed the child care funding allocation formula, which is now based on household income and no longer maintains a maximum benefit per apprentice, which was originally set at \$10,000 (plus additional \$2,000 for completing a budget class) and then increased to \$18,000 (plus an additional \$2,000 for those with one or more dependent children under the age of 3 or a special needs child). Funding for gas and travel was also de-emphasized in the 2022-2023 biennium as previous evaluations showed no positive impact on completion. In the 2022-2023 biennium, support for gas and travel was prioritized for those working on highway and bridge projects in order to have a more targeted approach to the funding.

Overall, the current study demonstrates the effectiveness of the Highway Construction Workforce Development Program at improving both the recruitment and retention of a diverse workforce since the last reporting period.

## Trends in recruitment

The Oregon highway construction workforce is continuing to become more diverse, with increased integration of women and people of color in apprenticeships. As shown in Figure 1, in 2022/23 the percentage of new apprentices in the highway construction trades who were white

men dropped to 46%, a decline of 20 percentage points since 2010/11, and a decline of 3 percentage points since 2020/21 (panel A). Notably, the percentage of new apprentices who are white men is lower in the highway construction trades than in all trades combined (panel B).

As a result of increased recruitment, women and people of color comprise a growing proportion of those completing apprenticeships (Figure 2). In the highway construction trades (panel A), 45% of apprentices completing in 2022/23 were women or people of color, compared to only 27% in 2010/11. Women and people of color comprise a larger percentage of apprentices completing in the highway construction trades than in all trades combined (panel B).

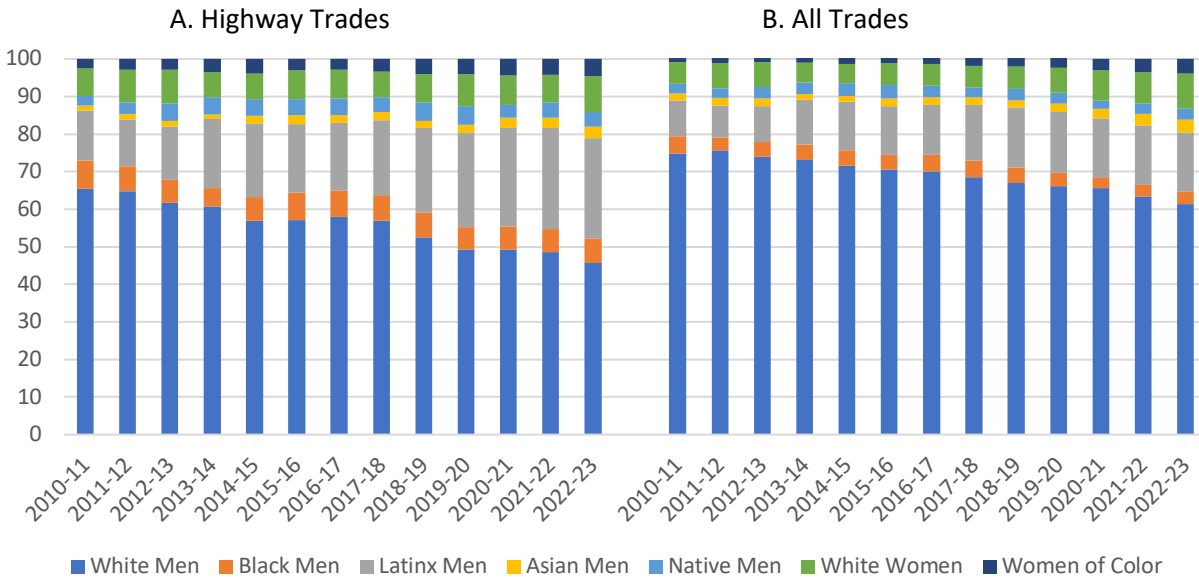


Figure 1. New apprentices in construction trades in Oregon by race/ethnicity and gender, 2010-2023.

A. Highway Trades

B. All Trades

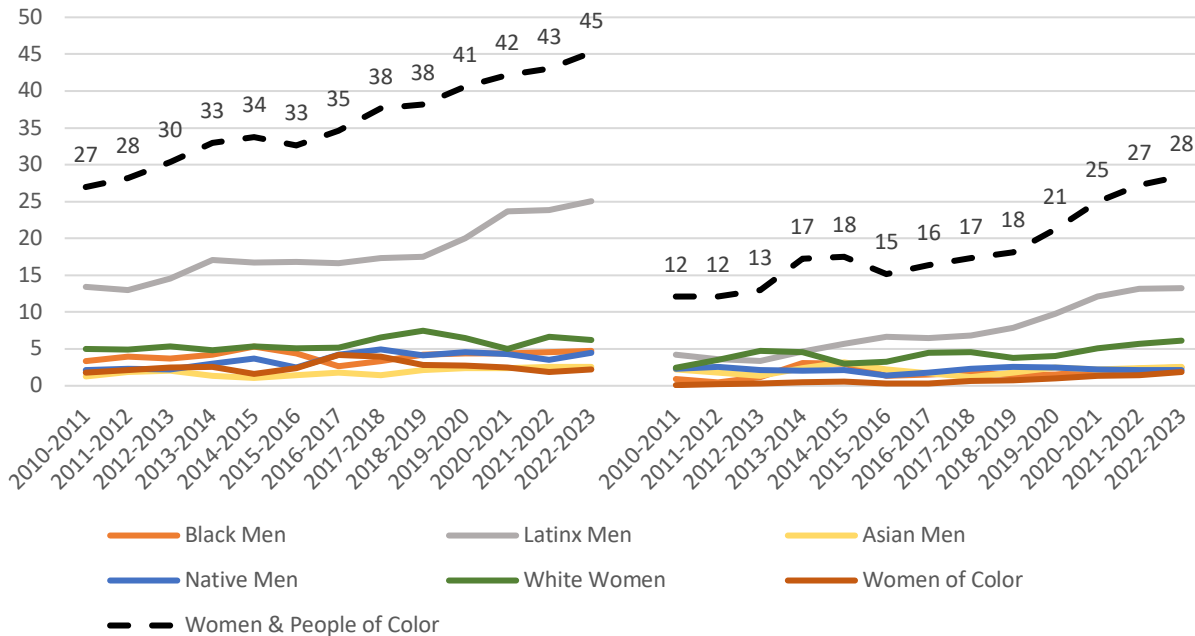


Figure 2. Percentage of apprentices completing who are women or people of color, 2010-2023.

### Recruitment through pre-apprenticeship

Pre-apprenticeship programs funded through the Highway Construction Workforce Development Program have contributed to the diversity of the construction trades, in particular with increased numbers of women in the highway construction trades. In the 2022-23 cohorts of new apprentices, 17 white women and 17 women of color entered a highway construction apprenticeship after completing a Program funded pre-apprenticeship, representing 10% of all white women and 18% of all women of color apprentices in the 2022-2023 cohorts (see Figure 3). In comparison, 5% of white women and 10% of women of color entered any trade apprenticeship after completing a Program funded pre-apprenticeship in 2022-23 (Figure 4).

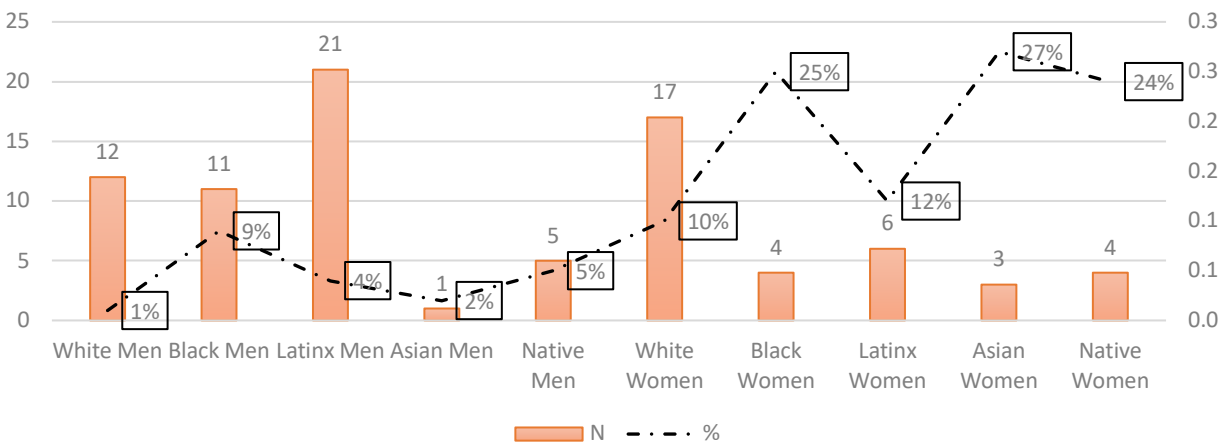




Figure 3. Percentage and number of apprentices in highway construction trades completing a Program funded pre-apprenticeship by race/ethnicity and gender, 2022-23 cohorts

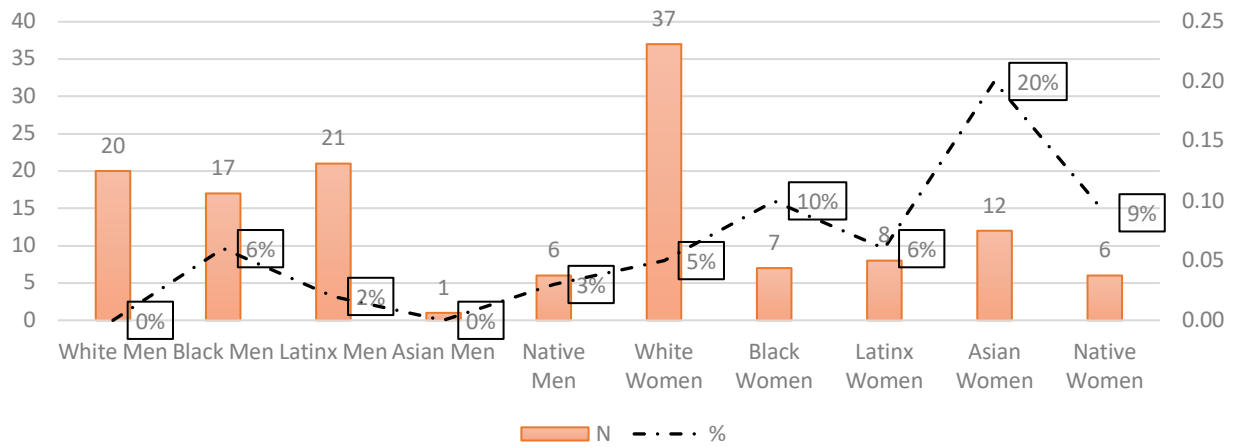


Figure 4. Percentage and number of apprentices in all trades completing a Program funded pre-apprenticeship by race/ethnicity and gender, 2022-23 cohorts

## Trends in retention

Women and some racial/ethnic minority groups are less likely than white men to complete their apprenticeship on time, yet progress continues to be made, especially among men of color. For example, while 21% of Black men in the 2014-15 cohorts completed an apprenticeship within six years, 33% of Black men in the 2016-17 cohorts completed an apprenticeship on time. This is a significant increase in completion rates among Black men apprentices in the highway trades given their historically low rates of completion. Unlike Black men, among the 2016-17 cohort, Latinx and Asian men apprentices in the highway construction trades have *higher* rates of completion than white men, with six-year completion rates for both Latinx and Asian men increasing between 2014-15 and 2016-17 (Figure 5). We also see six-year completion rates increasing among Latinx and Asian men among apprentices in all trades between 2014-15 and 2016-17, yet we do not see a similar increase among Black men apprentices in all trades (Figure 6). Among white women and women of color, we see a slight decrease in the percentage completing within six-years between 2014-15 and 2016-17, with both groups still less likely than white men to complete a highway trades apprenticeship within six years. As seen in prior reports, completion rates are significantly higher among apprentices working in union trades, including among Black, Latinx, and Asian men, and among women (Figure 7).

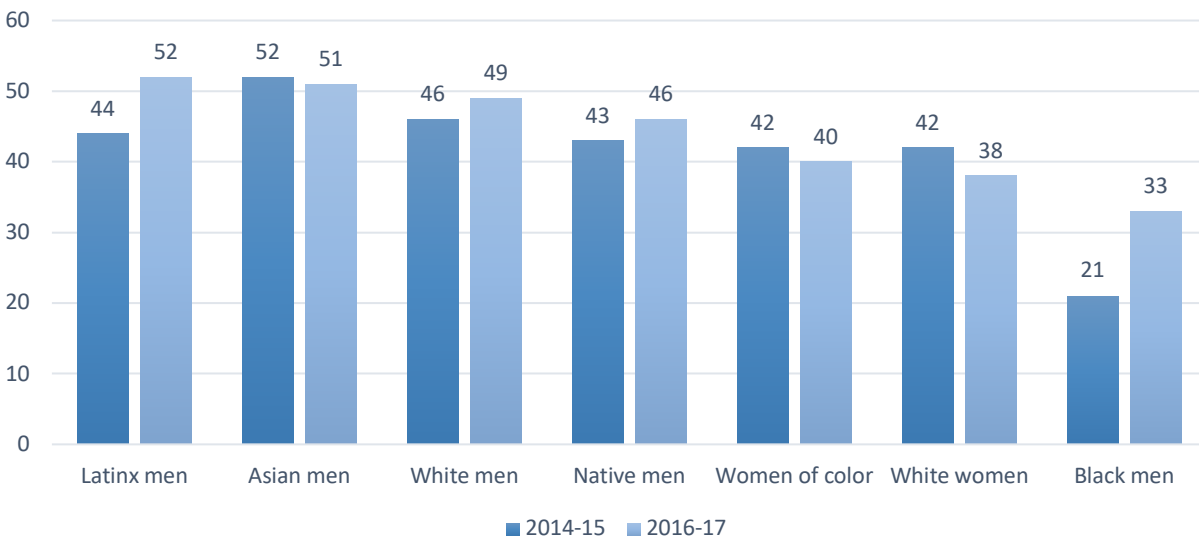


Figure 5. Percentage of apprentices in highway trades completing within six years by race/ethnicity and gender, 2014-2017 cohorts

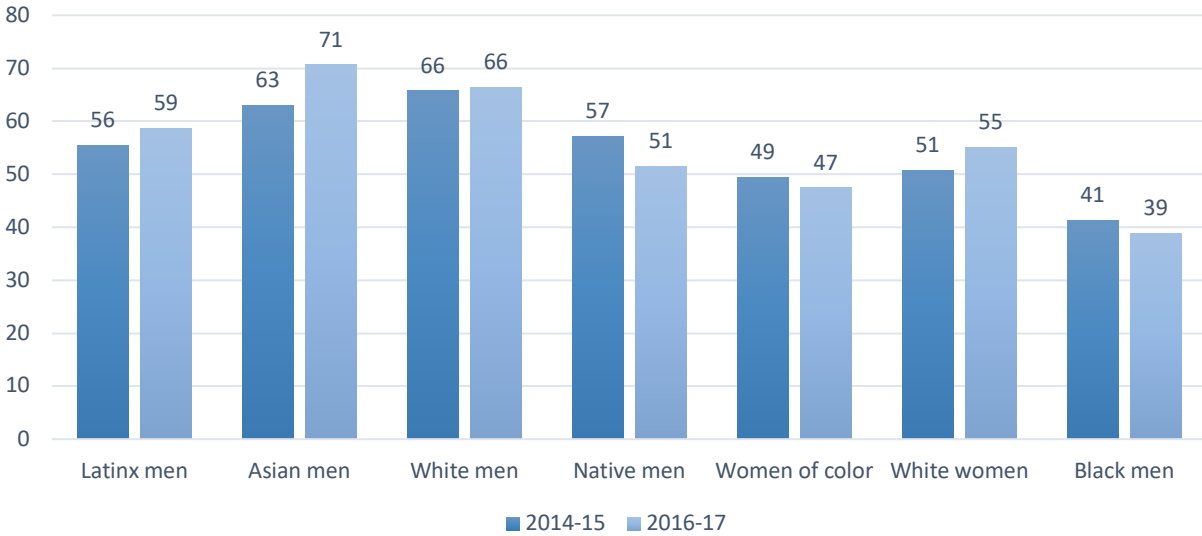


Figure 6. Percentage of apprentices in all trades completing within six years by race/ethnicity and gender, 2014-2017 cohorts

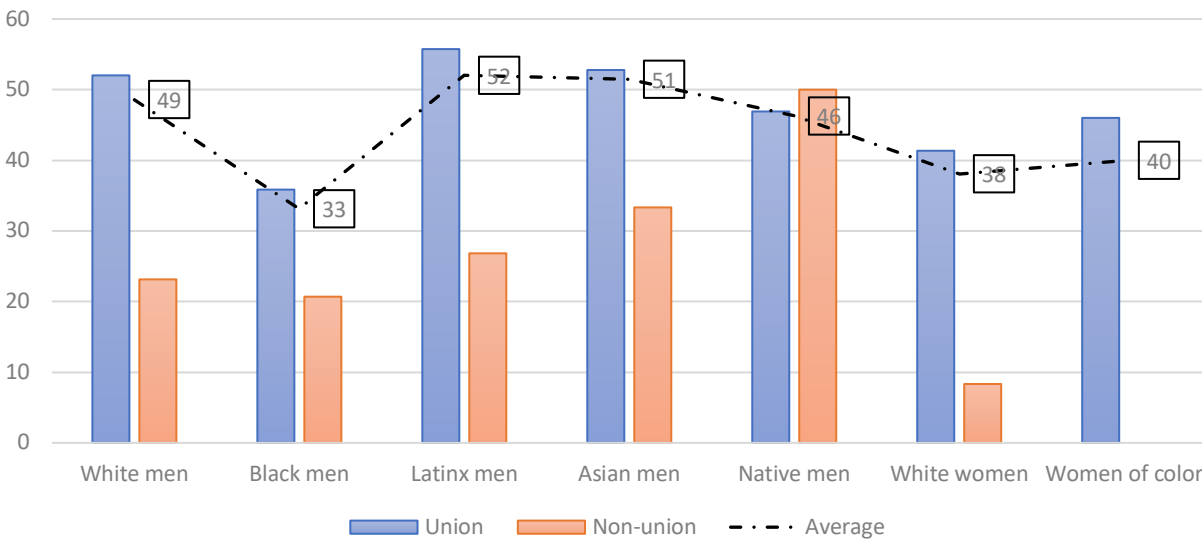


Figure 7. Percentage of apprentices in highway trades completing within six years by race/ethnicity, gender, and union status, 2014-2017 cohorts

The average age at apprenticeship registration in highway trades is 29, with women having a slightly higher average age at registration (32 among white women and 31 among women of color in 2022-23 cohorts, see Fig 8). Latinx men have the youngest average age at registration at 27 years.

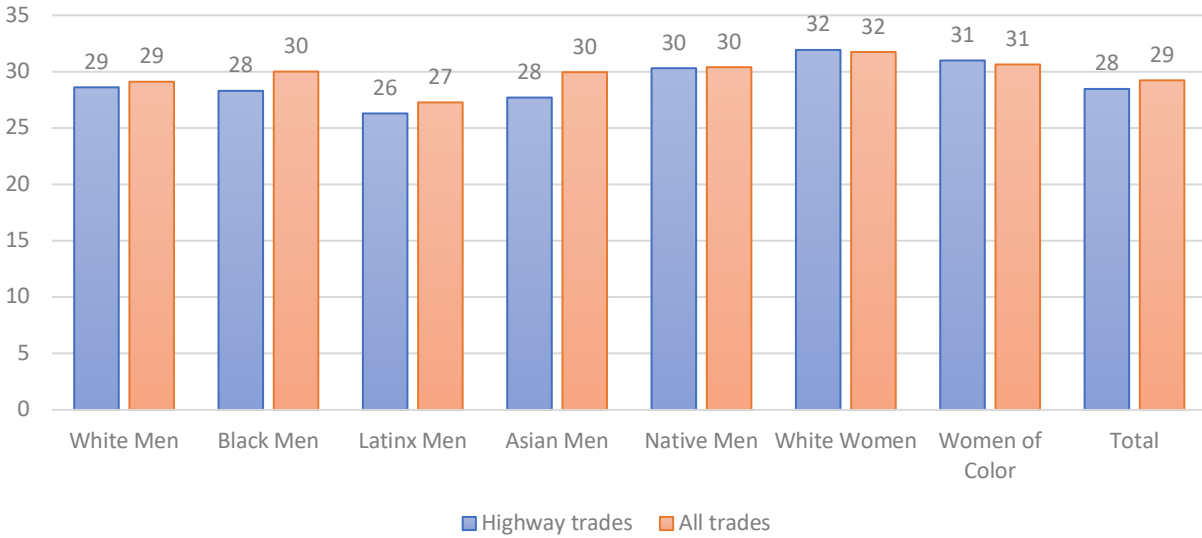


Figure 8. Average age at apprenticeship registration by race/ethnicity and gender and trade type, 2022-23 cohorts.

Among all race-gender groups, the highest completion rates are among those who began their apprenticeship between the age of 25-34, with the exceptions being Black men and women (Figure 9). Perhaps this is not surprising given the average age at which apprentices begin their apprenticeships is 29, indicating that the 25-34 age range is the normative age range in which to begin an apprenticeship. While white women and women of color have higher rates of six-year completion when they begin their apprenticeship at a younger age – between 16 and 24 – the average age at which women begin their apprenticeships is actually slightly higher than the overall average: 32 for white women and 31 for women of color in the most recent cohorts of apprentices (2022-23 cohorts). Black men, however, have a slightly higher rate of completion when beginning their apprenticeship at an older age – age 35 or older – and have a significantly lower rate of completion (13%) when beginning their apprenticeship at a younger age – between the ages of 16 and 24. This trend mirrors what we see in higher education in Oregon, with Oregonians who identify as Black/African American less likely than Oregonians who identify as white to graduate from high school or to earn a postsecondary degree. In 2019-20, the high school graduation rate was 74% among white Oregonians and 60% of Black/African American Oregonians (HECC 2022).



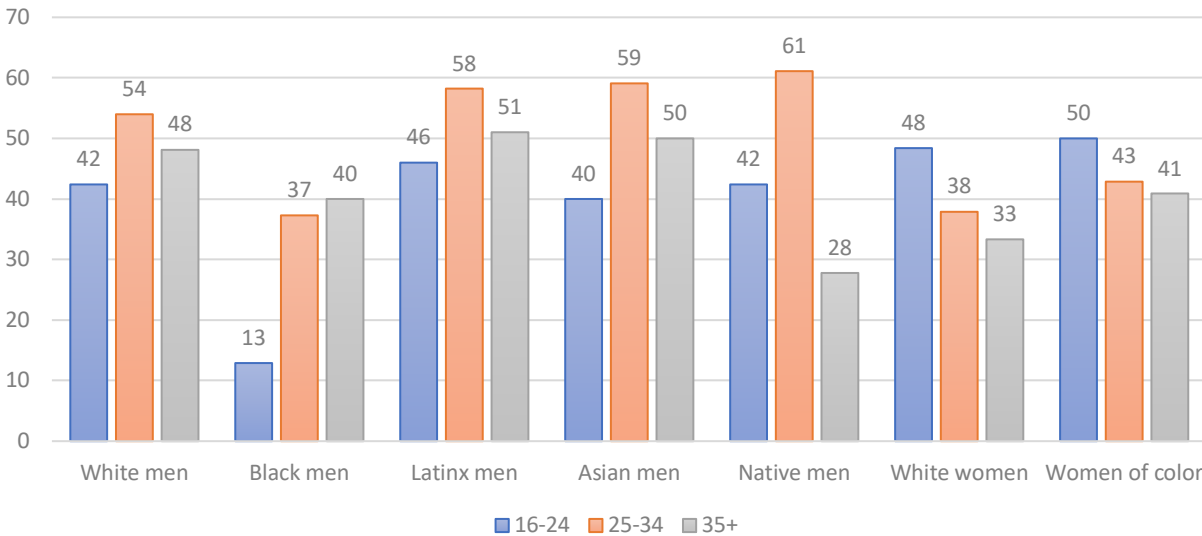


Figure 9. Percentage of apprentices completing within six years by race/ethnicity and gender, 2016-17 cohorts in highway trades

In addition to examining trends in six-year completion among apprentices in the 2016-17 cohorts, we also examine trends in cancellation by period among those who cancelled. Among highway trades apprentices in the 2016-17 cohorts who cancelled, the most common period to cancel in was period 1. Looking at the modal category by race/ethnicity and gender, that modal category is period 1 for all groups except Asian men and Native men (see Figure 10). For these two groups of highway trades apprentices, the most common period to terminate in was period 2. Among all highway trades apprentices in the 2016-17 cohorts, very few apprentices cancel an apprenticeship in periods 7-12, yet Asian men (11%), white women (6%), and Latinx men (5%) are more likely than white men to cancel in periods 7-12. Importantly, no women of color in the highway trades apprentices in the 2016-17 cohorts who cancelled cancelled in periods 7-12, with women of color who cancelled most likely to cancel in period 1 (39%), with the next most common period to cancel in being period 2 (23%).

Similarities and differences can be seen in trends in period cancelled when comparing apprentices cancelling in highway trades and apprentices cancelling in all trades. Similar to trends among apprentices in highway trades, among apprentices cancelling in all trades, period 1 is the modal cancellation period, with only Native men having a modal cancellation period other than period 1 (Figure 11). A slightly higher percentage of apprentices in all trades cancel in periods 7-12 (5%), relative to in highway trades (4%). Among apprentices in all trades cancelling, white women are the most likely to cancel in periods 7-12 (7%), followed by White men (6%), and Asian men (5%). Similar to highway trade apprentices, Black men apprentices in any trade have the highest rate of cancellation in period 1 (54%), a finding consistent with previous research on apprenticeship construction trades in Oregon (Zenthoefler 2015). In general, rates of cancellation in period 1 are higher among apprentices cancelling in all trades relative to apprentices in highway trades.

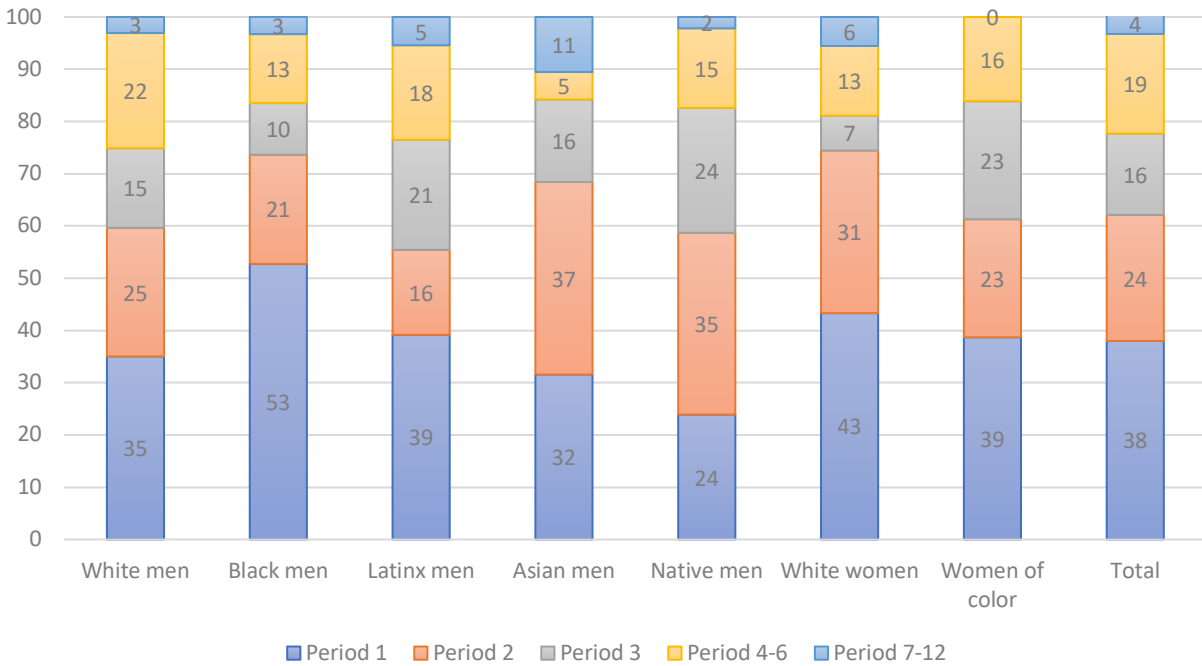


Figure 10. Percentage of apprentices in highway trades cancelling within each period, by race/ethnicity and gender, 2016-17 cohorts

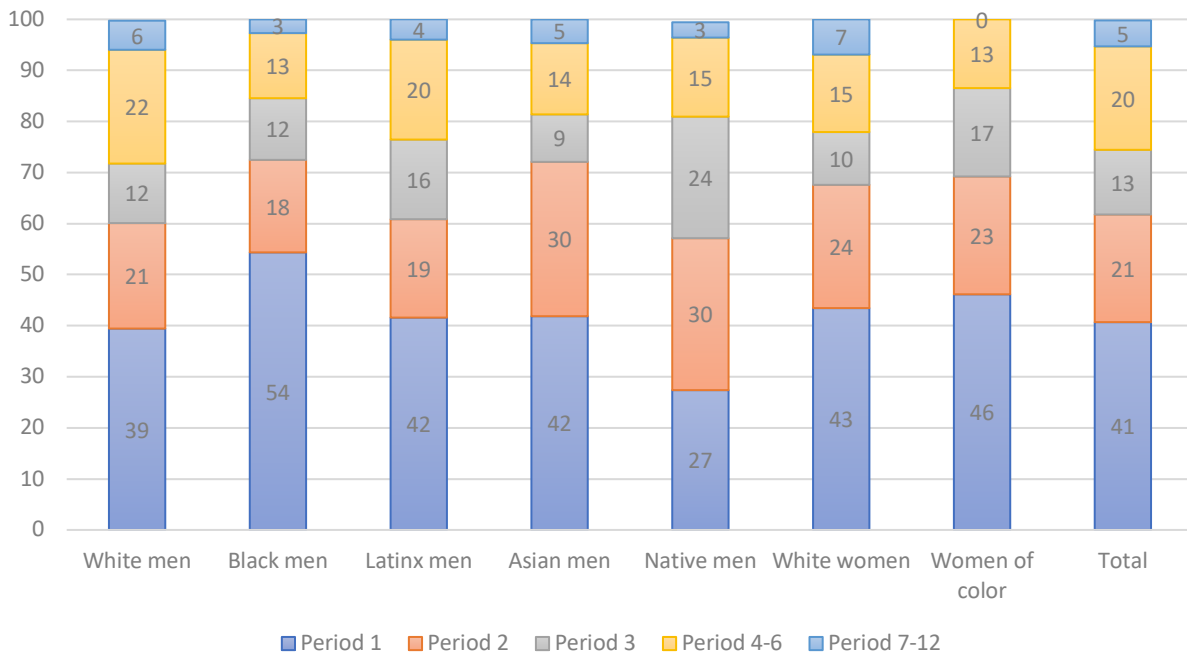


Figure 11. Percentage of apprentices in all trades cancelling within each period by race/ethnicity and gender, 2016-17 cohorts

In addition to six-year completion rates and trends in period cancelled, we also examine the average number of months to completion among apprentices (Figure 12). Among highway trades apprentices in the 2016-17 cohorts, women of color have the lowest average number of months to completion, at 35, followed by Native and white men (40), with Black men having the highest average number of months to completion (43). Across all racial/ethnic and gender groups, apprentices in highway trades complete apprenticeships in fewer months than apprentices in all trades combined.

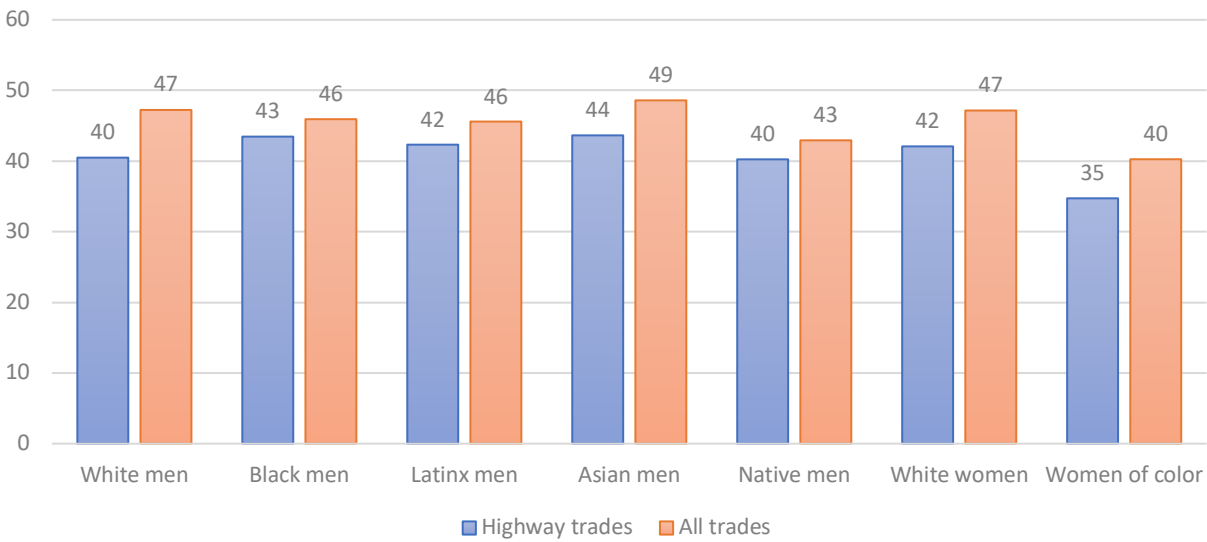


Figure 12. Average number of months required to complete an apprenticeship by race/gender, and ethnicity, 2016-17 cohorts

To ensure that these trends are not being driven by variation in the number of hours required to complete an apprenticeship across trades, in Figure 13 we present trends separately for laborers and operating engineers (3775-4000 OJT hours required); iron workers, cement masons, and painters (6,000 OJT hours required); and carpenters (8,000 OJT hours required).

Although apprentices in the carpenter trade are required to complete the most OJT hours, carpenter apprentices in the 2016-17 cohorts took, on average, fewer months (42) to complete than apprentices in the iron, cement, painting trades (45 months). We also see the smallest amount of variation in months to completion, across racial/ethnic and gender groups, among carpenter apprentices. And, it is among the carpenter apprentices that we find women of color taking the fewest months to complete, relative to other demographic groups, which is consistent with findings in Figure 12. While women of color take fewer months to complete than the average laborer or operating engineer apprentices, the group with the fewest months to completion among laborer and operating engineer apprentices is Native men. Across all types of highway trades, Black men, on average, consistently have some of the longest times to completion, relative to other groups. White women require the most months to complete in the carpenter and iron/cement/painter trades but not in the laborer/operating engineers trades.

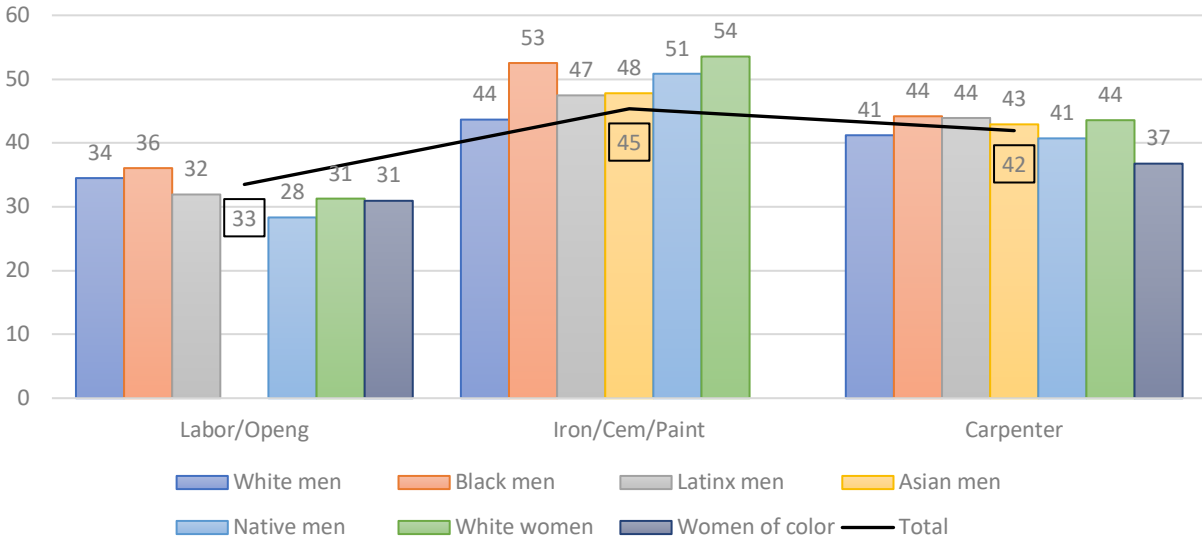


Figure 13. Average number of months required to complete an apprenticeship by race/gender, and ethnicity, trade, highway trades 2016-17 cohorts

Looking at months to complete across age groups (Figure 14), within the iron/cement/painter trades, there is a negative association between age and months to completion, with older age groups completing apprenticeships in fewer months. This trend is similar among carpenter apprentices, with the exception of the 45-54 age group.

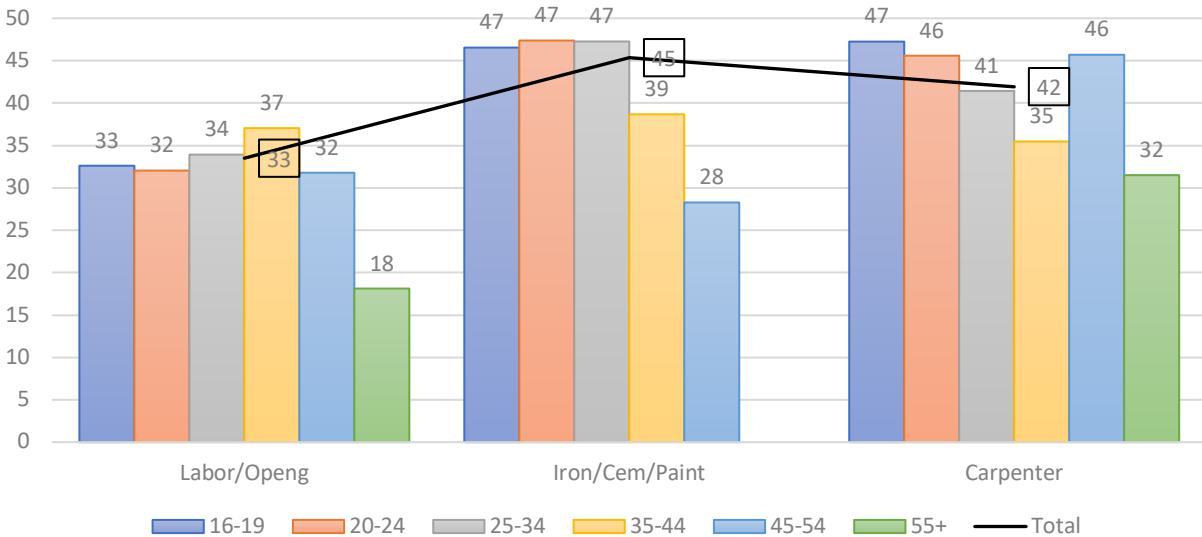


Figure 14. Average number of months required to complete an apprenticeship by age and trade, highway trades 2016-17 cohorts

Looking at the percentage of apprentices below the median wage journey worker wage, by race/ethnicity and gender (Figure 15), we see that, among all apprentices in the 2022-23 cohorts in the highway trades, Native men, followed by Black men, are the most likely to receive wages



below the median wage. Median wage is dependent upon trade and trends across demographic groups are thus driven by selection in trades.



Figure 15. Percentage of apprentices below the median journey worker wage, by race/ethnicity and gender, 2022-23 cohorts

### Participation in the Highway Construction Workforce Development Program

#### *Financial and non-financial services*

The Highway Construction Workforce Development Program reaches a diverse group of apprentices, although the majority of program participants are white men. While race/ethnicity and gender are not criteria for receiving services, the program has been successful in reaching disadvantaged apprentices, as shown in Figures 15 and 16. Among highway construction trades apprentices active in 2022 or 2023, 356 white men, 339 men of color, 77 women of color, and 137 white women have received services. More than 45% of Latinx and Native women received services, compared to 17% of white men. Importantly, among racial/ethnic minority men, Black men received services at the highest rate, with 24% of Black men receiving services, primarily through ready items (see Figure 16). Across all racial/ethnic and gender groups, the most commonly received service is ready items, followed by hardship funds. The next most common service received is gas or travel, with the exception among Latinx and Asian women. Relative to previous reporting periods (Kelly and Wilkinson 2020), fewer apprentices received non-financial services this biennium.

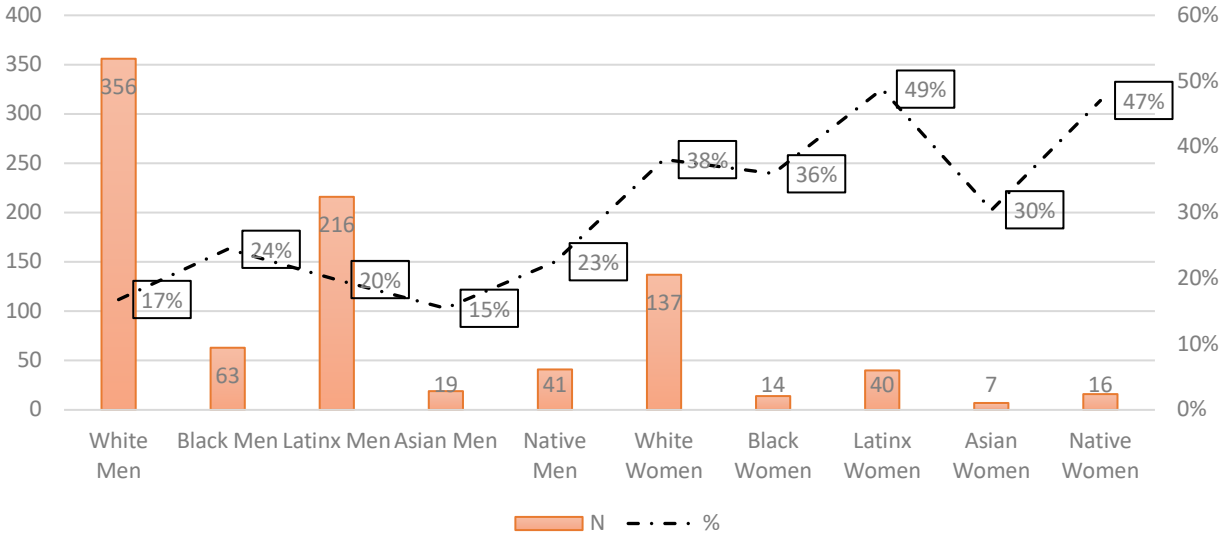


Figure 16. Percentage and number of apprentices in highway construction trades receiving services by race/ethnicity and gender, active 2022-23

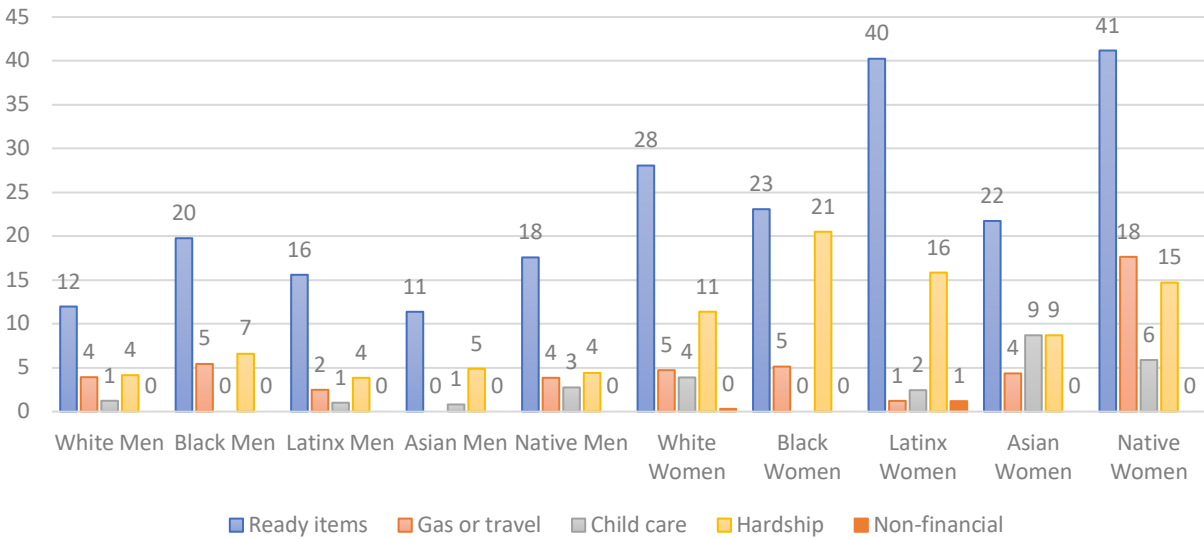


Figure 17. Percentage of apprentices in highway construction trades receiving Workforce Development Program Services, by race/ethnicity and gender and service type, active 2022-23

**Table 1. Number of Apprentices in Highway Construction Trades Served by Workforce Development Program, by Race/Ethnicity and Gender, Apprentices Active in 2022-23**

	White Men	Black Men	Latinx Men	Asian Men	Native Men	White Women	Black Women	Latinx Women	Asian Women	Native Women	Total
<b>Financial</b>	356	63	216	19	41	136	14	40	7	16	908
Ready items	254	51	170	14	32	101	9	33	5	14	683
Gas or travel	83	14	27	0	7	17	2	1	1	6	158
Child care	26	0	11	1	5	14	0	2	2	2	63
Hardship	88	17	42	6	8	41	8	13	2	5	230
<b>Non-financial</b>	0	0	0	0	0	1	0	1	0	0	2
Social support	0	0	0	0	0	1	0	1	0	0	2
Budget class	1	0	0	0	0	0	0	0	0	0	1
Nutrition class	0	0	2	0	0	3	0	0	0	0	0

### *Hardship fund records*

A total of 136 records of hardship funds provided in 2022 and 2023 were analyzed. Note that this represents funds awarded in the last biennium (2022 and 2023), which differs from the 230 apprentices who had received funding and were active in 2022 and 2023 (see Table 1).

The Program records included a narrative about why support was being requested. The most common primary reason for requesting funds related to illness or accidents for the apprentice and/or their family members (64 records). Notably, time away from work due to COVID was the primary causal event in 22 records and was mentioned as a contributing factor in an additional 7 records. Only 4 records mentioned work-related injuries. Most records reported more than one contributing factor, these included vehicle accident or breakdown (36), homelessness and/or eviction (20), separation, divorce, or domestic violence (18), death in the family (18), stolen or damaged tools (5), and being out of work or not getting enough hours at work (11). No clear trends by race or gender were apparent, with the exception that requesting hardship funds due to a separation, divorce, and/or domestic violence was more common among women (9 of 37 records for women included this element) than men.

The records were analyzed by type of support provided. As recorded in the 136 records analyzed, the most common type of support provided was for housing, which included: rent (83), mortgage (18), and utilities (10). The Program also provided support for vehicle repairs (14), help with replacing stolen or damaged tools (2), medical bills (2), and, in one case, assistance with renting a storage unit (1). Additionally, in eight cases, Program participants were provided assistance in multiple categories, for example, rent and utilities. Given that, in many cases, there are complex reasons for seeking support, it makes sense to often provide that support in the form of housing (rent, mortgage, or utilities) as these are generally the largest expense and being housed is critical to maintaining stability in apprenticeship.

## Effect of the Highway Construction Workforce Development Program on Completion

### *Financial and non-financial services*

The Highway Construction Workforce Development Program continues to improve completion rates for apprentices in eligible trades who receive services. Apprentices in eligible trades in cohorts 2016-17 who received supportive services were more likely to complete an apprenticeship (Figures 18), relative to those who did not receive services. The one exception is among Asian men: those who received a service are less likely to complete an apprenticeship.

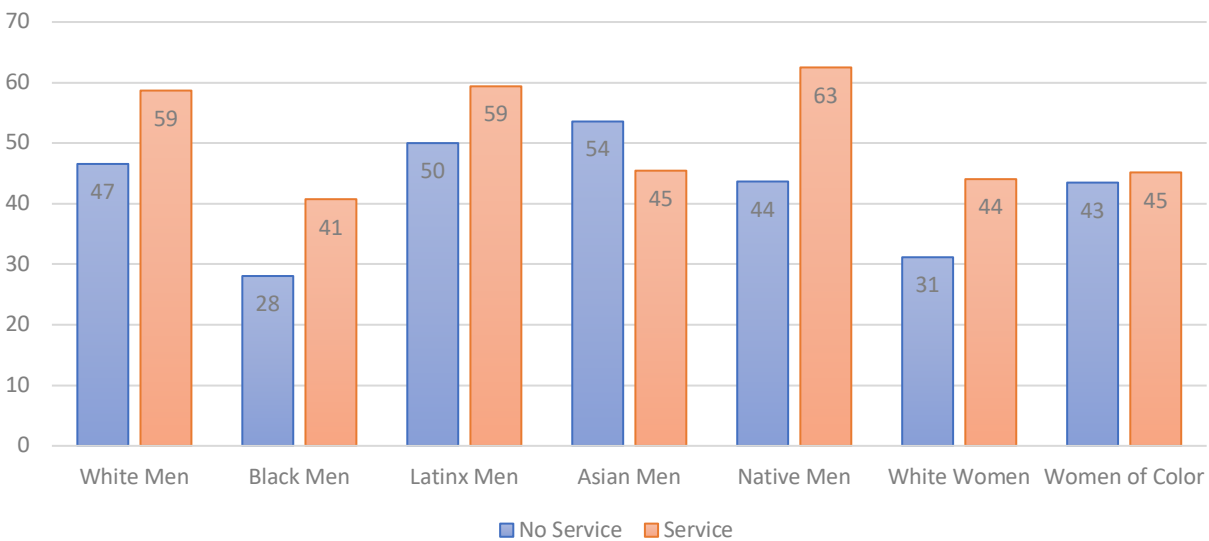


Figure 18. Percentage of apprentices in highway trades completing by service receipt and race/ethnicity and gender, 2016-17 cohorts

Importantly, the positive effects of receiving services remain after accounting for factors associated with both receiving services and completion, such as race/ethnicity, gender, age, trade and union status, prior credit, and region. **Among highway trades apprentices in the 2016-17 cohorts, on average, those receiving services were 10% (+/- 6%) more likely to complete their apprenticeship than those who did not receive services (Figure 19).**

Among all apprentices in the 2016-17 cohorts, the independent effect of child care services on completion, adjusted for other types of services and factors associated with receiving services and completion, is larger than the estimated effects of receiving ready items, gas/travel, hardship, or non-financial services (Figure 18). **Apprentices receiving ready items are 7% (+/- 6%) more likely to complete rather than cancel, relative to those not receiving services. Those receiving gas or travel are actually 4% less likely to complete (+/- 10%), while those receiving hardship funds are 6% (+/- 14%) more likely, and those receiving non-financial support are 9% (+/- 12%) more likely to complete.** Because of the small number of apprentices receiving hardship funds across race/ethnic and gender groups, we are only able to estimate adjusted marginal effects of receiving hardship funds among white men. Similar to the trend among all



apprentices, among white men, the estimated effect of receiving hardship funds on completion is positive. When we estimate the effect receiving hardship funds on women and people color, combined (see Figure ES3), we see a negative estimated effect of receiving hardship funds on completion. Yet unadjusted completion rates by hardship funds suggest that this negative effect is being driven by the negative association between receiving hardships funds and completion among women – both among white women and women of color. Among men of color, there is a positive association between receiving hardship funds and completion, with 63% of those who received hardship funds completing, compared to 47% of those who did not receive hardship funds completing.

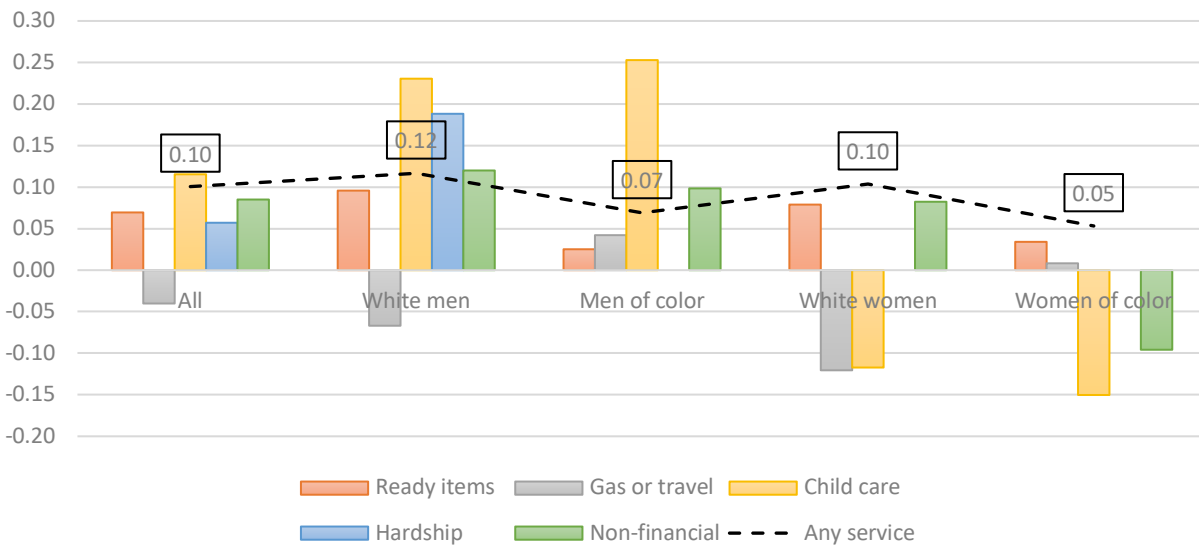


Figure 19. Estimated adjusted marginal effects of receiving services on completion by race/ethnicity and gender, 2016-17 cohorts

### Changes to childcare services

The effect of child care support is positive only among men in the 2016-17 cohorts. This finding is similar to previous findings indicating a larger impact of child care support on men and a negative impact among women of color (Kelly and Wilkinson 2020). It is important to note, however, that apprentices receiving child care, especially mothers, are likely different from those not receiving child care, in ways impacting both child care receipt and on-time completion and in ways we are unable to account for in models using OAS data. In previous surveys of apprentices, we found that mothers were more likely than fathers to report being single (40% vs. 11%) and were more likely to report an individual income below 226% of the federal poverty level. Mothers also reported a greater number of months out of work during their apprenticeship (1.9) than fathers (1.2). Mothers were more likely than fathers to rely on a paid child care provider or to state children were old enough to take care of themselves. In fact, 46% of fathers reported relying on a spouse or partner for child care, compared to only 18% of mothers. Not surprisingly, apprentices who are mothers appear to have fewer resources and to face more child care

challenges than those who are fathers: mothers were more likely than fathers to report problems paying for child care and finding consistent child care (Wilkinson and Kelly 2018).

While men apprentices were more likely than women apprentices to report having dependent children living with them during their apprenticeship in our 2018 survey (51% vs. 37%), men were more likely than women to depend on a spouse or partner for child care (36% vs. 7%), reflecting the persistent gendered division of labor in which women are expected to work within the home whereas men are expected to work in the paid labor market (Kelly & Wilkinson 2018). In addition to gender as a factor impacting perceptions of child care challenges, household income was also identified as a factor in our 2018 survey: apprentices with household incomes less than \$30,000 were the most likely of all income groups to report the cost of childcare as a challenge (65%) and were also the most likely to report being out of work as a problem (64% vs. 34% for highest income group) (Wilkinson and Kelly 2018).

For the above reasons, the Program, in August 2022 changed the formula for allocating child care support to eligible apprentices. The allocation formula is now based on household income and no longer maintains a maximum benefit per apprentice, a maximum that was originally set at \$10,000 (plus additional \$2,000 for completing a budget class) and then increased to \$18,000 (plus an additional \$2,000 for those with one or more dependent children under the age of 3 or a special needs child). Table 2 summarizes the various changes made to the child care support since the Program's inception in 2010, including the number of agreements (not individual apprentices) served, that status of those agreements, and information about the child care support received. We include the percentage of agreements in which the child care support exceeded \$10,000 because one of the biggest changes to the allocation model in Phase 3 was the elimination of maximum limits of support. We can see the effect of this in Table by looking at "mean child care payment" and "child payment exceeded \$10,000" across the phases. The mean child care payment for agreements receiving child care support increased from \$4,353 to \$14,584 between Phase 1 and Phase 3 of child care support implementation. A result of removing the maximum amount of child care support an apprentice can receive is that apprentices receiving child care in Phase 3 are receiving child care for, on average, a greater number of months than in earlier phases of the implementation (Table 2).

Table 2. Phases of Child Care Support Characteristics

	Phase 1	Phase 2	Phase 3	Any phase
	prior to July 2017	July 2017 - July 2022	August 2022-	
Time Period				
Total agreements served	57	107	44	186
% Agreements completed	68.42	48.60	20.45	44.09
% Agreements cancelled	24.56	31.78	6.82	28.49
% Agreements active	0.00	12.15	65.91	18.28
Term cancelled if cancelled	2.64	2.94	2.00	2.70
Mean child care payment	4353.26	7034.34	14584.22	7047.68
Mean child care payment per month	789.21	1456.43	4124.71	1774.23
Mean number months received child care	8.46	10.50	13.52	9.63
% Child payments exceeded \$10,000	3.85	13.08	53.66	13.98

Figure 20 shows percentage of apprentice agreements that are completed or still active in June 2024 by receipt of Phase 2 child care support, across racial/ethnic and gender groups, among agreements active in 2017-2024. While, overall, receiving Phase 2 child care support is associated with a higher percentage of complete/active agreements, relative to not receiving Phase 2 child care support, this association is observed among men but not among women.

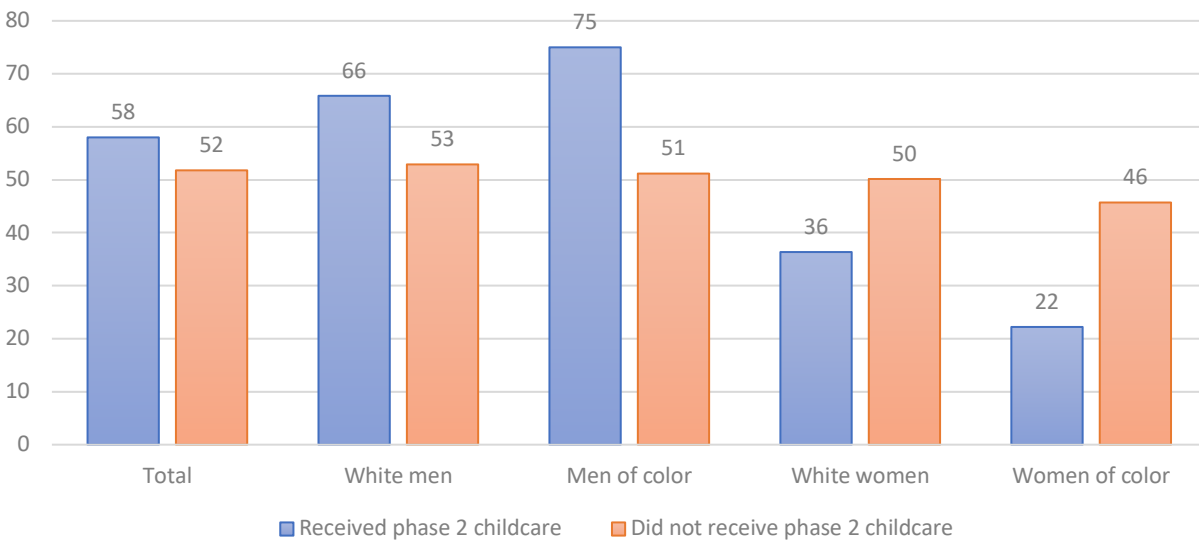


Figure 20. Percentage of apprentice agreements completed or active by Phase 2 child care support, by race/ethnicity and gender, highway trades agreements active in 2017-2024

Figure 21 shows the percentage of apprentice agreements that have been completed or are still active in June 2024 for those receiving Phase 3 child care support, across racial/ethnic and gender groups, among those active in 2022-2024.

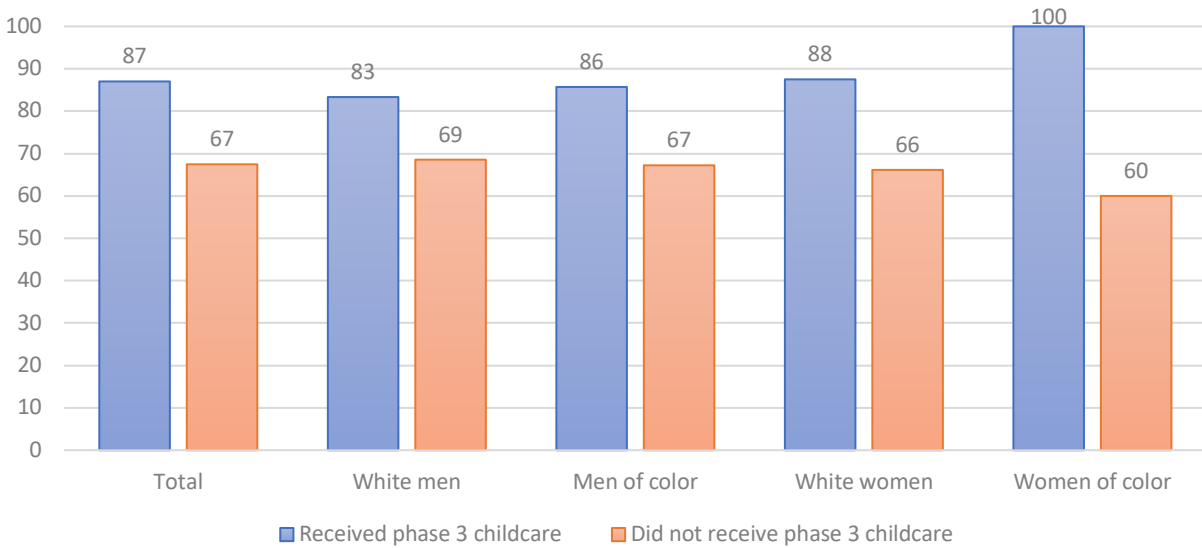


Figure 21. Percentage of apprentice agreements completed or active by Phase 3 child care support, by race/ethnicity and gender, highway trades agreements active in 2022-2024

What is important to notice in Figure 21 is that the positive association between receiving Phase 3 child care support and being active or complete is observed among all racial/ethnic and gender groups. While not all apprentices in this subgroup – those active in 2022-2024 – have had an opportunity to cancel, among all active apprentices in the highway trades active in this period, 87% are still active or/are completed, which is similar to what we see among those receiving Phase 3 child care support in Figure 21.

In addition to active/completion rates by child care phase, we also examined the impact of receiving child support payments in excess of \$10,000, which is much more common among those receiving Phase 3 child care support. No apprentices who received child care support payment in excess of \$10,000 have cancelled their apprenticeship, regardless of the Phase in which they received the child care support. Among agreements in which apprentices received child care support but did receive less than \$10,000, 37% of Phase 2 and 14% of Phase 3 agreements were cancelled (Table 3).

Table 3. Percentage of agreements cancelled by receipt of child care payment exceeding \$10,000, by child care phase.

Child care phase	Payment exceeded \$10k	Payment did not exceed \$10k
Phase 2	0% cancelled	37% cancelled
Phase 3	0% cancelled	14% cancelled
Total	0% cancelled	33% cancelled

Source: Apprentice agreements in highway trades receiving any child care support, 2014-2024 cohorts

### Pre-apprenticeship

Among highway trades apprentices in the 2014-17 cohorts, completing a pre-apprenticeship has a positive effect on completion only among white women (Figure 22). The finding that men do not benefit, in terms of likelihood of completing an apprenticeship, from pre-apprenticeships mirrors findings from previous reports and is not surprising given the unique challenges faced by many men participating in pre-apprenticeship programs. As an example, a recent study of pre-apprenticeship programs found that nearly half of all recent participants in Constructing Hope’s pre-apprenticeship program (which primarily serves men) had a criminal history and half were receiving public assistance (Wilkinson and Kelly 2017). Pre-apprenticeship programs such as Constructing Hope attract workers with challenges that make it difficult to complete an apprenticeship program. Results from our 2018 survey show that 79% of respondents completing a pre-apprenticeship program reported an individual income below 226% of the poverty level before they began their apprenticeship (Wilkinson and Kelly 2018). The finding that pre-apprenticeships are not benefitting women of color is somewhat surprising given previous reports indicate a positive effect of pre-apprenticeship among women of color, although the effect was less positive than the effect among white women.

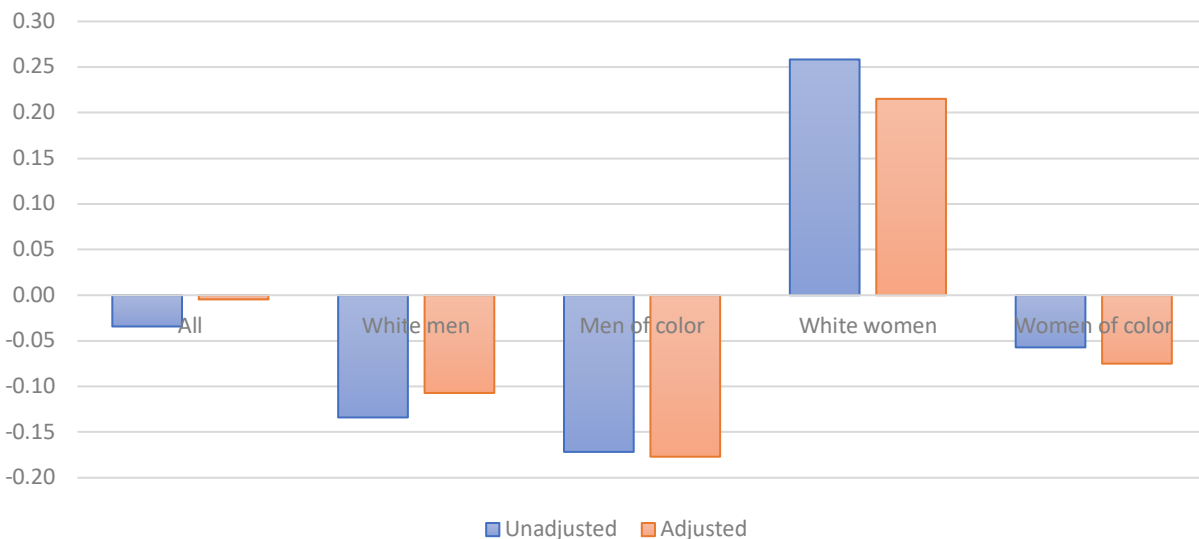


Figure 22. Unadjusted and adjusted marginal effects of pre-apprenticeship on completion, by race/ethnicity and gender, 2014-2017 cohorts

## Recommendations

Overall, pre-apprenticeship and supportive services funded by the Highway Construction Workforce Development Program are increasing the recruitment and retention of a diverse workforce and these efforts should be continued.

### *Recruitment*

Newer cohorts of apprentices are increasingly diverse, suggesting that current efforts to diversify apprenticeship have been effective. Pre-apprenticeship remains, to date, the only approach that has been empirically documented to increase the recruitment of women into the trades in Oregon (the impact of other approaches, such as school outreach and women in trades fairs has not been assessed). Additional research is needed to better understand how to best target investments in recruitment.

### *Pre-apprenticeship*

Pre-apprenticeship programs funded through the Highway Construction Workforce Development Program have contributed to the diversify of the construction trades, in particular with increased numbers of women in the highway construction trades. In the 2022-23 cohorts of new apprentices, 10% of all white women and 18% of all women of color apprentices entered a highway construction apprenticeship after completing a Program funded pre-apprenticeship. Notably, those who complete a pre-apprenticeship are less likely to complete an apprenticeship than those who did not complete a pre-apprenticeship. Previous evaluations have found that pre-apprenticeship students have more challenges than those who did not need to seek this pathway into the trades. While some pre-apprentices receive ongoing support from their pre-apprenticeship program, not all do. Given the investment in these individuals through pre-apprenticeship, we recommend a coordinated services or “wrap around” approach here to provide additional support through the Program when needed to ensure completion, such as non-financial support and hardship funds (if needed).

### *Retention*

About half of all apprentices who start an apprenticeship will complete it and completion rates are lower for women and some groups of men of color. in the current biennium there was an increase in completion rates among some race/gender groups. Previous research (Wilkinson and Kelly 2018, Kelly and Wilkinson 2020, Worksystems et al 2024) has identified a set of factors that impact the retention of apprentices, see Box 1. The higher frequency with which women and people of color experience many of these challenges sheds light on the lower completion rates in those race/gender groups. Some of the financial and non-financial challenges are currently being addressed through the Program and these efforts have been effective in increasing completion rates for those who receive the supportive services. However, there are industry-wide efforts that will be needed to more fully address the issue of apprenticeship completion.



While much attention has been placed on recruitment within the industry, we suggest increasing efforts to address retention as a critical strategy to maintain a strong construction pipeline.

Box 1. Factors impacting retention of apprentices

<b>Jobsite issues impacting retention of apprentices:</b>	<b>Other challenges impacting the retention of apprentices:</b>
Challenges accessing quality training	Being out of work
Harassment	Challenges accessing career mentorship and advancement opportunities
Exclusion and isolation	Financial challenges (e.g. transportation, housing, medical bills)
Lack of effective policies and practices to address jobsite harassment and discrimination incidents	Non-financial challenges (e.g. alcohol and drug use, legal issues, mental and physical health)
Issues with lack of clean restrooms and spaces for lactation	Cost of childcare and access to childcare
	Lack of flexibility in work hours
See Worksystems et al 2024	Inability to travel

*Ready items*

The findings of this evaluation show that apprentices receiving ready items are 7% (+/- 6%) more likely to complete rather than cancel, relative to those not receiving services. As noted in previous reports, receiving ready items addresses an immediate need as well as connects apprentices to the Program, which, for some apprentices, serves as a source of support throughout their apprenticeship (Kelly and Wilkinson 2020). As a low dollar amount investment per apprentice with a strong impact, we recommend support for ready items be continued or expanded. As noted in the findings above, in some instances, the Program has paid for tools from the hardship funds when tools are stolen or damaged. Leveraging hardship funds is also an effective way to meet this need.

*Gas and travel*

Those receiving gas or travel are actually 4% *less* likely to complete (+/- 10%). This is consistent with previous findings that did not demonstrate a positive impact of gas or travel on completion (Kelly and Wilkinson 2020). As in previous evaluations, gas and travel support is the least effective service; funds might be more effectively used to provide other types of support.

### *Childcare*

Receiving childcare has a strong positive impact on completion; however, the effect of child care is positive only among *men* in the 2016-17 cohorts. Women may need additional support beyond financial subsidies for childcare. In evaluating the expansion of childcare subsidies with Phase 3, the data shows a positive association between receiving Phase 3 child care support and being active or complete among all racial/ethnic and gender groups. Given the positive impacts of childcare subsidies on completion, we recommend the Phase 3 approach be continued or expanded. Given the significant investment for each apprentice receiving childcare, it may be helpful to offer additional services, such as non-financial support and hardship funds (if needed) to ensure the success of the investment in these apprentices.

### *Hardship funds*

Those receiving hardship funds are 6% (+/- 14%) more likely to complete than those who do not receive services. Notably, the impact of hardship funds is driven by the positive impact on white men and men of color. We do not see a similar effect of hardship funds on women, although the number of women, especially women of color, receiving hardship funds is small. In the 136 hardship fund records analyzed, the most common type of supports were related to housing: rent (83), mortgage (18), and utilities (10). The Program also provided support for vehicle repairs (14), help with replacing stolen or broken tools (2), medical bills (2), and, in one case, assistance with renting a storage unit (1). The records illustrate how hardship funds are being used to address a wide variety of situations that could prove destabilizing to apprentices' careers. Given the positive impact on completion, we recommend hardship funds be continued or expanded.

### *Non-financial support*

In the current biennium, there were far fewer records of non-financial services than in previous biennium. After consulting with Program staff, it seems this is likely to issues with reporting rather than delivery of non-financial services. As noted in a previous evaluation, non-financial support is harder to track as it is often provided in conjunction with financial supportive services, for example, encouragement and advice given while shopping for work boots (Kelly and Wilkinson 2020). Evaluation research has found these services to be underreported in Program data in a previous biennium (Kelly and Wilkinson 2020). Nevertheless, the results of the evaluation in this biennium align with previous findings that those receiving non-financial support are 9% (+/- 12%) more likely to complete. Given the higher rates of cancellation among Black men in the probationary period and the particularly low rates of completion among Black men, we recommend the Program consider identifying targeted resources to support Black men and their unique needs. This could include professional counseling to support Black men transitioning out of prison, for example, or having advocates on site to support young Black apprentices with building support networks and retention plans. We also recommend the Program consider targeted support services for apprentices who may be experiencing separation, divorce, and/or domestic violence. Analysis of hardship support indicates that women experience hardships

related to separation, divorce, and domestic violence at higher rates than men and that women experience less of a positive impact of receiving hardship funds on completion.

### *Coordinated services*

In the current biennium, apprentices who received both financial and non-financial services were more likely to complete than those who received a single service type. Findings from previous evaluations (Kelly and Wilkinson 2020) also suggest that many apprentices would benefit from coordinated or “wrap-around” services that connect apprentices with financial and non-financial support available through the Highway Construction Workforce Development Program as well as additional support available within the trades and in broader communities. As mentioned above, it may be particularly effective to provide coordinated services to apprentices who have already received significant investment, specifically, those who completed a pre-apprenticeship program and those receiving childcare services. Previous evaluations have found that the Program accomplishes this to some degree by having a single point of contact that apprentices can return to as issues arise during their apprenticeship (Kelly and Wilkinson 2020). A pilot expanding this type of approach is currently being implemented with the Operating Engineers in the Program’s current biennium. Findings from these efforts should be evaluated for effectiveness.

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## APPENDIX A. Research Design

Data from the Oregon Apprenticeship System (OAS) database of current and past apprentices was used for this study. For trend analysis of enrollment rates between 2010 and 2023, all apprentice agreements from the 2010-2023 cohorts that were not cancelled with zero credit hours accumulated were included (N=34,903). This includes 23,561 apprenticeship agreements among white men apprentices, 1,303 among Black men, 4,838 among Latinx men, 847 among Asian men, 947 among Native American men, 2,495 among white women, 228 among Black women, 351 among Latinx women, 143 among Asian women, and 190 among Native American women. Of the 34,903 agreements, 11,626 (33%) were in eligible highway construction trades, including those in the carpenter trades (carpenter, exterior-interior specialist, pile driver, scaffold erector, millwright), cement mason, ironworker, laborer, operating engineer, and painter. The unit of analysis for most analyses, however is apprentices, not apprenticeship agreements. Apprentices can have multiple apprenticeship agreements. Aggregating to the apprentice level resulted in a population of 32,246 individual apprentices, 10,710 who had at least one agreement in an eligible highway trade. To determine eligibility for ODOT/BOLI financial supportive services, we used information on apprentice trade.

For trend analysis in percent completing by race/ethnicity and gender, we included all apprentices who completed in each year, 2010-2023. There were 7,992 apprentices in the 2022-2023 cohorts (8,148 agreements), including 1,966 apprentices (2,066 agreements) in eligible highway trades.

For analysis of completion rates by receipt of ODOT/BOLI support services, we included all apprentices in the 2016-2017 cohorts in eligible trades who had completed or cancelled by 2023 and who did not cancel with zero credit hours accumulated (N=1,953).

For analyses of service receipt in the current reporting period, we used apprentices active between January 1, 2022 and December 31, 2023 who did not cancel with zero credit hours accumulated. This included 4,311 individual apprentices in eligible trades.

In cases where apprentices had multiple agreements, the average or sum of their characteristics was taken. For example, when determining completion of an apprenticeship, the sum of all agreements completed was used to create a dichotomous variable indicating whether the apprentice completed one or more agreements. Thus, the unit of analysis for most analyses is apprentices, not apprenticeship agreements. We used apprenticeship agreements as the unit

## **APPENDIX B. Highway Workforce Development Program Contacts**

Below are the organizations involved in the Highway Workforce Development Program.

Oregon Department of Transportation: Funds the Program.

Oregon Bureau of Labor and Industries: Administers the Program.

Akana: Contracted to administer the Program.

Oregon Southern Idaho Laborers-Employers Training Trust: Administers Program via a subcontract with Akana.

Labor's Community Services Agency: Administers hardship funds via a subcontract with Akana.

Oregon Tradeswomen: Administers pre-apprenticeship program, administered the Green Dot for the Trades program (respectful worksites), and provides non-financial support to apprentices.

Constructing Hope: Administers pre-apprenticeship program and provides non-financial support to apprentices.

Portland Youth builders: Administers pre-apprenticeship program.

## APPENDIX C. Fact Sheets

# 2024 Evaluation of Oregon’s Highway Construction Workforce Development Program Supportive Services

Dr. Lindsey Wilkinson and Dr. Maura Kelly  
Portland State University  
October 2024

The Oregon Department of Transportation and Oregon Bureau of Labor and Industries have partnered in a statewide effort—the Highway Construction Workforce Development Program—to recruit, train, and employ a diverse workforce for highway construction jobs throughout the state. This program supports a variety of initiatives, including supportive services for apprentices, which are designed to improve the recruitment and retention of a diverse highway construction workforce.

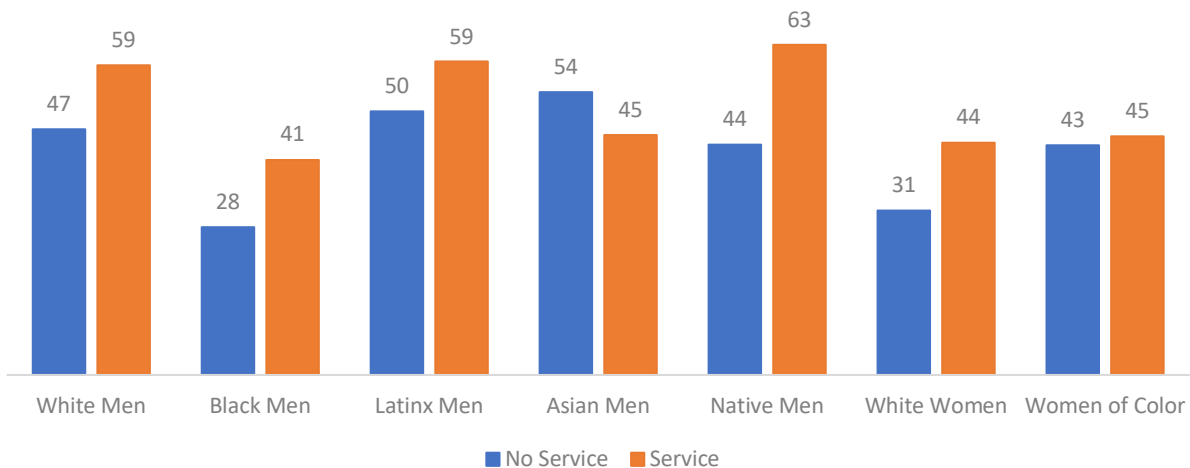
Total number of apprentices provided supportive services in 2022-2023:

356 white men  
339 men of color  
137 white women  
77 women of color

Apprentices who received one or more supportive services were

# 10%

more likely to complete than those who did not receive any services.



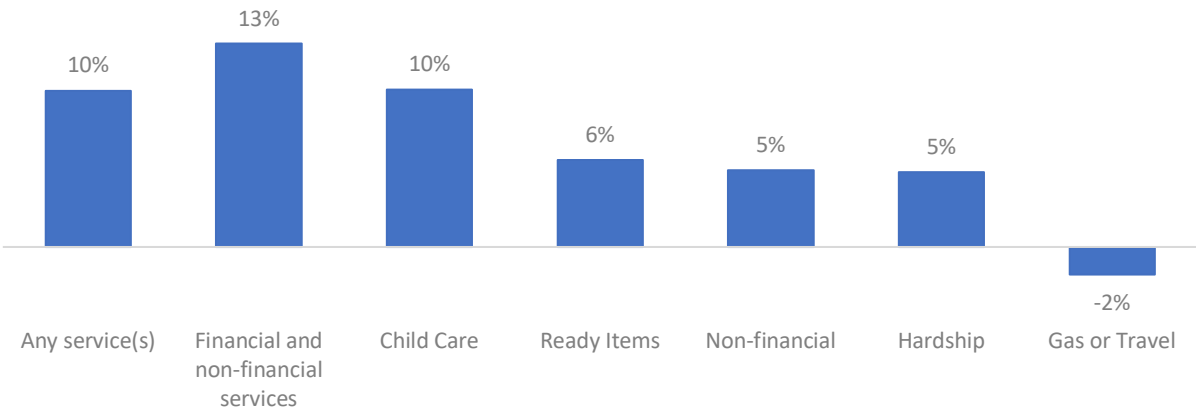
Percentage of apprentices completing by service receipt, race/ethnicity, and gender



The findings presented here demonstrate the effectiveness of the following supportive services: child care; “ready items” (work clothes, tools, and protective equipment); non-financial assistance; and hardship funds. The impact of childcare and hardship funds on completion was positive for men but not women. Only gas or travel funds did not have a demonstrable impact on completion for any race/gender groups. The findings also demonstrate that the likelihood of completion increased when apprentices received both financial and non-financial services, indicating the effectiveness of the “coordinated services” approach.

**\$1M**

Total amount provided in direct assistance through supportive services in 2022-2023



Effects of receiving services on completion by type of supportive service

Findings are based on an analysis of the Oregon Bureau of Labor and Industries’ Oregon Apprenticeship System and from administrative records collected from staff implementing the Highway Construction Workforce Development Program. Trades eligible for participation in the Program are carpenter, cement mason, electrician, ironworker, laborer, operating engineer, and painter (workers in other trades also eligible when working on a highway or bridge project).

See 2024 report at [www.maura-kelly.com](http://www.maura-kelly.com)



# Recruitment and retention of apprentices in the construction trades

Dr. Lindsey Wilkinson and Dr. Maura Kelly  
 Portland State University  
 October 2024

1,966

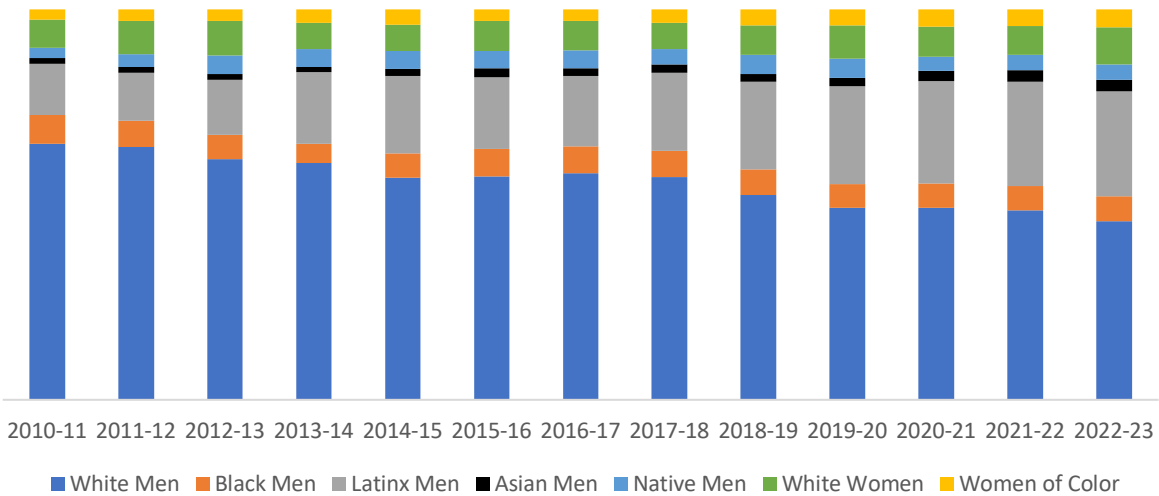
Total number of new apprentices in 2022-2023

14%

Of new apprentices are women

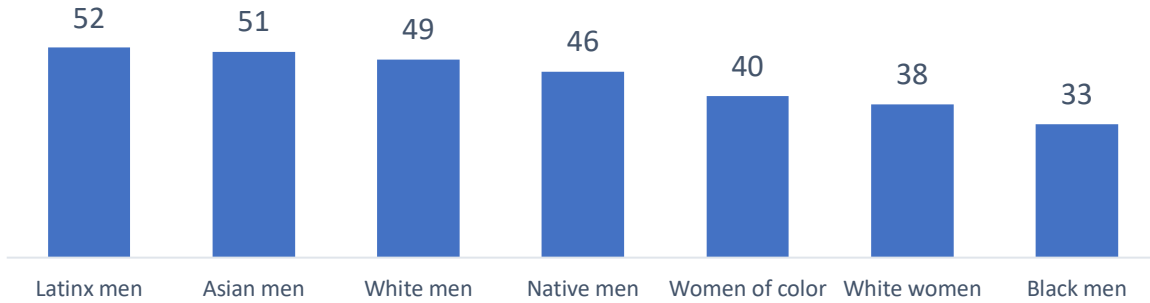
45%

Of new apprentices are people of color



New apprentices in construction trades in Oregon by race/ethnicity and gender

Oregon has intentionally engaged in efforts to recruit and retain a diverse construction workforce. New cohorts of apprentices are increasingly diverse and apprentices starting in 2022 and 2023 represent the most diverse cohort to date with women and people of color making up 54% of new apprentices. However, the industry still struggles with low completion rates for apprentices; only about half of all apprentices who start an apprenticeship will complete. Completion rates for Native men, women of color, white women, and Black men are even lower, representing the increased challenges experienced by apprentices with those identities. In order to continue to diversify Oregon’s construction workforce and meet the increasing demand for workers, current efforts to recruit a diverse workforce should continue and additional investments in retention must be implemented.



Percentage of apprentices completing within six years by race/ethnicity and gender

Findings are based on an analysis of the Oregon Bureau of Labor and Industries’ Oregon Apprenticeship System. Trades included in this analysis are carpenter, cement mason, electrician, ironworker, laborer, operating engineer, and painter.

<b>Jobsite issues impacting retention of apprentices:</b>	<b>Other challenges impacting the retention of apprentices:</b>
Challenges accessing quality training	Being out of work
Harassment	Challenges accessing career mentorship and advancement opportunities
Exclusion and isolation	Financial challenges (e.g. transportation, housing, medical bills)
Lack of effective policies and practices to address jobsite harassment and discrimination incidents	Non-financial challenges (e.g. alcohol and drug use, legal issues, mental and physical health)
Issues with lack of clean restrooms and spaces for lactation	Cost of childcare and access to childcare
	Lack of flexibility in work hours
	Inability to travel

See 2024 report at [www.maura-kelly.com](http://www.maura-kelly.com)

