

Apprenticeship in Pennsylvania

Overview

This report was prepared for the Pennsylvania Workforce Development Board's Apprenticeship and Career and Technical Education Committee in response to their need for research transmitted in the context of understanding past and present PA investments in registered pre-apprenticeship and apprenticeship programs. This report addresses the following four central concerns:

1. Trends in programs and participation
2. Representation of historically underserved populations
3. Expansion of industries and occupations
4. Geographic analysis

An interactive version of this report is available at [🌐 ApprenticeshipReportKRC.2025](https://www.keystoneresearchcenter.com/ApprenticeshipReportKRC.2025)

Unless otherwise noted, all apprenticeship data in this report are Keystone Research Center analysis of U.S. Department of Labor Registered Apprenticeship Partners Information Database System (RAPIDS) data, current as of December 31st, 2024, with program information provided by the Pennsylvania Apprenticeship and Training Office (ATO). RAPIDS data are imperfect, but the trends offered in this report are robust and useful for understanding the state of apprenticeship in Pennsylvania. All pre-apprenticeship data are sponsor-reported and are provided by the Pennsylvania ATO. These pre-apprenticeship data cover July 1st 2023 through June 30th 2024.

Registered Apprenticeship Programs

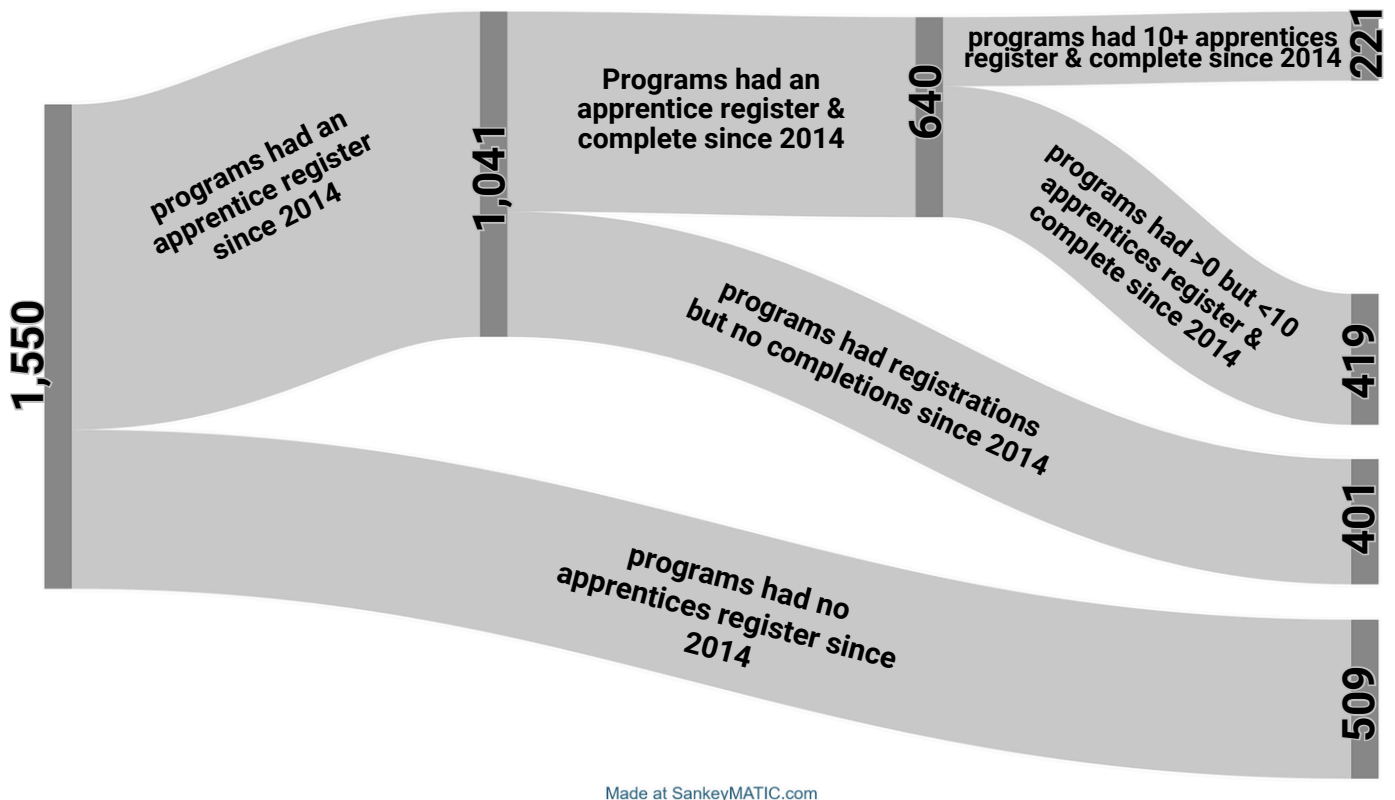
The historic level and composition of PA apprenticeship programs

Sponsors, Programs, Industry, and Type

In December 2024, there were 885 Registered Apprenticeship Program sponsors in Pennsylvania. Because sponsors can have more than one apprenticeship program, each unique occupation and sponsor combination counts as one apprenticeship program. Figure 1 shows the breakdown of the 1,550 PA programs in December 2024 based on different categories of registrants and completers.

Figure 1

Breakdown of PA Registered Apprenticeship Programs by Registrants and Completers



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In December 2024, there were **1,550** Registered Apprenticeship programs in Pennsylvania. **1,041** of these programs have had at least one apprentice register in the past decade (since calendar year 2014). **640** programs have had at least one apprentice start and complete a program since 2014. **221** programs have trained at least ten apprentices who have completed their program since 2014.

Industry

Manufacturing and construction industry apprenticeship programs far outnumber other industries in PA and have since this data series began. In recent years, health care/social assistance, educational services, and other service (such as repair service and technician) apprenticeships have expanded. Figures 2a and 2b, the bar charts, shows the currently registered PA apprenticeship programs in each industry and when they registered for pre-2008 and in 2024.

Figure 2a

Industry Breakdown of Pennsylvania Apprenticeship Programs by Program Registration Year

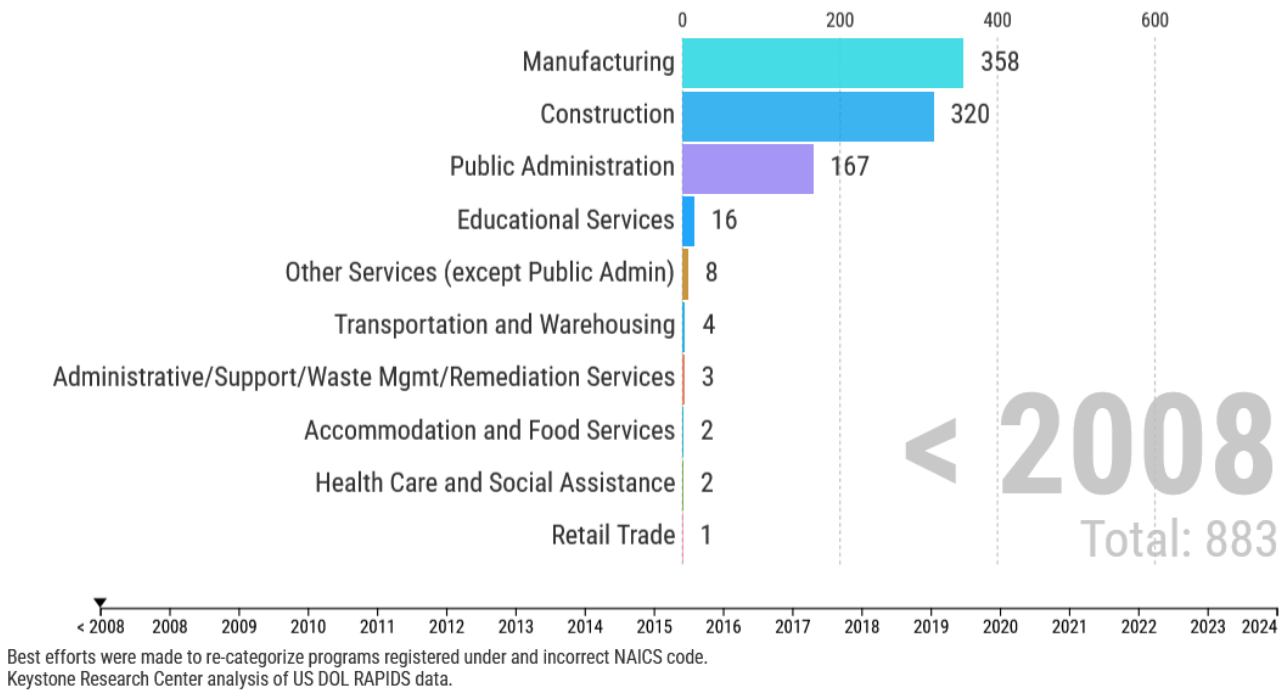
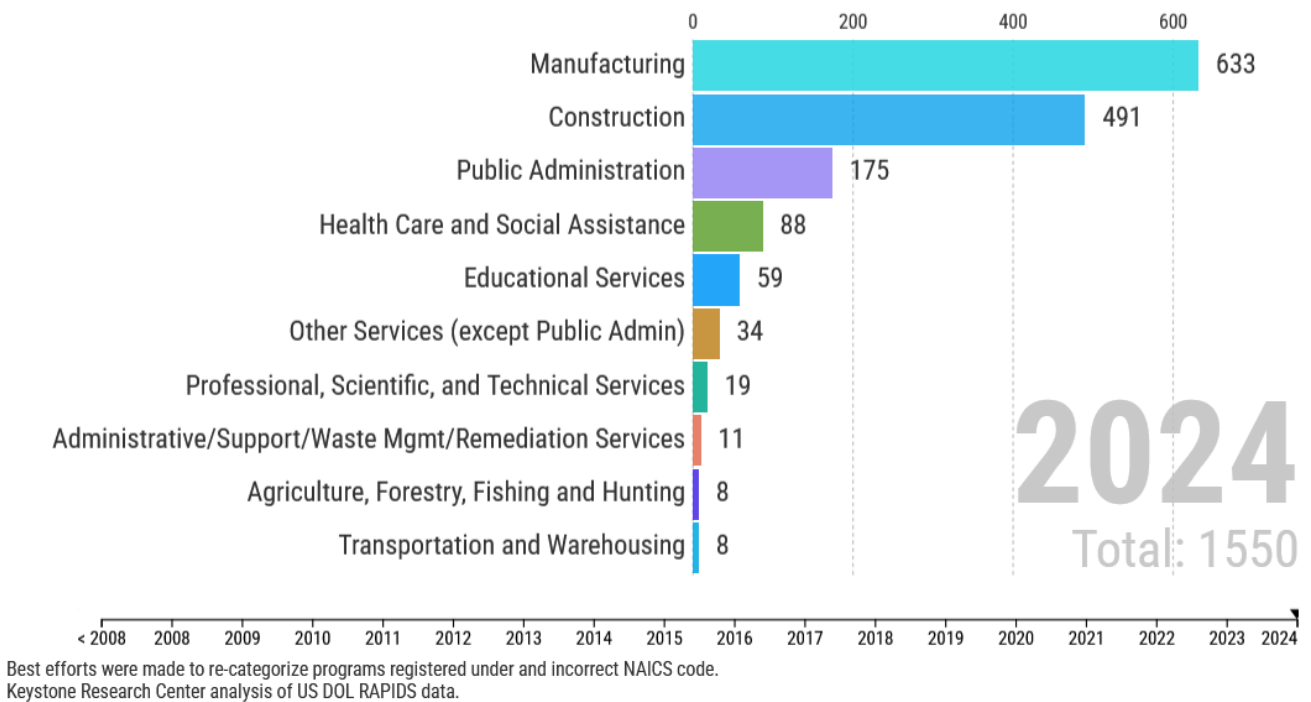


Figure 2b

Industry Breakdown of Pennsylvania Apprenticeship Programs by Program Registration Year



Of the 1,550 PA apprenticeship programs registered in year-end 2024, over half were registered before 2008. Between 2008-2024, Pennsylvania added 667 apprenticeship programs that are still registered. The year 2017 saw the most programs added that were still registered as of year-end 2024: 72. Since

2018 and through 2024, Pennsylvania has added an average of 40 programs per year that are still registered.

Table 1 shows the Industry breakdown of the programs registered since 2018. Manufacturing and Health Care and Social Assistance industry apprenticeships expanded the most. The expansion in Health Care and Social Assistance was driven by these occupations: Licensed Practical Nursing, child development specialists, various technicians, and Certified Nurse Assistants.

Table 1

Industry Breakdown of the 279 Programs Registered Since 2018

Industry:	2018	2019	2020	2021	2022	2023	2024	Total:
Agriculture, Forestry, Fishing & Hunting	3	0	0	0	0	1	0	4
Mining, Quarrying, & Oil & Gas Extraction	0	0	0	0	0	0	1	1
Utilities	0	0	0	0	0	2	1	3
Construction	9	6	5	4	3	2	6	35
Manufacturing	15	29	18	13	2	6	8	91
Wholesale Trade	0	0	0	0	0	0	0	0
Retail Trade	0	0	0	0	0	0	1	1
Transportation & Warehousing	1	0	1	0	0	2	0	4
Information	0	0	0	0	0	1	0	1
Finance & Insurance	0	0	0	0	0	1	0	1
Professional, Scientific, & Technical Services	5	0	0	2	1	4	4	16
Administrative/Support/Waste Mgmt/Remediation Services	0	0	2	1	0	3	1	7
Educational Services	7	5	5	1	2	2	6	28
Health Care & Social Assistance	0	10	13	10	15	5	11	64
Arts, Entertainment, & Recreation	0	0	0	2	0	0	0	2
Accommodation & Food Services	0	0	0	0	0	0	2	2
Other Services (except Public Admin)	5	3	2	2	0	2	2	16
Public Administration	0	1	1	1	0	0	0	3
Totals:	45	54	47	36	23	31	43	279

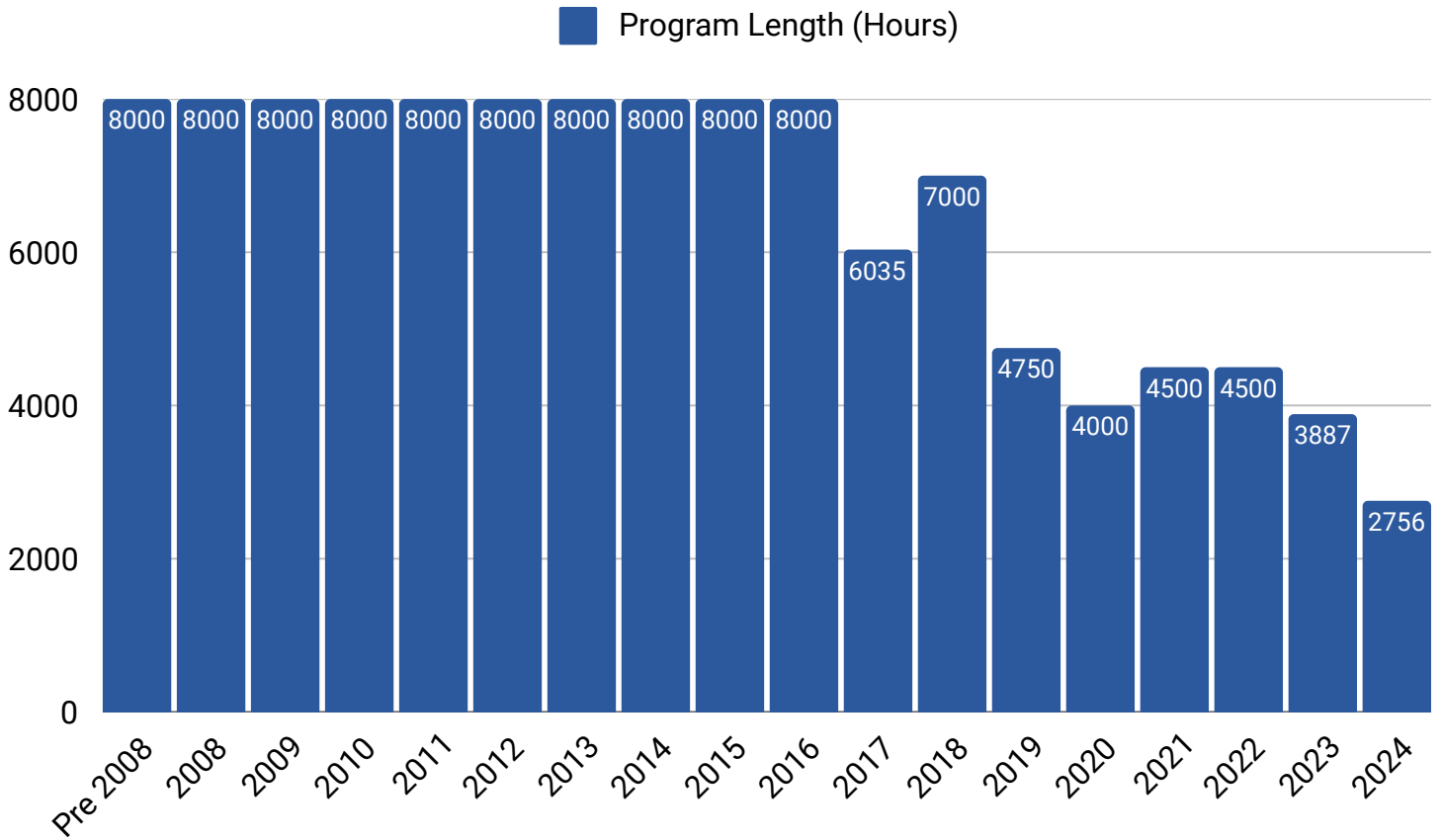
Note: Table displays programs that are still registered as of December 2024. Canceled programs are not shown.

Term Length

Of the 1,550 programs registered as of December 2024, programs that registered before 2008 had a median program length of 8000 hours, or four years. Programs with a term length of 8000 hours continued to be the median for newly registered programs for the next nine years. In 2017, many new programs that registered had a shorter median program length. Overall, newer apprenticeship programs have had, on average, a shorter term length than “traditional” apprenticeships. Figure 3 shows the median program length for programs registered before 2008, and then 2008-2024.

Figure 3

Median Program Length in Hours by Program Registration Year



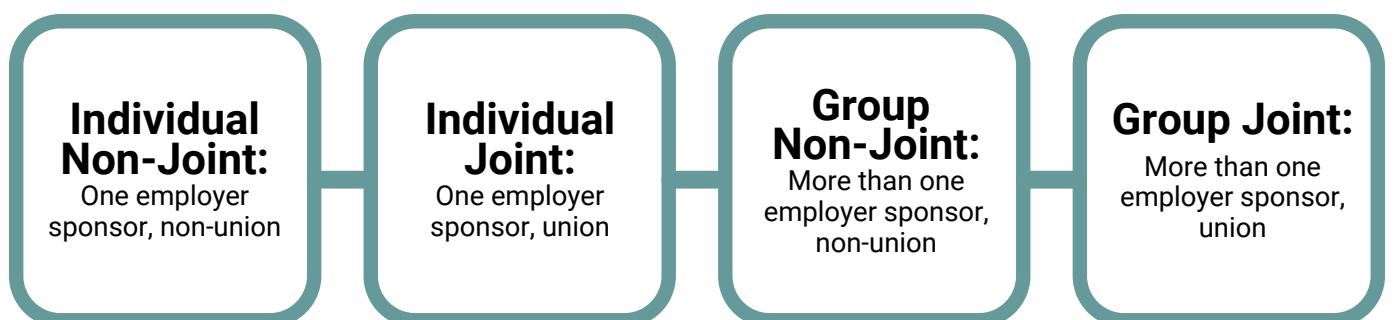
Notes: 2000 hours represents a program length of 1 year. Programs represented are those still registered as of December 2024, and that have ever registered at least one apprentice.

Program Types

Apprenticeship programs in Pennsylvania are sponsored either jointly by trade unions and employer(s) that are signatory to collective bargaining agreements or are sponsored non-jointly without union participation.

Figure 4

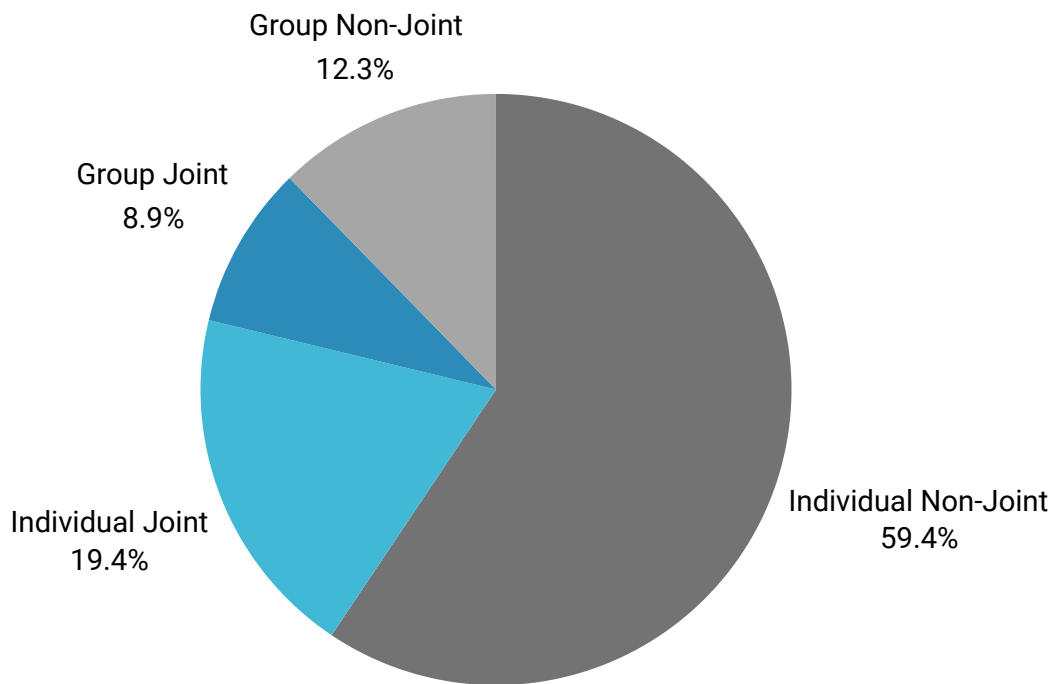
Apprenticeship Program Types



Almost 60% of currently registered PA apprenticeship programs that registered before July 2021 have individual non-joint sponsors, followed by nearly 20% with individual joint sponsorship, with group non-joint and group joint being the least represented type of program among Pennsylvania apprenticeships. Figure 5 shows the breakdown of program type of currently registered PA apprenticeship programs (registered before July 2021).

Figure 5

Registered PA Apprenticeship Programs by Type



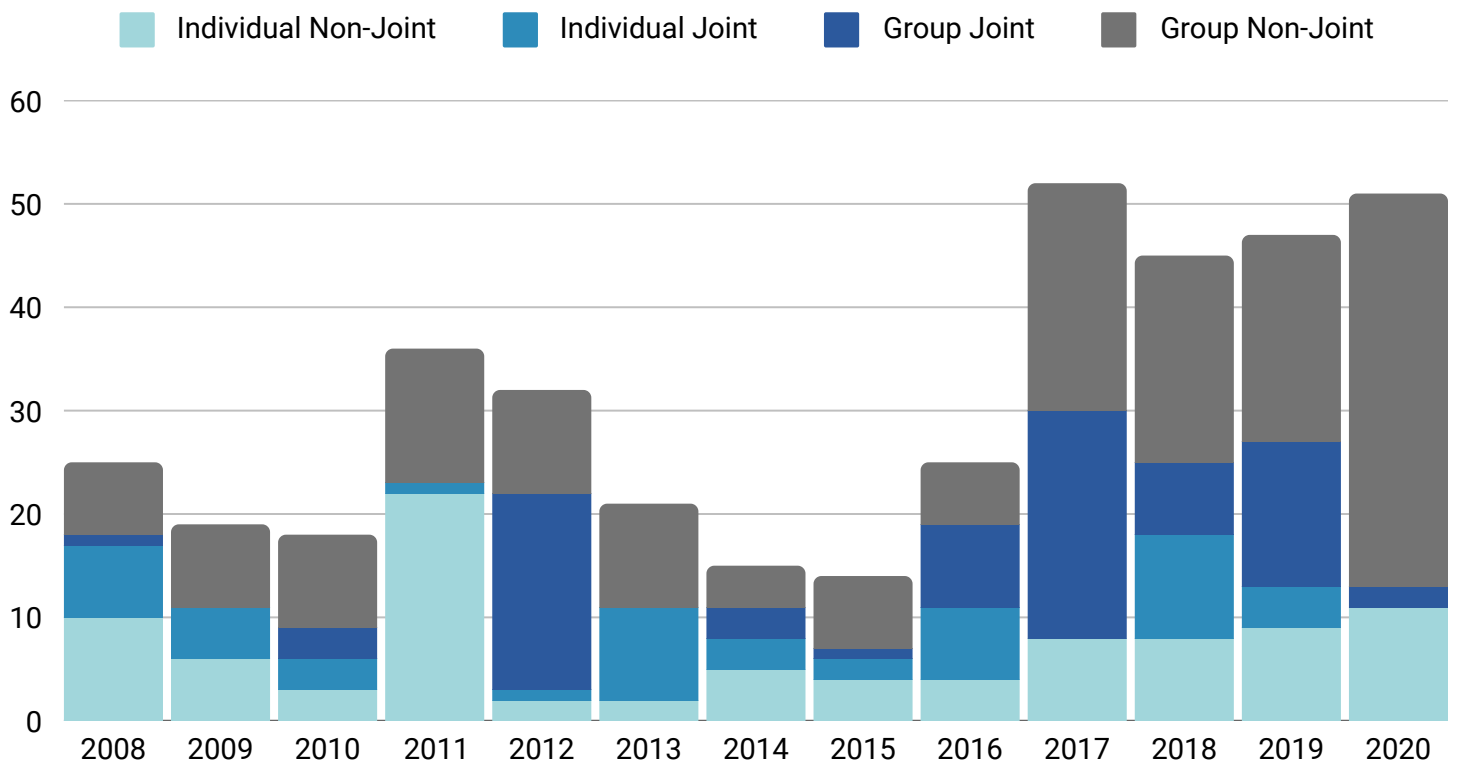
Note: Due to data availability, data shown only capture programs registered through July 2021.

Individual non-joint and individual joint programs dominate the field and account for nearly 80% of registered PA programs, but they don't necessarily train apprentices proportionally. Since 2008, nearly 60% of apprentices who completed a PA program were from a group joint program. When you exclude the "big three" programs from the analysis, (construction, public administration, and manufacturing), a different picture emerges. Figure 6 shows the yearly number of PA program completer apprentices *outside of* construction, public administration, and manufacturing programs. In 2008, 28% of PA program completers outside the big three were in group non-joint programs— a decade later, 44% finished group non-joint programs. Group programs (joint or non-joint) accounted for 32% of completers outside of the big three in 2008, yet accounted for 78% of them in 2020. Figure 6 shows the yearly completers (excluding apprentices in the big three industries) and what type of program they completed from 2008-2020.

Figure 6

Number of Completed Apprentices in PA Apprenticeship Programs, by Program Type and Exit Year

Apprentice Counts Excluding Those in Construction, Public Administration, & Manufacturing Programs



*Note: Program-type data are shown through year-end 2020 due to data availability. Apprentices were from any PA program outside of construction, public administration, and manufacturing, not just the programs still registered as of year-end 2024.

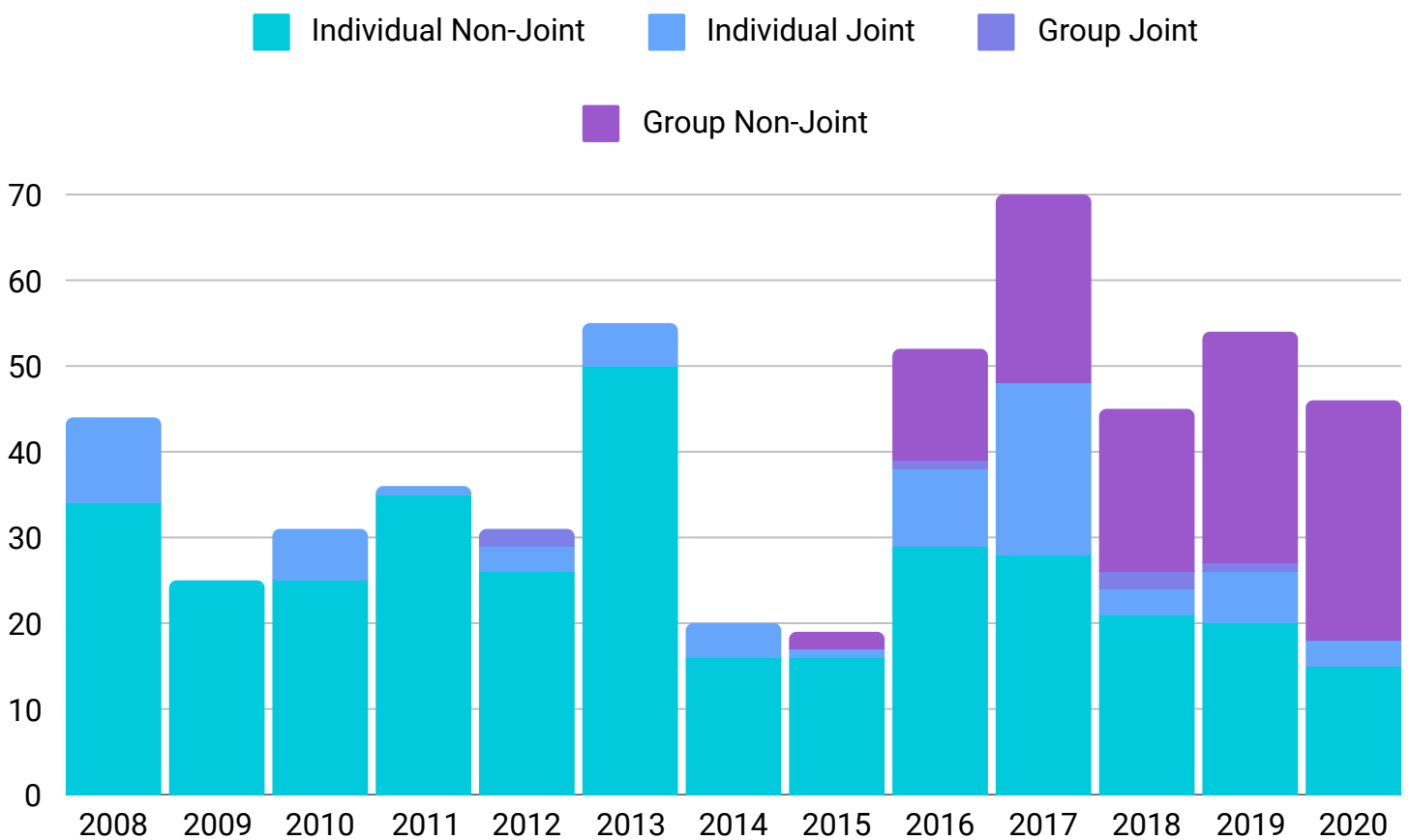
From 2014- mid 2021, newly registered PA apprenticeship programs (still registered as of December 2024) were:

- more likely to be group non-joint programs than they were historically.
- about as likely to be individual non-joint or individual joint as they were historically.
- less likely to be group joint programs than they were historically.

Figure 7 shows the number of new programs registered by year and their program type.

Figure 7

New PA Program Registrations by Program Types, 2008-2024



Note: Year-end 2020 data are shown because program-type data denoting individual/group and joint/non-joint status are unavailable after July 2021. Programs shown were among those still registered in December 2024.

Pennsylvania Apprentices

The historic level and composition of PA apprenticeship

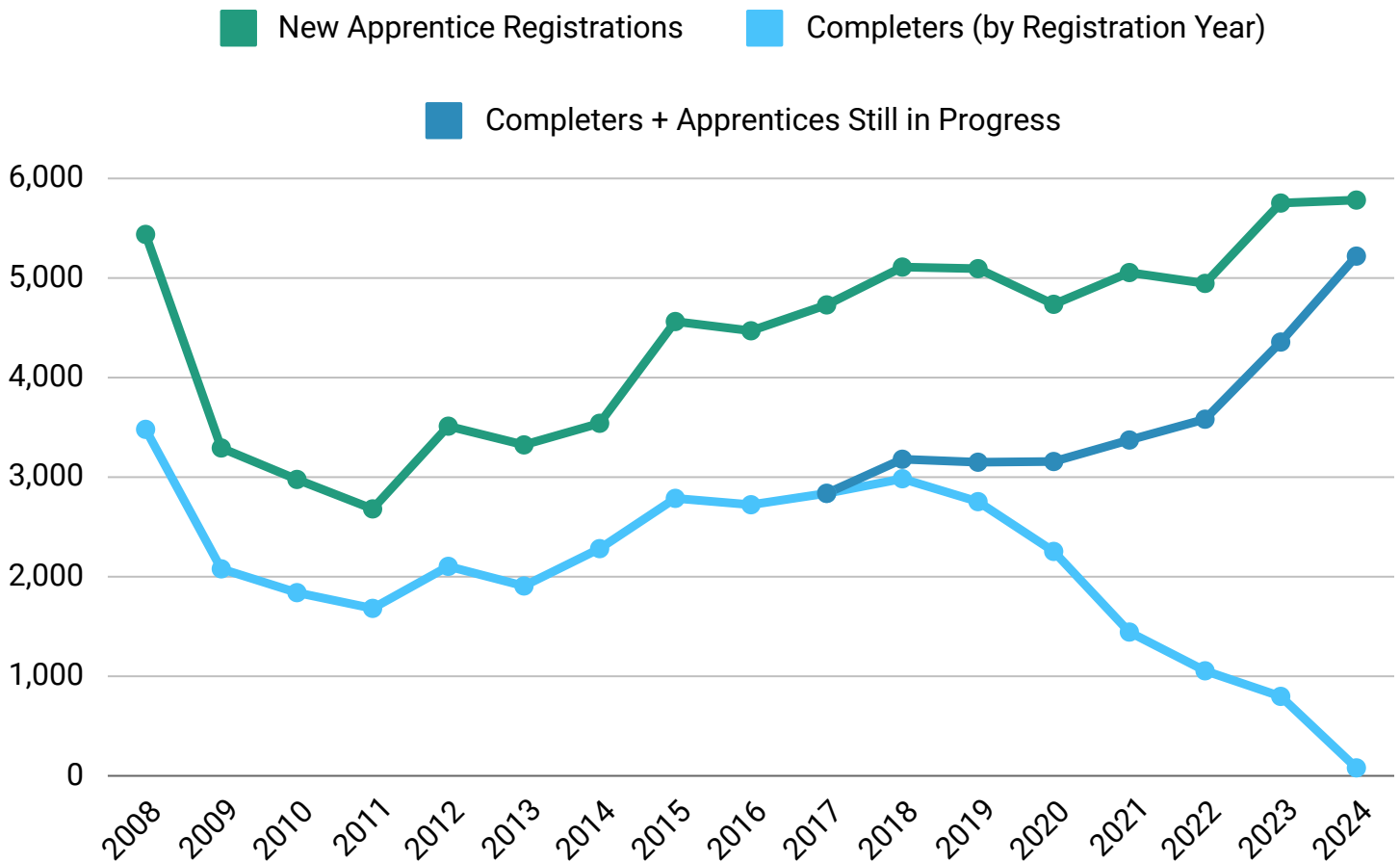
Levels, Industry, Demographics, and Occupations

Levels

Analyses of new registrations in PA programs show that Pennsylvania apprenticeship levels dropped during the Great Recession and have steadily risen in subsequent years. PA apprenticeship registrations are largely driven by construction occupations and respond quickly to business cycles. Figure 8 shows new apprentice registrations in PA programs per year, how many of those new registrants eventually completed their apprenticeship, and—starting in 2018—the count of apprentices who are still in the process of completing their programs were added to the number of completed (dark blue line). After the dip during and following the Great Recession, apprentice registrations in PA programs gradually rose and surpassed the 2008 level in 2023, despite a slight decrease during the COVID-19 recession. From 2008 to 2018, PA apprentices had a completion rate of 61%. It is too soon to estimate a completion rate for years after 2018, because many apprentices are still completing programs and can not yet be captured in a completion rate calculation.

Figure 8

Numbers of New Registrations, Completers, and In-Progress Apprentices in All PA Apprenticeship Programs, by Registration Year

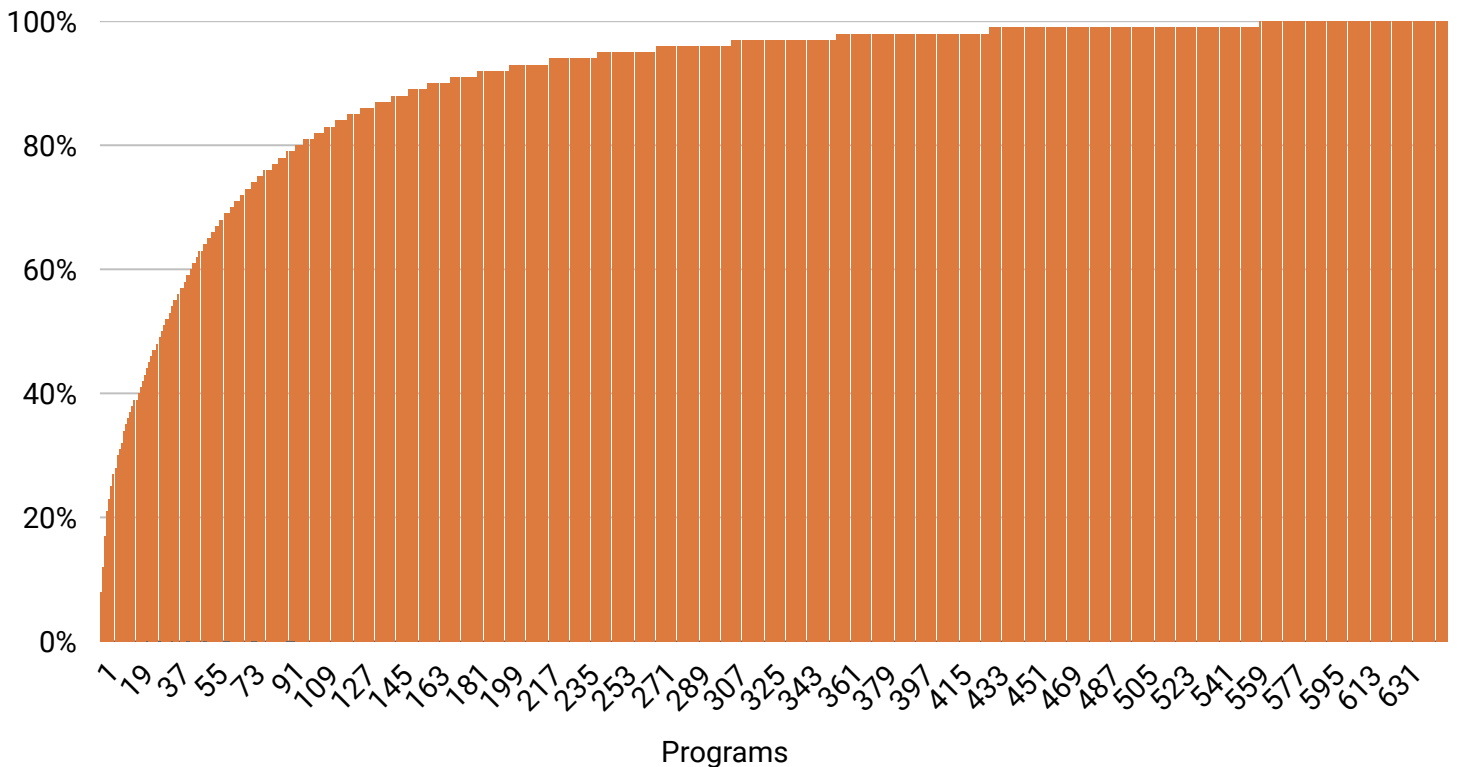


Of the 640 (see Figure 1) PA apprenticeship programs that have had at least one apprentice register and complete since 2014, 50% of the apprentices who completed were from one of only thirty programs. Figure 9 is a bar chart that shows one tiny bar for every apprenticeship program that has trained an apprentice who started and completed since 2014. The first bar on the bottom left represents the program that trained the biggest share of this apprentices group—7.6% of apprentices in PA programs who started and completed since 2014 were trained by this one program. The second largest program trained 4.5% of apprentices. Together, these two programs trained a cumulative total of 12.1% of the apprentices in PA programs who started and completed since 2014. The percentages stack, and we can use this figure to see how many PA programs trained what percent of completers in this timeframe.

Figure 9

Thirty Programs Trained 50% of All PA Program Completers Since 2014

Cumulative Percent of Apprentices Who Started and Completed a PA Apprenticeship Program since 2014, One Bar Per Program



Industry

Although there are more manufacturing apprenticeship programs than construction programs in Pennsylvania, more than eight times as many apprentices started construction programs in 2024. Over 80% of apprentices who started in PA programs in 2019 were in construction programs. Construction's share of new apprentices did not drop below 60% of new apprentices in the 17 years of data we analyzed. Almost 70% of all PA apprenticeship participants since 2008 have been in construction programs. Public administration apprenticeships, mainly for corrections officers and jailers, have historically held the second largest share of PA apprentices with the exception of 2018-2019 when manufacturing program starts slightly outpaced public administration starts. In all other years, manufacturing apprenticeships claimed the third largest industry share of starting apprentices in PA programs.

Of particular note, historically smaller apprenticeship sectors have recently expanded. Figures 10a and 10b show how many new apprentices started in different industries in 2008 compared to 2024, and their share of overall apprenticeship in PA programs.

Figure 10a

How Many New Apprentices Were Learning in Each Industry?

New Apprentices in Pennsylvania Apprenticeship Programs, by Industry and Year

► ● 2008

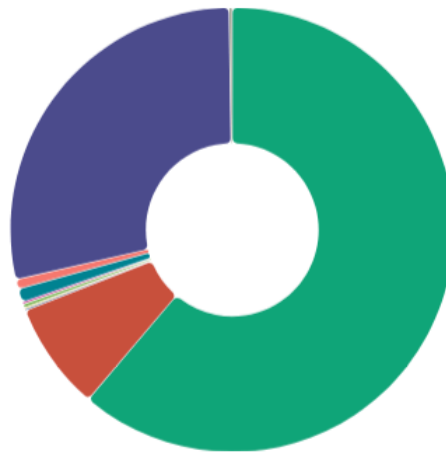
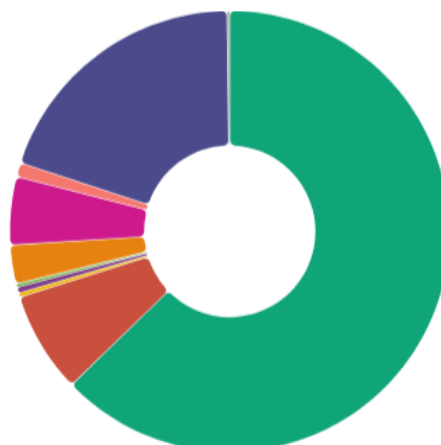


Figure 10b

How Many New Apprentices Were Learning in Each Industry?

New Apprentices in Pennsylvania Apprenticeship Programs, by Industry and Year

► ● 2024

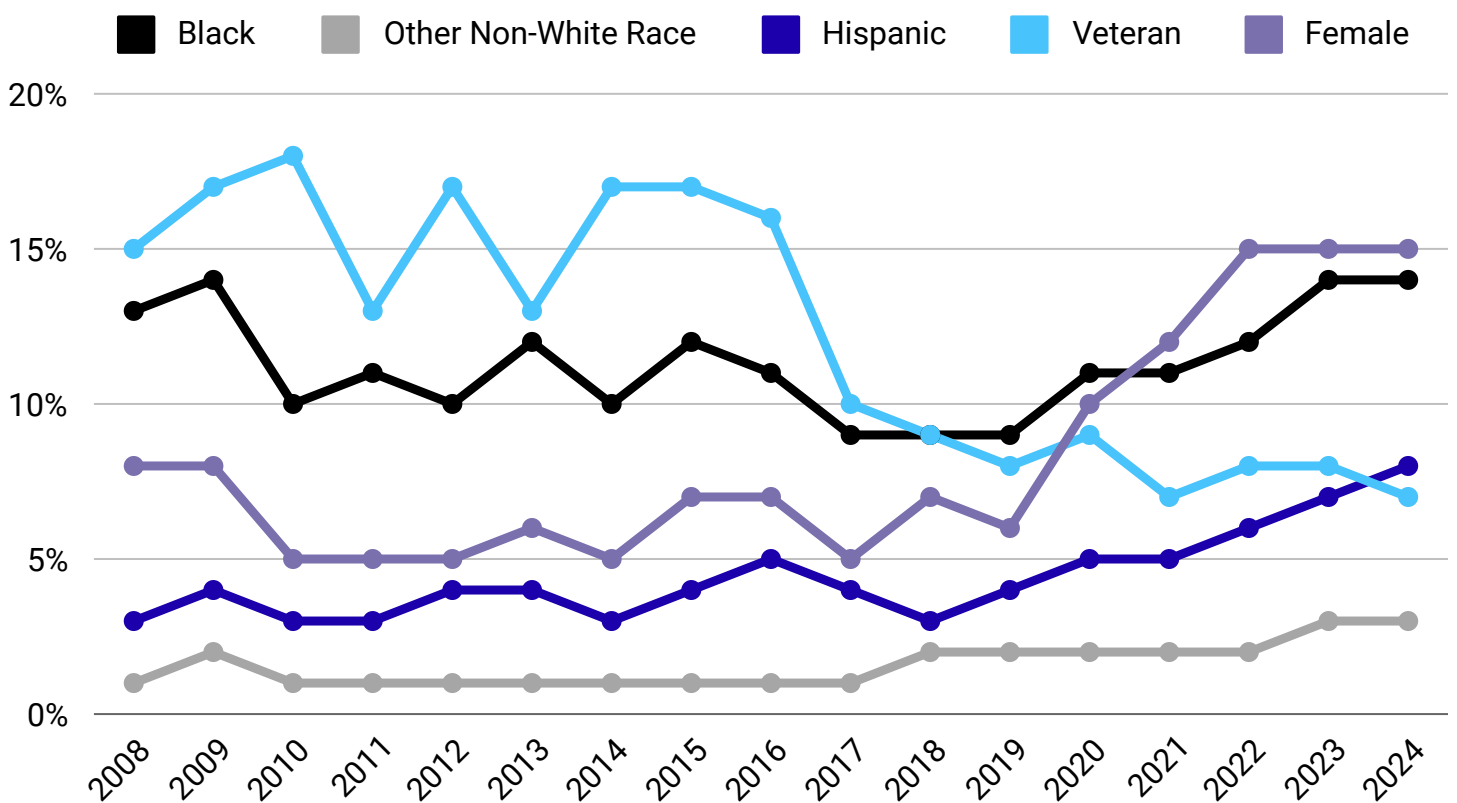


Demographics

Analyzing the demographics of new apprentices offers a noteworthy snapshot of apprentice diversity in PA programs, and reflects some important realities. Figure 11 shows the percent of Black, other non-white, Hispanic, veteran, and female apprentices registered in PA programs by year. Overall, shares of women and people of color in PA apprenticeship programs have increased since 2008. The biggest gain is seen for women’s increase, nearly tripling their percent of registrants from 2019-2023. Veterans’ share of registrants has fallen significantly since 2015. Closer analysis shows that this might not just be due to non-response rates in the data. In 2014, 557 apprentices reported that they were veterans when they registered in a PA apprenticeship program. A decade later in 2024, only 387 did. U.S. Department of Veterans Affairs data show that in 2014 there were 72,500 veterans living in Pennsylvania who were 34 years or younger. In 2024, the veteran population was considerably smaller – there were only 45,000 PA veterans age 34 or younger, just 62% of the veteran population in that age range a decade before. The median age of a new apprentice in a PA program has been between 26 and 27 years old for this entire data series. Although PA has fewer veteran apprentices than a decade ago, veterans are becoming apprentices at the same rate they were before.

Figure 11

Demographics of New Starters in PA Apprenticeship Programs, by Year



Occupations

Table 2 shows the top 40 PA apprenticeship program occupations by new registration count, 2014-2024. Correctional officer and jailer apprenticeship programs drew the most registrants (8,204), followed by carpenters and electricians with more than 6,600 registrants each. Stars (*) denote occupations that are one of the 10 fastest growing PA apprentice occupations since 2018, based on registration growth and number of apprentices overall. These 10 fastest growing PA apprentice

occupations were classified based on their Occupational Information Network (O*NET) code in RAPIDS data, a category narrower than the North American Industry Classification System (NAICS) code used to identify industry. The most specific occupation classification RAPIDS data offer is occupation title, outlined in Table 4.

Table 2

Top 40 Apprentice Occupations for PA Programs by Registration Count Since 2014	
Occupation	Total Registrations Since 2014
Correction Officer	8,204
Carpenter	6,835
Electrician	6,604
Line Erector	3,597
Plumber	2,627
Pipe Fitter (Construction)	2,054
Roofer	1,954
Sheet Metal Worker	1,620
Operating Engineer	1,346
Structural Steel Worker	1,325
Refrigeration Mechanic (Any Ind)	941
Construction Craft Laborer	860
Bricklayer (Construction)	851
Machinist/Precision	714
Elevator Constructor	645
Millwright	596
Boilermaker I	590
Painter (Const)	588
Cement Mason	525
Pipe Coverer & Insulator	501
Glazier	481
*Housekeeper, Com, Res, Ind	457
Tool And Die Maker	408
Tuckpointer, Cleaner, Caulker	399
Painter-Decorator (Painter Const)	389
*Licensed Practical Nurse - Home Health Care	372
Maintenance Mechanic (Any Ind)	347
*Industrial Manufacturing Technician	331
Mechatronics Technician	326
Floor Layer	298
*Level I: Child Development Specialist	285
Welder, Combination	277
Taper/ Drywall Finisher	245
Cabinetmaker	243
Tree Trimmer (Line Clear)	237
*Maintenance Technician	226
Electrician, Maintenance	218
*Internetworking Technician	197
Cook (Hotel & Restaurant)	190
Painter, Industrial Coating and Lining	186

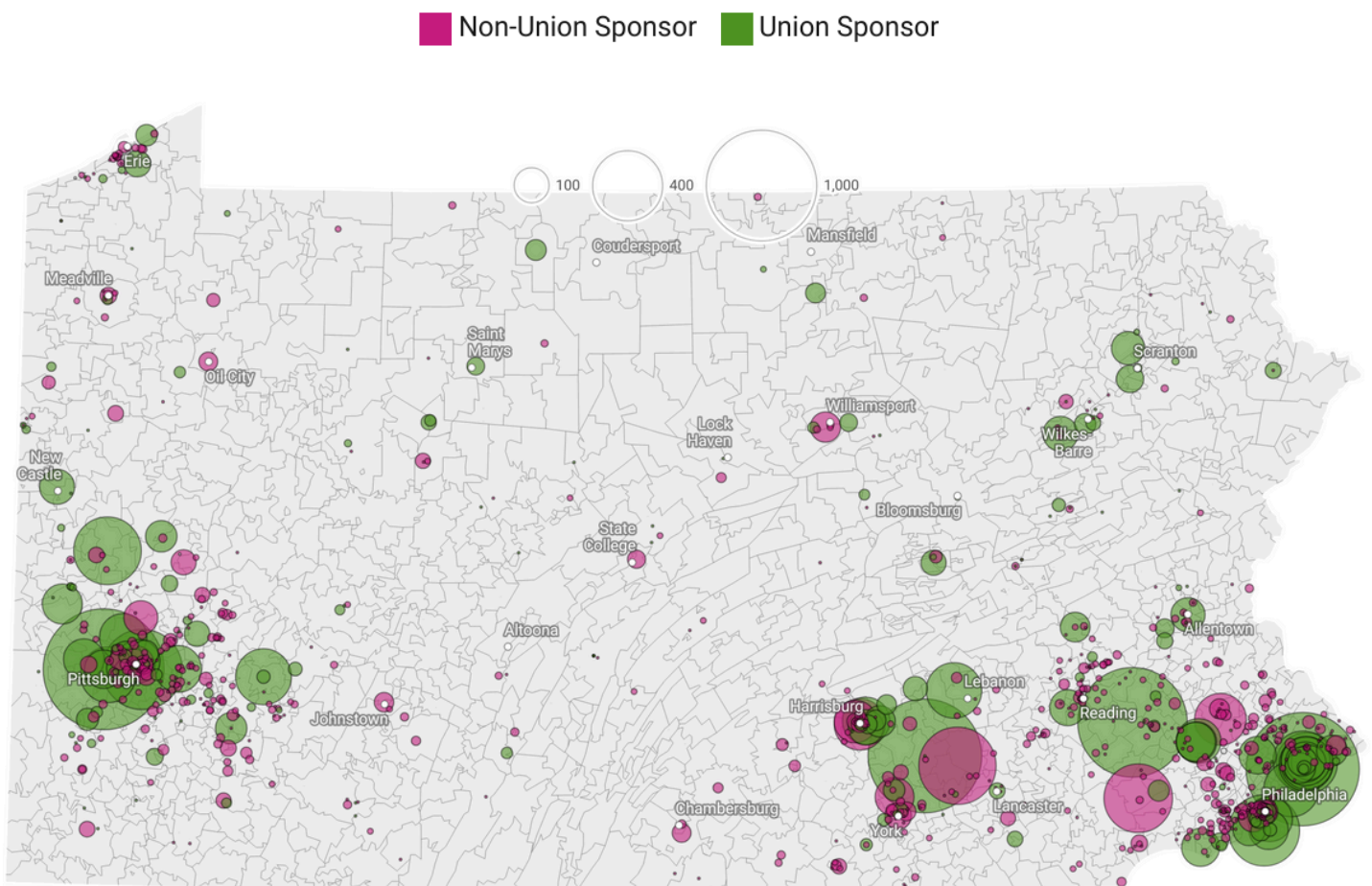
*Notes: *=one of the 10 fastest growing PA apprentice occupations since 2018, based on growth and number of apprentices overall.
Programs analyzed include some that are now canceled.*

Figure 12 shows a map of PA registered apprenticeship sponsors by the address sponsors listed in RAPIDS. They are listed by union or non-union status. Highlighting a dot will display the sponsor's name and the active apprentice count as of September 2024. Program sponsor dot size corresponds to the number of apprentices they sponsor across all of their programs.

Figure 12

Registered Pennsylvania Apprenticeship Program Sponsors by Address

Sponsors listed by union status and apprentice count as of September 2024



Source: Source: Keystone Research Center Analysis of US DOL RAPIDS data • Map data: © Esri, TomTom North America, Inc., United States Postal Service • Created with Datawrapper

Table 3 shows 100 PA apprenticeship programs ranked by the number of apprentices they've had complete the program in 2014 or later. This table provides the count of completed apprentices in the last decade, each program's occupation and sponsor, the program type, and the exit wage for 2024 apprentices (when data are available).

It is difficult to fairly compare completion rates for these 100 programs, as some programs have registered thousands of apprentices in this time and some have only registered a few dozen, and some programs are a year long and some are five years long. For a fairer comparison, we analyzed the completion rates for programs in these groups considering the number of apprentices who started between 2014-2018 and eventually completed the apprenticeship, taking into account the term length of the program. The only completion rate pattern that emerged showed an association between term-length and completion rate. There was a slight positive correlation ($r=.32$) between term length and program completion rate – longer programs tended to have a higher completion rate. All of the programs in this table that have term lengths shorter than two years had a completion rate about the same or lower than the average completion rate across *all* PA programs in the same time period. Table 3 below ranks these 100 PA apprenticeship programs who had the most completer apprentices who started in the last decade.

Table 3 (begins on following page)

Top 100 PA Apprenticeship Programs by Apprentices who have Completed Between 2014-2024

Rank	Completer Apprentice Count	Program Occupation	Sponsor Name	Program Type	Exit Wage Per Hour (2024*)
1	2,254	Electrical Power-Line Installers and Repairers	Northeastern Apprenticeship and Training Program (NEAT)	Group Joint	\$40.23
2	1,320	Carpenters	KML Carpenters' Apprenticeship & Training Fund	Group Joint	\$35.02
3	1,273	Carpenters	Eastern Atlantic States Carpenters Technical Centers	Group Joint	\$54.13
4	863	Correctional Officers and Jailers	Pennsylvania Department of Corrections	Individual Joint	\$23.01
5	683	Electricians	(PITTS) Electricians Local 5 JATC	Group Joint	\$40.60
6	638	Electricians	Apprentice Training for the Electrical Industry	Group Joint	\$69.58
7	614	Operating Engineers and Other Construction Equipment Operators	(PITTS) Western PA Operating Engineers	Group Joint	\$27.98
8	573	Plumbers, Pipefitters, and Steamfitters	Steamfitters Local Union No 449 Joint Apprenticeship Training Committee.	Group Joint	\$44.15
9	443	Plumbers, Pipefitters, and Steamfitters	Steamfitters Local Union 420 - JPATC	Group Joint	\$50.53
10	372	Structural Iron and Steel Workers	(PITTS) Iron Workers Local 3 JATC	Group Joint	\$38.89
11	361	Sheet Metal Workers	Sheet Metal Wrkrs JATF LU 19 of PHL & Vicinity	Group Joint	\$48.71
12	282	Roofers	(PHL) Roofers JAC (LU 30)	Group Joint	\$43.13
13	271	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Graterford	Individual Joint	N/A
14	270	Operating Engineers and Other Construction Equipment Operators	Ft. Washington Operating Engineers	Group Joint	N/A
15	269	Sheet Metal Workers	(PITTSBURGH) Sheet Metal Works	Group Joint	\$32.69
16	262	Plumbers, Pipefitters, and Steamfitters	PA Assoc. of Plmbng Htg & Cooling Cntrctrs (PHCC)	Group Non-Joint	\$23.00
17	256	Plumbers, Pipefitters, and Steamfitters	Harrisburg Plumbers	Group Joint	\$43.35
18	252	Plumbers, Pipefitters, and Steamfitters	(PHL) Plumbers	Group Joint	\$62.73
19	252	Electricians	Keystone Chapter ABC	Group Non-	\$22.75

				Joint	
20	249	Maids and Housekeeping Cleaners	Energy Innovation Center Institute	Group Non-Joint	\$17.88
21	249	Glaziers	The Finishing Trades Institute - Mid Atlantic Region	Group Joint	\$38.40
22	235	Insulation Workers, Mechanical	(PITTS)Asbestos Workers LU #2 JATC	Group Joint	\$38.16
23	233	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Forest	Individual Joint	\$19.18
24	232	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Coal Township	Individual Joint	\$19.18
25	231	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Somerset	Individual Joint	\$23.47
26	229	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Houtzdale	Individual Joint	\$19.18
27	226	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Camp Hill	Individual Joint	\$19.18
28	226	Electricians	Central PA Chapter Independent Electrical Contract	Group Non-Joint	\$26.25
29	224	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Steamfitters Local Union 420 - JCB	Group Joint	\$38.09
30	224	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Mahanoy	Individual Joint	\$19.18
31	221	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Huntingdon	Individual Joint	\$23.03
32	221	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Waymart	Individual Joint	\$20.23
33	216	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Albion	Individual Joint	\$23.03
34	214	Plumbers, Pipefitters, and Steamfitters	(Pittsburgh) Plumbers Local 27 JATC	Group Joint	\$42.30
35	211	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Greene	Individual Joint	\$22.23
36	209	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Smithfield	Individual Joint	\$23.03
37	208	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Rockview	Individual Joint	N/A
38	199	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Benner Township	Individual Joint	\$23.03

39	199	Electricians	Western Central Pennsylvania Electricians ' Joint Apprenticeship and Training Committee	Group Joint	\$45.55
40	199	Painters, Construction and Maintenance	Finishing Trades Institute of Western PA (DC 57) J	Group Joint	\$32.50
41	197	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Steamfitters Local Union No 449 Joint Apprenticeship Training Committee.	Group Joint	\$44.15
42	191	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Frackville	Individual Joint	\$19.18
43	188	Painters, Construction and Maintenance	The Finishing Trades Institute - Mid Atlantic Region	Group Joint	\$42.81
44	185	Electricians	Apprentice Traning for the Electrical Industry (Zone 2)	Group Joint	\$56.40
45	183	Carpenters	Carpenters JATC of Greater PA-Lebanon Center	Group Joint	\$34.34
46	181	Structural Iron and Steel Workers	(PHL) Ironworkers JATC (LU 401)	Group Joint	\$53.20
47	179	Elevator and Escalator Installers and Repairers	(PHL) Elevator Constructors JAC (LU 5)	Group Joint	\$59.44
48	177	Insulation Workers, Floor, Ceiling, and Wall	(PHL) Insulation Workers IAHFIAW JAC (LU 14)	Group Joint	\$59.37
49	165	Electricians	Allentown Electricians JATC Local 375	Group Joint	\$45.15
50	164	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Dallas	Individual Joint	\$19.18
51	164	Plumbers, Pipefitters, and Steamfitters	Latrobe & Vicinity Plumbers/Pipefitters Local 354	Group Joint	\$38.57
52	163	Industrial Machinery Mechanics	Cleveland Cliffs and UAW Local 3303 JATC	Individual Joint	\$24.94
53	160	Construction Laborers	(PHL) Bricklayers & Allied Crafts JAC (LU1)	Group Joint	\$48.70
54	152	Electricians	Scranton Electricians	Group Joint	\$36.36
55	152	Carpenters	(Pittsburgh) Heavy Highway Carpenters JATC	Group Joint	\$32.40
56	150	Boilermakers	(PHL) Boilmaker JAC 13	Group Joint	\$52.10
57	141	Carpenters	Keystone Chapter ABC, INC	Group Non-Joint	\$28.00
58	139	Electricians	Chester Electricians JAC (IBEW 654) (Comm/Ind)	Group Joint	\$47.72
59	137	Cement Masons and Concrete Finishers	Cement Masons LU 592	Group Joint	\$46.70
60	126	Sheet Metal Workers	Sheet Metal Workers of Central PA JATC LU	Group Joint	\$43.09

61	121	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Mercer	Individual Joint	\$23.03
62	115	Plumbers, Pipefitters, and Steamfitters	Phl. Sprinkler Industry	Group Joint	\$57.20
63	111	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Muncy	Individual Joint	\$23.03
64	110	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Laurel Highlands	Individual Joint	\$23.03
65	107	Electricians	Wilkes Barre Electricians	Group Joint	\$39.81
66	105	Tapers	The Finishing Trades Institute - Mid Atlantic Region	Group Joint	\$42.25
67	104	Brickmasons and Blockmasons	Bricklayers Local 9 JATC	Group Joint	\$36.64
68	103	Electricians	Reading Electricians JATC Local 743	Group Joint	\$42.02
69	101	Construction Laborers	Western PA Laborers JATC	Group Joint	\$28.83
70	100	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Cambridge Springs	Individual Joint	\$19.18
71	99	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Retreat	Individual Joint	N/A
72	99	Brickmasons and Blockmasons	Harrisburg Bricklayers & Allied Craftworkers LU	Group Joint	N/A
73	97	Electricians	Eastern PA Chapter ABC (East Norriton, PA)	Group Non-Joint	\$27.00
74	97	Cement Masons and Concrete Finishers	(Pittsburgh) Cement Masons Local 526 JATC	Group Joint	\$32.84
75	95	Elevator and Escalator Installers and Repairers	IUEC Local 6 JATC	Group Joint	\$46.84
76	93	Licensed Practical and Licensed Vocational Nurses	BAYADA Home Health Care	Group Non-Joint	\$27.63
77	93	Telecommunications Equipment Installers and Repairers, Except Line Installers	Apprentice Training for the Electrical Industry	Group Joint	\$61.91
78	91	Millwrights	Eastern Atlantic States Carpenters Technical Centers	Group Joint	\$53.54
79	91	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Chester	Individual Joint	\$19.18
80	85	Floor Layers, Except Carpet, Wood, and Hard Tiles	Eastern Atlantic States Carpenters Technical Centers	Group Joint	\$55.07

81	81	Electricians	York Electrical Institute	Group Joint	\$37.45
82	79	Industrial Engineering Technologists and Technicians	Pennsylvania College of Technology	Group Non-Joint	\$24.39
83	77	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Pine Grove	Individual Joint	\$19.18
84	76	Millwrights	KML Carpenters' Apprenticeship & Training Fund	Group Joint	\$39.83
85	75	Brickmasons and Blockmasons	(PHL) Bricklayers & Allied Crafts JAC (LU1)	Group Joint	\$48.70
86	74	Plumbers, Pipefitters, and Steamfitters	Worth & Company, Inc.	Individual Non-Joint	\$42.00
87	74	Plumbers, Pipefitters, and Steamfitters	Keystone Chapter ABC, INC	Group Non-Joint	\$23.13
88	74	Structural Iron and Steel Workers	Ironworkers Local 404 JATC	Group Joint	\$36.26
89	74	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Fayette	Individual Joint	\$21.11
90	73	Electricians	Harrisburg Electricians JATC	Group Joint	N/A
91	73	Electricians	Electricians IBEW Local 56 JATC	Group Joint	\$31.00
92	72	Carpenters	Eastern Atlantic States Carpenters Technical Centers	Group Joint	N/A
93	72	Carpenters	Kinsley Construction INC	Individual Non-Joint	\$26.29
94	71	Training and Development Specialists	Keystone Development Partnership	Group Non-Joint	\$33.41
95	71	Painters, Construction and Maintenance	The Finishing Trades Institute - Mid Atlantic Region	Group Joint	\$59.78
96	70	Electricians	The Tri-M Group LLC	Individual Non-Joint	\$28.80
97	70	Roofers	(ERIE) Roofers Local 210 JATC	Group Joint	\$33.00
98	69	Millwright	Carpenters JATC of Greater PA-Lebanon Center	Group Joint	\$39.21
99	67	Correctional Officers and Jailers	PA Dept. of Corrections - SCI - Quehanna Boot Camp	Individual Joint	\$19.18
100	67	Roofers	(Pittsburgh) Roofers Local 37 JATC	Group Joint	\$37.50

* Wage data are often automatically determined in the reporting system by an apprentice's entry date, exit date, and the apprenticeship program's wage schedule. In some cases, the wage the apprentice is paid at the time they complete the program may be higher than the data reflect.

We identified a group of “fast-growing” apprenticeship occupations for further analysis using the most specific occupation information available in RAPIDS to classify these occupations. To be considered fast-growing for this list, an occupation must have:

- been among top programs with increased registrant counts since 2018 (in relation to their 2014-2017 registrant counts)
- steady or growing registrant counts in recent years
- not be among the occupations that have historically dominated apprenticeship in Pennsylvania.

Table 4 shows 12 fast growing occupations, their registrants since 2018, and the exit wages for their apprentices in 2024.

Table 4

Fast Growing Occupations in PA Apprenticeship since 2018		
Occupation Title	Registrants since 2018	Median Exit Wage for 2024 *
Licensed Practical Nurse - Home Health Care	373	\$26.00
Maintenance Technician	263	\$23.60
Plastics Process Technician-Injection Molding	60	\$23.63
Nurse Assistant, Certified (Senior Care and other Miscellaneous Health Practitioners)	121	\$20.00
Registered Nurse - Home Health Care	75	\$28.01
Housekeeper, Com, Res, Ind	472	\$17.88
Nurse Assistant, Certified (CB) (Nursing Care Facility)	82	\$17.39
Level I: Child Development Specialist (CDA)	288	\$14.00
Registered Apprenticeship Navigator	122	\$33.41
Level II: Early Childhood/Pre-K Teacher (Associate Degree)	153	\$17.00
Industrial Manufacturing Technician	319	\$26.70
Internetworking Technician	159	\$15.38

Notes: Fast growing occupations were identified by a combination of new apprentices registered since 2018, increase in apprentices registered since 2014, steady and/or growing registration counts in recent years, and expansion of new occupation/industries.

** Wage data are often automatically determined in the reporting system by an apprentice's entry date, exit date, and the apprenticeship program's wage schedule. In some cases, the wage the apprentice is paid at the time they complete the program may be higher than the data reflect.*

Compared to Pennsylvania’s median hourly wage of \$22.81 in May 2023 (Occupational Employment and Wage Estimates from The Bureau of Labor Statistics), some apprenticeships in these 12 fast growing groups—especially some in specific types of nursing and childcare/education—had low exit wages for completer apprentices in 2024. While closer analysis of some starting and exit wage comparisons suggest that there has been recent wage growth some of these occupation (cases where the exit wage may be close to or lower than the starting wage for apprentices who entered and completed the program in the same two years), many wages in these fast growing occupations are

low, and some are even near or below the \$15 per hour state minimum wages of several of Pennsylvania's border state and regional neighbors.

Pre-Apprenticeship Programs

An overview of PA pre-apprenticeship programs and participation

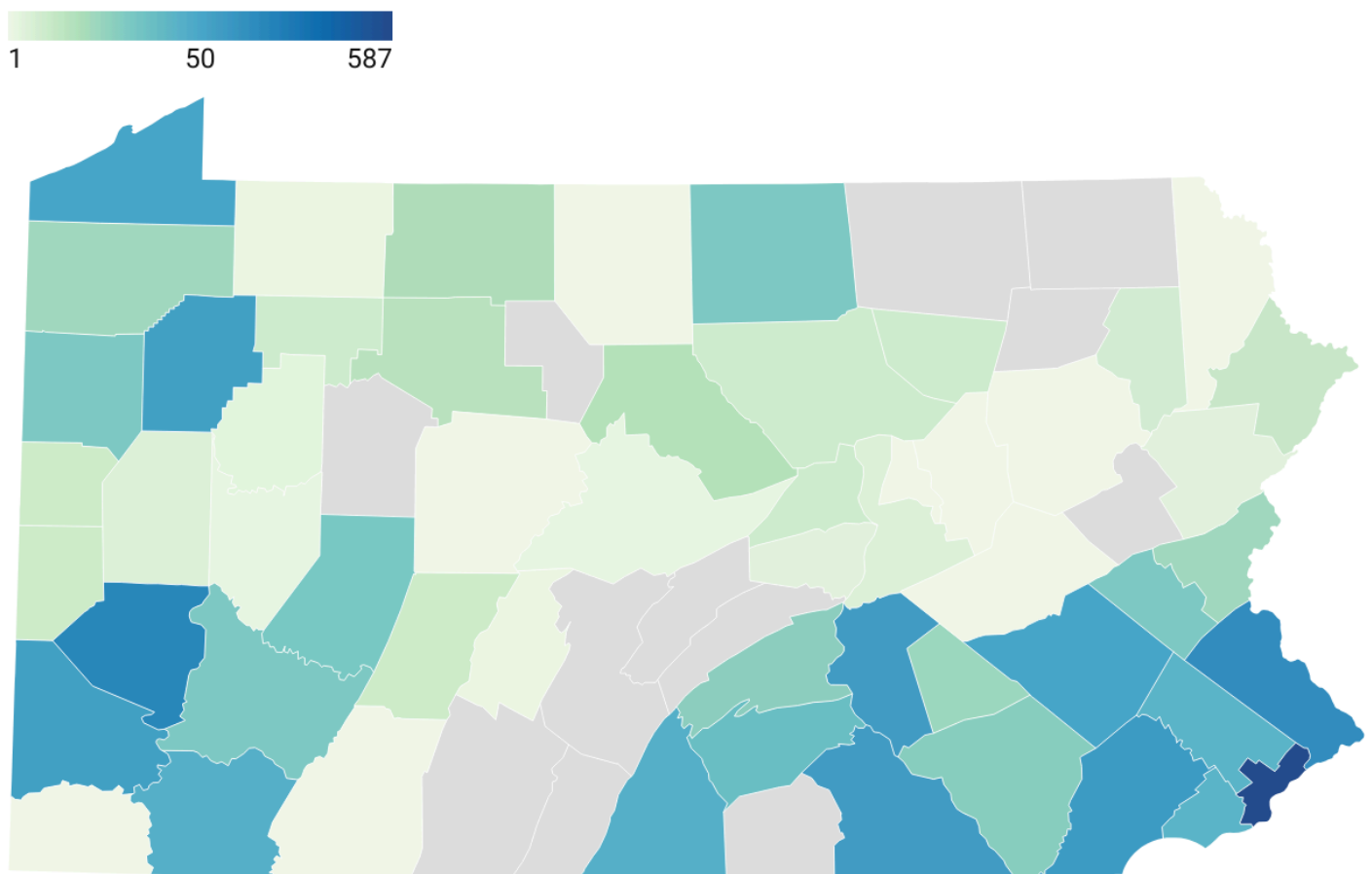
Counts, Location, and Demographics

There were 2,478 pre-apprentices in Pennsylvania programs in the data collection period of July 1st 2023 through June 30th 2024. At the end of the data collection period, 2,189 pre-apprentices were reported as either still participating in their program or that they had successfully completed it in the reporting period. Figure 13 is PA county map that shows the home county of PA pre-apprentices.

Figure 13

Pre-Apprenticeship Program Participants by Home County

Sponsor-Reported Data for Completed & Still Registered Pre-Apprentices, July 2023 - June, 2024.



88 additional pre-apprentices reported an out-of-state home address.

Map: Keystone Research Center Analysis • Source: Pre-Apprentice data provided by the PA Apprenticeship and Training Office (ATO) • Created with Datawrapper

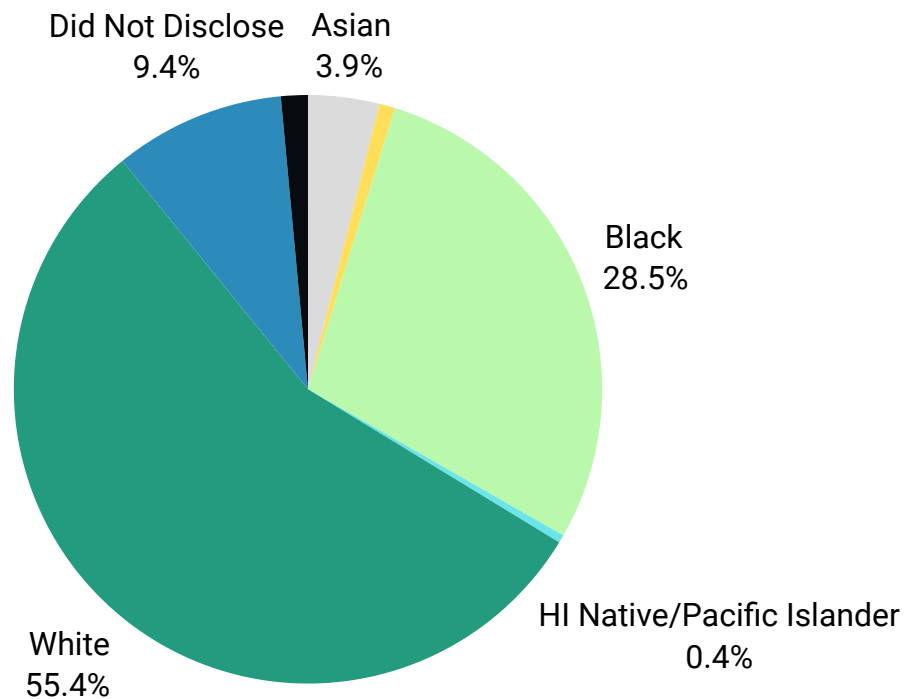
Of the 1,151 pre-apprentices who successfully completed a program in the reporting period, 11% were Hispanic or Latino. When asked to report their race, pre-apprentices responded:

- 10 are American Indian or Alaskan Native
- 45 are Asian
- 328 are Black
- 5 are Hawaiian Native or Pacific Islander
- 108 did not disclose their race
- 638 are white only (participants could select more than one race).
- 17 reported multiple races.

This breakdown is shown in the Figure 14 pie chart, with the small yellow slice representing American Indian or Alaska Native (less than 1%) and black slice representing multi-race pre-apprentices (1.5%). All others are labeled.

Figure 14

Pre-Apprenticeship Completers by Race, 2023-2024



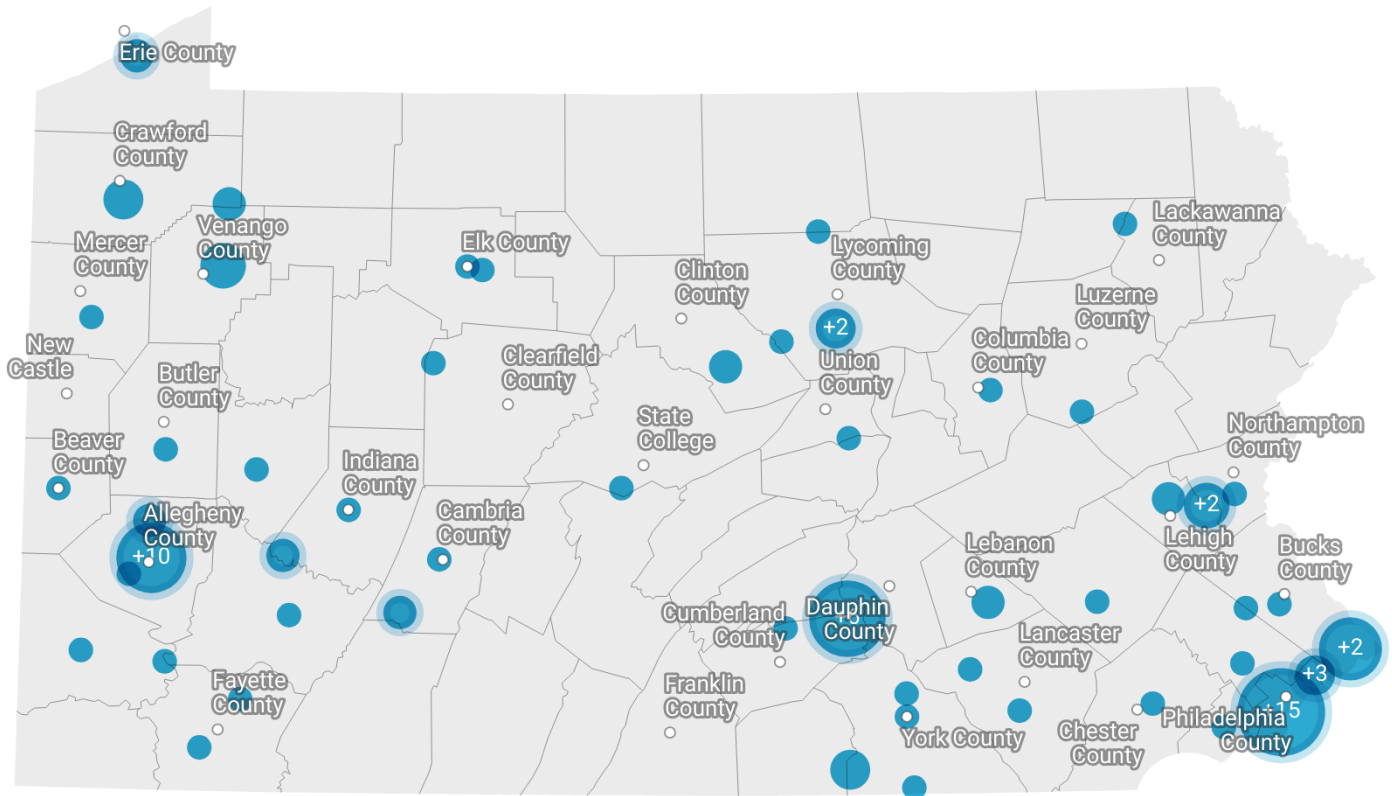
The average age of a completer pre-apprentice in the reporting period was 24 years old, and median age was 19. Of those pre-apprentices still finishing their programs, 21.9% are female. Similarly, 22.4% of completers in the data reporting period are women.

Figure 15 shows the geographic distribution of those 120/121 Pennsylvania pre-apprenticeship programs registered as of June 30th, 2024.

Figure 15

Registered Pre-Apprenticeship Programs in Pennsylvania

Programs by county, 2023-2024 school year. Larger dots represent multiple programs by that sponsor at one location.



Virtual programs are recorded in their sponsor's county of registration.

Map: Keystone Research Center • Source: Pennsylvania Apprenticeship and Training Office • Created with Datawrapper

Additional Analyses

KRC explored two other apprenticeship data issues of interest to the committee— a data sensitivity analysis and data matching feasibility.

Sensitivity Analysis

In conversations with U.S. DOL RAPIDS data representatives, a potential data issue was brought to light related to apprenticeship and data quality. One of the sponsor's responsibilities outlined in the U.S Department of Labor's Requirements for Apprenticeship Sponsors Reference under Section 1 - Standards of Apprenticeship 29 CFR § 29.5 is that the sponsor "must advise the Registration Agency within 45 of the execution of each new apprenticeship agreement." In short, new registrant information must be provided through RAPIDS in a timely fashion—45 days or less. This rule is not new, but in our conversations with state and federal data managers, we were informed that this rule

was not strongly enforced in the past. There were sometime situations where apprenticeship programs would submit data for a group of apprentices late, even up to a year late. One federal data manager was concerned that it was possible these late updates were not accurately captured in the federal data solely because of how the data are updated in the federal system. This concern centered around the question of whether there may be an undercount of apprentices in the federal data in years before the 45 day rule was more widely enforced.

As part of this report, KRC performed a sensitivity analysis, comparing RAPIDS data provided by the U.S. DOL to data provided by the PA Apprenticeship and Training office for the same years. For this process, we We found no evidence that these late-submissions were inaccurately tracked in the federal data. From 2008-2023, there were only 33 instances (representing a tiny 0.047% of apprentice entries) where the federal dataset had information for an apprentice and the PA dataset did not. We believe this tiny difference points to better accuracy in the state (ATO) data, or perhaps a difference in how federal data managers “close out” unresolved entries that remain open in the system far beyond an apprentice’s expected completion date. For our sensitivity analysis concerning the 45 day rule, we conclude that there is little or no undercount of PA apprentices in the federal data as a result of enforcement differences across years.

Matching Data to Explore Apprentice Outcomes

While there is widespread interest in the ability to track apprentice employment and wage outcomes post-apprenticeship, no current Census or PA data product allows researchers to track apprentices after they’ve exited their program. The format of RAPIDS allows workforce staff, sponsors, researchers, and others to track to apprentices while they are participating in a program, but the data coverage end with an exit wage and exit date when an apprentice leaves their program. As part of this report, KRC conducted interviews with data managers and researchers to assess the feasibility of matching Pennsylvania apprentice data with any other data product that would allow interested parties to track apprentice outcomes years later.

National Efforts

Our survey started with a discussion in a national RAPIDS working group meeting where members raised the idea and feasibility discussion of linking RAPIDS with a Census data project. Due to data privacy concerns, would process would require that the data link be made by Census researchers and the data made available for use by researchers who have obtained Special Sworn Status from the Census Bureau, clearing them to work with restricted data in very specific conditions. Most often, matched data such as these are only available to researchers who work in secure Federal Statistical Research Data Centers (FSRDCs or RDCs). There are 34 of these sites in the U.S., including two in Pennsylvania. One is located in State College on the Pennsylvania State University campus and the other is located in Philadelphia in the Federal Reserve Bank. RAPIDS working group members discussed the obstacles to linking this data, including data access and cost. They discussed what Census Bureau data products may be used, specifically mentioning the American Community Survey (ACS) and Survey of Income and Program Participation (SIPP). As of this report, we know of no existing/concrete efforts to link RAPIDS with a Census data product.

Pennsylvania Discussion

We continued our survey by discussing data-matching feasibility at the state level. ATO staff raised an important issue outside of data/privacy concerns – a Social Security number (SSN) would be essential for linking RAPIDS data with any state-level data product (such as unemployment and wage information). While SSNs are requested in apprentice applications, they are not a required field. As a result, only a small fraction of the PA apprenticeship data could be matched with unemployment and wage data by using SSNs. This small fraction is not random and therefore analysis of this group would not likely yield information that is representative of apprentice outcomes or generalizable to wider apprentice populations. As a result of this conversation, we returned to our RAPIDS working group members to explore other state-level efforts to link data.

Kansas Efforts

Researchers in Kansas are currently working on three new projects in the apprenticeship space. We spoke briefly with Shonda Anderson, the director of KansasWorks, about these efforts.

The U.S. National Science Foundation Established Program to Stimulate Competitive Research (EPSCoR) funds a program at The University of Kansas (KU), Kansas State, and Wichita State Universities called the Kansas Data Science Consortium (KDSC). The Department of Commerce commissioned KDSC to assess the economic impact of high quality, earn-and-learn registered apprenticeships in Kansas. Two studies are underway. One is an “ROI” (return on investment) study, where KU students are studying return on investment with employers participating in registered apprenticeship. This study has a Kansas focus, but similar to a [national study](#)*. Additionally, they’re conducting a registered apprenticeship study—a time series analysis of 20+ years of apprenticeship data from Kansas/RAPIDS.

The third project is a RAPIDS connection to KansasWorks, the state workforce system. Shonda described this project’s intention to make data reporting to the U.S. DOL easier. Separately, they plan to begin matching RAPIDS data to their Department of Labor data in 2025/2026, but are “not there yet.”

She acknowledged the SSN matching issue, and spoke about how they are using SSNs, first and last names, and addresses to match apprentices to KansasWorks data. As long as two of the three data point match, they consider it a “good match”, and that they get “pretty decent matching” with just name and address. Shonda spoke about how many of these apprentices are union construction workers who stay with the union after their apprenticeship and may have 2-8 employers in a year, and how it is difficult to study employment and wage patterns.

Of particular interest to groups looking to match RAPIDS data to other data, Shonda spoke about how U.S. DOL cannot or will not let any automated data systems “talk” to RAPIDS. This is most likely a reasonable protective measure due to data privacy and storage issues, but this also slows the matching process for data managers.

*National study: https://www.dol.gov/sites/dolgov/files/OASP/evaluation/pdf/AAI/AAI_ROI_Final_Report_508_9-2022.pdf

Policy Recommendations and Conclusion

Recommended ways Pennsylvania can expand high-quality apprenticeship programs

We conclude this report by summarizing the strides Pennsylvania's Registered Pre-Apprenticeship and Apprenticeship programs have made and sketching policy options that could enable Pennsylvania to expand high-quality apprenticeship. We draw from lessons in other countries that have expansive apprenticeship programs, comparing policy, practice, and regulations in high-quality apprenticeship.

Before diving into policy specifics, it may be helpful to take a step back and recall the problems that have led the Pennsylvania legislature and our state's last two governors to support expanding apprenticeship.

According to the [Bureau of Labor Statistics](#), 68.4% of U.S. jobs require less education than an Associate's Degree. That share is projected to decline only 1.1 percentage points, to 67.3%, by 2033. Particularly for the two thirds of U.S. jobs that are outside of the construction industry and do not require an Associate's Degree or higher, the U.S. lacks education, training, and career systems that connect tightly to employers and that link our K-12 and post-secondary education to the economy. The lack of systems of learning/careers connected to the economy hampers economic opportunity for most U.S. workers. It makes our businesses less productive and less innovative. It hurts our competitiveness.

Apprenticeships have attracted renewed and rare bipartisan support over the past dozen years, nationally and in Pennsylvania, in part because many observers and stakeholders think they could create a more functional training/learning infrastructure connected to the economy for a significant share of non-college workers and PA industries. There is also an intuitive recognition of the power of apprenticeship as a learning model. Most people understand that you learn how to do jobs —from physician to cement mason, lawyer to chef — by actually doing them, receiving mentoring from experienced workers, and learning from peers.

Despite its broad potential applicability and common-sense power and appeal, apprenticeship is underutilized in Pennsylvania and the United States. In Pennsylvania in 2024, active apprentices equaled 0.25% of Pennsylvania employment. By contrast, apprentices accounted for a larger share of the labor force in other countries. Table 5 shows this comparison.

Table 5

Apprentices as a Percentage of Workforce, 2022

Country	Apprentice % of Labor Force
<i>Australia</i>	2.9%
<i>England</i>	2.5%
<i>Germany</i>	3.0%
<i>Switzerland</i>	4.2%
<i>USA</i>	0.3%

*Reproduced from **Field Report: Apprenticeship Program Registration**. Stephen F. Hamilton, January 2024, *Apprenticeships for America*, pg. 13.*

Pennsylvania embarked on an effort to expand apprenticeship based on the idea buttressed by experience in other countries—that scaling the apprenticeship model beyond the only few pockets where it has been historically significant (unionized construction, corrections, and manufacturing) could address and be part of the solution to people’s dissatisfaction with current economic opportunities and the education system. It can provide the “missing link” between education and the economy or, more accurately, embed learning in the economy.

As we approach a decade in PA’s effort to expand apprenticeship to non-trade occupations, industries, and populations, our report offers critical insight into the progress we’ve made, some of the challenges associated with scaling apprenticeship where it hasn’t been present or widespread, and also to the issue of program quality.

Observation 1: A Small Number of Programs Do Most of the Training

Whether you’re talking traditional or newer, “nontraditional” apprenticeships, a relatively small number of programs account for most of the apprentice training. In many cases, these are group programs. Seventeen PA group apprenticeship programs trained 39% of all apprentices who completed after 2014. Similarly, 55% of programs that registered 2018- July 2021 were group programs, and they trained over 68% of the apprentices who started and completed since 2018.

Observation 2: Wages and Wage Progression

This report shows that wages in some new/expanding apprenticeships are low at both entry and exit, and/or there is little wage progression. A fair number of apprenticeships with low wages are service sector jobs in industries funded by a combination of government and families with limited ability to pay, such as senior care/long term care, and childcare. The role of government funding and regulation could be seen as a reason to “throw up our hands” and say we can’t afford to pay journeypersons in these occupations decently. It could also be seen as an opportunity because it gives policymakers

leverage to enact wage standards and wage progression requirements. The issues of low wages and lack of wage progression are also issues in some industries that are less reliant on public funding, including manufacturing and non-union construction.

Low wages and lack of wage progression are challenges that limit the expansion of apprenticeship to German and English levels as well as reduce job quality. It seems highly unlikely that occupations in which apprentices and journeypersons receive wages far below a living or self-sufficiency wage will ever see apprenticeship become widespread.

Observation 3: Promoting Equity and Diversity

This report shows that Pennsylvania apprenticeship overall has become slightly more racially and ethnically diverse and considerably more gender diverse in recent years. For women, this expansion primarily reflects the expansion of apprenticeship beyond male-dominated occupations to occupations with female-dominated occupational segregation. To a lesser extent it reflects growing female and Hispanic shares of unionized construction apprenticeships. Unsurprisingly, the big uptick in female participation in apprenticeship concentrates in low-paid service occupations. It's not enough to open up more apprenticeship to women and people of color. For an expansion of apprenticeship to promote equity outside construction—i.e., in about 95% of the economy—we have to address the wage issue.

Observation 4: Retention

Overall, PA apprenticeships have a completion rate of around 61%. Understanding reasons why apprentices withdraw is key to improving completion rates. Occasionally RAPIDS public data will have a note such as “apprentice left for other employment” or “joined armed services,” but a deeper understanding of why people drop out is necessary for helping more people finish apprenticeship programs.

We expect that the reasons people do not complete apprenticeship vary. In apprenticeships with low wages, including for journeypersons, we expect but have not yet proved that completion rates tend to be low. In newer, lower-paid service sector apprenticeships, we can explore whether sample sizes are large enough at unionized companies to see whether exit wages and retention rates at those companies are higher. We know from previous research that completion rates are higher in joint labor-management construction apprenticeships than non-union ones—although completion rates could improve in both.

In traditional construction apprenticeship, we know a fair amount from best-practice research about factors that reduce completion rates and also ways to improve them.

- Childcare is a barrier for women starting/completing apprenticeships
- The lack of drivers' licenses and funds for transportation is a major impediment according to program managers overseeing apprenticeship readiness programs/pre-apprenticeships and seeking to place graduates into apprenticeships.
- Low-income participants entering apprenticeship need help paying for shoes and tools.
- In traditional, and likely non-traditional, apprenticeships, support networks—both mentors and more experienced “peer mentors”—have demonstrated effectiveness at improving retention.

The design of Governor Shapiro’s new Commonwealth Workforce Transportation Program (CWTP), which will provide subsidies to companies that take on new apprentices and other new hires on projects funded by federal climate and infrastructure dollars, has been informed by an understanding of these barriers to diversify apprenticeship intake and high retention rates. Such supports are needed more broadly.

Policy Options

We now turn to policy options that could enable Pennsylvania to scale high-quality apprenticeship, drawing both from our knowledge of Pennsylvania specifics and on experience in other countries and states. We do not attempt to outline a detailed blueprint here, but rather some possible directions for consideration by the Apprenticeship and CTE Committee, full PA Workforce Development Board, and the Governor’s and Department of Labor & Industry’s policy offices.

A central starting observation is that counties with apprenticeship at 10 times the scale in the United States (relative to employment) have a host of “systemic” support for apprenticeship that enable it to achieve scale, high completion rates, and job quality. Could Pennsylvania seek to create versions of some of those systemic supports?

1. Skill standards and common assessment tools

Countries such as Germany, Australia, and the United Kingdom all have entities that maintain standards for apprentice-able occupations at a national level. With such standards, each new apprenticeship in an occupation starts with a common definition of the skills people need to know which can guide, in turn, development of similar curricula for apprenticeship programs, and contribute to ensuring that journeypersons who complete an apprenticeship have a common body of knowledge. A complement to having some uniformity in skill standards is common examinations and assessments to ensure some uniformity in what people actually learn. Skill standards and common assessments could be maintained in a government entity or contracted to one or more public/private entities that meet a set of criteria related to knowledge of industry, including worker as well as employer voices, and wage standards.

2. Government subsidy of related technical instruction

In countries with widespread apprenticeship, the classroom education is ordinarily integrated tightly into the public education system and thus paid for by the government. Pennsylvania could move in that direction in two ways.

First, if Pennsylvania adopts a free college tuition program as proposed by the Pennsylvania Promise legislative proposal, (a “pilot version” of which passed the Pennsylvania House in 2023), classroom related technical instruction (RTI) articulated with college credit could be reimbursed to the RTI provider at the same level per credit as the “scholarship” received by students attending community colleges. (Since apprenticeship education is “free”—and, indeed, as implied by the phrase “lean and earn” apprentices get paid—the student does not need a scholarship.) Thus, for example, at \$232.50 per credit hour for an in-district student, Harrisburg Area Community College in 2024-25 costs \$2790 for a full-time (12 credit hours) semester. If an apprenticeship program leads to journeypersons receiving an Associate’s Degree equivalent to 48 credits, therefore, it would receive \$11,160.

Second, Pennsylvania could subsidize high-quality pre-apprenticeship programs delivered in Career and Technical Education in high school. The subsidies could be small and include a small amount of funding based on the number of pre-apprenticeship completers, the increase in the number of completers, and the number of completers who enter an apprenticeship affiliated or articulated with the pre-apprenticeships.

3. Wage and benefit standards and wage progression

RAPIDS data and our discussion establish the need for wage standards to (a) lift entry and exit wages in low-wage service occupations with a growing number of new apprenticeship programs and apprentices; (b) to raise wages and strengthen wage progression in some manufacturing apprenticeships; and to (c) raise wages and strengthen wage progression in some non-union construction apprenticeships. The state could promote wage standards and wage progression in distinct ways customized to each of these contexts. For example, reimbursement rates could be adjusted for employers with more journeypersons in child care and long-term care. State (and local) construction procurement and/or responsible contractor ordinances could require or reward contractors that pay first-year apprentices a living wage and journeypersons the prevailing wage for their occupation. In all three of these segments, the state and local workforce development boards could allocate workforce training and apprenticeship subsidies based on whether programs meet wage and wage progression standards. Similarly, funding for entities to establish/strengthen skill standards and assessment tools for families of occupations (number 1) should require incorporation of wage and wage progression standards.

4. Free the data to support scaling and system building for high-quality apprenticeship

In commissioning this report, the Apprenticeship and CTE Committee of the PA WDB signaled its aspiration to have its work supported by available data. The rich, if imperfect (as always), RAPIDS database provides the committee, state board, legislature and gubernatorial administration with a powerful, and until now, underutilized tool for guiding policy and performance improvement. The committee's goal of linking RAPIDS data with wage records further signals the aspiration to achieve evidence-based policymaking. Another way to strengthen the data support for scaling PA apprenticeship will be linking pre-apprenticeship data with CWDS and with RAPIDS. Even without further data enhancements, the opportunity to further utilize RAPIDS as it currently exists to drill down on completion rates and how they vary based on different variables—in construction, manufacturing, low-wage service occupations and across the board.

Pennsylvania is at the forefront of a national movement in the United States to scale apprenticeship. By explicitly engaging in a discussion of policies that can achieve apprenticeship scale and system-building—informed by annual state subsidies for apprenticeship that now equal \$2 per worker per year—Pennsylvania can move apprenticeship from the margins of the Pennsylvania economy (outside construction) to the center of state efforts to boost good jobs, Pennsylvania businesses, and living standards and competitiveness.