NORTH CAROLINA CERTIFIED CAREER PATHWAYS 2016-2022: PARTICIPATION, IMPACTS, & ALIGNMENT

BARTLETT & BARTLETT 2023

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Executive Summary

Purpose

The purpose of this project was to describe North Carolina's NCWorks Certified Career Pathways (CCPs) and analyze participation, participant outcomes, and alignment to labor market demands. Profiling of CCP participants was conducted by sector, region, and demographics. Participation was disaggregated by the year of participation, gender, race, veteran status, disability status, employment status, and prior education level, as well as Prosperity Zone. Outcomes of participants were analyzed by the year of participation, gender, race, veteran status, disability status, employment status, and prior education level, and Prosperity Zone. The study explores labor market outcomes of participants by sector for the top sectors, demonstrating earnings prior to the program and after the program. This report presents information in both tabular and visual formats to provide a holistic view of CCP participants and outcomes. It also explores the alignment of participation and completion with labor market demands by assessing labor market availability in regions with CCP participation by industry sector. The report concludes with recommendations for intentional future data collection and developing an evaluation plan with a research team beforehand, rather than relying on post-facto data gathering.

Scope and Methods

The project's initial phase involved constructing a dataset, aggregating individual participant-level data, CCP elements, Prosperity Zones, industry sectors, and various outcomes. Due to the lack of data to answer the questions for this project not residing in one database, missing data from some variables of interest, changing of the structure of local workforce development boards and lack of data in some instances provided challenges to answer all of the desired questions. Additionally, the transitions and realignments of some boards provided challenges to examine data longitudinally. The final dataset constructed for this project incorporates participant demographics, workforce development boards, the 41 CCPs map to sectors, and participants map to the Prosperity Zone. Because of the diverse data collection methods employed and the presence of multiple CCPs catering to similar sectors, it was not possible to pinpoint the exact pathways completed by each participant. This challenge prompted us to develop a mapping system for pathways and subsequently explore the data based on the WDBs and Prosperity Zones. This also created a unique challenge that left the researchers unable to consider the unique features of the 41 CCPs in relation to other outcome variables. The labor market demand data was examined in relation to participation by the Prosperity Zones. For the top sectors, labor market outcomes of participants prior and after participation was described. An acknowledged limitation of the data in this report is the fact that only those people enrolled in the Workforce Innovation & Opportunity Act (WIOA) Title I program are reflected in the data. Other students and jobseekers that were not enrolled in WIOA Title I may also have benefited from the CCPs.

Key Findings by Goal

Goal 1 findings in the document detail the North Carolina Certified Career Pathways (CCPs) and their distribution across various Prosperity Zones in the state. Table 3 and Figures 2-9 highlight the participation in different career clusters, with healthcare, transportation, information technology, business, and manufacturing being the most prominent. Notably, 245 cases lacked location data, and 1,104 cases couldn't be mapped to a specific cluster. The Health Science cluster dominated across all zones, involving 42.7% of participants, while the Transportation, Distribution, and Logistics cluster was second with 20.7% participation. The document underscores the use of Prosperity Zones to analyze regional economic development,

collaborations, and how career pathways align with workforce and market demands, highlighting the disparities and interdependencies across different regions.

Goal 2 findings from the document focus on exploring participation in the NCWorks Certified Career Pathways from January 2016 to June 2022. The total participation during this period was 28,193, with the highest annual participation in 2019 (6,665 participants) and the lowest in 2021 (3,317 participants). The data for 2022, covering only the first half of the year, suggests an expected annual participation of approximately 3,744 if trends remained constant. Participation varied across Prosperity Zones, with the Sandhills (South Central) zone having the most participants (5,492), followed by the North Central (5,096), Piedmont Triad (4,550), and Southwestern (4,181) zones. Five of the Prosperity Zones accounted for 78.7% of the total participants. The demographics of the participants showed that the majority were female (65%, *n*=18,332), and the largest racial groups were African American (49.1%, *n*=13,854) and White (34.2%, *n*=9,637). The average age of participants was 35 years, with a standard deviation of 11.34 years. The educational background of participants varied, with significant numbers holding high school/GED qualifications (34.9%) and some college education (22.0%).

The Goal 3 findings from the document focus on the completion rates of the NCWorks Certified Career Pathways from January 2016 to June 2022. The data reveals a consistent pattern of participation, with a total of 28,193 participants starting the program and 20,516 (72.8%) completing it. The completion rate peaked in 2019 at 75.9%, but there was a slight decline in 2022 with a completion rate of 67.4%. The analysis also breaks down participation by different sectors, with Health Science and Transportation, Distribution, & Logistics being the most popular, showing high completion rates of 70.2% and 81.9%, respectively. Gender-wise, males had a higher completion rate (78.4%) compared to females (69.8%). Racially, White participants had a slightly higher completion rate (75.0%) compared to African Americans (71.4%). The data indicates significant differences in completion rates among different racial groups and between genders, highlighting the importance of considering these factors in program planning and implementation.

Goal 4 document focuses on exploring the alignment of participation in the NCWorks Certified Career Pathways (CCPs) with workforce demands, based on a 5-year forecast using JobsEQ data. This analysis covers the entire state and its division into eight Prosperity Zones, each with unique economic profiles. Findings reveal that healthcare, manufacturing, and education are top-demand industries at the state level and also see significant participation in the CCPs. The alignment of participants with top-demand industries varies across regions, but healthcare, manufacturing, and education & training commonly appear in most zones. Despite some instances of misalignment in certain regions, the pathways generally do not excessively produce talent in areas without corresponding labor market needs, suggesting a balanced approach to workforce development.

Recommendations

To enhance the efficacy of the NCWorks Certified Career Pathways (CCPs), a multifaceted approach is recommended. This includes tailoring regional development strategies to leverage dominant clusters like Health Science and Transportation, while also promoting diversity in career pathways, especially in underrepresented zones. Efforts should focus on improving completion rates, addressing racial equity, and fostering collaborations among stakeholders to align pathways with market demands. Public awareness campaigns and policy support are crucial for expanding CCPs. Addressing data challenges is key, necessitating standardized data collection, enhanced protocols, and the use of GIS technology for accurate mapping. A centralized data collection system, coupled with training and support for data collectors, will ensure data integrity. Future strategies should involve developing a logic model for program evaluation, applying the Plan-Do-Study-Act cycle for continuous improvement, and conducting longitudinal studies to assess labor market impacts. This should include tracking employment outcomes, aligning training with regional economic needs, gathering employer feedback, and integrating data with state and national employment statistics. Sector-

specific outcome analysis, skill gap analysis, and policy impact assessments will further inform and enhance the effectiveness of career pathways.

Call to Action

To actualize the full potential of Certified Career Pathways, a collective and proactive effort is urgently needed from all stakeholders, including educational institutions, industry leaders, government agencies, and community organizations. It is imperative to embrace a comprehensive strategy that not only focuses on enhancing regional development and diversifying career pathways but also rigorously addresses the existing data challenges. This calls for a unified commitment to standardizing data collection, implementing robust data management systems, and ensuring continuous training and support for data collectors. Stakeholders must actively engage in collaborative efforts to align career pathways with evolving market demands, advocate for supportive policies and funding, and raise public awareness about the benefits of CCPs. Furthermore, there is a critical need for ongoing evaluation and improvement of these pathways, utilizing logic models and the Plan-Do-Study-Act cycle, to ensure they effectively meet the needs of participants and the labor market. This concerted action will not only enhance the immediate effectiveness of the CCPs but also ensure their long-term impact on the economic prosperity and workforce development of North Carolina. Let's unite in this endeavor to create a more inclusive, skilled, and prosperous future for all participants of the CCPs.

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North Carolina Certified Career Pathways 2016–2022 Participation, Impacts, & Alignment

The purpose of this project was to describe North Carolina's NCWorks Certified Career Pathways (CCPs) and analyze participation, participant outcomes, and their alignment with labor market demands. The first goal was to delineate the pathways, including their regional distribution and collaborations. The project then sought to profile CCP participants by sector, region, and demographics. Participation was disaggregated by year of participation, gender, race, veteran status, disability status, employment status, and prior education level, as well as by Prosperity Zone.[1] The outcomes of participants were analyzed according to the same categories. The study examined the labor market outcomes of participants by sector for the top sectors, demonstrating earnings before and after the program. Lastly, the report provides an in-depth look into the sectors of healthcare, transportation, and information technology, which had the highest number of participants.

Overview of Certified Career Pathways in North Carolina

In North Carolina, Certified Career Pathways (CCPs) evolved from the 2012 North Carolina Jobs Plan by the North Carolina Economic Development Board, which provided strategies for economic growth. The plan stated, 'Our state can create a competitive advantage by enhancing Career and Technical Education, with a focus on STEM training for industry clusters like manufacturing, IT, Health Sciences, and Agribusiness. Workforce development programs must integrate with secondary school curricula and career development and pathways.' It also recommended establishing career pathways that 'reward teachers for teaching in critical-need locations, servicing critical-need student populations, and teaching in targeted academic disciplines, including high-need STEM subject areas.' The following year, the NCWorks Commission published 'Preparing North Carolina's Workforce for Today and Tomorrow,' identifying certified career pathways as one of the four major actions to develop the workforce. Concurrently, the Workforce Innovation and Opportunity Act (WIOA) called for the development and implementation of career pathways for state and local workforce development boards. In response, in 2015, the NCWorks Commission developed criteria to certify these pathways.

Criteria for Certification

The NCWorks Commission's criteria for Certified Career Pathways seek to ensure that these pathways are robust, relevant, and responsive to the needs of both the workforce and the regional economy. These criteria add significant value in several ways. The criteria are:

[1] The North Carolina General Assembly has divided the state into eight regions, called Prosperity Zones, for various purposes. A map of the Prosperity Zones is found at https://www.commerce.nc.gov/about-us/nc-prosperity-zones.

(1) Demand-Driven and Data-Informed: By basing the pathways on actual regional needs and data, the program ensures relevance and responsiveness to the local labor market. This approach helps in addressing real skill shortages and aligning training with economic growth areas, making the pathways valuable for both students and employers.

(2) Employer Engagement: The active involvement of employers in developing these pathways ensures that the training provided is aligned with industry needs. This engagement is crucial for creating curricula that are practical and job-relevant, increasing the employability of graduates and meeting the specific skill demands of local industries.

(3) Collaborative Development: Collaboration among educational agencies, higher education, workforce boards, industry, and community leaders ensure a holistic approach. This broad base of input and commitment adds value by ensuring that the pathways are well-rounded, supported at multiple levels, and address a wide range of community and economic needs.

(4) Career Awareness: By raising awareness about career pathways and providing consistent career advising, the program helps students make informed decisions about their education and career trajectories. This focus on career awareness ensures that students are better prepared and motivated, leading to more successful outcomes.

(5) Articulation and Coordination: The emphasis on articulation agreements and stackable credentials makes the learning process more efficient and less redundant. This system allows for a smoother transition between different levels of education and reduces barriers to advancing in a career or educational path.

(6) Work-Based Learning: Incorporating work-based learning into the pathways provides practical experience and a better understanding of the workplace. This hands-on approach is invaluable in preparing students for real-world job scenarios and making them more attractive to potential employers.

(7) Multiple Points of Entry and Exit: The flexibility of the pathways, with multiple entry and exit points, caters to a diverse range of learners, including those with prior experience or education. This flexibility is particularly beneficial in accommodating non-traditional students and veterans, making the pathways more inclusive and accessible.

(8) Evaluation: Regular assessment and the ability to update and refine the pathways ensure continuous improvement and relevance. This evaluative aspect adds value by ensuring that the pathways remain effective and aligned with evolving industry needs and educational standards.

In summary, the criteria for NCWorks Certified Career Pathways provide a foundation to ensure the pathways can contribute significantly to the development of a skilled workforce that is well-prepared to meet the current and future needs of the economy of North Carolina and the specific pathways are unique by region. These criteria ensure that the pathways are

comprehensive, industry-relevant, and adaptable, providing tangible benefits to students, employers, and the community at large.

Expansion from 13 to 41 Certified Pathways

By June 30, 2018, an NCWorks Certified Career Pathways report indicated there were 13 pathways that had been implemented over the previous year in North Carolina. The 2020 Workforce Innovation and Opportunity Act (WIOA) Unified State Plan for North Carolina stated that "communities in North Carolina have developed 36 Certified Career Pathways to help North Carolinians work in high-demand, high-wage careers, with additional pathways being developed." At the time of this report in 2023, the state has a total of 41 NCWorks Certified Career Pathways. Data provided by the NCWorks Commission indicated that there is one information technology pathway in Eastern Carolina that launched in April of 2022, *Grow with Google*, that was provided in the list of pathways but highlighted as NOT recognized. For this report, it is possible that some participants in the data may be in this pathway that is not officially recognized by the NCWorks Certified Career Pathway, however, may be included in the analysis.

Table 1 includes a list of the Certified Career Pathways by Prosperity Zones 1-8. Additionally, this table shows how each of the Certified Career Pathways can map to one of the 16 Career Clusters. Prosperity Zones had between 3 and 18 pathway options. Table 2, Certified Career Pathways exist and fall within each of the career clusters. As seen in this table, healthcare has the largest number of pathways followed by information technology and transportation. Additionally, this table shows how there is possible overlap and connections between multiple pathways. For example, in the STEM pathway there are Health Life Science pathways that are connected to STEM-related careers but in some instances would connect to the occupations in the Healthcare pathways. A detailed list of all Certified Career Pathways can be found at *North Carolina's Certified Career Pathways*, updated on 6/30/23. For this project, we used a list that was provided by the NCWorks Commission, which was last updated on 5/11/23.

Table 1

Certified Career Pathways Number by Region and Mapped to 16 Career Clusters

	Career Pathway	Prosperity Zone	Cluster
1	The Northeastern NC Pathway to Prosperity (PtP) Health Careers Pathway	1 & 3	Health Science
2	Collision Repair & Refinishing Technology	4	Transportation, Distribution, & Logistics
3	Information Technology	3	Information Technology
4	Advanced Manufacturing	3	Manufacturing
5	Nursing/Healthcare	3, 4 & 5	Health Science
6	Advanced Manufacturing	1 & 3	Manufacturing
7	Health Life Sciences	3, 4 & 5	Science, Technology, Engineering, & Mathematics
8	Advanced Manufacturing	1 & 3	Manufacturing
9	Health Sciences	3	Health Science
10	Advanced Manufacturing	8	Manufacturing
11	Advanced Manufacturing	6, 7 & 8	Manufacturing
12	Hospitality & Tourism	8	Hospitality & Tourism
13	Advanced Manufacturing	6	Manufacturing
14	Health Sciences	4	Health Science
15	Healthcare/Nursing	2 & 4	Health Science
16	Nursing & Allied Health	6, 7 & 8	Health Science
17	Nursing & Related Healthcare	7	Health Science
18	Advanced Manufacturing	3	Manufacturing
19	Information Technology	3	Information Technology
20	Health/Life Sciences	3	Science, Technology, Engineering, & Mathematics
21	Healthcare/Nursing	8	Health Science
22	Advanced Manufacturing	3, 4, & 5	Manufacturing
23	Aviation	3, 4, & 5	Transportation, Distribution, & Logistics
24	Advanced Manufacturing	2	Manufacturing
25	Advanced Manufacturing	7	Manufacturing
26	Transportation & Logistics	3, 4, & 5	Transportation, Distribution, & Logistics
27	Healthcare	6	Health Science
28	Nursing & Allied Health	7	Health Science
29	Construction Technology	2 & 4	Architecture & Construction

30	Manufacturing & Welding	7	Manufacturing
31	Business Support Services	1 & 3	Business Management & Administration
32	The Triangle South Health Care pathway	3 & 4	Health Science
33	Construction/ Skilled Trades	3	Architecture & Construction
34	Advanced Manufacturing	3 & 4	Manufacturing
35	Transportation, Distribution, & Logistics	2	Transportation, Distribution, & Logistics
36	Energy Career Pathway	8, 6, & 7	Science, Technology, Engineering, & Mathematics
37	Aerospace and Aviation	2	Transportation, Distribution, & Logistics
38	Construction and Skilled Trades	2	Architecture & Construction
39	Agriscience/Biotechnology	1 & 3	Agriculture, Food, & Natural Resources
40	Human Services	7	Human Services
41	Information Technology NOT Recognized	NA	Information Technology
42	Information Technology	8	Information Technology

Note. Pathway 41 is not recognized but coded in all data as 41 and will appear in this report in the same manner to reduce any confusion.
Prosperity Zone 1 = Northeast, Prosperity Zone 2 = Southeast, Prosperity Zone 3 = North Central, Prosperity Zone 4 = Sandhills, Prosperity Zone 5 = Piedmont, Prosperity Zone 6 =Southwest, Prosperity Zone 7 = Northwest, Prosperity Zone 8 = Western

Table 2 shows a summary of the distribution of career pathways within the NCWorks Certified Career Pathways program, offering valuable insights into its diversity and scope. Notably, advanced manufacturing boasts a robust 12 pathways and the health science sector has the next most at 11 pathways, showcasing a commitment to providing a variety of opportunities in these two critical fields. In stark contrast, the information technology sector is notably limited, featuring only 2 recognized pathways, and is the only area with one pathway that has yet to be recognized. Transportation, distribution, and logistics offer 5 pathways. In the STEM area, 3 pathways are available, with some having the potential to overlap with health science pathways. Furthermore, the construction sector contributes 3 distinct pathways. Lastly, the sectors of agriculture, business management, hospitality and tourism, and human services each offer a single designated pathway. Despite the variation in pathway numbers, the overarching aim of the Certified Career Pathways program is to serve career interests and industries, fostering opportunities for participants.

Table 2

Crosswalk Pathway to Clusters with Local Workforce Development Boards Listed

Pathways by Cluster	*Workforce Development Board*
Agriculture, Food, & Natural Resources	
Agriscience/Biotechnology	Northeastern, Rivers East, Turning Point
Architecture & Construction	
Construction Technology	Eastern Carolina
Construction/ Skilled Trades	Cape Fear
Construction and Skilled Trades	Triangle Region Collaborative: Capital Area, Durham
Business Management & Administration	
Business Support Services	Northeastern, Rivers East, Turning Point
Health Science	
The Northeastern NC Pathway to Prosperity (PtP) Health Careers Pathway	Northeastern, Rivers East, Turning Point
Nursing/Healthcare	Triad Works: Piedmont Triad (PTRC), Guilford County
Health Sciences	Eastern Carolina
Health Sciences	Mid-Carolina, Lumber River
Healthcare/Nursing	Mountain Area
Nursing & Allied Health	Foothills
Nursing & Related Healthcare	High Country
Healthcare/Nursing	Cape Fear, Lumber River (The Sandhills Region)
Healthcare	The Southwest Prosperity Zone: Centralina, CharlotteWorks, Gaston
Nursing & Allied Health	Western Piedmont
The Triangle South Health Care Pathway	Capital Area
Hospitality & Tourism	
Hospitality & Tourism	Mountain Area
Human Services	
Human Services	Future Workforce Alliance: High Country, Western Piedmont, Foothills
Information Technology	
Information Technology	Capital Area
Information Technology	Kerr-Tar, Durham
Information Technology *NOT Recognized*	
Manufacturing	
Advanced Manufacturing	Western Piedmont
Advanced Manufacturing	Northeastern, Rivers East, Turning Point
Advanced Manufacturing	Southwestern
Advanced Manufacturing	Foothills

Advanced Manufacturing	Centralina, CharlotteWorks, Gaston
Advanced Manufacturing	Capital Area, Durham
Advanced Manufacturing	Piedmont Triad, Guilford County (Triad Works)
Advanced Manufacturing	Eastern Carolina
Advanced Manufacturing	Capitol Area
Advanced Manufacturing	Kerr-Tar
Manufacturing & Welding	High Country
Advanced Manufacturing	Mountain Area
Science, Technology, Engineering, & Mathematics	
Health Life Sciences	North Central Workforce
Health Life Sciences	Capital Area, Kerr-Tar
Energy Career Pathway	Southwest, Northwest & Western Carolina Alliance: Foothills, Mountain Area, Western Piedmont, Gaston, Centralina, CharlotteWorks
Transportation, Distribution, & Logistics	
Collision Repair & Refinishing Technology	Mid-Carolina
Aviation	Guilford County, Piedmont Triad, (Triad Works)
Transportation & Logistics	TriadWorks: Guilford County, Piedmont Triad
Transportation, Distribution, & Logistics	Eastern Carolina
Aerospace and Aviation	Eastern Carolina

Methods Used to Evaluate NCWorks Certified Career Pathways

To evaluate and explore the Certified Career Pathways data, we employed a multi-step methodology. Initially, we requested data to answer a set of questions co-constructed with the NCWorks Commission. Upon the completion of data sharing agreements, the State of North Carolina provided us with various datasets, each assigned an ID to connect participants. We then merged these datasets, cleaned anomalies and inconsistencies, and prepared the data for analysis. It's worth noting that the data provided had limitations, which will be addressed throughout the project to ensure transparency in the results. Our second step involved conducting an in-depth descriptive analysis, delving into the pathways that participants navigated. Subsequently, we disaggregated the data to uncover patterns of participation and completion rates, aiming to understand the demographic and socio-economic factors associated with these metrics. Furthermore, an investigative step was taken to explore the connection between pathway completion rates, participant engagement, and prevailing labor market trends, in order to discern the practical implications of our findings. Finally, our last step provided a deeper dive into describing the outcomes of participants in the three pathways with the largest number of participants, allowing us to explore nuances in terms of who is participating and completing them.

In the preliminary stages of data preparation, we encountered the challenge of constructing a comprehensive dataset that could effectively inform our inquiries. The research team was

provided with data in two formats from various sources. Excel files were used to provide the data related to training activities, applications, participant characteristics, and credential attainment, while another set of files in CSV format contained data on apprenticeship status, community college credential completion, and wage data. Although there was a common identifier to connect the participants, not all datasets included all participants. The local program level data was captured by the local Workforce Development Boards using the state's NCWorks.gov system. After merging the datasets, we found a total of 28,193 individuals who participated in an NCWorks Certified Career Pathway between January 2016 and June 2022.

In addition to challenges with individual-level data, the research team had to establish connections between pathways and regional economic zones by matching the zip codes of participants to their corresponding counties, which were then aligned with the designated Prosperity Zones. While this approach was not perfect, it provided a practical means to link participants to the Prosperity Zones, offering a regional perspective. However, NCWORKs Career Centers serve individuals based on their own ZIP-to-Office crosswalk, and it can happen that individual's home zip code belongs to one prosperity zone, while the Career Center that provided career services to the individual is located in another prosperity zone. For example, a person living in zip-code 27819 (Edgecombe County) would be matched to North Central Prosperity Zone. However, zip code 27819 is served by the NCWorks Career Center #4100 that is located in Pitt County which belongs to the Northeast Prosperity Zone. This would not be the case in a significant number of instances. A significant hurdle arose due to the absence of data that could directly link individuals to their specific pathways. To address this challenge, the research team, in consultation with the NCWorks Commission staff, addressed it by highlighting the intersectionality between various pathways and career fields, taking into account the shared pathways across diverse workforce development boards. To facilitate analysis, we implemented a matching process using well-recognized crosswalks from AdvanceCTE. Although our initial strategy to align pathways with career clusters proved unfeasible due to data limitations, specifically the lack of individual-level data, we adapted to a robust alternative that leveraged the availability of occupational codes at the individual level. While the occupational level was highly detailed, we were able to map these codes into 16 clusters for the purpose of making comparisons and gaining insights into workforce development within the NCWorks Certified Career Pathways.

Specifically, we adjusted our approach to data disaggregation by mapping each participant's provided Standard Occupational Classification (SOC) to the aligned career clusters. This approach was appropriate since one of the criteria for the pathways was the presence of multiple entry and exit points that could potentially lead to a variety of occupations. This mapping process used Perkins IV Crosswalk, a resource from Advance CTE (2012), as a foundational tool. Despite reservations regarding this method, it emerged as the optimal solution that aligns the career trajectories of each pathway with established career clusters, offering a perspective that business and industry could explore as potential workforce development solutions. Once the dataset was prepared for analysis, we utilized descriptive statistics such as frequency, percentage, mean, and standard deviation, which offered a quantitative perspective for analyzing the pathways and participants. To examine group-based differences, we employed the

Chi-square test as a statistical tool to identify significant disparities in completion rates, providing a quantifiable representation of participant access and success. Finally, we integrated visualizations with descriptive statistics to craft a narrative that evaluates and offers insights into possible improvements for the pathways, as well as suggestions for enhancing data collection for future evaluations. We considered the participants' pathways, their completion achievements, and the demand in the workforce labor market when making our recommendations for future work. This comprehensive approach not only shed light on the current state of NCWorks Certified Career Pathways for workforce development but also provided insights for strategic alignment with labor market demands and future requirements for data collection to conduct high-quality evaluations. An acknowledged limitation of the data in this report is the fact that only those people enrolled in the Workforce Innovation & Opportunity Act (WIOA) Title I program are reflected in the data. Other students and jobseekers that were not enrolled in WIOA Title I may also have benefited from the CCPs. Lastly, we acknowledge that we calculated annual post-completion wages across four post-completion quarters. These annual averages are then aggregated for multiple cohorts of completers who exited the program in different years between 2016 and 2022. We caution against interpreting the higher rates in 2021-2023 as one-year post-completion wages across all cohorts of completers vary due to different program years.

Goal 1: Describe the NCWorks Certified Career Pathways

Connecting Pathway Sectors to Prosperity Zones

Table 3 presents a cross-tabulation of participants in CCPs mapped to career clusters by Prosperity Zone in North Carolina, providing a detailed breakdown of participation levels in various career clusters across different regions of the state. The first column lists the different career clusters, with the numbers representing the number of participants in each cluster. This table specifically disaggregates the data by Prosperity Zones in North Carolina, providing total counts for each zone. The clusters are sorted in descending order based on the number of participants. Notably, healthcare (n=12,056), transportation (n=5,861), information technology (n=1,751), business (n=1,619), and manufacturing (n=1,110) had the highest number of participants.

It's important to mention that there are 245 cases without a recorded location and 1,104 cases that lacked data for a career pathway or SOC/occupation code, making it impossible to identify the cluster they would belong to. Among the Prosperity Zones, the Sandhills (South Central) Prosperity Zone (n=5,492), North Central Prosperity Zone (n=5,096), and Southwestern Prosperity Zone (n=4,181) had the most participants. In contrast, the Western (n=1,615), Northwestern (n=1,918), and Northeast (n=2,212) Prosperity Zones had the fewest participants. Furthermore, it's worth noting that the largest number of participants differs across the various Prosperity Zones, a point that will be discussed in greater detail later in the analysis.

Table 3

Participants in Pathways Organized in Career Cluster/Sectors by Prosperity Zone Sorted on Number of Total Participants in Sectors

	NO Location in Data	North Central Prosperity Zone	Northeast Prosperity Zone	Northwestern Prosperity Zone	Piedmont Triad (Central) Prosperity Zone	Sandhills (South Central) Prosperity Zone	Southeast Prosperity Zone	Southwestern Prosperity Zone	Western Prosperity Zone	Total
1	108	1816	1122	1135	1908	2383	1382	1292	910	12056
2	41	1053	534	242	1222	882	471	1265	151	5861
3	14	903	12	11	94	187	71	436	23	1751
4	13	291	53	63	221	240	193	460	85	1619
5	11	105	64	48	280	215	115	180	92	1110
6	12	187	179	111	32	412	63	67	41	1104
7	6	113	102	83	85	236	150	88	144	1007
8	17	116	38	43	105	449	123	48	46	985
9	9	138	33	25	122	259	155	176	29	946
10	2	173	48	111	242	130	74	77	42	899
11	1	20	10	6	93	23	34	10	27	224
12	0	68	3	6	18	5	15	6	4	125
13	5	19	0	14	34	33	6	8	4	123
14	1	18	7	6	19	11	16	36	8	122
15	3	33	3	8	20	19	6	11	6	109
16	1	27	2	1	41	3	0	6	1	82
17	1	16	2	5	14	5	10	15	2	70
Total	245	5096	2212	1918	4550	5492	2884	4181	1615	28193

Note. 245 cases did not have location (could not determine PZ) and 1104 cases did not have pathway to map to cluster 1= Health Science, 2 = Transportation, Distribution, & Logistics, 3= Information Technology, 4= Business Management & Administration, 5= Manufacturing 6=None, 7= Education and Training, 8= Law, Public Safety, Corrections, and Security, 9=Arts, Audio/Video Technology & Communications, 10=Hospitality & Tourism, 11=Human Services, 12=Agriculture, Food, & Natural Resources, 13=Architecture & Construction, 14=Finance, 15= Science, Technology, Engineering, & Mathematics, 16= Government & Public Administration, 17=Marketing (16 Cluster and then a None category).

Figure 1 presents a visual representation of how North Carolina is divided into regions that aids in understanding the geographical distribution of Prosperity Zones in North Carolina. The choice to utilize Prosperity Zones in this research is grounded in their intended role of fostering regional economic development and collaboration. These zones serve as a means to assess economic disparities and interdependence among regions. In the context of this analysis of NCWorks Certified Career Pathways, these Prosperity Zones offer a regional framework for disaggregating workforce development data. This framework allows us to examine how pathways may be benefiting each region and provides a basis for evaluating the alignment of workforce development with labor market demand across these regions since each one may have unique needs.

Figure 1
North Carolina Prosperity Zones

To better understand the distribution of NCWorks Certified Career Pathways, Figures 2 through 9 displayed below show the five career clusters of pathway participants, categorized by Prosperity Zone. The Healthcare pathways had the highest level of participation across all Prosperity Zones. Overall, 42.7% (n=12,056) of participants were involved in this sector. Number and overall percent of participation in the Healthcare sector varied by Prosperity Zone, ranging from a high of 59.2% to a low of 30.9%. Out of the 8 Prosperity Zones, 3 had over 50% of their participants in the Healthcare sector, and another 4 had over 40% in this cluster.

The next highest sector represented by participants in the NCWorks Certified Career Pathways overall and ranking second across all Prosperity Zones, was Transportation, Distribution, and Logistics, with 20.7% (n=5,861) of the participants. The range in participation in Transportation, Distribution, and Logistics by Prosperity Zone varied from 30.2% to 9.3%. Among the 8 Prosperity Zones, half (n=4) had over 20% of their participants in Transportation, Distribution, and Logistics.

No other sector had participants ranked in the top five for all Prosperity Zones, highlighting the unique participation patterns in each the 8 Prosperity Zones.

While the IT cluster had the next highest number of participants (n=1,751, 6.2%), it was only in the top five for the North Central Prosperity Zone, accounting for 17.7% (n=903) or their participants.

Business Management & Administration, Manufacturing, and Education and Training ranked in the top five for participants in 4 of the 8 Prosperity Zones. However, Business Management & Administration accounted for only 5.7% (*n*=1,619) of participants overall, and Manufacturing comprised just 3.9% (*n*=1,110) of the total participants. While in the top 5 in 4 Prosperity Zones, Education and Training made up only 3.6% (*n*=1,007) of the overall participants. Hospitality and Tourism ranked in the top 5 for 2 Prosperity Zones, while the Arts, Audio/Video Technology & Communications cluster and the Law, Public Safety, Corrections, and Security were only in the top five for 1 Prosperity Zone each.

Another interesting piece of data from these tables is that in three of the Prosperity Zones, no data was provided to identify the occupation of the participant. This is represented in the bar charts with the label "None," accounting for a total of 3.9% (*n*=1,104) of the participants.

Figure 2

Top Five Career Clusters with Pathways as Measured by Number of Participants for North Central Prosperity Zone

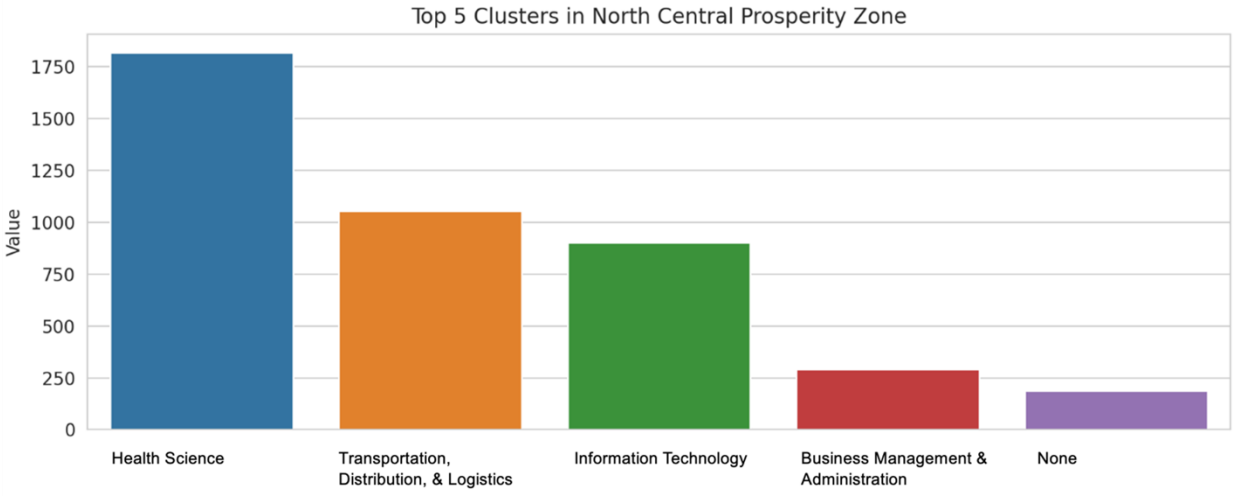


Figure 3

Top Five Career Clusters with Pathways as Measured by Number of Participants for Northwestern Prosperity Zone

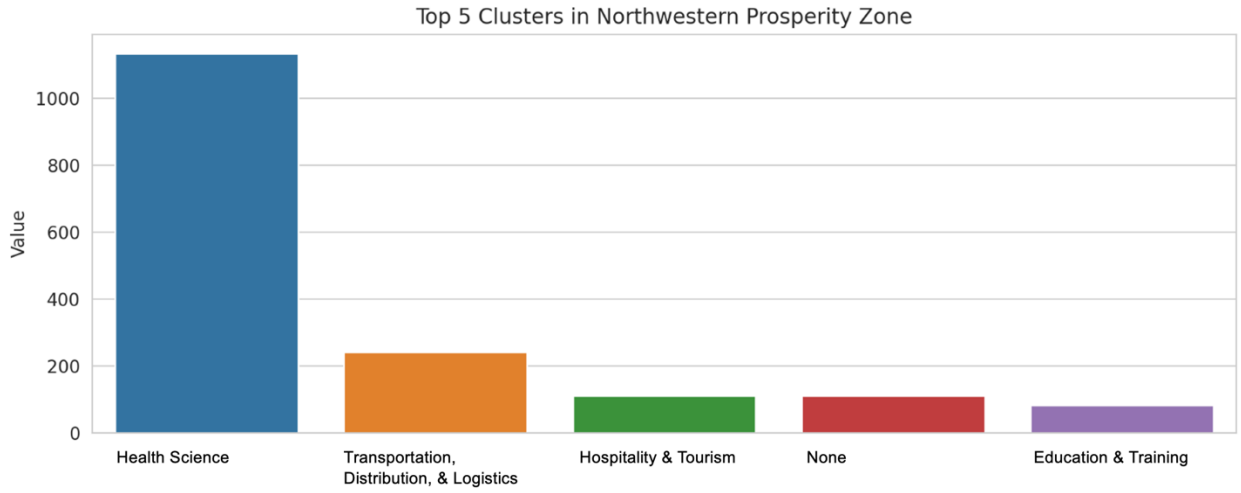


Figure 4

Top Five Career Clusters with Pathways as Measured by Number of Participants for Northeast Prosperity Zone

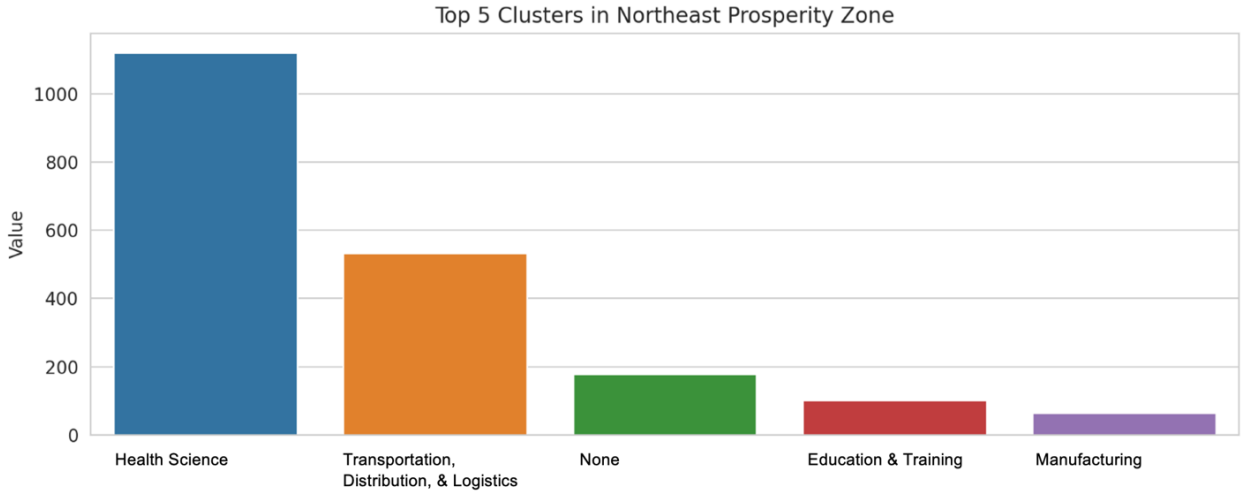


Figure 5

Top Five Career Clusters with Pathways as Measured by Number of Participants for Piedmont Triad (Central) Prosperity Zone

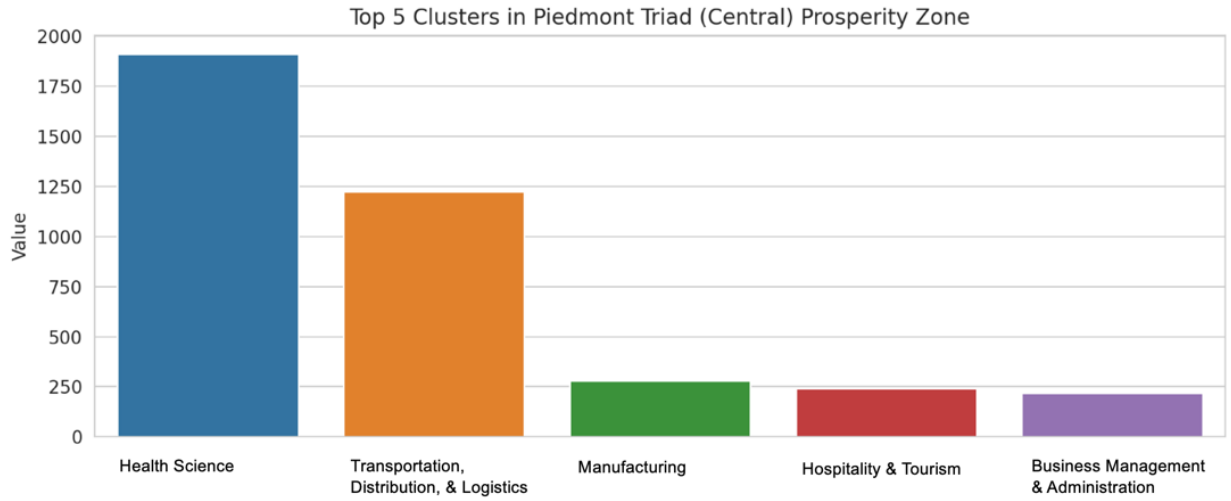


Figure 6

Top Five Career Clusters with Pathways as Measured by Number of Participants for Sandhills Prosperity Zone

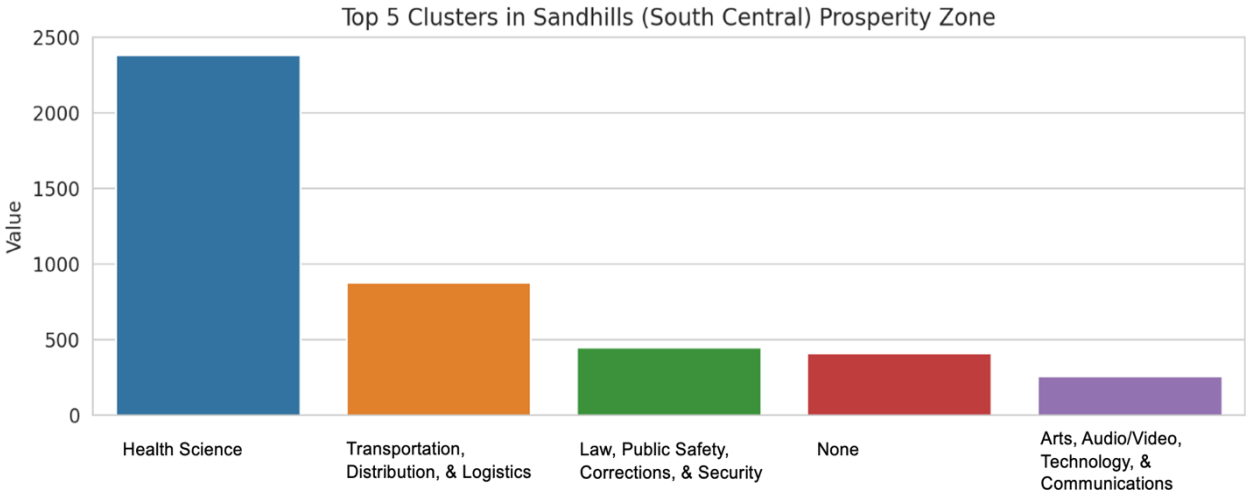


Figure 7

Top Five Career Clusters with Pathways as Measured by Number of Participants for Southeast Prosperity Zone

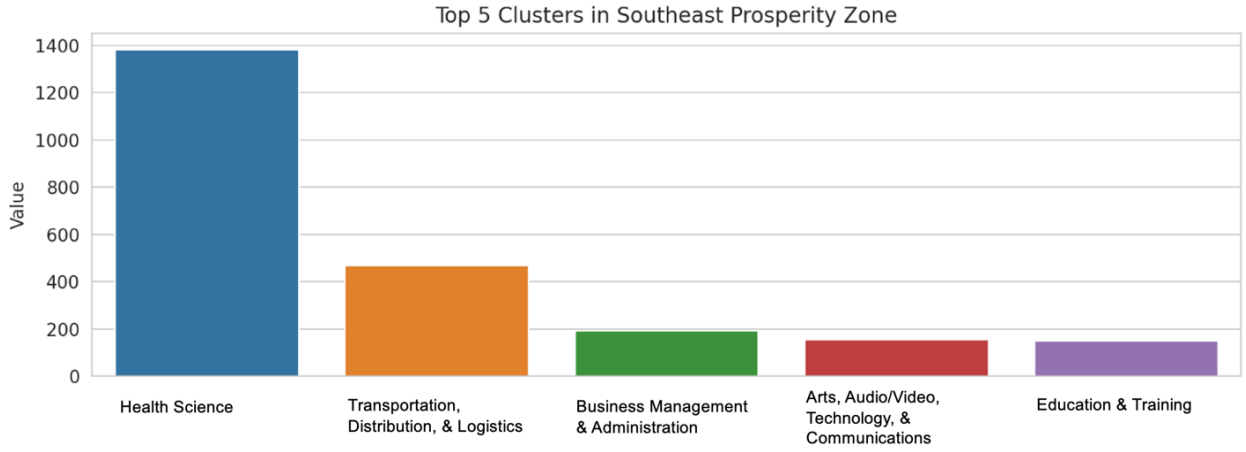


Figure 8

Top Five Career Clusters with Pathways as Measured by Number of Participants for Southwestern Prosperity Zone

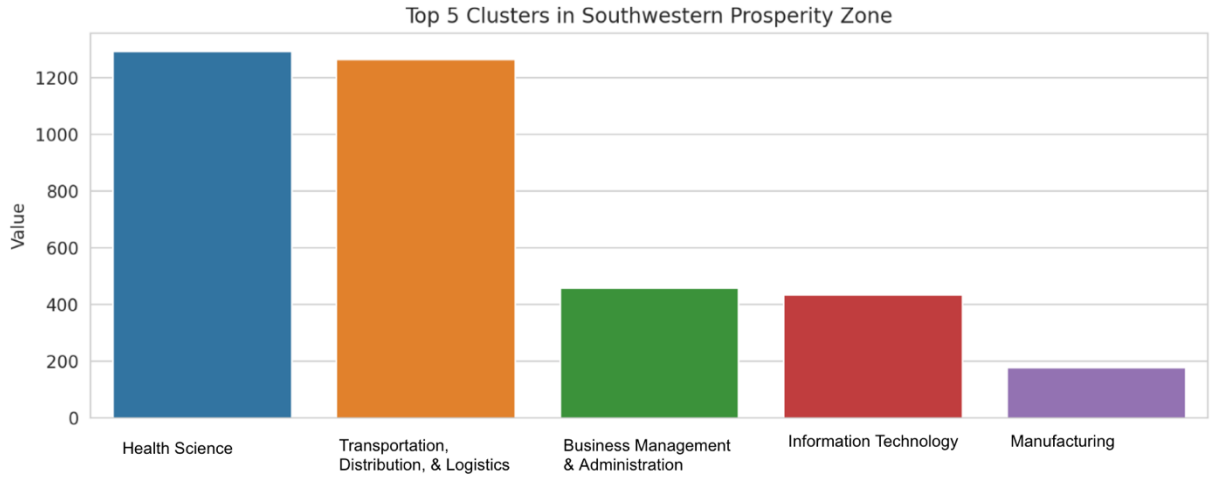
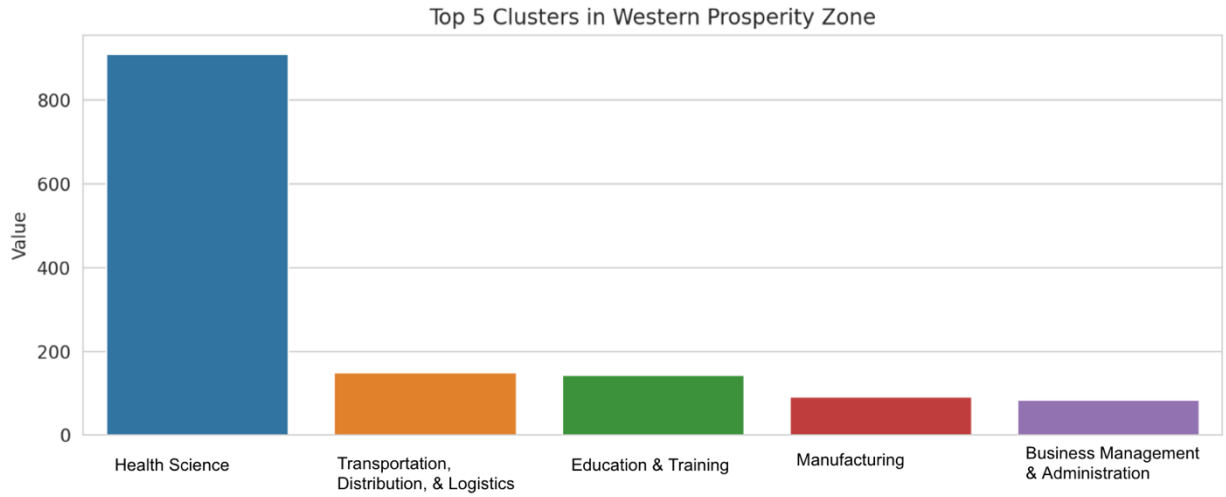


Figure 9

Top Five Career Clusters with Pathways as Measured by Number of Participants for Western Prosperity Zone



Connecting Pathway Sectors to Workforce Development Boards

Table 4 organized the data to provide a view of the number of participants by local Workforce Development Boards overall and disaggregated by sectors. The career cluster provided the sectors to display the number of participants. The sectors were mapped from the NCWorks Certified Career Pathways. The data is organized from most to least by the number of participants overall for each of the local Workforce Development Boards. The number of participants for each local Workforce Development Board between 2016 – 2022 ranged from 2,606 to 352. A quarter of the participants (*n*=7098) were served by the Capital Area, Durham, and GuilfordWorks boards. Overall, around 50% (*n*=14288) of all participants were served by 7 of the boards. In this table each board can determine which sectors have the largest number of participants and compare them to the other boards. From the data in the table, healthcare was the largest sector across all boards. However, the second largest sectors are different based on the boards whereas when examined by Prosperity Zone or region, it was similar.

Table 4

Number of Participants in Pathways by Career Clusters by Workforce Development Board Sorted by Number of Participants

	NI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
Capital Area WDB	70	41	36	16	183	63	7	4	727	10	55	858	23	29	14	22	448	2606
Durham WDB	31	12	73	2	165	106	14	0	1211	28	50	53	106	85	6	6	365	2313
GuilfordWorks WDB	103	2	121	0	71	71	2	1	1214	10	19	11	57	56	1	3	437	2179
Cumberland County WDB	11	0	134	5	362	46	30	5	410	7	34	375	24	20	14	5	605	2087
High Country WDB	4	2	25	9	65	23	3	27	903	44	62	31	63	81	5	7	643	1997
Turning Point WDB	343	0	96	25	77	37	3	0	287	2	7	99	284	38	1	2	261	1562
Foothills WDB	17	0	50	22	81	36	11	13	548	36	75	26	20	138	4	8	459	1544
Charlotte Works WDB	4	2	30	4	85	30	6	2	530	1	27	51	15	142	2	2	510	1443
Mountain Area WDB	170	2	16	0	29	50	6	1	612	0	11	4	25	47	0	2	356	1331
Cape Fear WDB	48	3	103	5	62	88	4	0	600	7	46	22	32	101	3	6	114	1244
Northeastern WDB	15	20	93	9	85	29	7	1	526	23	131	47	72	48	6	6	113	1231
Lumber River WDB	69	5	13	3	24	49	0	0	625	5	83	6	16	21	6	3	61	989
Western Piedmont WDB	14	1	32	8	66	80	6	2	294	5	55	75	130	58	2	6	151	985
Triangle South WDB	15	4	10	4	54	123	1	1	332	22	19	13	24	63	2	5	128	820
Kerr-Tar WDB	103	0	10	2	22	18	2	0	478	1	12	12	6	49	0	1	51	767
Rivers East WDB	18	1	13	0	11	36	2	1	431	10	30	8	12	22	1	0	171	767
Regional Partnership WDB	1	1	7	6	28	32	5	1	460	1	35	2	20	11	0	5	129	744
Southwestern WDB	5	3	12	3	44	27	2	1	328	1	50	12	10	19	1	2	129	649
Mid-Carolina WDB[1]	30	0	12	0	11	25	3	0	367	0	10	2	3	1	0	1	179	644
Gaston County WDB	4	1	27	0	12	3	0	22	260	0	10	6	6	16	0	9	192	568
Piedmont Triad Regional WDB	13	0	16	0	26	17	6	0	399	5	19	3	21	18	0	4	18	565
Centralina WDB	16	17	4	0	25	4	2	0	158	3	42	24	2	22	2	0	114	435
DavidsonWorks Inc WDB	0	8	5	0	19	10	0	0	219	2	16	4	10	21	0	1	56	371
Eastern Carolina WDB	0	0	8	0	12	4	0	0	137	1	1	7	4	4	0	3	171	352
Total	1104	125	946	123	1619	1007	122	82	12056	224	899	1751	985	1110	70	109	5861	28193

[1] The presence of data shown for the Mid-Carolina local area prior to its official start in July 2022 can be attributed to the transfer of all individuals who were still active or part of the future performance pool from their original local area counties to the new Mid-Carolina Workforce Development Board (WDB) when these counties transitioned to the new WDB

Goal 2: Explore Participation in the NCWorks Certified Career Pathways

This section aims to analyze the participation in the NCWorks Certified Career Pathways. Our analysis includes data from 2016, following the NCWorks Commission's 2015 approval of pathways for certification. The report starts with total participation and then provides a yearly breakdown of participant numbers starting from January 2016 to June 2022. This timeframe is crucial for understanding the initiative's trajectory, including the impact of COVID-19 on participation rates. Our examination shows fluctuations in yearly participation, with a peak of 6,665 participants in 2019 and a low of 3,317 in 2021. The data for 2022 covers only the first half of the year; however, if the participation trend for 2022 continued unchanged, the expected number of participants for the full year would be approximately 3,744. The following Figure 10 provides a visualization to see the fluctuation in participation from 2016 to 2022.

Table 5

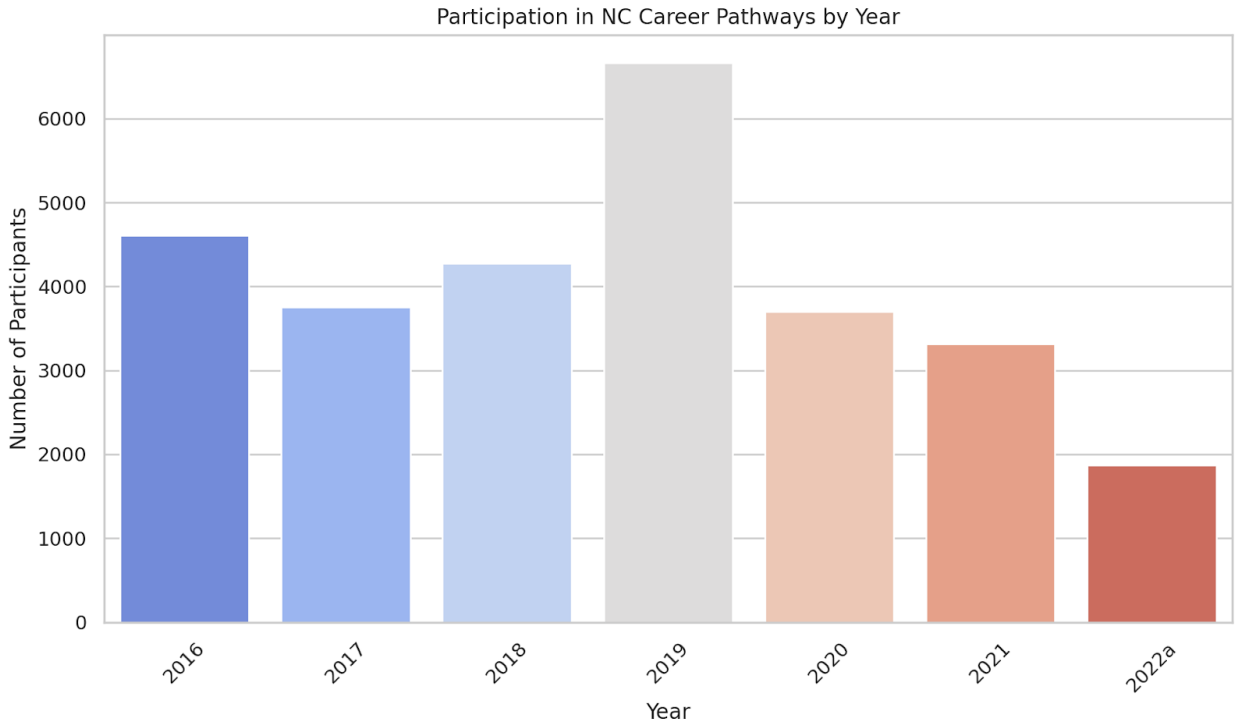
Participants by Year

Year	Participants	
	n	*%*
2016	4606	16.3
2017	3757	13.3
2018	4278	15.2
2019	6665	23.6
2020	3698	13.1
2021	3317	11.8
2022[a]	1872	6.6
Total	28193	100.0

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Figure 10

Number of Individuals that Participated in Certified Career Pathways between January 2016 and June 2022



Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Participation did vary across the Prosperity Zones. The Sandhills (South Central) Prosperity Zone had the most participants (*n*=5,492), followed by the North Central (*n*=5,096), Piedmont Triad (*n*=4,550), and Southwestern (*n*=4,181) Prosperity Zones. When examining participation in more detail you can see that 5 of the Prosperity Zones account for 78.7 of the participants. Figure 10 provides a visualization that highlights the different level of participation, with the highest participation represented by the top bar chart and lowest by the smallest chart on the bottom. Figure 11 shows a visualization of the data from ***table 5***.

Table 6

Number of Participants in NCWorks Certified Career Pathways by Prosperity Zone from January 2016 and June 2022

NC Prosperity Zones	Participants	
	n	%
Sandhills (South Central) Prosperity Zone	5492	19.5
North Central Prosperity Zone	5096	18.1
Piedmont Triad (Central) Prosperity Zone	4550	16.1
Southwestern Prosperity Zone	4181	14.8
Southeast Prosperity Zone	2884	10.2
Northeast Prosperity Zone	2212	7.8
Northwestern Prosperity Zone	1918	6.8
Western Prosperity Zone	1615	5.7
Missing Data	245	0.9
Total	28193	100

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Figure 11

Number of Individuals that Participated in Certified Career Pathways by Prosperity Zone between January 2016 and June 2022

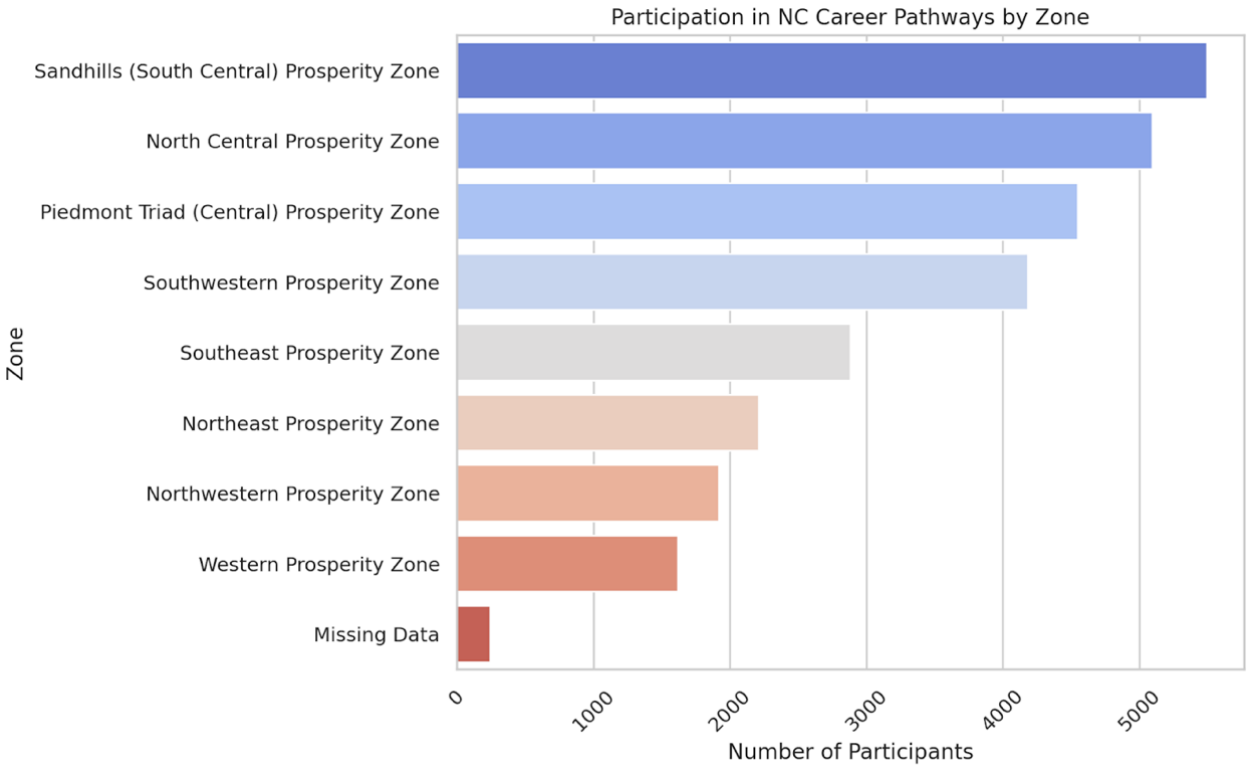


Table 7 and Figures 12-14 provide a view of the demographics of those that participated in the pathways from 2016-2022 including the gender and race of the participants. Additionally, the table provides a breakdown of the education level of the participants upon enter the program. The majority of the participants were 65% (*n*=18,332) females and 35% (*n*=9,842) males. African American and White participates made up 83.3% of the participants in the NCWorks Certified Career Pathways, with the majority of the participants being African American (*n*=13,854, 49.1%). Over half of the participants were either high school graduates or had a GED or had some college (56.9%, n=16,025). The participants were 35 (SD=11.34) years old on average.

Table 7

Sociodemographic Characteristics of Participants at Baseline

Characteristics	Participants	
	n	%
Gender		
Female	18332	65.0
Male	9842	34.9
No Response	19	0.1
Race		
African American	12854	49.1
White	9637	34.2
American Indian/Alaskan	1072	3.8
Asian	361	1.3
Native Hawaiian/ Pacific Islander	78	0.3
No Response	3191	11.3
Education Level		
No High School	775	2.7
High School/GED	9830	34.9
Some College	6195	22.0
Certificate/Diploma	2829	10.0
Associate's Degree	4032	14.3
Bachelor's Degree	2878	10.2
Masters	665	2.4
Doctorate	39	0.1
Professional Graduate	40	0.1
No Response	910	3.2

Figure 12

Gender of Participants in Certified Career Pathways from January 2016 and June 2022

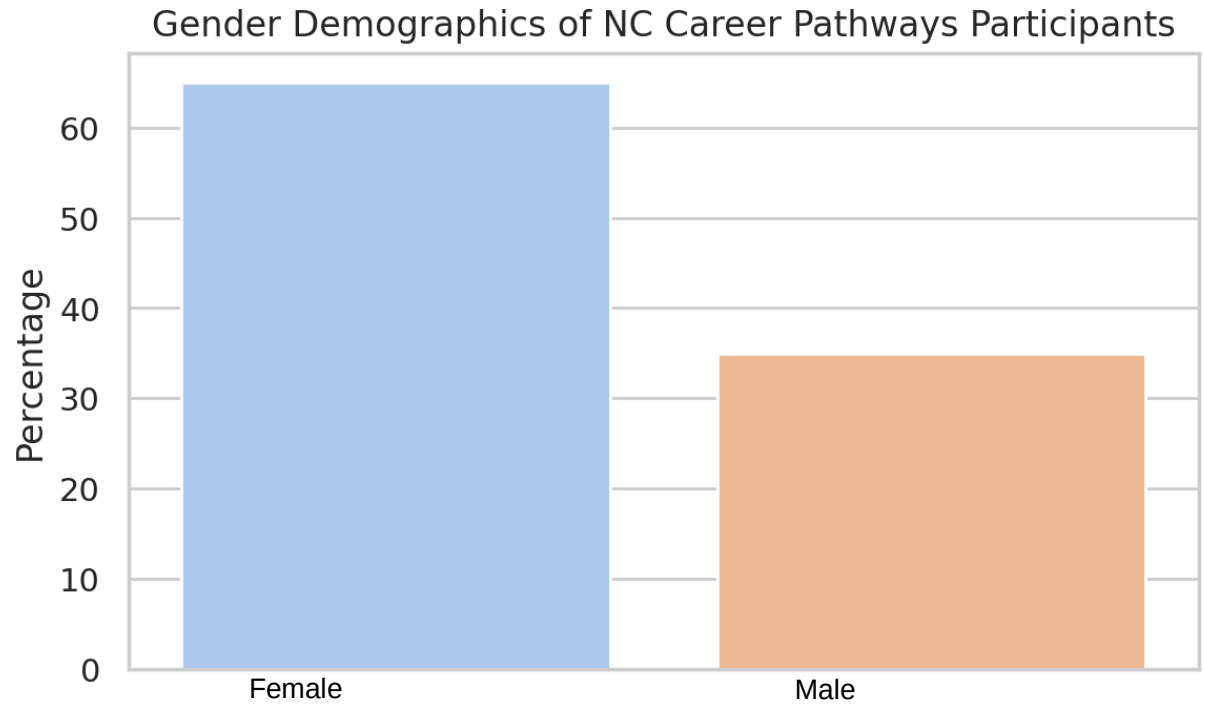


Figure 13

Race of Participants in Certified Career Pathways from January 2016 and June 2022

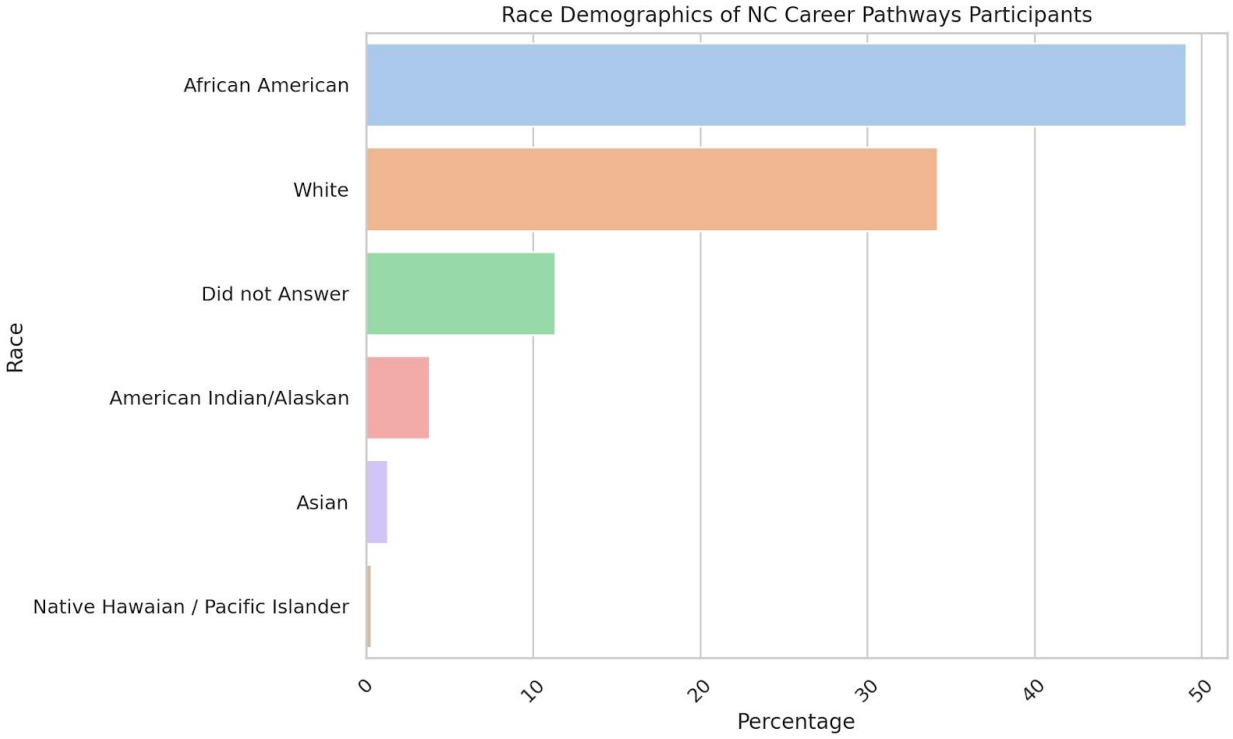
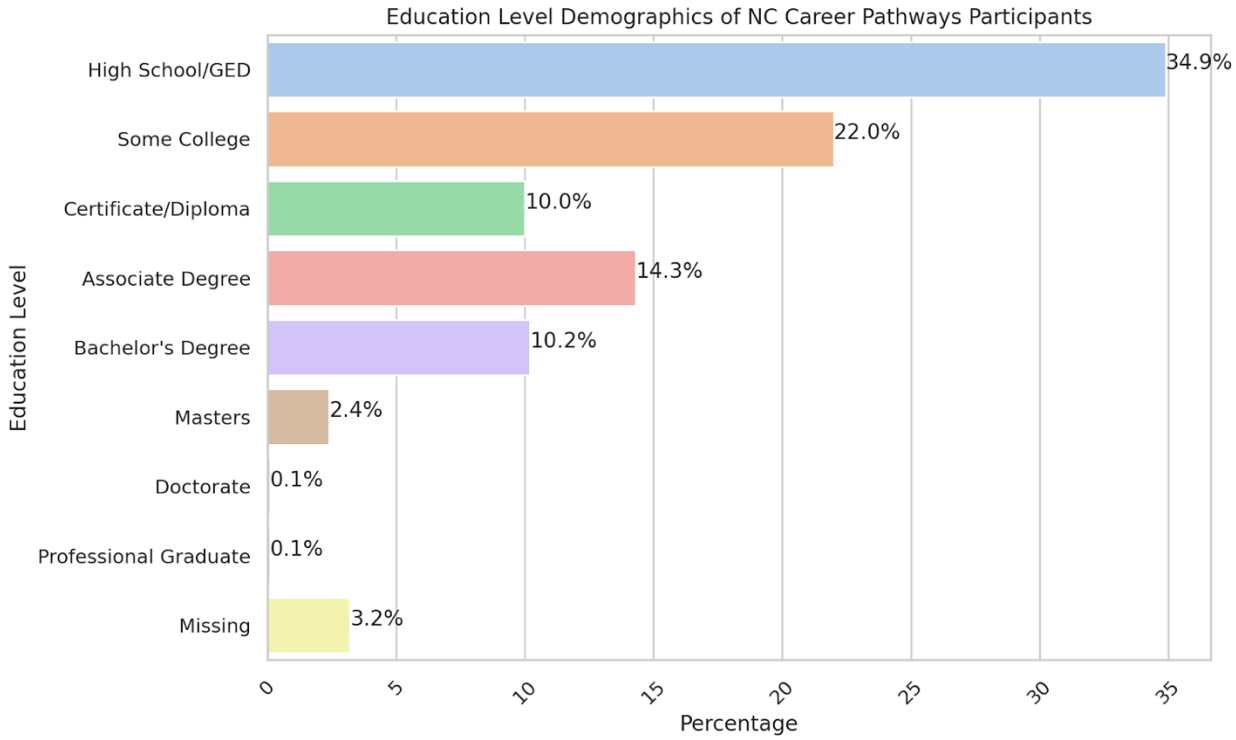


Figure 14

Education Level of Participants in Certified Career Pathways from January 2016 and June 2022



To gain a better understanding of the participants' characteristics, we explored their pre-program employment status, veteran status, and disability status. ***Table 8*** below presents the pre-participation employment status of the participants. Of all participants, more than half (54.8%, n=15,456) were not employed at the time they started their program. Additionally, 19.9% (n=5,612) were working full time, and 16.0% (n=4,516) were working part-time. Only 211 individuals (.7%) reported that they had never worked previously.

Table 9 below reveals that only 9.6% (n=2,717) of the participants reported having veteran status, and a mere 2.9% (n=831) of the participants reported having a disability. It is important to note that 20% (n=5,643) of the participants did not provide a response regarding their disability status.

Table 10 below describes the enrollment status of the participants. Approximately a quarter of the participants were identified as being on state or national dislocated worker grants.

Table 8

Pre-Participation Employment Status of Participants at Baseline

Characteristics	Participants	
	n	%
Employment Status		
Not Working	15456	54.8
Working Full Time	5612	19.9
Working Part Time	4516	16.0
Other	1316	4.7
No Response	1082	3.8
Never Worked	211	0.7

Table 9

Special Characteristics of Participants at Baseline

Characteristics	Participants	
	n	%
Veteran		
No	25476	90.4
Yes	2717	9.6
Disability		
No	21719	77.0
Yes	831	2.9
No Response	5643	20.0

Table 10

Enrollment Code

	Participants	
	n	%
Enrollment Type		
Adult (17)	20859	74.0
Dislocated Worker (20)	6108	21.7
Incumbent Worker Adult (23)	16	0.1
Statewide Adult (24/27)	24	0.1
National Dislocated Worker Grant (40)	1185	4.2
Missing Data	1	0.0

Table 11 below shows the participants by Workforce Development Board. Of the total 28,193 participants, boards served as much as 9.2% (*n*=2606) of the populations and as low as 1.2% (*n*=352).

Table 11

Number of Participants per Workforce Development Board

Workforce Development Boards	Participants	
	n	%
Cape Fear	1244	4.4
Capital Area[2]	2606	9.2
Centralina	435	1.5
Charlotte Works	1443	5.1
Cumberland County	2087	7.4
DavidsonWorks Inc	371	1.3
Durham	2313	8.2
Eastern Carolina	352	1.2
Foothills	1544	5.5
Gaston County	568	2.0
GuilfordWorks	2179	7.7
High Country	1997	7.1
Kerr-Tar	767	2.7
Lumber River	989	3.5
Mid-Carolina[3]	644	2.3
Mountain Area	1331	4.7
Northeastern	1231	4.4
Piedmont Triad Regional	565	2.0
Regional Partnership	744	2.6
Rivers East	767	2.7
Southwestern	649	2.3
Triangle South	820	2.9
Turning Point	1562	5.5
Western Piedmont	985	3.5
Total	28193	100.0

[2] Chatham and Lee counties became part of Capital Area WDB's area on July 1, 2022. They were previously part of Triangle South.

[3] Mid-Carolina WDB began operations on July 1, 2022. Cumberland, Harnett and Sampson counties combined to form the Mid-Carolina local workforce board area at that time. Cumberland County was, until that time, a single-county local workforce area, while Harnett and Sampson were part of Triangle South.

[4] The presence of data shown for the Mid-Carolina local area prior to its official start in July 2022 can be attributed to the transfer of all individuals who were still active or part of the future performance pool from their original local area counties to the new Mid-Carolina Workforce Development Board (WDB) when these counties transitioned to the new WDB.

Following the participant count, the data will be examined by year. This is undertaken in recognition of the significant impact of the COVID-19 pandemic and the relatively recent introduction of NCWorks Certified Pathways. This approach enables a more comprehensive analysis that considers the unique effects of each year on the program, especially in light of the unprecedented challenges posed by the pandemic and the evolving nature of the pathways, including the incorporation of new pathways.

Table 12 shows over the years from January 2016 to June 2022, the gender distribution of participants in a given context shows a consistent trend with females generally representing a larger proportion than males. In 2016, there were 2,945 female participants (63.90%) and 1,659 male participants (36.00%), with a negligible number (2) not responding. This pattern continued in subsequent years, with female participation peaking at 66.20% (*n*=4,411) in 2019 and male participation reaching its highest at 36.50% (*n*=1,562) in 2018. The percentage of non-respondents remained consistently low, never exceeding 0.10%. Overall, across these seven years, the total number of participants was 28,193, with females comprising 65.00% (18,332 participants), males 34.90% (*n*=9,842), and a marginal 0.10% (*n*=19) not specifying their gender.

Table 12

Participants Gender (Frequency and Percent) by Year with Total

	Female		Male		No Response	
	n	%	*n*	%	*n*	%
2016	2945	63.90	1659	36.00	2	0.00
2017	2477	65.90	1277	34.00	3	0.10
2018	2713	63.40	1562	36.50	3	0.10
2019	4411	66.20	2249	33.70	5	0.10
2020	2439	66.00	1256	34.00	3	0.10
2021	2134	64.30	1180	35.60	3	0.10
2022	1213	64.80	659	35.20	0	0.00
Total	18332	65.00	9842	34.90	19	0.10

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 13 shows that from January 2016 to June 2022, the racial composition of participants showed notable trends and variations. African Americans consistently formed the largest group, with their proportion ranging from 43.80% to 52.00%, totaling 13,854 participants (49.10%) over the years. Whites were the second-largest group, with their percentage fluctuating between 29.70% and 36.70%, amounting to 9,637 participants (34.20%). American Indians, Asians, and Native Hawaiians/Pacific Islanders represented smaller fractions. American Indians accounted for 3.80% (*n*=1,072) overall, with their yearly percentage slightly varying around 4%. Asians, contributing 1.30% (*n*=361) overall, saw a modest increase in representation, peaking at 1.60% in

2022. Native Hawaiians/Pacific Islanders consistently remained the smallest group, totaling 0.30% (*n*=78). Notably, the percentage of participants who did not respond to the race question increased over the years, starting at 5.70% in 2016 and reaching a high of 17.80% in 2020, culminating in a total of 11.30% (*n*=3,191) across the period

Table 13

Participants Race (Frequency and Percent) by Year with Total

	African American		White		American Indian		Asian		Native Hawaiian/ Pacific Islander		No Response	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
2016	2395	52.00	1689	36.70	192	4.20	50	1.10	16	0.30	264	5.70
2017	1912	50.90	1360	36.20	188	5.00	44	1.20	10	0.30	243	6.50
2018	2140	50.00	1547	36.20	178	4.20	57	1.30	15	0.40	341	8.00
2019	3213	48.20	2237	33.60	220	3.30	95	1.40	21	0.30	879	13.20
2020	1620	43.80	1229	33.20	131	3.50	52	1.40	7	0.20	659	17.80
2021	1611	48.60	1019	30.70	103	3.10	33	1.00	6	0.20	545	16.40
2022	963	51.40	556	29.70	60	3.20	30	1.60	3	0.20	260	13.90
Total	13854	49.10	9637	34.20	1072	3.80	361	1.30	78	0.30	3191	11.30

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 14 illustrates the age profile of participants from January 2016 to June 2022, revealing a gradual decrease in the average age while maintaining a consistent range of age diversity. The standard deviations indicate a moderately wide age distribution that remained consistent by year. The youngest participant was 15 years old, while the oldest was 88 with an overall average age of 35.00 (SD=11.34) years. This suggests a diversity in age and slightly younger participant demographic evolving over time.

Table 14

Participants Age (Minimum, Maximum, Mean, and Standard Deviation) by Year with Total

	n	Min	Max	M	SD
2016	4,606	17	76	37.27	11.46
2017	3,757	17	75	36.10	11.41
2018	4,278	16	80	35.33	11.40
2019	6,665	15	88	34.19	11.26
2020	3,698	16	71	33.52	11.10
2021	3,317	16	73	34.19	11.11
2022	1,872	15	77	33.76	10.88
Total	28,193	15	88	35.00	11.34

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Educational levels of participants are in ***Table 15***. While varying, the majority of participants completed high school or engaged in some college education. In 2016, the largest group was high school graduates or GED holders, comprising 38.8% (1,762 participants) and was consistent across all years. Participants with some college education also formed a significant portion, ranging from 20.8% to 24.4% annually, amounting to 6,195 (22.7%) participants in total. Those with an associate degree represented a steady share, around 13-16.6% each year, totaling 4,032 participants (14.8%). The proportion of participants with a bachelor's degree varied around 9-12%, totaling 2,878 (10.5%), while those with a certificate or diploma comprised around 8.5-12.1% annually, totaling 2,829 (10.4%). Advanced degrees like master's, doctorates, and professional graduate degrees collectively formed a smaller fraction. A small percentage of participants had not completed high school, ranging from 2.2% to 3.3% annually, totaling 775 participants (2.8%). Another notable characteristic is the decrease in the participation of those with a Master's degree after 2019.

Table 15

Participants Education Level (Frequency and Percent) by Year with Total

		2016	2017	2018	2019	2020	2021	2022	**Total**
No High School	*n*	99	97	129	173	118	106	53	775
	%	2.2	2.8	3.2	2.6	3.3	3.3	2.9	2.8
High School/GED	*n*	1762	1192	1468	2105	1293	1221	789	9830
	%	38.8	34.1	36.4	32.1	36.1	37.7	42.9	36.0
Some College	*n*	1062	770	840	1602	763	767	391	6195
	%	23.4	22.0	20.8	24.4	21.3	23.7	21.3	22.7
Certificate/Diploma	*n*	466	421	481	678	341	286	156	2829
	%	10.3	12.1	11.9	10.3	9.5	8.8	8.5	10.4
Associate's Degree	*n*	604	492	577	1091	557	465	246	4032
	%	13.3	14.1	14.3	16.6	15.6	14.4	13.4	14.8
Bachelor's Degree	*n*	425	387	401	740	431	328	166	2878
	%	9.4	11.1	9.9	11.3	12.0	10.1	9.0	10.5
Masters	*n*	111	121	123	150	66	57	37	665
	%	2.4	3.5	3.1	2.3	1.8	1.8	2.0	2.4
Doctorate	*n*	3	5	7	15	3	5	1	39
	%	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1
Professional Graduate	*n*	6	8	5	10	6	4	1	40
	%	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1
No Response	*n*	68	264	247	101	120	78	32	910
	%	1.5	7.0	5.8	1.5	3.2	2.4	1.7	3.2
Total	*n*	4538	3493	4031	6564	3578	3239	1840	27283
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

As can be seen in ***Table 16***, veteran participation ranged from 13% to 8.1% across the years. After 2018, there does appear to be slightly less veterans participating. ***Table 17*** displays the participants reporting of their disability status. After the years this reporting ranged between 2% to 3%. The category of non-response concerning their disability status did fluctuate from 9.2% to 28.5%.

Table 16

Participants Veteran Status (Frequency and Percent) by Year with Total

	Veteran		Non-Veteran		Total by Year	
	f	%	*f*	%	*f*	%
2016	484	10.5	4122	89.5	4606	100.00
2017	489	13.0	3268	87.0	3757	100.00
2018	477	11.2	3801	88.8	4278	100.00
2019	559	8.4	6106	91.6	6665	100.00
2020	262	7.1	3436	92.9	3698	100.00
2021	295	8.9	3022	91.1	3317	100.00
2022	151	8.1	1721	91.9	1872	100.00
Total	2717	9.6	25476	90.4	28193	100.00

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 17

Participants Disability Status (Frequency and Percent) by Year with Total

	Yes		No		No Response	
	f	%	*F*	%	*f*	%
2016	119	2.60	4064	88.20	423	9.20
2017	111	3.00	3144	83.70	502	13.40
2018	131	3.10	3378	79.00	769	18.00
2019	232	3.50	4826	72.40	1607	24.10
2020	83	2.20	2562	69.30	1053	28.50
2021	104	3.10	2346	70.70	867	26.10
2022	51	2.70	1399	74.70	422	22.50
Total	831	2.90	21719	77.00	5643	20.00

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Goal 3: Explore Completion in the NCWorks Certified Career Pathways

The next step of the project was to explore completion of the NCWorks Certified Career Pathways programs. Table 8 shows that the overall completion rate is 72.8% (n=20,516) of the participants completed a pathway. The completion rates did vary slightly by year ranging from 67.4% to 75.9%. From January 2016 to June 2022, the data on overall participant engagement shows a consistent pattern in starting, completing, and not completing the program. In 2016, 4,606 participants started the program, with 3,185 (69.1%) completing it and 1,421 (30.9%) not completing. This trend of a higher completion rate continued in the subsequent years. The completion rate peaked in 2019 at 75.9% (5,056 out of 6,665 participants), indicating the highest level of participant engagement and success. Interestingly, the year 2022 (data only until June) showed a slight decline in the completion rate, with 67.4% (1,211 out of 1,872 participants) completing and a higher non-completion rate of 35.3%. Overall, out of the total 28,193 participants who started the program over these years, 20,516 (72.8%) successfully completed it, while 7,677 (27.2%) did not complete. This overall data suggests nearly three-quarters successfully completing the program across the years.

Table 18

Overall Participants Starting, Completing and Not Completing by Year and Total

Year	Started	Completed		Did not Complete	
	N	*n*	%	*n*	%
2016	4606	3185	69.1	1421	30.9
2017	3757	2735	72.8	1022	27.2
2018	4278	3183	74.4	1095	25.6
2019	6665	5056	75.9	1609	24.1
2020	3698	2750	74.4	948	25.6
2021	3317	2395	72.2	921	27.8
2022[a]	1872	1211	67.4	661	35.3
Total	28193	20516	72.8	7677	27.2

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 19 shows varied levels of participation, completion, and non-completion rates across different sectors. Health Science, with the highest number of participants (12,056) and had a

completion rate of 70.2% (8,458 participants). Transportation, Distribution, & Logistics had the highest completion rate of 81.9% (4,801 participants). Information Technology and Education & Training followed, with completion rates of 74.7% and 64.8%, respectively. Business Management & Administration had 1,619 participants with a completion rate of 68.4% (1,107 participants). Manufacturing, Law, Public Safety, Corrections, & Security, and Human Services also showed substantial participation and completion rates. Architecture & Construction and Hospitality & Tourism, with completion rates of 78.1% and 71.4% respectively, had fewer participants but high success rates. Finance and Arts, Audio/Video, Technology, & Communications had the lowest number of participants and lower completion rates of 61.5% and 63.4%, respectively. Overall, the total participation across all sectors was 28,193, with a completion rate of 72.8% (20,516 participants) and a non-completion rate of 27.2% (7,677 participants).

Table 19

Overall Participation, Started, Completed and Did not Complete by Cluster

	Started	Completed		Did not Complete		Rank Order
	N	*n*	*%*	*n*	*%*	
Health Science	12056	8458	70.2	3598	29.8	1
Transportation, Distribution, & Logistics	5861	4801	81.9	1060	18.1	2
Information Technology	1751	1308	74.7	443	25.3	3
Business Management & Administration	1619	1107	68.4	512	31.6	4
Education & Training	1007	653	64.8	354	35.2	5
Manufacturing	1110	800	72.1	310	27.9	6
Law, Public Safety, Corr., & Sec.	985	683	69.3	302	30.7	7
Human Services	899	660	73.4	239	26.6	8
Architecture & Construction	946	739	78.1	207	21.9	9
Hospitality & Tourism	224	160	71.4	64	28.6	10
Finance	122	75	61.5	47	38.5	11
Arts, Audio/Video, Tech., & Comm.	123	78	63.4	45	36.6	12
STEM	109	72	66.1	37	33.9	13
Marketing	70	46	65.7	24	34.3	14
Government & Public Admin.	82	64	78.0	18	22.0	15
Agriculture, Food, & Natural Resources	125	87	69.6	38	30.4	16
No Cluster Identified	1104	725	65.7	379	34.2	
Total	28193	20516	72.8	7677	27.2	

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June. Completed = the number and percent completed by year.

Table 20 provides a breakdown of participation from January 2016 to June 2022, categorized by gender, showing the number of participants who started, completed, and did not complete the

program. Among females, 18,332 started the program, with 12,789 (69.8%) completing it and 5,543 (30.2%) not completing. In contrast, a higher completion rate was observed among males: out of 9,842 who started, 7,717 (78.4%) completed, and 2,125 (21.6%) did not complete. The group with no gender response, although very small in number (*n* = 19), had a completion rate of 52.6% and a non-completion rate of 47.4%. Overall, the total number of participants was 28,193, with 20,516 (72.8%) completing and 7,677 (27.2%) not completing the program. The significant difference in completion rates between genders is statistically notable, as indicated by the chi-square test result (X^2= 2401.640, *df*=1, p<.001), suggesting that gender is a significant factor in the completion rates of this program.

Table 20

Participation, Started, Completed and Did not Complete by Gender with Total

Gender	Started		Completed	Did not Complete	
	N	*n*	*%*	*n*	*%*
Female	18332	12789	69.8	5543	30.2
Male	9842	7717	78.4	2125	21.6
No Response	19	10	52.6	9	47.4
Total	28193	20516	72.8	7677	27.2

Note. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.
X^2= (2401.640, *df*=1, p<.001)

Table 21

Participation, Started, Completed and Did not Complete by Race with Total

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
African American	13854	9886	71.4	3968	28.6
White	9637	7231	75.0	2406	25.0[a]
American Indian/Alaska	1072	709	66.1	363	33.9[b]
Asian	361	272	75.3	89	24.7
Native Hawaiian / Pacific	78	56	71.8	22	28.2
No Response	3191	2362	74.0	829	26.0
Total	28193	20516	72.8	7677	27.2

Note. X^2= (66.413, *df*=5, p<.001) [a] Differs significantly from all other proportions, [b] Differs significantly fArom all other proportions. Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 21 outlines the participation data from January 2016 to June 2022, categorized by race, showing the number of participants who started, completed, and did not complete a program or initiative. African American participants were the largest group, with 13,854 starting the program. Of these, 9,886 (71.4%) completed and 3,968 (28.6%) did not complete. White participants had a slightly higher completion rate of 75.0% (7,231 out of 9,637), with a non-completion rate of 25.0%. American Indian/Alaska Native participants had a lower completion rate of 66.1% (709 out of 1,072), with a non-completion rate of 33.9%. Asian participants, though a smaller group (361), had a high completion rate of 75.3% (272 participants). Native Hawaiian/Pacific Islander participants had a completion rate of 71.8% (56 out of 78). Participants who did not respond to the race question, totaling 3,191, had a completion rate of 74.0% (*n* = 2,362 participants). Overall, out of 28,193 participants, 20,516 (72.8%) completed the program, while 7,677 (27.2%) did not complete it. The chi-square test result (X^2= 66.413, *df*=5, p<.001) indicates significant differences in completion rates among different racial groups. The note specifies that the completion rate for White and American Indian/Alaska Native participants significantly differs from other groups.

Table 22 presents data on participation from January 2016 to June 2022, categorized by education level, showing the number of participants who started, completed, and did not complete the program. Participants without a high school diploma, numbering 775, had a completion rate of 73.0% (*n* = 566). Those with a high school diploma or GED, the largest group with 9,830 participants, had a completion rate of 70.4% (*n* = 6,924). Participants with some college education, totaling 6,195, had a completion rate of 69.7% (*n* = 4,318). Those with a certificate or diploma, numbering 2,829, had a higher completion rate of 77.6% (*n* = 2,194). Associate degree holders, totaling 4,032, had a completion rate of 74.5% (*n* = 3,002). Bachelor's degree holders, numbering 2,878, had a completion rate of 78.2% (*n* = 2,250). Participants with a master's degree, though a smaller group (*n* = 665), had a high completion rate of 82.0% (*n* = 545). Doctorate holders, the smallest group with 39 participants, had the highest completion rate of 87.2% (*n* = 34). Professional graduate degree holders had a completion rate of 72.5% (29 out of 40 participants). Participants who did not respond to the education level question, totaling 910, had a completion rate of 71.9% (*n* = 654). Overall, out of 28,193 participants, 20,516 (72.8%) completed the program, while 7,677 (27.2%) did not complete it. The chi-square test result (X^2= 170.175, *df*=9, p<.001) indicates significant differences in completion rates among different education levels.

Table 22

Participation, Started, Completed and Did not Complete by Education Level with Total

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
No High School	775	566	73.0	209	27.0
High School/GED	9830	6924	70.4	2906	29.6
Some College	6195	4318	69.7	1877	30.3
Certificate/Diploma	2829	2194	77.6	635	22.4
Associate's Degree	4032	3002	74.5	1030	25.5
Bachelor's Degree	2878	2250	78.2	628	21.8
Masters	665	545	82.0	120	18.0
Doctorate	39	34	87.2	5	12.8
Professional Graduate	40	29	72.5	11	27.5
No Response	910	654	71.9	256	28.1
Total	28193	20516	72.8	7677	27.2

Note. X^2= (170.175, *df*=9, p<.001)

Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 23 presents data on participation categorized by disability status, covering the period from January 2016 to June 2022. Of the 831 participants with a disability, 69.3% completed and 30.7% did not. Among the 21,719 without a disability, 72.8% completed, while 27.2% did not. For those who did not respond about their disability status (*n*=5,643), 73.3% completed and 26.7% did not. Overall, out of 28,193 participants, 72.8% completed the activity, and 27.2% did not. The note indicates a statistically significant difference in completion rates based on disability status (X^2= 5.962, *df*=5, =.05).

Table 23

Participation, Started, Completed and Did not Complete **by Disability Status** with Total

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Disability	831	576	69.3	255	30.7[b]
No Disability	21719	15801	72.8	5918	27.2[ab]
No Response	5643	4139	73.3	1504	26.7[a]
Total	28193	20516	72.8	7677	27.2

Note. X^2= (5.962, *df*=5, =.05) [a] Differs significantly from other proportions mark with [b], Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 24 shows participation data from January 2016 to June 2022, comparing veterans and non-veterans. Veterans had a higher completion rate (78.1%) compared to non-veterans (72.2%), with a statistically significant difference (X^2= 42.530, *df*=1, p<.001); veterans constituted 9.6% (n = 2717) of all participants.

Table 24

Participation, Started, Completed and Did not Complete for Veteran with Total

	Started	Completed		Did not Complete	
	N	n	%	n	%
Veteran	2717	2121	78.1	596	21.9
Non-Veteran	24786	18395	72.2	7081	27.8
Total	28193	20516	72.8	7677	27.2

Note. X^2= (42.530, *df*=1, p<.001) 9.6% (*n* = 2717) of all of the participants reported being a veteran Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 25, covering participation data from January 2016 to June 2022, compares completion rates based on employment status. Participants working part-time had the highest completion rate (74.8%), while those who had never worked had the lowest (70.6%), with a statistically significant difference with full-time workers from all other groups (X^2= 17.272, *df*=5, =.004).

Table 25

Participation, Started, Completed and Did not Complete for this with Employment Status with Total

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Never Worked	211	149	70.6	62	29.4
Not Working	15456	11156	72.2	4300	27.8
Working Full Time	1316	975	74.1	341	25.9[a]
Working Part Time	5612	4198	74.8	1414	25.2
Other	4516	3255	72.1	1261	27.9
No Response	1082	783	72.4	299	27.6
Total	7677	20516	72.8	7677	27.2

Note. X^2= (17.272, *df*=5, =.004) [a] Differs significantly from all other proportions, Participation Data was from 1/2016 to 6/2022. [a]2022 only represents through June.

Table 26 provides an overview of participation in a program across different Prosperity Zones (PZs), with data from an unspecified period. The completion rates varied significantly among the zones (X^2= 300.477, *df*=8, p<.001). The Piedmont Triad (Central) had the highest completion rate at 78.00%, while the Southeast had the lowest at 64.70%. Other zones like North Central, Western, Southwestern, Northwestern, Sandhills (South Central), and Northeast showed varying completion rates, ranging from 65.90% to 77.30%. Additionally, there were some participants with no response data, showing a 75.10% completion rate. Overall, the total completion rate across all zones was 72.80%.

Table 26

Participation, Started, Completed and Did not Complete for by Prosperity Zone (PZ) with Total

Prosperity Zone	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Piedmont Triad (Central)	4550	3547	78.00	1003	22.00
North Central	5096	3938	77.30	1158	22.70
Western	1615	1239	76.70	376	23.30
Southwestern	4181	3055	73.10	1126	26.90
Northwestern	1918	1398	72.90	520	27.10
Sandhills (South Central)	5492	3832	69.80	1660	30.20
Northeast	2212	1458	65.90	754	34.10
Southeast	2884	1865	64.70	1019	35.30
No Response Data	245	184	75.10	61	24.90
Total	28193	20516	72.80	7677	27.20

Note. X^2= (300.477, *df*=8, p<.001)

Goal 4: Exploring Alignment of Participation NCWorks Certified Career Pathways and Workforce Demands

Tables 27 to 35 deliver an analytical view of how current participation in the NCWorks Certified Career Pathways in relation to the alignment of anticipated labor demands, based on a projected 5-year forecast using data from JobsEQ, a comprehensive labor market data tool. This forecast encompasses the entire state of North Carolina, as well as its division into eight Prosperity Zones, each with unique economic profiles. The forecast is detailed by NAICS (North American Industry Classification System) codes, which categorize businesses into specific industries, and by direct industry names. The numbers reported in these tables capture the total projected demand over 5-years, including job exits, inter-industry transfers, and overall employment growth. These projections, while estimates, serve as a gauge for the potential demand in various sectors and offer insights into the strategic alignment of the Certified Career Pathways with future workforce requirements in the state.

Table 27 demonstrates that, at the state level, healthcare, manufacturing, and education appear in our data as both as top-demand industries and in terms of the number of participants. A review of *Tables 27 to 35*, which compare the alignment of participants with top-demand industries, suggests varying levels of alignment across regions. Nonetheless, healthcare, manufacturing, and education & training commonly appear on both lists in the majority of cases. Instances of apparent misalignment between the Certified Career Pathways in certain regions and the highest demand industries are noted. However, it is essential to recognize that even if some pathways do not align with the highest demand sectors, they still may be supplying talent for demands in the region. There is no indication that the Certified Career Pathways are excessively producing talent in specific areas without corresponding labor market needs. This suggests a balanced approach to workforce development, ensuring that a variety of sectors can benefit from skilled professionals. Appendix B and C provide insight into the labor demands for North Carolina and by Prosperity Zones using the CTE Clusters that can enhance this data.

Table 27

Alignment of Participation by Labor Market Demand for North Carolina

North Carolina

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Accommodation & Food Services	Health Care & Social Assistance	Retail Trade	Manufacturing	Administrative/ Support/ Waste Management & Remediation Services	Educational Services
Demand	444,659	397,868	392,149	262,055	248,965	214,097
Cluster	Health Science	Transportation	IT	Business Management/ Administration	Manufacturing	Education &Training
Participants	12.056	5,861	1,751	1,619	1,110	985

Table 28

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 1 Northeastern

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Accommodation & Food Services	Retail Trade	Health Care & Social Assistance	Educational Services	Manufacturing	Administrative/ Support/ Waste Management & Remediation Services
Demand	21,831	18,336	18,215	10,524	9,161	7,104
Cluster	Health Science	Transportation	Education & Training	Manufacturing	Business Management / Administration	Hospitality
Participants	1122	534	102	64	53	48

Table 29

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 2 Southeast

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Health Care & Social Assistance	Retail Trade	Accommodation & Food Services	Manufacturing	Construction	Educational Services
Demand	35,120	41,511	50,088	17,629	16,521	16,539
Cluster	Health Science	Transportation	Business Management / Administration	Arts, Audio/Video & Communications	Education & Training	Law, Public Safety, Corrections, and Security
Participants	1,382	471	193	155	150	123

Table 30

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 3 North Central

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Health Care & Social Assistance	Accommodation & Food Services	Retail Trade	Professional, Scientific, & Technical Services	Educational Services	Administrative/ Support/ Waste Management & Remediation Services
Demand	106,959	105,724	92,127	76,311	73,458	59,536
Cluster	Health Science	Transportation	Information Technology	Business Management / Administration	Hospitality & Tourism	Arts, Audio/Video & Communications
Participants	1,816	1,053	903	291	173	138

Table 31

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 4 Sandhills

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Accommodation & Food Services	Health Care & Social Assistance	Retail Trade	Manufacturing	Educational Services	Public Administration
Demand	35,128	32,397	30,244	19,429	16,418	13,208
Cluster	Health Science	Transportation	Business Management / Administration	Arts, Audio/Video & Communications	Education and Training	Manufacturing
Participants	1,382	471	193	155	150	115

Table 32

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 5 Piedmont

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Accommodation & Food Services	Health Care & Social Assistance	Retail Trade	Manufacturing	Administrative/ Support/ Waste Management & Remediation Services	Educational Services
Demand	65,498	64,311	61,285	51,381	35,604	31,078
Cluster	Health Science	Transportation	Manufacturing	Hospitality & Tourism	Business Management / Administration	Arts, Audio/Video & Communications
Participants	1,908	1,222	280	242	221	122

Table 33

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 6 Southwestern

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Accommodation & Food Services	Retail Trade	Health Care & Social Assistance	Administrative/ Support /Waste Management & Remediation Services	Manufacturing	Transportation & Warehousing
Demand	112,752	98,344	92,210	70,973	62,847	56,493
Cluster	Health Science	Transportation	Business Management / Administration	Information Technology	Manufacturing	Arts, Audio/Video & Communications
Participants	1,292	1,265	460	436	180	176

Table 34

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 7 Northwestern

Top Industries by Demand and Top Pathway Participants by Cluster Participants

Industry	Manufacturing	Accommodation & Food Services	Retail Trade	Health Care & Social Assistance	Educational Services	Administrative/ Support/ Waste Management & Remediation Services
Demand	29,372	21,680	21,634	18,727	9,854	8,442
Cluster	Health Science	Transportation	Hospitality & Tourism	Education & Training	Business Management / Administration	Manufacturing
Participants	1,153	242	111	83	63	48

Table 35

Alignment of Participation by Labor Market Demand by Prosperity Zone

Prosperity Zone 8 Western

	Top Industries by Demand and Top Cluster Completers					
Industry	Accommodation & Food Services	Health Care & Social Assistance	Retail Trade	Manufacturing	Educational Services	Other Services (except Public Administration)
Demand	35,713	28,149	27,844	15,481	12,697	12,013
Cluster	Health Science	Transportation	Education & Training	Manufacturing	Business Management / Administration	Law, Public Safety, Corrections, and Security
Participants	910	151	144	92	85	42

Deeper Dive into Top Three Clusters

To explore participation, completion, and impact in more detail, the next section will provide a deeper view into the top three clusters by number of participants. Healthcare, Transportation, and Information Technology. For individuals that participated in these pathways it will disaggregate the data by education level, working status upon entry into the program, gender, race, Veteran status, and disability status. In addition to participation, the tables will provide a view into the completion to understand who is not completing and if there are difference by education level, working status upon entry into the program, gender, race, Veteran status, and s disability status. Additionally, limited insight in labor market outcomes will be provided.

Healthcare Career Sector

From 2016-2020, the healthcare career pathway had a total of 12,056 participants, accounting for 42.8% of the total. An examination of the education level reveals that individuals entered the pathway from a variety of entry points, each with different levels of prior education. Some individuals had as little education as no high school degree, while others held doctorates or professional graduate degrees. There was a significant difference in completion rates in relation to education ($\chi 2=270.798$, $df=9$, $p<.001$). The highest percentage of completers were those who entered holding a certificate or diploma (78.0%), followed by those with no high school degree (77.3%). Those with a bachelor's degree had the lowest rate of completion (64.7%), followed by those with a high school diploma or GED (65.9%).

Table 36

Health Cluster Participation, Started, Completed and Did not Complete by Educational Level

	Started	Completed		Did not Complete	
	N	*N*	*%*	*n*	*%*
Education Level					
No High School	5096	3938	77.3	1158	22.7
High School/GED	2212	1458	65.9	754	34.1
Some College	1918	1398	72.9	520	27.1
Certificate/Diploma	4550	3547	78.0	1003	22.0
Associate's Degree	5492	3832	69.8	1660	30.2
Bachelor's Degree	2884	1865	64.7	1019	35.3
Doctorate	4181	3055	73.1	1126	26.9
Professional Graduate	1615	1239	76.7	376	23.3
No Response	245	184	75.1	61	24.9
Total	12056	8458	70.2	3598	29.8

Note. Educational Level X^2= (70.798, *df*=9, p<.001)

The employment status of participants also varied upon entry into this pathway with the majority of the participants (5,963) reporting not working when starting the program. There was a statistically significant difference ($\chi2=12.650$, $df=5$, $=.027$) in completion based on employment status among the groups that ranged from 65% to 72%. Those who had never worked before had the lowest completion rates (65.5%).

Table 37

Health Cluster Participation, Started, Completed and Did not Complete by Employment Status

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Employment Status					
Never Worked	96	63	65.5	33	34.3
Not Working	5963	4104	68.8	1859	31.2
Other	589	429	72.8	160	27.2
Working Full Time	2425	1721	71.0	704	29.0
Working Part Time	2503	1800	71.9	703	28.1
No Response	480	341	71.0	139	29.0
Total	12056	8458	70.2	3598	29.8

Note. Employment Status $X^2= (12.650, df=5, =.027)$

The healthcare area had more females (11,405) than males ($n=600$) participate. However, there is no statistically significant difference ($\chi2=3.965$, $df=2$, $p=.138$) between the completion rates and gender. African American ($n=5,657$) and White ($n=4,504$) participants represented the majority of the 11,405 participants. There was a statistically significant difference ($\chi2=64.892$, $df=5$, $p<.001$) between completion rates and race. The completion rate for White (73.6%) and Asian (73.9%) was higher than for African American (67.7%) and American Indian/Alaskan Native (62.1%) participants. In the health care pathway, 379 of the participants reported being veterans and 68 reported a disability. There was no statistically significant difference on in completion for Veterans ($\chi2= .486$, $df=1$, $p=.486$) and those reporting a disability ($\chi2=2.748$, $df=2$, $p=.253$).

The completion rates by Prosperity Zone revealed that in some regions completion in the health care area is as high as 76.6% and in other areas as low as 63.7%. When examining completion rates by Prosperity Zone, there were significant differences ($\chi2=2.748$, $df=2$, $=.253$). The Western (78.5%), Piedmont (76.6%), North Central (73.4%), and Northwestern (71.5%) Prosperity Zones all had completion rates over 70%.

Table 38

Health Cluster Participation, Started, Completed and Did not Complete by Educational Level and Employment Status

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Gender					
Female	11450	8038	70.2	3412	29.8
Male	600	418	69.7	182	30.3
No Response	6	2	33.3	4	66.7
Race					
African American	5657	3830	67.7	1827	32.3
White	4504	3316	73.6	1188	26.4
American Indian/ Alaskan	549	341	62.1	208	37.9
Asian	111	82	73.9	29	26.1
Native Hawaiian / Pacific Islander	25	14	56.0	11	44.0
No Response	1210	875	72.3	335	27.7
Veteran Status					
Yes	379	272	71.8	107	28.2
No	11677	8186	70.1	3491	29.9
Disability					
No	9451	6612	70.0	2839	30.0
Yes	268	180	67.2	88	32.8
No Response	2337	1666	71.3	671	28.7
Total	12056	8458	70.2	3598	29.8

Note. Gender X^2= (3.965, *df*=2, *p*=.138); Race X^2= (64.892, *df*=5, p<.001); Veteran Status X^2= (.486, *df*=1, *p*=.486); Disability X^2= (2.748, *df*=2, *p*=.253)

When examining the limited labor market data from the 12,056 people that participated, the report explored the 8,548 (70.2%) completers. Of those that completed, 4,536 (53.6%) had employment based on earnings in the last 4 quarters of provided data (Q3, Q4, of 2021, Q1, and Q2 of 2022). There were 1,605 (19.0%) of the respondents that did not have any wage data reported. Of the 4,536 with earnings data, the minimum 4 quarter earnings were $600. and the maximum was $146,204. The mean earnings for the completers that had wage data reported was $34,219.31 (SD=$21,596.44). The data indicates that of the 8,548 individuals that started a pathway in the health cluster, 4,536 (53.1%) had employment based on the UI wage data in North Carolina. Please keep in mind that the UI wage data will only cover employees covered by unemployment insurance. Additionally, the UI wage data is location based, so if an employee lives in a different state, they would not be present in this data. Additionally, when a participant moves out of state, there is no interstate tracking. Typically, this data does not cover federal employees such as Veterans Health Administration (VHA), Federal Bureau of Prisons, and Military Base. This also excludes contractors. The transparency in the flaws with this data is critical to understand this can sometimes provide an incomplete picture of participant success when using labor market outcomes.

Table 39

Health Cluster Participation, Started, Completed and Did not Complete by Prosperity Zone

Prosperity Zone	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
North Central Prosperity Zone	1816	1333	73.4	483	26.6
Northeast Prosperity Zone	1122	716	63.8	406	36.2
Northwestern Prosperity Zone	1135	811	71.5	324	28.5
Piedmont Triad (Central) Prosperity Zone	1908	1462	76.6	446	23.4
Sandhills (South Central) Prosperity Zone	2383	1517	63.7	866	36.3
Southeast Prosperity Zone	1382	935	67.7	447	32.3
Southwestern Prosperity Zone	1292	885	68.5	407	31.5
Western Prosperity Zone	910	714	78.5	196	21.5
No Zone Identified	108	85	78.7	23	21.3
Total	12056	8458	70.2	3598	29.8

Note. X^2= (157.351, *df*=8, p<.001)

Transportation, Distribution, and Logistic Career Sector

From 2016-2020, the transportation, distribution, and logistic career area had a total of 5,861 participants, accounting for 20.8% of the total participants. An examination of the education level reveals that individuals entered the pathway from a variety of entry points, each with different levels of prior education. Some individuals had as little education as no high school degree, while others held doctorates or professional graduate degrees. There was a significant difference in completion rates in relation to education ($\chi 2=32.395$, $df=9$, $p<.001$). The highest percentage of completers were those who entered holding a certificate or diploma (87.9%), followed by those with a bachelors (86.4%). Those with high school diploma/GED completed at a lower rate (79.8%). Since those in the categories of doctorate and professional graduate were so small, it should be noted that one person completing or not completing makes what seems to be a large impact to the percentage and cells with small numbers should be interpreted with caution.

Table 40

Transportation, Distribution, and Logistics Cluster Participation, Started, Completed and Did not Complete by Educational Level

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Education Level					
No High School	311	255	82.0	56	18.0
High School/GED	2912	2323	79.8	589	20.2
Some College	998	814	81.6	184	18.4
Certificate/Diploma	601	528	87.9	73	12.1
Associate's Degree	417	356	85.4	61	14.6
Bachelor's Degree	389	336	86.4	53	13.6
Masters	84	67	79.8	17	20.2
Doctorate	4	3	75.0	1	25.0
Professional Graduate	6	5	83.3	1	16.7
No Response	10	114	82.0	25	18.0

Note. Educational Level X^2= (32.395, *df*=9, p<.001)

The employment status of participants also varied upon entry into this pathway with the majority of the participants (3,864) reporting not working when starting the program. There was a statistically significant difference ($\chi 2=14.500$, *df*=5, p=013) in completion based on employment status. Those who had never worked before had the lowest completion rates (78.6%). In this cluster, the average completion rate was around 82%.

Table 41

Transportation, Distribution, and Logistics Cluster Participation, Started, Completed and Did not Complete by Employment Status

	Started	Completed		Did not Complete	
	N	*n*	*%*	*n*	*%*
Employment Status					
Never Worked	28	22	78.6	6	21.4
Not Working	3864	3124	80.8	740	19.2
Other	308	253	82.1	55	17.9
Working Full Time	1042	890	85.4	152	14.6
Working Part Time	485	395	81.4	90	18.6
No Response	134	117	87.3	17	12.7
Total	5861	4801	81.9	1060	18.1

Note. Employment Status X^2= (14.50, *df*=5, *p*=.013)

Table 42 highlights that the transportation, distribution, and logistic career area had more males (4,518) than females (*n*=1339) participate. There was a statistically significant difference ($\chi 2=39.783$, df=2, p<.001) between the completion rates and gender. Males (83.6%) completed at a higher rate than females (76.1%). African Americans (*n*=3,887) and White (*n*=1,224) represented the majority of the 5,861 participants. There was a statistically significant difference ($\chi 2=29.434$, df=5, p<.001) between completion rates and race. The completion rate for African Americans (80.1%) was lower than all the other races in the transportation, distribution, and logistics pathway. Of the 5,253 participants 618 reported being veterans and 142 reported a disability. There was a statistically significant difference on in completion for Veterans ($\chi 2=$ .5.768, *df*=1, p=.016) and there was not for those reporting a disability ($\chi 2=1.700$, *df*=2, p=.427). The Veterans completed at a lower rate (81.5%) than non-veterans (85.4%).

The completion rates by Prosperity Zone revealed that in some regions completion in the health care area is as high as 91.3% and in other areas as low as 75.7%. When examining completion rates by Prosperity Zone, there were significant differences ($\chi 2=39.627$, df=8, p<.001). The Piedmont Triad (91.8%), Northwestern (88%), Western (86.1%) Prosperity Zones had the highest completion rates. The Northeast and Southeast Prosperity Zones had completion rates under the average (81.95).

Table 42

Transportation, Distribution, and Logistics, Cluster Participation, Started, Completed and Did not Complete by Educational Level and Employment Status

	Started	Completed		Did not Complete	
	N	*n*	%	*n*	%
Gender					
Female	1339	1019	76.1	320	23.9
Male	4518	3779	83.6	739	16.4
No Response	4	3	75.0	1	25.0
Race					
African American	3887	3112	80.1	775	19.9
White	1224	1057	86.4	167	13.6
American Indian/Alaskan	156	129	82.7	27	17.3
Asian	46	41	89.1	5	10.9
Native Hawaiian / Pacific Islander	11	10	90.9	1	9.1
No Response	537	452	84.2	85	15.8
Veteran Status					
No	5253	4273	81.5	970	18.5
Yes	618	528	85.4	90	14.6
Disability					
No	4557	3719	81.6	838	18.4
Yes	142	115	81.0	27	19.0
No Response	1162	967	83.2	195	16.8
Total	5861	4801	81.9	1060	18.1

Note. Gender X^2= (39.783, *df*=2, p<.001); Race X^2= (29.434, *df*=5, p<.001); Veteran Status X^2= (5.786, *df*=1, p=.016); Disability X^2= (1.70, *df*=2, p=.427)

Table 43

Transportation, Distribution, and Logistics Cluster Started, Completed and Did not Complete by Prosperity Zone

Prosperity Zone	Started	Completed		Did not Complete	
	N	*n*	%	*n*	%
North Central Prosperity Zone	1053	864	82.1	189	17.9
Northeast Prosperity Zone	534	404	75.7	130	24.3
Northwestern Prosperity Zone	242	213	88.0	29	12.0
Piedmont Triad (Central) Prosperity Zone	1222	2039	91.8	183	8.2
Sandhills (South Central) Prosperity Zone	882	724	82.1	158	17.9
Southeast Prosperity Zone	471	360	76.4	111	23.6
Southwestern Prosperity Zone	1265	1034	81.7	231	18.3
Western Prosperity Zone	151	130	86.1	21	13.9
No Zone Identified	41	33	80.5	8	19.5
Total	5861	4801	81.9	1060	18.2

Note. X^2= (39.627, *df*=8, p<.001)

When examining the limited labor market data from the 5,861 people who participated in the transportation, distribution, and logistics cluster, this part of the report was only able to explore outcomes for the 4,801 (81.9%) who completed the program. Of those that completed, 1,769 (36.8%) had available data for their earnings in Q3 and Q4 of 2021, and Q1 and Q2 of 2022, which indicated employment. It's important to note that the UI (Unemployment Insurance) wage data covers only those employees covered by unemployment insurance. Many individuals working in the transportation industry might be working as contractors and therefore not have UI wage data, or they might be living in a different location. The UI wage data is location-based, so if an employee lives in a different state, they would not be included in this data. Additionally, when a participant moves out of state, there is no interstate tracking. This data also excludes contractors, which may include many of those with CDLs (Commercial Driver's Licenses). Transparency regarding the flaws in this data is critical to understand that it can sometimes provide an incomplete picture of participant success when using labor market outcomes. There were 443 (9.2%) of the respondents who did not have any wage data reported. Of the 1,769, the minimum four-quarter earnings were $2,017.50, and the maximum was $163,467.00. The mean earnings were $40,649 (SD = $22,243.72). The data indicates that of the 5,861 individuals who started a pathway in the transportation cluster, 1,769 (30.1%) were employed based on the UI wage data and on average earned $40,649.

Information Technology Career Sector

From 2016-2020, the information technology (IT) career area had a total of 1751 participants, accounting for 6.2% of the total participants. An examination of the education level reveals that individuals entered the pathway from a variety of entry points, each with different levels of prior education. Some individuals had as little education as no high school degree, while others held doctorates or professional graduate degrees. There was a significant difference in completion rates in relation to education ($\chi 2=18.866$, $df=8$, $=.016$). Those with no high school, doctorates, and Masters had to few people to provide good estimates on completion. Those with a high school diploma (67.0%) and that had some college (69.2%) had lower completion rates than those with a Certification/Diplomas (75.6%), Association Degrees (75.1%), Bachelor's degree (77.1%), and Master's Degree (78.7%) had the highest.

Table 44

IT Cluster Participation, Started, Completed and Did not Complete by Educational Level

	Started	Completed		Did not Complete	
	N	*N*	*%*	*N*	*%*
Education Level					
No High School	5	4	80.0	1	20.0
High School/GED	270	181	67.0	89	33.0
Some College	234	162	69.2	72	30.8
Certificate/Diploma	147	114	77.6	33	22.4
Associate's Degree	275	208	75.6	67	24.4
Bachelor's Degree	585	451	77.1	134	22.9
Masters	174	137	78.7	37	21.3
Doctorate	8	8	100	0	0.0
Professional Graduate	3	2	66.7	1	33.3
No Response	50	41	82	9	18.0

Note. Educational Level X^2 = (18.866, *df*=8, =.016)

The employment status of participants also varied upon entry into this pathway with the majority of the participants (1,006) reporting not working when starting the program. There was no statistically significant difference (χ2=2.152, *df*=5, *p*=.828) in completion based on employment status.

Table 45

IT Cluster Participation, Started, Completed and Did not Complete by Employment Status

	Started	Completed		Did not Complete	
	N	*N*	*%*	*n*	*%*
Employment Status					
Never Worked	16	14	87.5	2	12.5
Not Working	1006	745	74.1	261	25.9
Other	45	33	73.3	12	26.7
Working Full Time	354	270	76.3	84	23.7
Working Part Time	249	185	74.3	64	25.7
No Response	81	61	75.3	20	24.7
Total	1751	1308	74.7	443	25.3

Note. Employment Status X^2 = (2.152, *df*=5, =.828)

The information technology career area had more males (1,079) than females (*n*=670) participate. There was a statistically significant difference (χ2=7.043, df=2, p=.030) between the completion rates and gender. Males (76.7%) completed at a higher rate than females (71.3%). African American (*n*=769) and White (*n*=597) participants represented the majority of the 1751 participants. There was a statistically significant difference (χ2=16.832, df=5, =.005) between completion rates and race. The completion rate for African Americans (71.3%) and Asians (71.6%) was lower than White (80.4%) and American Indiana/Alaskan (80.0). Of the 1,751 IT pathway participants, 295 reported being veterans and 79 reported a disability. There was not a statistically significant difference on in completion for those reporting a disability (χ2=.868, *df*=2, =.648) or veteran status (χ2=.009, *df*=1, =.926).

The completion rates by Prosperity Zone revealed that in some regions completion in the IT area is as high as 81.6% and in other areas as low as 60.6%. When examining completion rates by Prosperity Zone, there were significant differences (χ2=58.907, *df*=8, p<.001). The Prosperity Zones with the highest completion rates were North Central (81.6%), Piedmont Triad (74.5%), and Sandhills (72.2%). The Southeast (60.6%) and Southwestern (64.9%) had the lowest rates. Other Prosperity Zones such as the Northeast and Northwestern also had low completion rates but had too few participants to make meaningful estimations.

Table 46

IT Cluster Participation, Started, Completed and Did not Complete by Educational Level and Employment Status

	Started	Completed		Did not Complete	
	N	*n*	*%*	*N*	*%*
Gender					
Female	670	478	71.3	192	28.7
Male	1079	828	76.7	251	23.3
No Response	2	2	100	0	0.0
Race					
African American	769	548	71.3	221	28.7
White	597	480	80.4	117	19.6
American Indian/Alaskan	30	24	80.0	6	20.0
Asian	81	58	71.6	23	28.4
Native Hawaiian / Pacific Islander	8	6	75.0	2	25.0
No Response	266	192	72.2	74	27.8
Veteran Status					
Yes	295	221	74.9	74	25.1
No	1456	1087	74.7	369	25.3
Disability					
Yes	79	59	74.7	20	25.3
No	1300	978	75.2	322	24.8
No Response	372	271	72.8	101	27.2
Total	1751	1308	74.7	443	25.3

Note. Gender X^2= (7.043, *df*=2, =.030); Race X^2= (16.832, *df*=5, =.005); Veteran Status X^2= (.009, *df*=1, =.926); Disability X^2= (.868, *df*=2, =.648)

Table 47

IT Cluster Participation, Started, Completed and Did not Complete by Prosperity Zone

Prosperity Zone	Started	Completed		Did not Complete	
	N	*N*	*%*	*n*	*%*
North Central Prosperity Zone	903	737	81.6	166	18.4
Northeast Prosperity Zone	12	8	66.7	4	33.3
Northwestern Prosperity Zone	11	7	63.6	4	36.4
Piedmont Triad (Central) Prosperity Zone	94	70	74.5	24	25.5
Sandhills (South Central) Prosperity Zone	187	135	72.2	52	27.8
Southeast Prosperity Zone	71	43	60.6	28	39.4
Southwestern Prosperity Zone	436	283	64.9	153	35.1
Western Prosperity Zone	23	18	78.3	5	21.7
No Zone Identified	14	7	50.0	7	50.0
Total	1751	1308	74.7	443	25.3

Note. X^2= (58.907, *df*=8, p<.001)

When examining the limited labor market data from the 1,751 people that participated in the IT area, a total of 1,308 (74.7%) completed. Of those that completed, 522 (39.9%) had data available for their earnings in Q3, Q4, of 2021, Q1, and Q2 of 2022 that indicated employment. There were 411 (31.4%) that did not have any data reported. Of the 522, the minimum 4 quarter earnings were $3,744.17 and the maximum was $307,646.00. The mean earnings were $57,340.62 (SD=36,495.52). The data indicates that of the 1,751 individuals that started a pathway in the information technology cluster, 522 (39.9%) had employment based on the UI wage data. It's important to note that the UI (Unemployment Insurance) wage data covers only those employees covered by unemployment insurance. Many individuals working in the information technology sector might be telecommuting and working remotely. Additionally, a number of others might be working as gig employees or contractors and therefore not have UI wage data. The UI wage data is location-based, so if an employee lives in a different state, they would not be included in this data. Additionally, when a participant moves out of state, there is no interstate tracking.

Challenges with Data and Future Questions

This section will address challenges with the data that was provided to the research team. Additionally, for transparency, we will address how these types of challenges can potentially impact an evaluation project and potential outcomes. The section will also provide suggestions for improved data collection. The section will end with suggestions for future methods using a logic model that integrates an improvement lens how and future questions for evaluations could be used to develop a model for improvement.

Challenges with Project's Data

Since this is one of the initial projects to evaluate the NCWorks Certified Career Pathways outcomes, created the need for a detailed examination of the data and the data collection process that revealed multiple challenges that undermine the efficacy and accuracy of the information gathered.

First, if the NCWorks Certified Career Pathways project was evaluating the pathway level they must identify the type of pathway that a student is enrolled in, students should be classified according. Currently, there are 41 distinct career pathways that North Carolina has laid out (and 1 not yet certified). However, it is difficult to identify which pathway a student is a part of because participants are classified at the program level and not at the pathway level. Moreover, the programs have unique titles that are difficult to determine which pathway it falls under. The NCWorks Commission could address this issue by identifying a crosswalk between the pathways, occupations, programs and sectors.

Second, if a goal of the evaluation is to identify student program participation, local workforce development boards in the region, programs must collect the data to disaggregate by workforce development board. Currently, some programs are assigned to multiple local workforce development boards and there is not a rule in place to determine which program is unique to a workforce development board. The NCWorks Commission could address this issue by laying out guidelines for coding data. Describing the Career pathways by local workforce development board, sector, location, pathway, and Prosperity Zones is difficult because there currently are not crosswalks available to merge the different datasets with this unique information into a unified dataset.

Third, understanding student participation by sociodemographic status is important to address equitable outcomes. However, there were large percentages of participants missing racial information. For example, during the period of the COVID-19 pandemic, over 15% of participants did not provide information about their race.

Fourth, knowing student outcomes is important for program evaluation. Student outcomes can be found in a dataset that include the type of credential earned and the date received. However, in many cases they were entered in a non-systemic way and same credential was enter in a variety of manners. Additionally, in a separate dataset, there is information about the type of

program a participant enrolled in, and their respective program start date and end date. It is plausible that someone earned a credential after the end date. As a result, there is not enough information to merge these datasets together. Thus, we are not able to evaluate student outcomes by type of program.

These challenges present significant barriers to drawing reliable conclusions and formulating informed strategies, especially at the pathway level to address continuous improvement. The data collection for the project revealed several areas that could be of concern for high-quality evaluation and research to provide evidence-based suggestions for practice. The following areas were noted after receiving the data and conducting this project.

- Incomplete Data: There were significant gaps in the dataset, particularly with missing occupational codes and locations, which hinder comprehensive analysis.

- Inconsistent Coding: The coding of degrees lacked uniformity, leading to inconsistencies that could impact the interpretation of the data.

- Inaccurate Recordings: The accuracy of certificate names was questionable, casting doubts on the reliability of the data collected.

- Lack of Specific Information: The data failed to capture detailed information regarding the specific pathways that participants were involved in, which is crucial for evaluating the project's impact.

- Geographical Mapping Challenges: The process of mapping zip codes to counties and then to Prosperity Zones introduced an additional layer of complexity and potential for error.

- Variation in Pathways Across Boards: Different boards had multiple pathways that were situated in different Prosperity Zones, posing a challenge for data aggregation and comparison.

- Diverse Data Sources: The individualized collection methods employed by each workforce development board, along with the reception of data in various formats from different stakeholders, resulted in a lack of standardization.

These issues highlight the need for a more streamlined and standardized approach to data collection to ensure data quality and utility. Not having the data in a form that could easily be merged and analyzed took the majority of the time spent on this project.

Suggestion for Improvement in Data Collection

In order to address data difficulties previously delineated, it is imperative to institute a methodical and strategic framework for data collection based on the goals of evaluation. It is

critical that the correct data is collected accurately. This should involve the integration of sophisticated data management technologies, the formulation and enforcement of stringent data governance protocols, and the cultivation of an ethos of perpetual enhancement throughout the stakeholder spectrum engaged in the data acquisition cycle. Through a well-developed protocol to measure to each identified issue, the objective is to refine the data collection mechanism, guaranteeing uniformity and precision, thereby solidifying the infrastructure that supports informed and analytical decision-making processes.

To effectively address the data collection issues identified in the project, a structured and multifaceted approach is necessary:

- Standardizing Data Entry Protocols: It's crucial to establish uniform guidelines across all workforce development boards. This involves creating standardized coding practices for degrees, occupational codes, and certificate names, ensuring consistency and reducing discrepancies.
- Implementing a Centralized Data Collection System: The introduction of a centralized, web-based data collection system can greatly improve uniformity and ease data aggregation. This system should be designed to guide stakeholders through a standardized data entry process, making it user-friendly and efficient.
- Incorporating Data Validation Checks: Automated checks for data accuracy and completeness can be a game-changer. By flagging entries that are missing critical information or that deviate from the standard formats, the integrity of the data is maintained.
- Providing Training and Support: Comprehensive training for personnel involved in data collection is essential. Ensuring they understand and adhere to the new protocols is key, and ongoing support and refresher training sessions will help maintain data integrity.
- Utilizing GIS Technology for Geographical Mapping: The use of Geographic Information System (GIS) technology to automatically map zip codes to counties and Prosperity Zones can minimize manual errors and streamline the mapping process.
- Conducting Regular Data Audits: Periodic audits are important to ensure continuous adherence to data collection standards and to identify areas for improvement.
- Facilitating Stakeholder Collaboration: Regular meetings with all stakeholders should be conducted to discuss data collection practices, challenges, and updates. This encourages a collaborative approach and ensures everyone is aligned with the standards.
- Establishing a Feedback Mechanism: A system to continuously gather input from users of the data system will allow for ongoing improvements and adjustments to the data collection process.

By implementing these steps, the project can significantly enhance the quality, accuracy, and usability of its data, leading to more reliable and insightful outcomes. This approach not only addresses the current issues of incomplete and inconsistent data, inaccurate recordings, and

geographical mapping challenges but also sets a foundation for robust data management in the future.

Future Suggestions for Improvement and Questions for Evaluation

First, we would suggest creating a logic model to better understand how to view the pathways projects and to understand what aspects of pathways could be related to the success of students completing and obtaining employment. A logical model is a systematic and visual representation of how a program or system is intended to work. It details the resources, activities, outputs, and outcomes associated with a program or project, helping to clarify the underlying theory of change. For this project, the logic models could be used to design the program evaluation and planning, as they provide a clear framework for understanding the relationships between different components of a program. Done in an intention way prior to the evaluation would ensure the correct data is present for future evaluations. Key components of a logical model could include:

> Inputs/Resources: These are the personnel, finances, and other resources required to implement the program or project.
>
> Activities: These are the actions or processes that utilize the inputs to achieve the program's objectives. Examples include career counseling, education programs, training sessions, workshops, or development of materials.
>
> Outputs: Outputs are the direct results of the program's activities. They are often quantifiable and can include things like the number of people trained, number of workshops conducted, employment attainment, or materials produced.
>
> Outcomes: Outcomes are the changes or benefits that result from the program. They can be short-term, intermediate, or long-term. Outcomes are more than just a count of activities; they reflect the impact of those activities, such as improved knowledge, changed attitudes, or behavioral changes. For this project it could be the available labor force in a region.
>
> Goals/Objectives: These are the overarching aims of the program. They provide a clear direction for what the program intends to achieve in the long term.

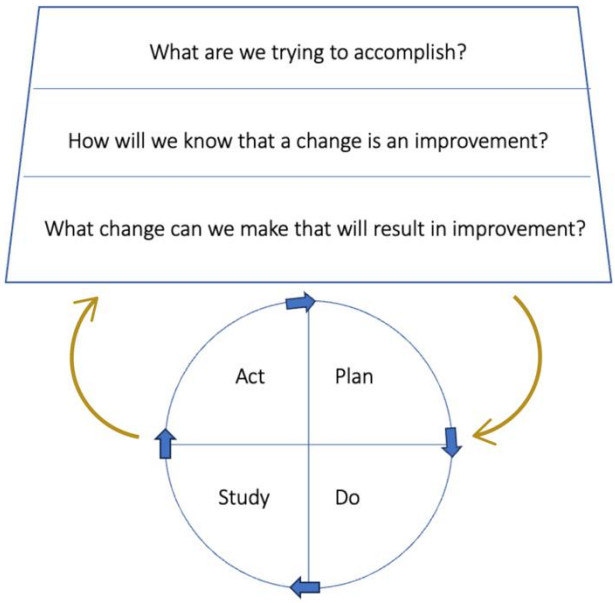
This type of logic model can assist in evaluating programs, as it would help stakeholders understand the program's process and expect results. Once completed this could also help identify potential challenges and gaps.

In addition to the logical model, we would like to suggest a model for improvement within the career pathways. The Model for Improvement is a framework developed by Walter Shewhart in the 1920's (Shewhart, 1937) and was adapted by the Carnegie Foundation for improvement in schools. This could be a powerful approach for enhancing career pathways. This model operates

on two fundamental principles: setting clear objectives and applying small-scale tests of change. To apply this model in the context of career pathways, the first step would be to establish specific, measurable goals, such as increasing completion rates or improving labor market outcomes and encouraging future education. Once these goals are defined, the next step involves identifying key areas for improvement, such as curriculum development, participant engagement, or support services.

The model's iterative process, which revolves around the Plan-Do-Study-Act (PDSA) cycle, allows for ongoing refinement based on real-world feedback. For example, if the objective is to increase the completion rate of a healthcare career program, the 'Plan' phase could involve implementing new mentoring strategies or tailored study supports. During the 'Do' phase, these changes would be applied on a small scale, perhaps in a single cohort of students. In the 'Study' phase, the outcomes of these changes would be closely monitored and compared against predetermined metrics. Finally, the 'Act' phase would involve analyzing the results and deciding whether to adopt, adapt, or abandon the changes. This cyclical process ensures continuous improvement and adaptation, making it a valuable tool for educational administrators and policymakers looking to enhance career pathways and ensure they align with evolving industry needs and participant expectations. Additionally, they would make use of the data being collected for longer terms evaluations at the local level and provide incentive to collect data.

Figure 15
Model for Improvement



Note: Figure is recreated from *The Improvement guide: A practical approach to enhancing organizational performance* by Langley et al. (2009)

Recommendations for Practice and Future Research

From the results of this project, we would have recommendations in 4 areas.

Practice

First, data collection needs to be improved to have a standardized process across Workforce Development Boards. The protocols to collect data to have clear guidelines and the sociodemographic variables that are important need to be defined early and collected in the same manner. Crosswalks need to be created to view the alignment of the pathways and workforce demand. The standardized data collection needs to have training and support and regular audits to ensure it is being done accurately and there is adherence to the protocols.

Second, based on the information it is important to ensure there is regional alignment of the career pathways with the workforce demands. it's crucial to continue tailoring the program to match the specific needs of each region. This may involve conducting regular assessments of local labor markets and collaborating closely with employers and industries to ensure alignment. Furthermore, it is important to continue to emphasize the diversity of career opportunities within the program. The existence of 41 Certified Career Pathways is commendable, but efforts should be made to regularly review and update these pathways to reflect emerging industries and evolving job market demands. This will ensure that individuals have access to the most relevant and in-demand career options and increase options in regions that have less pathways.

Third, it would be useful to Implement a robust monitoring and evaluation system to track the success and impact of the program within each region. Collect data on completion rates, employment outcomes, and participant satisfaction to continuously assess the program's effectiveness and make data-driven improvements. Given that Health Science and Manufacturing and Transportation pathways consistently attract the highest number of participants, consider providing additional resources and support to these pathways to ensure they can accommodate the demand effectively. This might involve expanding faculty or resources in these areas. Additionally, providing supports in low completion areas could add values. Addressing any disparities in completion rates and participation, such as the gender and race-related differences or other characteristics is impotent. It is suggested that programs develop targeted support programs or initiatives to promote all students within the pathway programs.

Future Research

Suggestions for future research include a quantitative analysis to understand the participants experiences and the perspective from business and industry. Collecting qualitative data through surveys, interviews, and focus groups to gauge participant satisfaction and gather feedback on program strengths and weaknesses. This type of approach could also address barriers that

provided challenges for participants and supports that help the participants complete. Use this information to inform program improvements.

A variety of other methods could be used to study pathways at their point of development. A comprehensive longitudinal study tracking participants from the start of their career pathway programs through to completion or attrition could provide value in examining factors that contribute to completion, such as program features, support services, and demographic characteristics. To better understand outcomes, it would be valuable to examine labor market outcomes a quantitative study that seeks to understand the impact of career pathways on participants' labor market outcomes, including employment rates, wage growth, and job stability could be conducted. A difference and differences design could be used by creating a control group to compare these outcomes to individuals who did not participate in such programs, controlling for relevant variables.

Additionally, a study that could examine credential attainment and high-value credentials would add value if that data is collected. That type of study could investigate the attainment of high-value credentials, such as industry-recognized certifications or licenses, among career pathway participants. Assess the influence of credential attainment on career advancement and income levels. Furthermore, it would be valuable to understand what pathway participants do post-pathway in relation to their education pursuits. This type so study could examine the educational trajectories of career pathway completers. Investigate whether participants pursue further education, such as degree programs, after completing their initial pathways and assess the impact of this additional education on career prospects.

Lastly, a valuable study would be to conduct a cost-benefit analysis to determine the return on investment for career pathway programs. Evaluate the economic impact of program funding and resources against the societal benefits in terms of reduced unemployment, increased tax revenue, and decreased reliance on social support programs.

Conclusions

Goal 1: Describe NCWorks Certified Career Pathways

The NCWorks Certified Career Pathways program is a comprehensive initiative designed to provide diverse opportunities for individuals looking to pursue their career aspirations. With a total of 41 Certified Career Pathways, this program ensures that a wide range of career interests and industries are represented. Across all local Workforce Development Boards (WDB) and Prosperity Zones, there is a commitment to offering pathways, however, there was a different level of offerings based on the local workforce development boards and Prosperity Zones. The distribution of pathway options within Prosperity Zones varies significantly, highlighting the flexibility and adaptability of the program to meet the unique needs of different regions. While half of the zones offered five pathways each, others exhibited a more extensive range, with one zone offering 18 pathways. Notably, Health Science and Manufacturing and Transportation pathways each had the top number of participants regardless of Prosperity Zone.

Goal 2: Explore Participation in the NCWorks Certified Career Pathways

The participation in the NCWorks Certified Career Pathways program is characterized by a diverse and widespread demographic representation, reflecting the program's commitment to inclusivity and accessibility. With a total of 28,193 participants, the program has a substantial number of individuals seeking training. Participation within Prosperity Zones varied significantly, underscoring the regional differences in program engagement. Some zones served a substantial proportion of participants, with one zone accommodating as much as 19.5% of the total, while others had lower rates, with one zone serving as low as 5.7%. Despite this variability, five of the zones collectively served the majority, accounting for 78.7% of all participants, highlighting the significance of these regions. At the level of local Workforce Development Boards (WDB), participation also exhibited a broad spectrum, ranging from serving 1.2% of participants to as high as 9.2%. This variation underscores the needs and demographics of different areas. The range in participants served by individual WDBs, from 352 to 2,606

Demographically, the participants of the program are predominantly female, comprising 65% of the total. Additionally, nearly 50% of participants are African American, indicating it is serving historically underrepresented individuals in career opportunities. Education levels among participants vary, with approximately 34% having a high school/GED diploma and 22% having some college experience, showcasing the program's commitment to providing pathways for individuals at different educational stages. Furthermore, the program serves a significant number of individuals who were not employed at the program's outset, accounting for 54.8% of participants. Additionally, 8.6% of participants are veterans. Lastly, 3% of participants reported having a disability. In summary, the participation data for the NCWorks Certified Career Pathways program reflects its success in engaging a broad and diverse range of individuals, addressing regional disparities, promoting diversity, and providing career development opportunities to a wide cross-section of the population. It demonstrates the program's commitment serving all individuals.

Goal 3: Explore Completion in the NCWorks Certified Career Pathways

In summary, the data regarding who is completing the NCWorks Certified Career Pathways program reveals important insights into the characteristics and demographics of successful participants. Out of the 28,193 individuals who initiated the program, an impressive 72.8% successfully completed a Certified Career Pathway, indicating the program's overall effectiveness in guiding a significant majority of its participants towards successful career outcomes.

Completion rates were not uniform and varied depending on the chosen career cluster that the pathway participant selected, ranging from 61.5% to 81.9%. Notably, the top three participation areas—Health Science, Transportation, Distribution, and Logistics, and Information Technology—all exceeded the average completion rate, demonstrating their effectiveness in supporting large numbers of participants in achieving completion.

Several demographic factors were found to be statistically significant in relation to completion rates. Gender played a significant role, with males completing at a higher rate than females, suggesting potential areas for gender-specific support and interventions. Race was another significant factor, with White and Asian participants completing at the highest rates, highlighting the importance of exploring this more at program levels. Education level also had a significant impact on completion rates, with those holding certificates, diplomas, or other degrees completing at higher rates than those with a high school diploma/GED and some college education. Additionally, employment status at the time of program entry significantly affected completion rates, with those who had never worked completing at a lower rate compared to other employment statuses. This might suggest additional support for those in this group.

Lastly, the data revealed variations in completion rates across different Prosperity Zones, ranging from around 65% to 78%. These differences highlight the need for localized strategies and tailored support to ensure consistent program success across all regions.

In conclusion, the NCWorks Certified Career Pathways program has proven effective in guiding a majority of participants to successful completion, with varying outcomes influenced by factors such as gender, race, education level, employment status, and regional differences. Addressing these disparities and providing targeted support can enhance the program's ability to deliver equitable opportunities and outcomes for all participants.

Goal 4: Explore Alignment of Participation in the NCWorks Certified Career Pathways to Workforce Demand

In conclusion, analyzing alignment between workforce demand and those participating in the Certified Career Pathways, the state-level labor market data would not be an effective strategy for examining alignment between the programs and the demands of the job market. The data suggests that the alignment between the programs and labor market demands varies significantly around the state and what would appear as the highest demand for the state overall would differ between specific regional levels.

At the state level and across all Prosperity Zones, Health Science consistently emerged as a high-demand field, ranking within the top 5 for demand in all 8 zones. Manufacturing also demonstrated strong demand, ranking as the top demand in one Prosperity Zone and appearing within the top 5 in the other 7 Prosperity Zones. Education was similarly identified as a top demand in 4 Prosperity Zones.

These findings highlight the dynamic nature of labor market demands, which can vary significantly across regions underscoring the importance of considering local and regional labor market dynamics when aligning educational and training programs, such as the NCWorks Certified Career Pathways, with workforce needs. Furthermore, it is important to acknowledge that each region possesses its unique economic landscape and industry composition. This diversity necessitates a more granular exploration of alignment between education and the workforce, potentially at the sector or occupational level. Understanding the specific needs and

opportunities in each region is crucial for tailoring educational pathways to the local job market realities.

Additionally, despite certain regions not being identified as high-demand areas, the data reveals that the NCWorks Certified Career Pathways program is not overproducing talent in fields that do not demonstrate significant demand. This indicates a level of responsiveness to labor market signals, ensuring that resources are allocated efficiently and that participants are trained for careers with opportunities. To ensure continued effectiveness and alignment, policymakers and program administrators should foster ongoing collaboration with local employers and industries to assess and adapt to changing regional labor market dynamics. The closer business can connect with the career pathways, the likelihood of better labor market outcomes will increase. This approach will maximize the program's impact in preparing individuals for careers in fields with strong demand, ultimately contributing to the economic success of individuals, businesses, and their respective communities.

Deep Dive Conclusions

The deeper dive sections have provided valuable insights into the participants of the NCWorks Certified Career Pathways program and their outcomes, shedding light on various aspects of participation and completion. The analysis has revealed important trends and variations by education level, employment status, gender, race, veteran status, and disability, offering a comprehensive understanding of who is being served by the program. The examination of completion rates by Prosperity Zones in each deep dive highlights regional variations, emphasizing the need for tailored strategies to address the unique needs of different areas. This insight is invaluable for program administrators and policymakers seeking to improve the program's effectiveness and alignment with local labor markets.

One notable finding is the variation in average annual wages among completers in different career pathways, with healthcare completers earning about $34,000, transportation completers earning $40,000, and IT completers earning $57,000 on average. These findings underscore the potential economic benefits of participating in specific pathways and may inform career choices for individuals.

Furthermore, the discussions on the limitations of UI wage data have highlighted the need for more comprehensive data sources to provide a more accurate and detailed picture of participant outcomes.

Overall, these deeper dive sections could be instrumental for program providers, policymakers, and educators. They offer a clear understanding of who is being served, who is successfully completing the pathways, and where improvements can be made. This knowledge can guide efforts to enhance program accessibility, effectiveness, and relevance, ultimately benefiting participants, businesses, and the communities they serve. By continually refining and adapting the program based on evidence-based insights, stakeholders can better support individuals in pursuing successful careers aligned with labor market demands.

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Appendix A

NCWorks Commission Certified Career Pathways

Sector/ Career Pathway	Workforce Development Board(s)	Year Launched	Counties	Prosperity Zone(s)	Notes
Healthcare ***The Northeastern NC Pathway to Prosperity (PtP) Health Careers Pathway***	Northeastern, Rivers East, Turning Point	2016	Currituck, Camden, Pasquotank, Perquimans, Chowan, Gates, Washington, Tyrell, Dare, Hyde, Hertford, Bertie, Martin, Pitt, Beaufort, Northampton, Halifax, Nash, Edgecombe, Wilson	1-Northeast 3-North Central	Pathway was officially organized in the summer of 2013. The regional pathways partnership was an outgrowth of a PtP pilot project developed by the CTE Division of DPI. Develops a wide-reaching pathway to reach enrollees in numerous counties in the Northeastern part of the state. It brings together numerous counties in a rural part of the state, combining resources, collaborating, and maximizing efficiencies to serve the enrollee and the employer. • Health Care – Northeast Pathways to Prosperity (nencpathways.org) • https://nencpathways.org/health-sciences/ • Career-Pathway-Toolkit-for-Career-Advisors.pdf (nwdbworks.com)
Collision Repair & Refinishing Technology	Mid-Carolina	2016	Cumberland	4-Sandhills	For more information, see their local area workforce development plan.
Information Technology	Capital Area	2016	Wake, Johnston, Durham, Person, Granville, Vance, Warren, Franklin	3-North Central	Triangle Regional Pathways is a collaboration between Capital Area, Durham, and Kerr-Tar workforce development boards. Provides comprehensive training in the Information Technology industry sector. Develops a strong employer network to provide career awareness and work-based learning opportunities. Capital Area's pathway demonstrates a strong commitment to employer engagement. Their employers provided the template to meet information technology needs in the region. • Information Technology (IT) Careers - Triangle Career Pathways (CAWD)

Advanced Manufacturing	Kerr-Tar (lead)	2016	Wake, Johnston, Durham, Caswell, Person,	3-North Central	Provides comprehensive training in the Advanced Manufacturing industry sector. Develops a wide reaching skilled-trades pathway to identify enrollees at all stages in their career in numerous counties.
			Granville, Vance, Warren, Franklin		Kerr-Tar's pathway includes numerous counties in rural areas adjacent to urban ones. This pathway provides numerous integral work-based learning and training opportunities for enrollees along all levels of the pathway. • Advanced Manufacturing Skills Training Alliance Cruisers 2017 Event | Kerr Tar COG
Nursing/ Healthcare	Piedmont Triad, Guilford County (*TriadWorks)*	2016	Forsyth, Davie, Surry, Stokes, Rockingham, Yadkin, Caswell, Davidson, Guilford, Alamance, Montgomery, Moore, Orange, Randolph	3-North Central 4-Sandhills 5-Piedmont	Provides comprehensive training in the Healthcare industry sector. Reduces duplication of education and training along the nursing curriculum. PTRC has developed strong work-based learning opportunities for pathway enrollees to ensure pathway exiters are well trained when seeking employment. • Nursing Pathway Grant Flyer (ptrc.org)
Advanced Manufacturing	Northeastern, Rivers East, Turning Point	2016	Currituck, Camden, Pasquotank, Perquimans, Chowan, Gates, Washington, Tyrell, Dare, Hyde, Hertford, Bertie, Martin, Pitt, Beaufort, Northampton, Halifax, Nash, Edgecombe, Wilson	1-Northeast 3-North Central	Provides comprehensive training in the Advanced Manufacturing industry sector. Develops a wide-reaching pathway to reach enrollees in numerous counties in the Northeastern part of the state. The Northeast Region's pathway represents the essence of this work. It brings together numerous counties in a rural part of the state, combining resources, collaborating and maximizing efficiencies to serve the enrollee and the employer. • Advanced Manufacturing – Northeast Pathways to Prosperity (nencpathways.org)

Health Life Sciences	Durham (lead)	2016	Wake, Johnston, Durham, Caswell, Person, Granville, Vance, Warren, Franklin	3-North Central	Provides comprehensive training in the Healthcare industry sector. Focuses on the most in-demand careers within the industry sector to develop a strong, streamlined pathway. Durham has developed a very nimble career pathway around the careers within healthcare that will afford enrollees the greatest opportunity for high-demand, high-wage employment. • Workforce Development Perspectives (durhamnc.gov)
Advanced Manufacturing	Mountain Area	2016	Madison, Buncombe, Henderson, Transylvania	8-Western	Provides comprehensive training in the Advanced Manufacturing industry sector. Meets the growing need for skilled workers to perform all jobs within the occupation. Pathway demonstrates strong employer engagement. Advanced Manufacturing is growing in and around the Asheville area. Employers have engaged in a meaningful way to develop work-based learning and training opportunities for pathway enrollees. • Manufacturing Jobs | Mountain Area Careers | Western North Carolina
Health Sciences	Eastern Carolina	2017	Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, Wayne	2-Southeast	ECWDB aligns career development strategies into targeted career pathways and focuses on sector strategies that align to the region's high growth, high wage, and high skill demands. • Career Pathways Training Options Guide
Advanced Manufacturing	Southwestern	2017	Cherokee, Graham, Clay, Macon, Jackson, Haywood, Swain	8-Western	Provides comprehensive training in the sector. Combines urban and rural industry and education partners to expand options for workers and employers. The collaborative's regional application represents input from local healthcare employers committed to flexible career pathways for individuals in the local labor market to enter and grow the field of nursing. Long term industry buy-in is a key component of career pathways in this region. • Workforce Development – Southwestern Commission (regiona.org)

Advanced Manufacturing	Foothills	2017	Cleveland, McDowell, Polk, Rutherford	6-Southwest 7-Northwest 8-Western	Provides comprehensive training in the Advanced Manufacturing industry sector. Develops a broad collaboration of stakeholders in the region to champion their pathway efforts. The pathway includes many nontraditional workforce stakeholders including DHHS/Vocational Rehabilitation to ensure broad access to this pathway. • Workforce Development - Foothills Regional Commission
Hospitality & Tourism	Mountain Area	2017	Madison, Buncombe, Henderson, Transylvania	8-Western	In the hospitality & tourism industry, jobseekers can move from one pathway to another as they advance from entry-level to management. There are a diverse range of job opportunities available from over 50 craft breweries, boutique hotels, award winning restaurants and outdoor recreation. Provides comprehensive training in the Hospitality industry sector. Meets the growing need for skilled workers to perform all jobs within the occupation. The region is a natural fit for the state's first certified pathway in Hospitality and Tourism.

					This pathway is unique in that it articulates and formalizes careers along a trajectory not always thought to be high-demand or high-wage. • Hospitality Jobs | Mountain Area Careers | Western North Carolina
Advanced Manufacturing	Centralina, Charlotte Works, Gaston	2017	Gaston, Lincoln, Iredell, Rowan, Cabarrus, Stanly, Union, Anson, Mecklenburg	6-Southwest	Represents input and support from across the 10-county area and is a guide that students, jobseekers and those looking at new career paths can use to learn about how to gain the skills necessary for employment in this Prosperity Zone's advanced manufacturing industry. • Centralina Workforce Development Board: Centralina WDB and Regional Partners Receive Certified Career Pathway (centralinaworks.com) • Manufacturing - Charlotte Works
Health Sciences	Mid-Carolina, Lumber River	2017	Cumberland, Moore, Hoke Harnett, Sampson, Montgomery	4-Sandhills	Recognizing the value of regionalism, counties joined together in July 2016 to create a healthcare pathway with a focus on nursing. Broad pathway spanning multiple occupations within the healthcare cluster. Participants can take advantage of the multiple entry and exit points to pursue a sustainable career and a living wage. • Nursing-and-Allied-Health-Pathway-Overview.docx (live.com)
Healthcare/ Nursing	Cape Fear, Lumber River (The Sandhills Region)	2017	Robeson, Bladen, Columbus	2-Southeast 4-Sandhills	• Services for Job Seekers | lrcog (lumberrivercog.org) • Workforce Development1 - Cape Fear Council of Governments (capefearcog.org)

Nursing & Allied Health	Foothills	2017	Cleveland, McDowell, Polk, Rutherford	6-Southwest 7-Northwest 8-Western	Culmination of coordinated efforts between diverse stakeholder representatives from industry employers, education, community partners, & government/workforce development agencies to meet the increasing demand for health careers by enhancing existing programs and developing new strategies that capitalize on leveraged resources. • Workforce Development - Foothills Regional Commission
Nursing & Related Healthcare	High Country	2017	Ashe, Alleghany, Avery, Mitchell, Watauga, Wilkes, Yancey	7-Northwest	Allows entrance from many points: whether high school student, graduate, no experience, or credentials, work experienced, degrees, dislocated, etc. By taking a series of non-degree classes & certification coursework, an enrollee could qualify as a semi-skilled employee in the healthcare setting in as little as six weeks. • Career Pathways | High Country (highcountrywdb.com)

Advanced Manufacturing	Capital Area, Durham	2017	Durham, Wake, Johnston Orange, Chatham, Lee	3-North Central	Triangle Regional Pathways is a collaboration between Capital Area, Durham, and Kerr-Tar workforce development boards. Provides comprehensive training in the Advanced Manufacturing industry sector. Builds on the existing Advanced Manufacturing Pathway in the Kerr-Tar service delivery area. • Advanced Manufacturing Careers - Triangle Career Pathways (CAWD)
Information Technology	Kerr-Tar, Durham	2017	Durham, Person, Granville, Vance, Warren, Franklin	3-North Central	Provides comprehensive training in the IT sector. Demonstrates a strong commitment to information technology training in and around RTP. • Workforce Development Perspectives (durhamnc.gov)
Health/Life Sciences	Capital Area, Kerr-Tar	2017	Wake, Johnston Person, Granville, Vance, Warren, Franklin Orange, Chatham, Lee	3-North Central	Provides comprehensive training in the Health Sciences sector. Extends existing pathway in Durham to its two regional partners. Capital Area, Durham and Kerr-Tar workforce development boards work together to develop certified career pathways in three areas. This certification for Capital Area and Kerr-Tar indicates their efforts to regionalize existing pathways to serve their respective workforce more efficiently. • Home - Triangle Career Pathways (CAWD)

Healthcare/ Nursing	Mountain Area	2017	Madison, Buncombe, Henderson, Transylvania	8-Western	Provides comprehensive training in the Health Sciences sector. Certifies a key strategic workforce development tool in the region. Provides sustainable nursing training to serve an aging population. • Healthcare-Pathway.pdf (mountainareacareers.org) • Healthcare Jobs | Mountain Area Careers | Western North Carolina
Advanced Manufacturing	Piedmont Triad, Guilford County (TriadWorks)	2017	Alamance, Randolph, Guilford, Davidson, Surry, Stokes, Rockingham, Caswell, Yadkin, Forsyth, Davie	3-North Central 4-Sandhills 5-Piedmont	Certifies a key strategic workforce development tool in the Triad region. Demonstrates a strong commitment to manufacturing careers in the region. Workforce boards worked together to develop this pathway that serves the greater Triad region. Provides invaluable services to the regional workforce and epitomizes the NCWorks Commission's strong commitment to regional efforts to streamline workforce development strategies. • Advanced Manufacturing Career Pathway document (ptrc.org)

Aviation	Guilford County, Piedmont Triad (TriadWorks)	2017	Alamance, Randolph, Guilford, Davidson, Surry, Stokes, Rockingham, Caswell, Yadkin, Forsyth, Davie	3-North Central 4-Sandhills 5-Piedmont	Certifies a key strategic workforce development tool in the Triad region. Demonstrates a strong commitment to setting the region up for continued aviation careers. The aviation industry sector pathway is one of the most established in the state. Having this pathway certified provides increased resources both for current and future enrollees as well as for the staff that serves this population. • Aviation Career Pathway information (ptrc.org)
Advanced Manufacturing	Eastern Carolina	2017	Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, Wayne	2-Southeast	Provides updated comprehensive training in the Advanced Manufacturing industry sector. Capitalizes on Eastern Carolina's strong presence of major manufacturing companies. Since early 2015 Eastern Carolina has worked to develop a pathway that meets the needs of Eastern NC's industries within the Advanced Manufacturing industry. It focuses heavily on the training and career awareness of pathway enrollees to ensure employer need is met. • Career Pathways Training Options Guide

Advanced Manufacturing	Western Piedmont	2017	Caldwell, Alexander, Burke, Catawba	7-Northwest	Provides comprehensive training in the Advanced Manufacturing industry sector. Strengthens collaboration between industry, community colleges and secondary education entities. Advanced Manufacturing has been an employment mainstay in the Western Piedmont area for decades. Western Piedmont's Advanced Manufacturing Pathway utilizes their established partnership with local industries and has worked to develop a solid education pipeline to address skill gaps within the industry. • Western Piedmont Advanced Manufacturing Career Paths Information
Transportation & Logistics	Guilford County, Piedmont Triad (*TriadWorks)*	2017	Alamance, Randolph, Guilford, Davidson, Surry, Stokes, Rockingham, Caswell, Yadkin, Forsyth, Davie	3-North Central 4-Sandhills 5-Piedmont	Provides comprehensive training in the transportation & logistics industry sector. Meets the growing need for skilled workers to perform varied positions within the occupation. Transportation & logistics is a growing industry in the Piedmont Triad region and intersects with two other clusters TriadWorks supports: Aviation and Advanced Manufacturing. Together, these three industry clusters provide the Triad workforce ample opportunities for upward mobility and diverse career options in the transportation field. • Piedmont Triad Regional Transportation and Logistics Pathway Information (ptrc.org)
Healthcare	Centralina, Charlotte Works, Gaston	2017	Gaston, Lincoln, Iredell, Rowan,	6-Southwest	Provides comprehensive training in the Healthcare industry sector. Combines urban and rural industry and education partners to expand options for workers and employers.
			Cabarrus, Stanly, Union, Anson, Mecklenburg		The Southwest Collaborative's regional application represents input from local healthcare employers committed to flexible career pathways for individuals in the local labor market to enter and grow the field of nursing. Long term industry buy-in is a key component of career pathways in this region. • Healthcare - Charlotte Works
Nursing & Allied Health	Western Piedmont	2018	Caldwell, Alexander, Burke, Catawba	7-Northwest	Provides comprehensive training in the Nursing and Healthcare industry sector. Strengthens collaboration between industry, community colleges and secondary education entities. The Nursing and Allied Healthcare industry is one of the largest and fastest growing industries in the nation, state, and Western Piedmont's local area. Utilizes established partnerships with community colleges and local education agencies to engage employers in developing a solid education pipeline to address skill gaps within the Nursing and Allied Healthcare industry. • Western Piedmont WDB Nursing Pathway information

Construction Technology	Cape Fear	2018	Pender, New Hanover, Brunswick, Columbus	2-Southeast 4-Sandhills	Provides comprehensive training in the Construction Technology industry sector. Meets the growing need for skilled workers to perform varied positions within the occupation. The Construction Industry in the Cape Fear Region continues to grow due to an increase in residents and tourist traffic. Industry in this region is committed to providing work-based learning opportunities for potential industry professionals at all career levels. • Workforce Development - Cape Fear Council of Governments (capefearcog.org)
Manufacturing & Welding	High Country	2018	Ashe, Alleghany, Avery, Mitchell, Watauga, Wilkes, Yancey	7-Northwest	Promotes career awareness at all education levels in the Manufacturing & Welding industry sector. Provides comprehensive training and education in the Manufacturing & Welding sector. Career awareness activities are a strong component in the High Country Region and include collaboration among industry, education partners and NCWorks Career Centers. Participating local education agencies and community colleges also provide professional development and custom training programs for the manufacturers in the area, along with stackable credentials available to prospective and incumbent employees. Expectations of a regional increase in awareness of occupations, in addition to a quantifiable increase in skilled employees, in manufacturing professions among youth, adults and other non-traditional populations so that the High Country can keep pace with current and projected workforce needs. • HCWDB-Manufacturing-Career-Pathway-FINAL-03.22.18.pdf (highcountrywdb.com)

Business Support Services	Northeastern, Rivers East, Turning Point	2018	Currituck, Camden, Pasquotank, Perquimans, Chowan, Gates, Washington, Tyrell, Dare, Hyde, Hertford, Bertie, Martin, Pitt, Beaufort, Northampton, Halifax, Nash, Edgecombe, Wilson	1-Northeast 3-North Central	Provides comprehensive training in the Business Support Services industry sector. Strengthens collaboration between industry, community colleges and secondary education entities. The Northeastern Business Support Pathway covers many sectors under one umbrella, including business administration and support, logistics and supply chain management, & IT. Collectively, these positions are projected to encompass 17% of all job openings in the Northeast and North Central NC Prosperity Zones in 2022. • Career-Pathway-Toolkit-for-Career-Advisors.pdf (nwdbworks.com) • https://nencpathways.org/business-support-services/

Health Sciences ***The Triangle South Health Care pathway***	Triangle South (former area*)	2018	Chatham, Lee, Harnett, Sampson	3-North Central 4-Sandhills	Provides comprehensive training in the Healthcare industry sector. Meets the growing need for skilled workers to perform varied positions within the occupation. Designed to allow multiple and diverse populations access to training and employment throughout their careers. The foundation of the pathway is a traditional route starting in the public school system and moving through the community colleges and universities. There are also a wide range of entry/exit points for adults and dislocated workers, and opportunities for youth ranging from short-term certifications that can lead quickly to a job through to advanced degree programs. • https://trianglecareerpathways.com
Construction/ Skilled Trades	Capital Area, Durham, Kerr-Tar (lead; Triangle Region Collaborative)	2018	Wake, Johnson, Durham, Caswell, Person, Granville, Vance, Warren, Franklin	3-North Central	Promotes career awareness at all education levels in the Construction/ Skilled Trades sector. Demonstrates employer commitment to leading the development and implementation of work-based learning opportunities. The Triangle Region aims to simplify students' choices by utilizing career roadmaps and visual graphics that show clear paths to high school completion, further education, and employment opportunities for the Construction and Skilled Trades Industry cluster. The region also emphasizes supporting students through a strong advising process that is embedded and ongoing in the pathway to help students make informed education and career choices. • Kerr-Tar-Construction-Pathway-Press-Release.pdf (kerrtarcog.org) • Construction & Trades Careers - Triangle Career Pathways (CAWD)

Advanced Manufacturing	Triangle South (former area*)	2018	Chatham, Lee, Harnett, Sampson	3-North Central 4-Sandhills	Designed to allow multiple and diverse populations access to training and employment throughout their careers. Prioritizes work-based learning as a strategy for career exploration and workforce engagement. The Triangle South's Advanced Manufacturing Pathway programs at the partner community colleges have advisory committees that review curricula and provide insight on future labor needs. These committees consist of professionals from local manufacturing companies who employ individuals at different stages of the Advanced Manufacturing pathway. In particular, Central Carolina's Innovation Center provides a facility through which students can obtain hands on experience in technical areas. • https://trianglecareerpathways.com/industry/advanced-manufacturing/

Transportation, Distribution, & Logistics	Eastern Carolina	2018	Wayne, Greene, Duplin, Lenoir, Jones, Craven, Onslow, Pamlico & Carteret	2-Southeast	Promotes career awareness at all education levels in the transportation industry sector Provides work-based learning opportunities that apply academic theory and hands-on training. • Career Pathways Training Options Guide
Energy Career Pathway	Foothills, Mountain Area, Western Piedmont, Gaston, Centralina, Charlotte Works (Southwest, Northwest & Western Carolina Alliance)	2019	Alexander, Anson, Buncombe, Burke, Cabarrus, Caldwell, Catawba, Cleveland, Gaston, Henderson, Iredell, Lincoln, McDowell, Madison, Mecklenburg, Polk, Rowan, Rutherford, Stanly, Transylvania, Union	8-Western, 6-Southwest, 7-Northwest	Provides comprehensive training in the Energy industry sector. Strengthens collaboration between industry, community colleges and secondary education entities. Multiple employment and career opportunities. High demand jobs, high wage jobs and career advancement opportunities. Covers 27 local education agencies, 14 community colleges. • Western Piedmont WDB • Career Maps - Charlotte Works
Aerospace and Aviation	Eastern Carolina	2020	Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow,	2-Southeast	This area has become a growing region for Aerospace and Aviation manufacturing, maintenance, repair and overhaul and logistics with the major hub being the North Carolina Global TransPark (GTP) in Kinston. The GTP is home to several Aerospace and Aviation businesses as well as the Spirit-Lenoir Community College Composite Center of Excellence.

			Pamlico, Wayne		• Career Pathways Training Options Guide
Construction and Skilled Trades	Eastern Carolina	2020	Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, Wayne	2-Southeast	Architecture & Construction: Individuals have the opportunity to move along a career pathway in a manner that allows them to seamlessly transfer credits should they want to continue their education. These stackable credentials can be earned beginning in high school through CTE programs. Residential, industrial and highway construction are all increasing and there is a consistent need for skilled workers. Hurricane Florence caused $24B in damages to homes & businesses. • Career Pathways Training Options Guide

Agriscience/ Bio-Technology	Northeastern, Rivers East, Turning Point	2020	Wilson, Nash, Edgecombe, Halifax, Northampton, Hertford, Chowan, Martin, Pitt, Beaufort, Gates, Bertie, Perquimans, Pasquotank, Camden, Currituck Washington, Tyrell, Dare, Hyde	1-Northeast 3-North Central	In the Northeast, 195 businesses fall under the pathway for biotechnology & more than 2,000 businesses under agriculture. Biotechnology is an industry covering pathways in pharmaceutical manufacturing and genetic crop engineering. Nearly 500 CTE students in the NE were considered "concentrators" in agriculture during 2018/2019, while nearly 1000 students were provided opportunities for work-based learning in agriculture during that same period. Active 4-H and other agriculture-related clubs in every county. Many community college partners have developed pathway-related courses/programs. Many middle-high school CTE programs in NE offer agricultural-based courses and clubs. Secondary school students earned 339 agricultural industry-related credentials in 2018-2019. Focused on a collaborative initiative with Apprenticeship NC for agriculture apprenticeships. • Career-Pathway-Toolkit-for-Career-Advisors.pdf (nwdbworks.com) • https://nencpathways.org/agriscience-biotechnology/
Human Services	High Country, Western Piedmont, Foothills (Future Workforce Alliance)	2021	Alleghany, Alexander, Ashe, Avery, Burke, Caldwell, Catawba, Cleveland, Mitchell, McDowell, Polk, Rutherford, Yancey, Watauga, Wilkes	7-Northwest	The alliance and its partners will work to establish pathway as a systemwide framework that will enable students and adults with internship assistance, education, and training opportunities to advance into various types of occupations across the human services industry beyond social services. • Workforce Development - Foothills Regional Commission

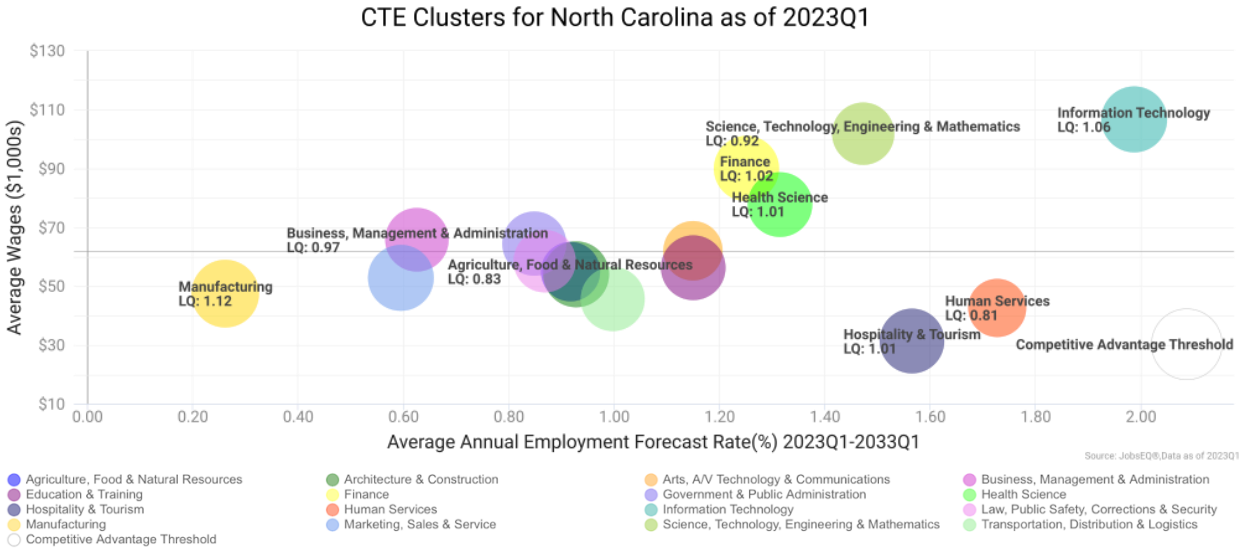
Information Technology	Mountain Area	2023	Madison, Buncombe, Henderson, Transylvania	8-Western	Workforce region was recognized by LinkedIn data analysts to have the 7th largest growing technology sector in the nation. The board will financially support IT employability skills, training with federal and non-federal funding, foster collaboration among workforce partners, and continue to develop partnerships between public and private sectors. • Pathway Summary

* Much of this former local area has since transitioned to being served by Capital Area Workforce Development Board.

Updated 6/30/2023 and can be found at https://www.commerce.nc.gov/list-certified-career-pathways/open

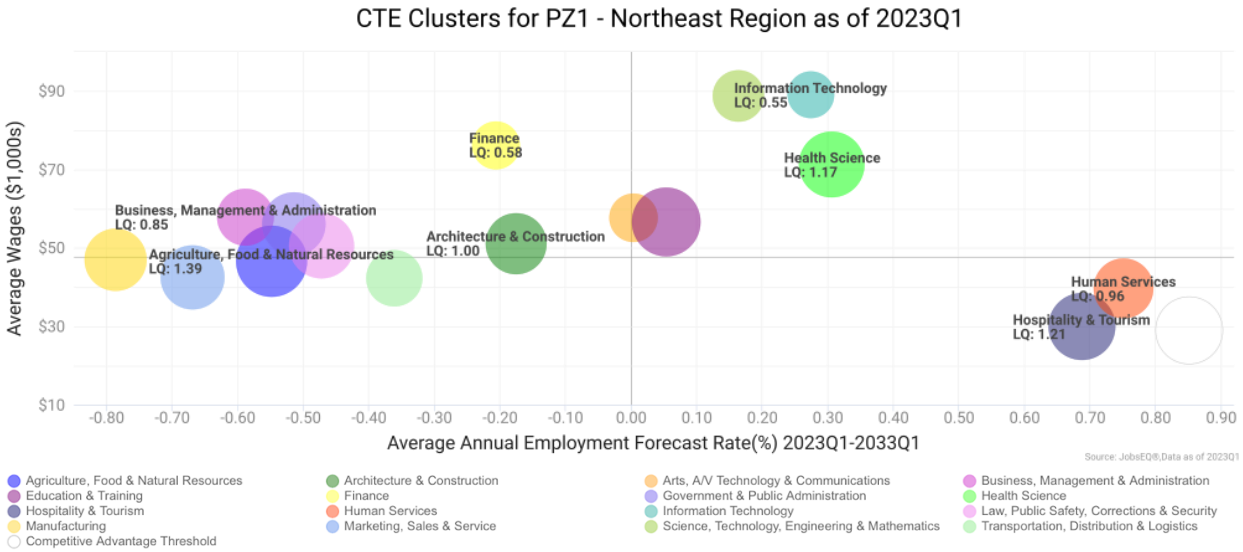
APPENDIX B

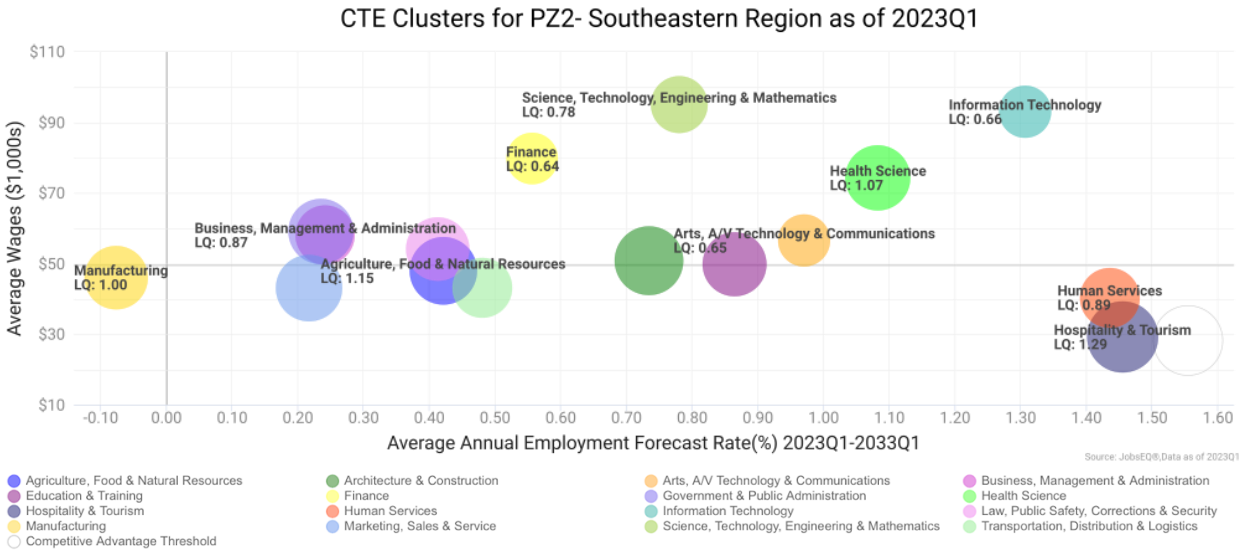
Workforce Demand for CTE Clusters for North Carolina



APPENDIX C

Workforce Demand for CTE Clusters by NC Prosperity Zones





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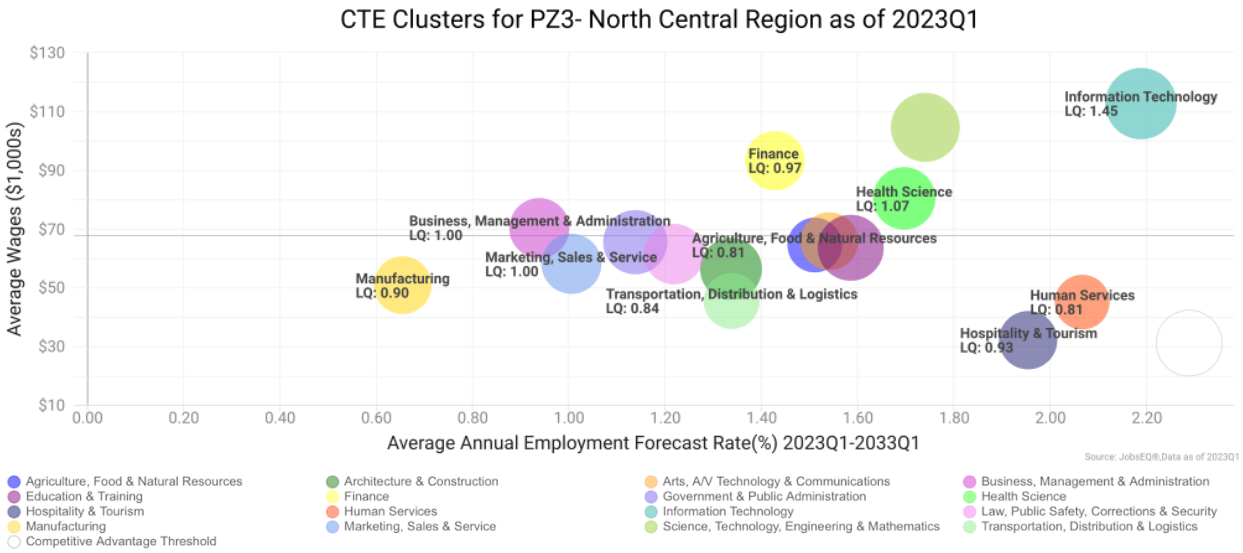

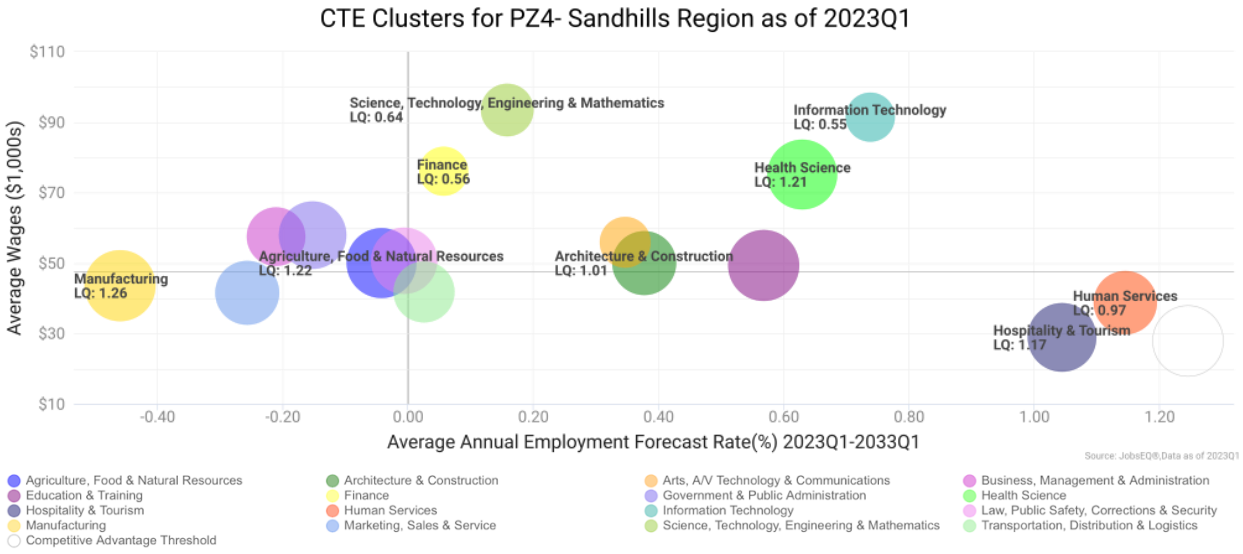

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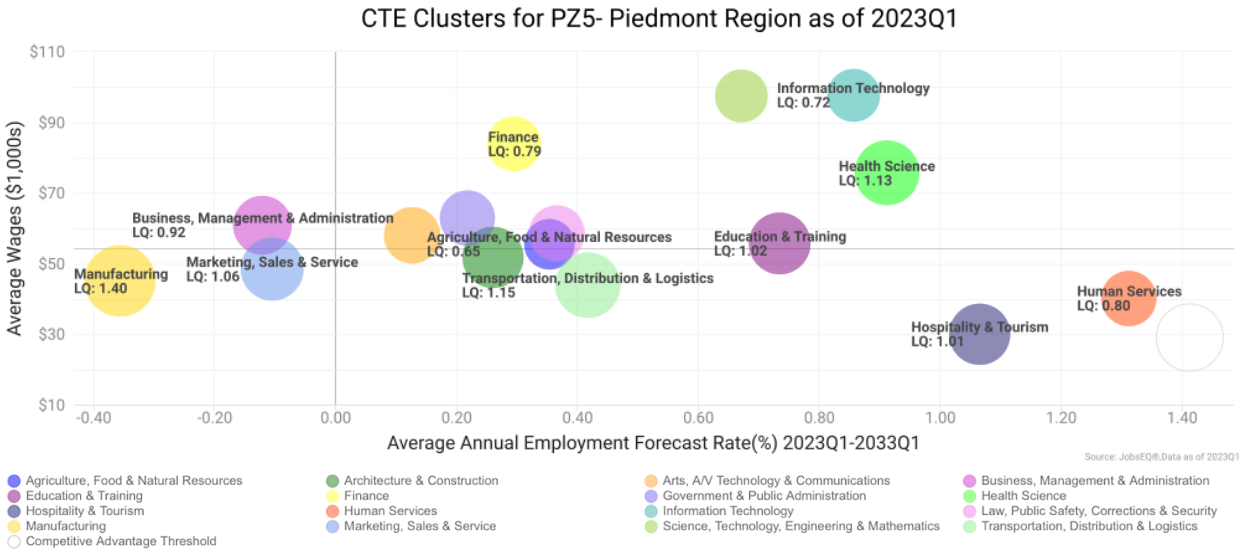

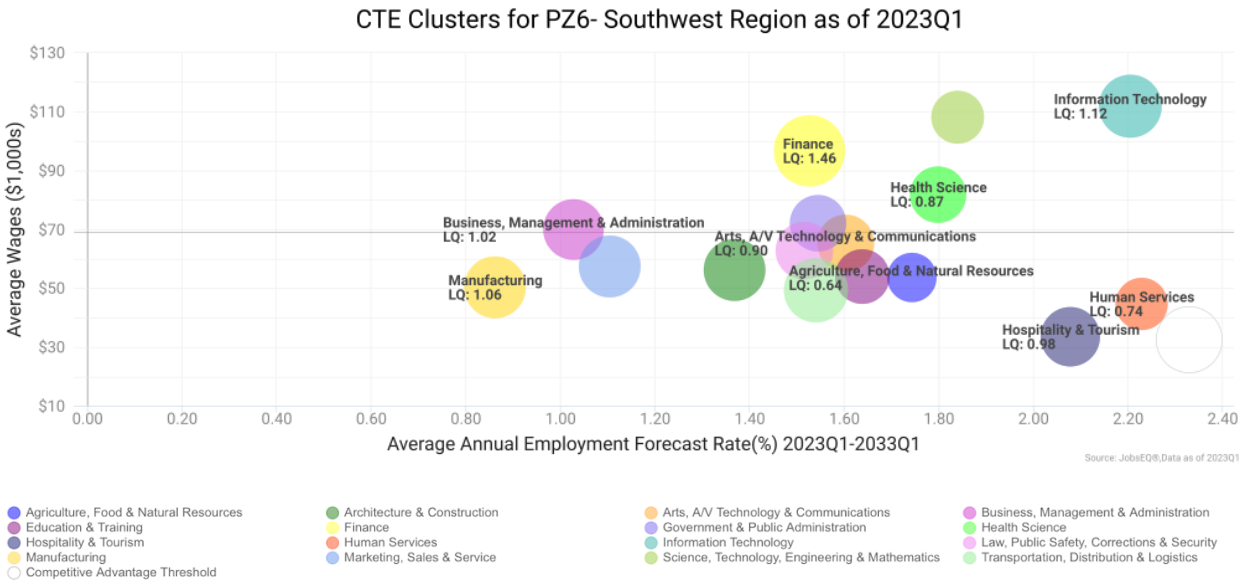

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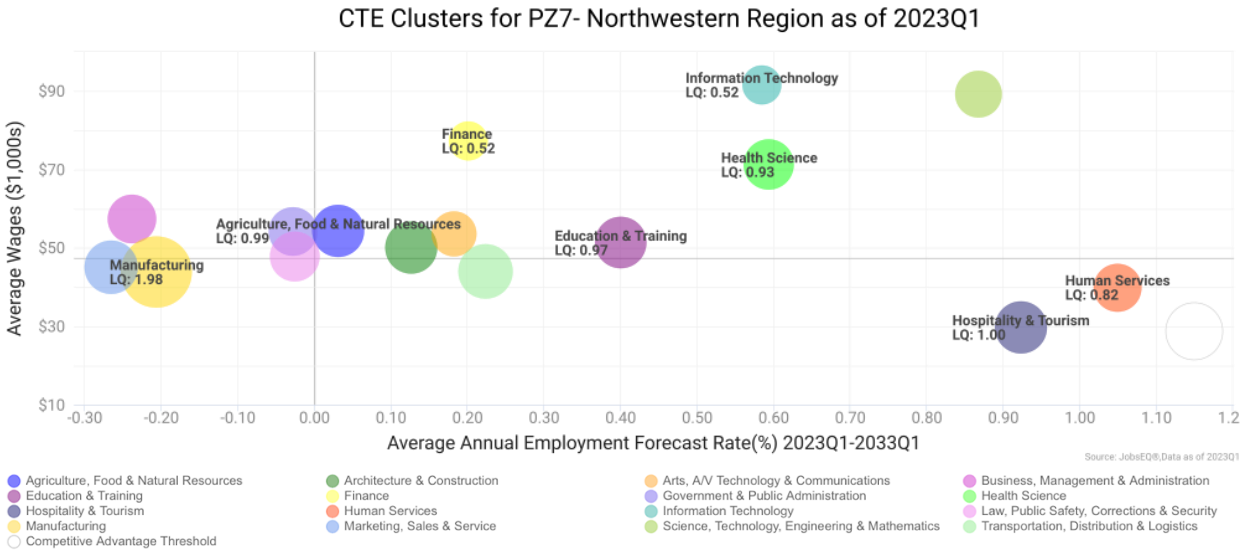

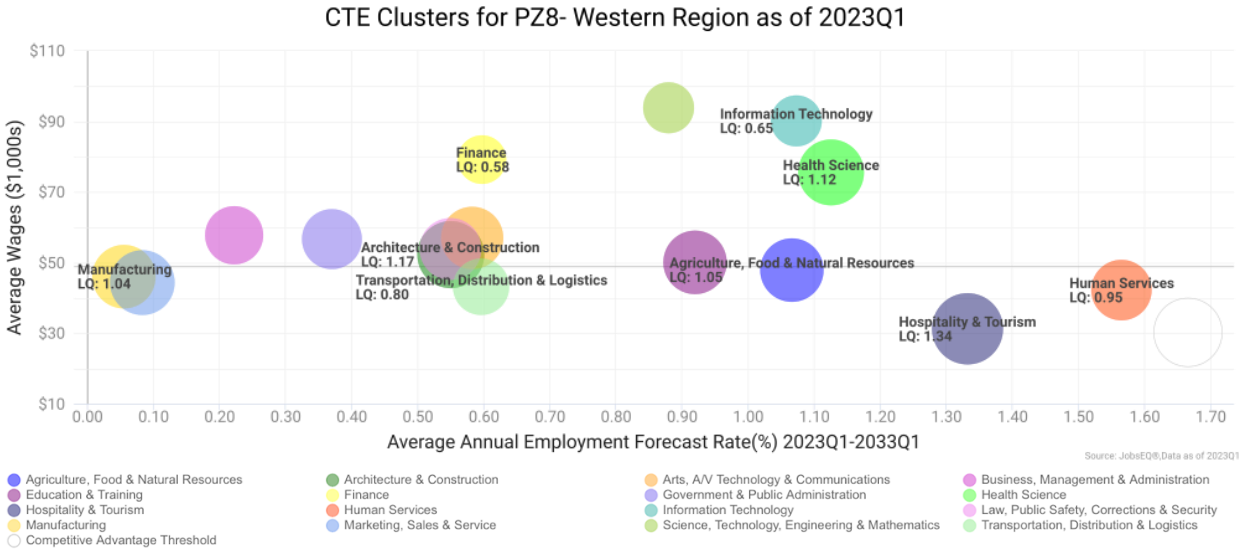

2023

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