

PITT COMMUNITY COLLEGE

# ECONOMIC OVERVIEW & PROGRAM GAP ANALYSIS

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# EXECUTIVE SUMMARY

Pitt Community College (PCC) serves a growing region comprising Pitt, Edgecombe, Greene, Lenoir, Craven, Beaufort, Martin, and Wilson Counties in North Carolina. This report outlines the economy of this eight-county region and provides a “gap” analysis to determine how well the college’s program offerings are satisfying regional workforce demand. The report also offers recommendations for new program development. The following are some of the key findings of the analysis:

## OVERVIEW OF REGIONAL OVERVIEW

- The economy of the region served by PCC (“the PCC Service Region”) is primarily driven by the Government, Manufacturing, and Health Care & Social Assistance industries. All three industries added new jobs between 2008 and 2013 and are projected to grow through 2023. Overall the regional job growth is expected to exceed 12% over the next decade.
- Between 2013 and 2023, the highest number of average annual job openings for workers with postsecondary certificates and above are projected to occur within sales & related occupations; office & administrative support occupations; and education, training, & library occupations.
- Many high-skill occupational categories are projected to see average to rapid job growth over the next ten years, including healthcare practitioners & technical occupations (12% growth), business & financial operations occupations (24% growth), and computer & mathematical occupations (20% job growth).
- Approximately 35% of residents in the PCC Service Region commute outside the region for work, indicating that there are not strong economic links between the region and the surrounding communities for either in-commuters or out-commuters.
- The educational composition of the adult population in the PCC Service Region (people age 24 and older) has seen only minor shifts in recent years. Between 2008

and 2013, the percentage of adults with a high school diploma decreased by 1 percentage point. The percentage of adults with degrees (such as associate’s degrees and bachelor’s degrees) remained virtually unchanged during the same time period. Adults with less than a high school diploma increased by 3.1 percentage points.

## PROGRAM GAP ANALYSIS

- A total of 10 institutions in the PCC Service Region offered associate’s degrees and postsecondary certificates between 2010 and 2012. These institutions produced an average of 4,250 completers per year. Of these, 38% graduated from PCC.
- Of the postsecondary certificate programs offered by PCC, those facing the greatest workforce gaps (i.e., an undersupply of workers in the occupations related to the programs) are General Business Administration & Management, Operations Management & Supervision, Industrial Mechanics and Maintenance Technology, and General Cosmetology/Cosmetologist
- The associate’s degree programs at PCC that are facing the greatest workforce gaps are Operations Management and Supervision, General Business Administration & Management, Industrial Mechanics and Maintenance Technology, and Machine Shop Technology/Assistant.
- While many regional workforce demands are being met, there are several occupations at the postsecondary certificate level and at the associate’s degree level that are undersupplied such as heavy and tractor-trailer truck drivers, general maintenance and repair workers, and industrial machinery mechanics. Healthcare related occupations like dental laboratory technicians, emergency medical technicians and paramedics, and dental hygienists also appear to be undersupplied. These findings suggest that training opportunities do not exist in the region for these occupations, or that the existing institutions are not training a sufficient number of workers for them.

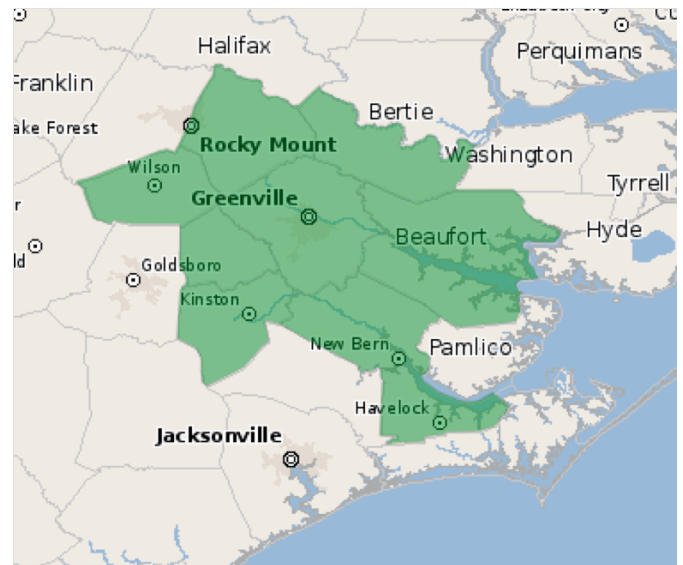
# INTRODUCTION

Community colleges face many challenges in their efforts to identify the training needs of their service regions. They must account for regional economic trends and the changing quality of the workforce. Furthermore, as technology progresses, colleges need to address the increasingly complex and specialized skills required by employers. In light of these dynamics, an understanding of the regional economy and the demand for skilled labor is vital to the planning efforts of colleges seeking to adapt their program offerings to the requirements of an ever-changing workforce.

To gain better insight on economic conditions and workforce trends, Pitt Community College (PCC) partnered with Economic Modeling Specialists Intl. (EMSI) to conduct an economic overview of the college's service region and a workforce "gap" analysis of the college's program offerings. Gap analysis is a technique used to assess the supply and demand of skilled workers and identify the educational programs that need to be adapted in order to fill any existing or future gaps. The analysis weighs the educational output of PCC and other regional institutions against the number of job openings related to the institutions' program offerings to determine whether an oversupply or an undersupply of skilled workers exists. The goal of the analysis is to provide PCC with relevant data and information that it can use when solving problems and making decisions about current and future program development.

The regional backdrop used in this report is defined by Pitt, Edgecombe, Greene, Lenoir, Craven, Beaufort, Martin, and Wilson Counties in North Carolina (hereinafter referred to as "the PCC Service Region"). See Figure 1 for a map of the region. At the center of the PCC Service Region is Pitt County, which has the largest population and the highest average earnings per worker among the eight counties

**FIGURE 1: Map of PCC Service Region**



in the region. The principal city and county seat of Pitt County is Greenville, where PCC is located. The other seven counties in the region have strong economic ties to Pitt County.<sup>1</sup>

The report is broken into two chapters. Chapter 1 provides an overview of employment in the PCC Service Region economy with high-level information about current and projected job trends, resident commuting patterns, and unemployment. Chapter 1 also provides further information specifically related to the educational characteristics of the population by gender and ethnicity. Chapter 2 summarizes the results of the program gap analysis and provides recommendations for possible future program needs. After a brief conclusion, detailed information and data are provided in the appendices.

1 The industry and occupation data presented in this report reflect the number of jobs by place of work, not by place of residence. However, the report does assess the commuting patterns of residents to determine where they live and work both within and outside of the region.

# CHAPTER 1

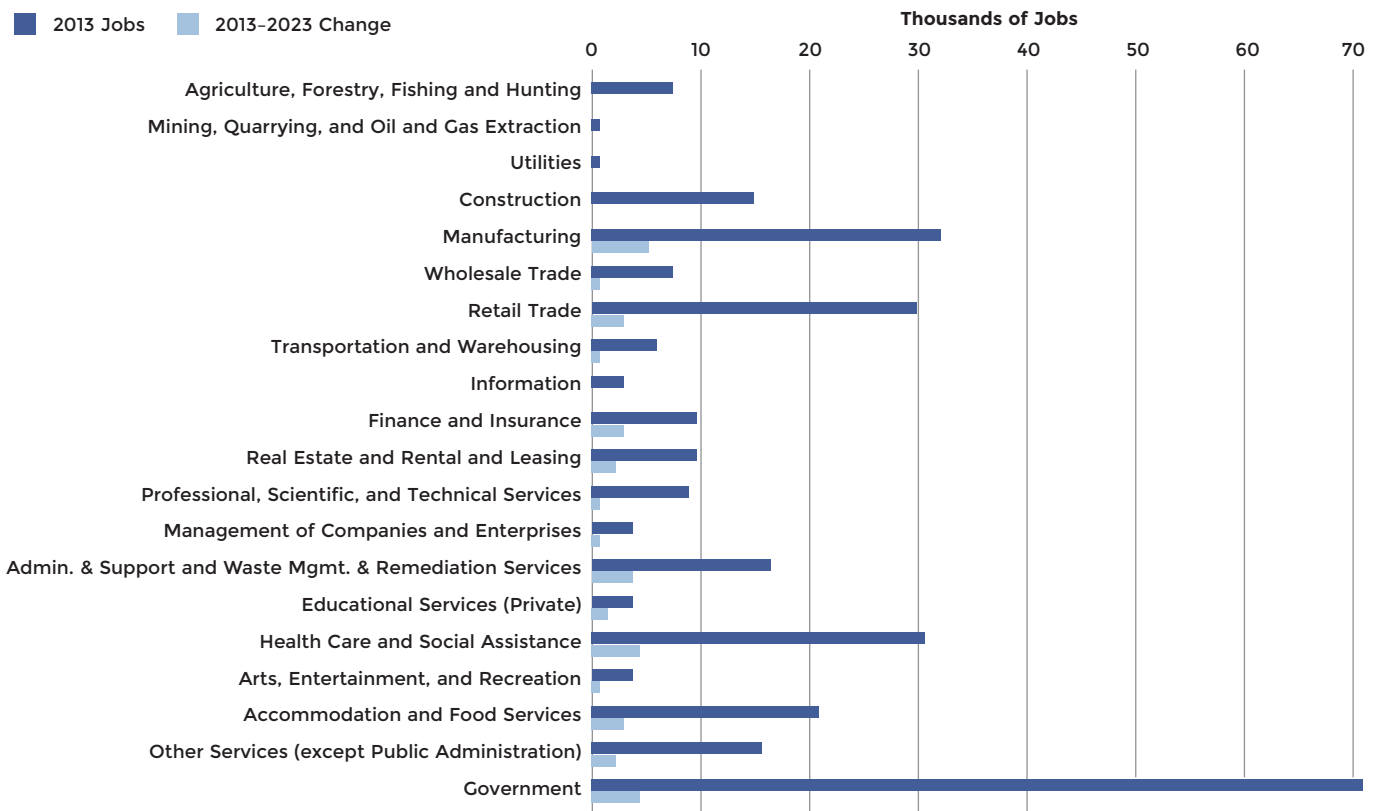
## OVERVIEW OF THE ECONOMY

This chapter provides a high-level overview of employment and demographics in the economy of the PCC Service Region, defined by Pitt, Edgecombe, Greene, Lenoir, Craven, Beaufort, Martin, and Wilson Counties in North Carolina (see Figure 1). The goal of the chapter is to provide data on the economic and workforce employment trends that either already exist or are developing in the region. Such information is crucial in building awareness of the region’s labor force—both now and in the future—and identifying priority areas where educators can focus their attention. The chapter examines employment and demographics in the PCC Service Region according to the following five indicators: jobs by industry, jobs by occupation, commuting patterns, unemployment, and educational attainment.

### JOBS BY INDUSTRY

Evaluating current and future employment by industry provides information on the economic diversification of a given region. Industries consist of groups of companies that are primarily engaged in producing the same product or service. The North American Industry Classification System (NAICS) is the structure used by the U.S. Census Bureau to classify establishments into industries based on their production process (although the final product or service is usually similar for the firms in a given industry). NAICS applies a six-digit hierarchical coding system to organize more than 1,100 detailed industries into twenty larger industry sectors. The breakdown of current and future

**FIGURE 2: Jobs and Job Change by Industry Sector in PCC Service Region, 2013 to 2023**



Source: EMSI Complete Data 2014.2

employment by major industry sector in the PCC Service Region appears in Table 1 and Figure 2.

As shown, the three largest industry sectors in the PCC Service Region are Government, Manufacturing, and Health Care & Social Assistance. Together these sectors made up 133,857 jobs or 45% of total regional employment in 2013. All three sectors are projected to grow between 2013 and 2023, most notably the Manufacturing sector, which is expected to add 5,491 jobs over the next ten years. Other industry sectors with notable projected growth are Administrative & Support & Waste Management & Remediation Services (+3,968 jobs) and Retail Trade (+2,739 jobs). Only three industry sectors are expected to decline between 2013 and 2023, namely, Construction (-250 jobs), Agriculture, Forestry, Fishing & Hunting (-223 jobs), and Utilities (-54 jobs).

Table 2 on the next page shows the employment concentration of the industry sectors in the PCC Service Region, measured in terms of location quotients (LQs). LQs are used to assess national competitiveness by compar-

ing the concentration of employment in a given industry against the concentration of employment for that same industry across the nation. An LQ equal to 1 means that the percentage of total employment comprised by an industry in the region exactly matches the percentage of total employment comprised by that industry in the nation. An LQ greater than 1 means that the industry comprises a greater proportion of total employment in the region than it does in the nation.

High LQs (usually anything greater than 1.2) are an indication that the region has a comparative advantage or specialization in certain industries relative to the rest of the nation, or potentially to other competing regions. When evaluated jointly with job counts and expected job growth, high LQs give a sense of the industry sectors that have the greatest potential for workforce investment and where regional economic development professionals are likely to be focusing their efforts. This information is of particular importance to educators seeking to engage in larger conversations with other organizations about align-

**TABLE 1: Current and Projected Jobs Change by Industry Sector, 2013 to 2023**

NAICS CODE	DESCRIPTION	2013 JOBS	2023 JOBS	CHANGE	% CHANGE
11	Agriculture, Forestry, Fishing and Hunting	7,610	7,387	(223)	(2.9%)
21	Mining, Quarrying, and Oil and Gas Extraction	496	672	176	35.5%
22	Utilities	384	330	(54)	(14.1%)
23	Construction	14,945	14,695	(250)	(1.7%)
31	Manufacturing	32,434	37,925	5,491	16.9%
42	Wholesale Trade	7,270	7,797	527	7.2%
44	Retail Trade	29,904	32,643	2,739	9.2%
48	Transportation and Warehousing	5,705	6,612	907	15.9%
51	Information	3,200	3,522	322	10.1%
52	Finance and Insurance	9,671	12,348	2,677	27.7%
53	Real Estate and Rental and Leasing	10,070	12,198	2,128	21.1%
54	Professional, Scientific, and Technical Services	8,695	9,384	689	7.9%
55	Management of Companies and Enterprises	3,458	3,995	537	15.5%
56	Administrative and Support and Waste Management and Remediation Services	16,606	20,574	3,968	23.9%
61	Educational Services	3,681	5,093	1,412	38.4%
62	Health Care and Social Assistance	30,425	35,017	4,592	15.1%
71	Arts, Entertainment, and Recreation	3,618	4,339	721	19.9%
72	Accommodation and Food Services	21,025	23,713	2,688	12.8%
81	Other Services (except Public Administration)	15,484	17,526	2,042	13.2%
90	Government	70,998	75,756	4,758	6.7%
	<b>Total</b>	<b>295,679</b>	<b>331,526</b>	<b>35,847</b>	<b>12.1%</b>

Source: EMSI Complete Data 2014.2

**TABLE 2: Employment Concentration by Industry Sector in PCC Service Region, 2013 and 2023**

NAICS CODE	DESCRIPTION	2013 LOCATION QUOTIENT	2023 LOCATION QUOTIENT
11	Agriculture, Forestry, Fishing and Hunting	1.34	1.32
21	Mining, Quarrying, and Oil and Gas Extraction	0.21	0.22
22	Utilities	0.41	0.36
23	Construction	1.01	0.89
31	Manufacturing	1.58	1.86
42	Wholesale Trade	0.71	0.69
44	Retail Trade	1.02	1.05
48	Transportation and Warehousing	0.60	0.62
51	Information	0.60	0.63
52	Finance and Insurance	0.58	0.61
53	Real Estate and Rental and Leasing	0.74	0.75
54	Professional, Scientific, and Technical Services	0.43	0.39
55	Management of Companies and Enterprises	0.95	0.98
56	Administrative and Support and Waste Management and Remediation Services	0.90	0.93
61	Educational Services	0.51	0.59
62	Health Care and Social Assistance	0.92	0.88
71	Arts, Entertainment, and Recreation	0.55	0.56
72	Accommodation and Food Services	1.00	0.99
81	Other Services (except Public Administration)	0.92	0.92
90	Government	1.81	1.89

Source: EMSI Complete Data 2014.2

ing program offerings with workforce needs.

The following three industry sectors have the highest location quotients in the PCC Service Region: Government (1.81), Manufacturing (1.58), and Agriculture, Forestry, Fishing, & Hunting (1.34). Most industry sectors in the region have that an employment concentration that is lower than the nation, but a few, such as Educational Services and Finance & Insurance, are projected to increase in concentration over the next decade. Other sectors, like Utilities and Construction, are expected to decrease.<sup>2</sup>

## JOBS BY OCCUPATION

Researchers often refer to industry data to get a sense of regional economic trends, but in order to better understand the quality of the jobs contained within that region, some

<sup>2</sup> Note that because LQs represent regional employment relative to national employment, a decreasing LQ does not necessarily mean decreasing employment, and likewise an increasing LQ does not necessarily mean increasing employment.

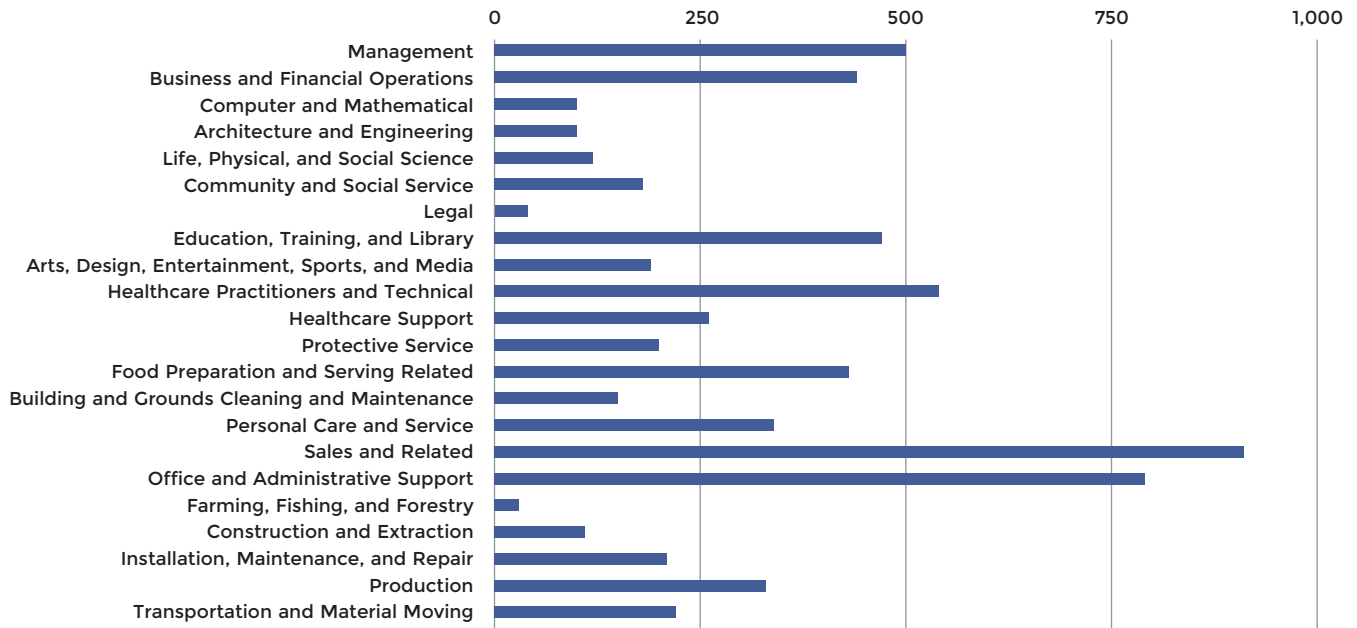
knowledge of occupations is needed. This is because the earning levels and education requirements of workers bear more of a relationship to their occupation than to the industry in which they work. For example, the Manufacturing industry—while employing a number of assemblers and machine operators—also employs people in management occupations and in professional occupations such as engineering. All of these occupations have different pay scales and require varying levels of education and training.

Federal agencies use the Standard Occupational Classification (SOC) system to classify workers into occupational categories based on work performed. The 2010 SOC system contains more than 800 detailed occupations organized according to a five-digit hierarchical coding structure. Detailed occupations with similar job duties are further combined to form 23 major groups. Table 3 shows the breakdown of employment in the PCC Service Region by major group, with information on current and projected jobs, job change, average annual openings, and wage rates.

Office & administrative support occupations comprise the largest occupation group in the PCC Service Region



**FIGURE 3: Average Annual Openings between 2013 and 2023 for Workers with Some College and Above by Occupation Group in the PCC Service Region**



Source: EMSI Complete Data 2014.2

**TABLE 3: Current and Projected Jobs, Job Change, and Median Hourly Earnings by Major Occupation Group in PCC Service Region, 2013 to 2023**

SOC CODE	DESCRIPTION	2013 JOBS	2023 JOBS	CHANGE	% CHANGE	AVERAGE ANNUAL OPENINGS	MEDIAN HOURLY EARNINGS
11-0000	Management	15,680	17,853	2,173	14%	499	\$28.78
13-0000	Business and Financial Operations	10,374	12,845	2,451	24%	442	\$25.88
15-0000	Computer and Mathematical	2,803	3,355	552	20%	103	\$27.37
17-0000	Architecture and Engineering	2,870	3,158	267	9%	98	\$32.32
19-0000	Life, Physical, and Social Science	2,339	2,856	479	20%	117	\$26.05
21-0000	Community and Social Service	4,781	5,459	678	14%	178	\$18.48
23-0000	Legal	1,497	1,605	108	7%	39	\$29.29
25-0000	Education, Training, and Library	17,462	19,882	2,409	14%	587	\$19.81
27-0000	Arts, Design, Entertainment, Sports, and Media	4,848	5,727	862	18%	193	\$15.75
29-0000	Healthcare Practitioners and Technical	16,303	18,339	2,015	12%	545	\$31.43
31-0000	Healthcare Support	12,540	14,442	1,902	15%	262	\$10.39
33-0000	Protective Service	6,824	7,379	555	8%	200	\$16.20
35-0000	Food Preparation and Serving Related	21,201	23,786	2,585	12%	428	\$9.20
37-0000	Building and Grounds Cleaning and Maintenance	12,393	14,810	2,417	20%	149	\$9.45
39-0000	Personal Care and Service	12,886	15,618	2,720	21%	337	\$9.59
41-0000	Sales and Related	33,636	37,540	3,904	12%	906	\$12.96
43-0000	Office and Administrative Support	36,233	39,848	3,605	10%	793	\$14.51
45-0000	Farming, Fishing, and Forestry	3,886	3,682	(190)	(5%)	25	\$12.56
47-0000	Construction and Extraction	12,631	12,552	(67)	(1%)	110	\$15.25
49-0000	Installation, Maintenance, and Repair	12,434	13,440	995	8%	212	\$18.34
51-0000	Production	22,483	25,745	3,249	14%	325	\$15.59
53-0000	Transportation and Material Moving	17,086	19,060	1,974	12%	218	\$13.38

Source: EMSI Complete Data 2014.2



at 36,233 jobs, followed by sales & related occupations at 33,636 jobs. Neither of these occupation groups ranks among the highest paid, however. Architecture & engineering occupations—while one of the smallest occupation groups—have median earnings of \$32.32 an hour. Healthcare practitioners & technical occupations have median earnings of \$31.43 an hour, also ranking high on the regional pay scale. It is notable that several of the higher-paying occupation groups are projected to experience high job growth over the next ten years, such as

business and financial operations occupations (24%), life, physical, & social science occupations (20%), and computer & mathematical occupations (20%).

Figure 3 provides a look at the average annual job openings for workers with some college or above by occupation group. Job openings refer to new jobs due to growth plus replacement jobs due to worker turnover. Between 2013 and 2023, the occupations with the highest number of average annual job openings for workers with some college or above occurs in sales & related occupations office & administrative support occupations; and education, training, & library occupations.

**TABLE 4: Jobs by Place of Work**

COUNTY	JOBS	COMMUTE SHARE
Pitt County, NC	50,638	25%
Craven County, NC	20,277	10%
Wilson County, NC	18,067	9%
Lenoir County, NC	15,996	8%
Wake County, NC	15,847	8%
Beaufort County, NC	12,191	6%
Nash County, NC	9,651	5%
Edgecombe County, NC	9,470	5%
Wayne County, NC	4,667	2%
Martin County, NC	4,495	2%
All Other Locations	42,245	21%

Source: Census LEHD

**COMMUTING PATTERNS**

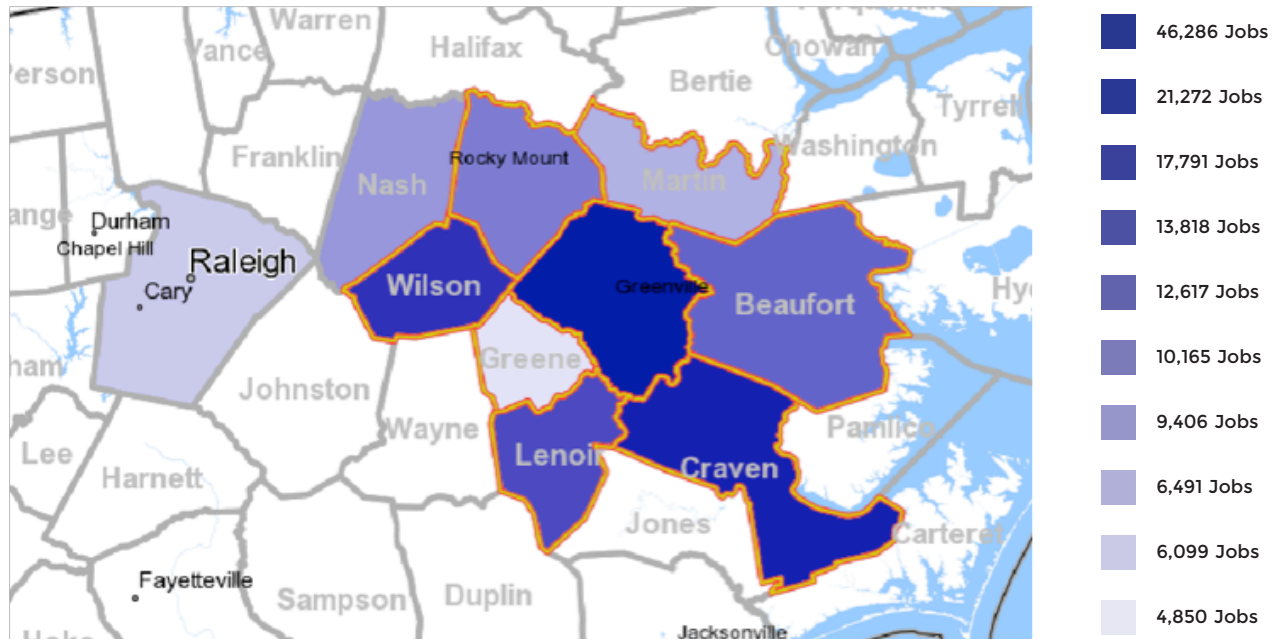
The Longitudinal Employer-Household Dynamics (LEHD) program<sup>3</sup> at the U.S. Census Bureau provides information on the residential and employment locations of workers. “Jobs by place of work” refers to where residents of the region commute to work, and “jobs by place of residence” refers to where workers in the region live. Data for the PCC Service Region appear in Tables 4 and 5, with the same

3 LEHD is an innovative program that uses modern statistical and computing techniques to combine federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data.

**FIGURE 4: Jobs by Place of Work in the PCC Service Region**



**FIGURE 5: Jobs by Place of Residence in PCC Service Region**



**TABLE 5: Where Workers in the PCC Service Region Live**

COUNTY	COUNT	COMMUTE SHARE
Pitt County, NC	46,286	22%
Craven County, NC	21,272	10%
Wilson County, NC	17,791	9%
Lenoir County, NC	13,818	7%
Beaufort County, NC	12,617	6%
Edgecombe County, NC	10,165	5%
Nash County, NC	9,406	5%
Martin County, NC	6,491	3%
Wake County, NC	6,099	3%
Greene County, NC	4,850	2%
All Other Locations	58,201	28%

Source: Census LEHD

information displayed in Figures 4 and 5.

As shown in Table 4, approximately 35% of residents commute outside the PCC Service Region for work, indicating that there are economic links between the region and surrounding communities. A significant percentage of residents (8%) commute to Wake County.

Of the people who work in the PCC Service Region, 5% live in Nash County, 3% live in Wake County, and 28% live

in other locations. The remaining 64% of workers in the PCC Service Region both live and work in the eight-county region. This information appears in Table 5.

## UNEMPLOYMENT

Data on unemployment give researchers an idea of where skills mismatches may exist in the region. Unemployment data can also provide important context when identifying the training programs that are best suited to transitioning unemployed workers into in-demand occupations.

Table 6 and Figure 6 present the number of people unemployed by industry sector in the PCC Service Region. Data reflect February 2014 and follow the same methodology used by the federal statistical agencies to determine the number of workers in an industry that are not currently employed. The unemployment rate is not provided because it is difficult to accurately determine the size of the labor force in a given industry on a monthly basis. Rather than the unemployment rate, the percent of all unemployed for the region and for the nation are provided to display which industry sectors have the highest concentration of unemployed workers.

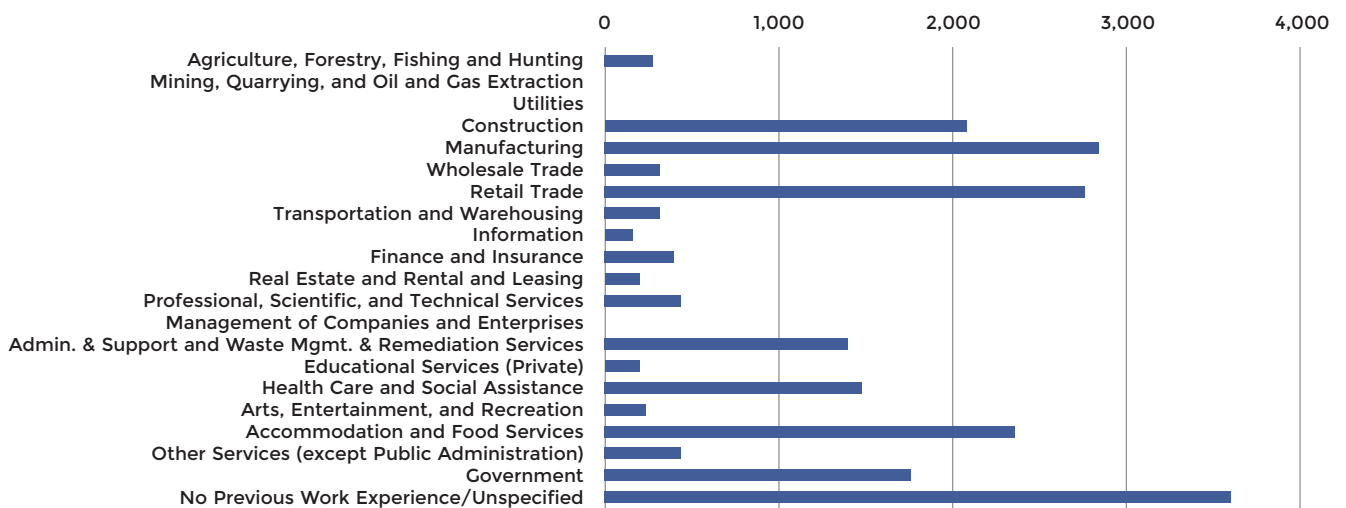
Industry sectors in the PCC Service Region that exceed the national concentration of unemployed workers are

**TABLE 6: Number of Unemployed Workers by Industry Sector in PCC Service Region**

NAICS CODE	DESCRIPTION	NO. OF UNEMPLOYED	% OF UNEMPLOYED	NATIONAL % OF UNEMPLOYED
11	Agriculture, Forestry, Fishing and Hunting	285	1%	2%
21	Mining, Quarrying, and Oil and Gas Extraction	10	0%	1%
22	Utilities	16	0%	0%
23	Construction	2,065	10%	13%
31	Manufacturing	2,834	13%	9%
42	Wholesale Trade	300	1%	2%
44	Retail Trade	2,774	13%	10%
48	Transportation and Warehousing	312	1%	3%
51	Information	164	1%	2%
52	Finance and Insurance	400	2%	3%
53	Real Estate and Rental and Leasing	208	1%	1%
54	Professional, Scientific, and Technical Services	425	2%	4%
55	Management of Companies and Enterprises	13	0%	0%
56	Administrative and Support and Waste Management and Remediation Services	1,389	7%	8%
61	Educational Services (Private)	198	1%	2%
62	Health Care and Social Assistance	1,474	7%	6%
71	Arts, Entertainment, and Recreation	234	1%	2%
72	Accommodation and Food Services	2,349	11%	8%
81	Other Services (except Public Administration)	447	2%	3%
90	Government	1,762	8%	7%
99	No Previous Work Experience/Unspecified	3,619	17%	14%

Source: EMSI Total Unemployment (2/2014)

**FIGURE 6: Number of Unemployed Workers by Industry Sector in PCC Service Region**



Source: EMSI Total Unemployment (2/2014)

Manufacturing, Retail Trade, Health Care & Social Assistance, Accommodation & Food Services, and Government. All of the other industry sectors in the region are either at or below national levels.

As shown in the table, the category with the highest number of unemployed workers is a non-industry labeled as “No Previous Work Experience/Unspecified.” This is simply a catch-all category for which reliable unemployment data are unavailable. Manufacturing has the second highest number of unemployed workers, followed by Retail Trade. Both industry sectors—particularly Retail Trade—have a high percentage of low-skill jobs that require little to no education and training, thus making them more vulnerable to worker turnover. Other sectors that are generally affected by high turnover include Accommodation & Food Services and Administrative & Support & Waste Management & Remediation Services. For industry sectors such

as Construction, seasonal jobs or jobs of short duration may also lead to high numbers of unemployed workers.

Table 7 and Figure 7 provide a breakdown of unemployment in the PCC Service Region by major occupation group. As shown, occupation groups that contain the highest number of unemployed workers are office & administrative support occupations (2,972 unemployed workers), transportation & material moving occupations (2,459 unemployed workers), no previous work experience/unspecified occupations (2,458 workers), construction & extraction occupations (1,932 workers), and food preparation & serving related occupations (1,750 workers). Though some of these occupations groups have a relatively high number of annual openings (see Figure 3), high turnover still leads to a high number of unemployed.

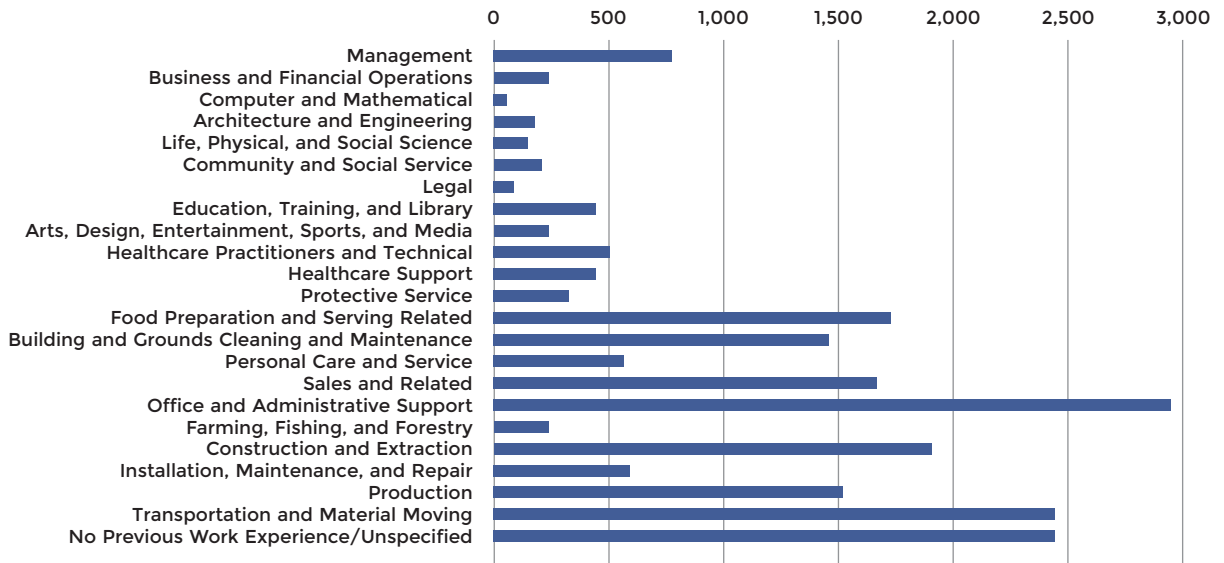
A number of occupation groups have a concentration of unemployed workers that is either at or below the national

**TABLE 7: Number of Unemployed Workers by Occupation Group in PCC Service Region**

SOC CODE	DESCRIPTION	# UNEMPLOYED	% OF UNEMPLOYED	NATIONAL % OF UNEMPLOYED
11-0000	Management	777	4%	5%
13-0000	Business and Financial Operations	247	1%	3%
15-0000	Computer and Mathematical	45	0%	1%
17-0000	Architecture and Engineering	175	1%	1%
19-0000	Life, Physical, and Social Science	139	1%	0%
21-0000	Community and Social Service	209	1%	1%
23-0000	Legal	75	0%	0%
25-0000	Education, Training, and Library	464	2%	2%
27-0000	Arts, Design, Entertainment, Sports, and Media	237	1%	2%
29-0000	Healthcare Practitioners and Technical	510	2%	2%
31-0000	Healthcare Support	455	2%	2%
33-0000	Protective Service	321	2%	1%
35-0000	Food Preparation and Serving Related	1,750	8%	6%
37-0000	Building and Grounds Cleaning and Maintenance	1,456	7%	7%
39-0000	Personal Care and Service	557	3%	3%
41-0000	Sales and Related	1,682	8%	10%
43-0000	Office and Administrative Support	2,972	14%	11%
45-0000	Farming, Fishing, and Forestry	233	1%	2%
47-0000	Construction and Extraction	1,932	9%	14%
49-0000	Installation, Maintenance, and Repair	604	3%	3%
51-0000	Production	1,524	7%	7%
53-0000	Transportation and Material Moving	2,459	12%	8%
99-0000	No Previous Work Experience/Unspecified	2,458	12%	10%

Source: EMSI Total Unemployment (2/2014)

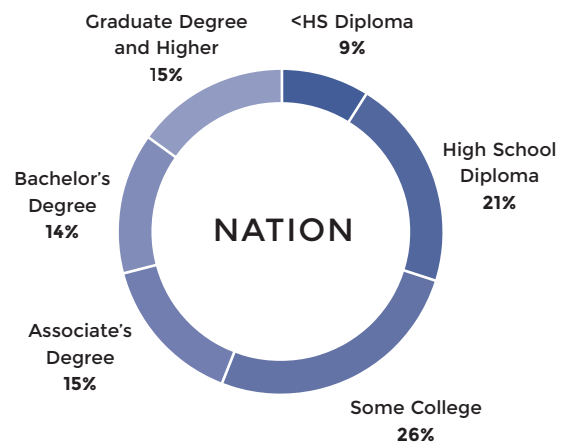
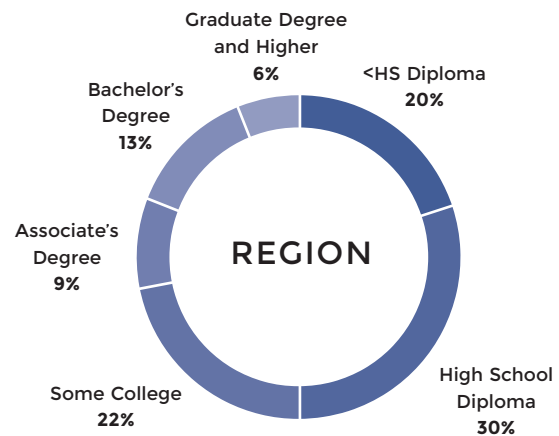
**FIGURE 7: Number of Unemployed Workers by Occupation Group in PCC Service Region**



Source: EMSI Total Unemployment (2/2014)

average, including management occupations, business & financial operations occupations, and computer & mathematical occupations. These occupation groups generally require more education and training than low-skill groups such as food preparation & serving related occupations.

**FIGURE 8: Educational Attainment of Adult Population in PCC Service Region**



## EDUCATIONAL ATTAINMENT

This section describes the educational attainment of the population in the PCC Service Region for adults aged 25 years and older. This information is useful for educators targeting specific population groups that have low education levels. Educational attainment data in this section is presented by gender and by ethnicity and is broken out according to the following categories: 1) less than a high school degree, 2) high school degree, 3) some college,<sup>4</sup> 4) associate's degree, 5) bachelor's degree, and 6) graduate degree or higher.

### Overall Educational Attainment

Table 8 and Figure 8 display the educational attainment of the overall adult population in the PCC Service Region, without reference to gender and ethnicity. In the PCC Service Region, the percentage of the adult population

<sup>4</sup> The "some college" category includes individuals who attended college but did not successfully obtain a degree and individuals who have received a postsecondary vocational award or professional certification but did not receive an associate's or bachelor's degree.

**TABLE 8: Breakdown of Adult Population in PCC Service Region by Educational Attainment, 2008 and 2013**

EDUCATION LEVEL	2008 POPULATION	2008 % DISTRIBUTION	2013 POPULATION	2013 % DISTRIBUTION	POPULATION CHANGE	% DISTRIBUTION CHANGE
Less than HS diploma or GED	60,380	17%	75,930	20%	15,550	3.1%
High school diploma or GED	109,477	31%	112,821	30%	3,344	(1.0%)
Some college	81,749	23%	81,750	22%	1	(1.4%)
Associate's degree	32,592	9%	33,425	9%	833	(0.3%)
Bachelor's degree	46,672	13%	50,231	13%	3,559	0.1%
Graduate degree and higher	22,745	6%	22,618	6%	(127)	(0.4%)

Source: EMSI Complete Data 2014.2

with a high school diploma or less is 50%, higher than the national average of 30%. These data suggest an opportunity for educators in the PCC Service Region to boost the percentage of adults with an associate's degree or higher (currently this percentage sits at 28% for the region overall). Out of all the education categories in Table 8, the people that are most likely to seek education and training from PCC are those in the "Less than high school diploma," "High school diploma," and "Some college" categories. Together these categories make up 270,500 people, or 72% of the entire adult population in the region.

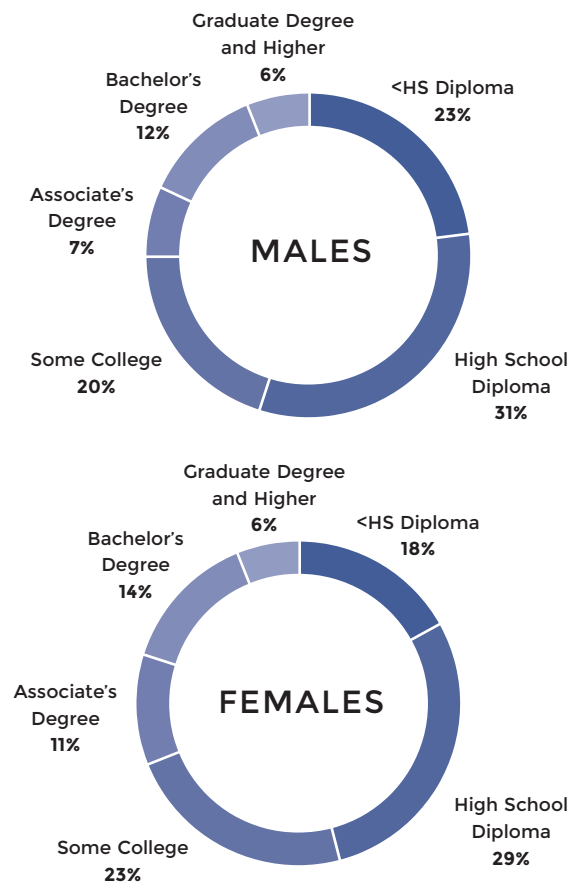
Between 2008 and 2013, the proportion of the overall adult population with less than a high school diploma increased by 3.1%.<sup>5</sup> Meanwhile, the proportion of the adult population with an associate's degree or with a graduate degree and higher decreased marginally. The proportion of adults with a bachelor's degree remained relatively stable.

**Educational Attainment by Gender**

The distribution of educational attainment by gender is

5 The column labeled "% Change" in Table 8 refers to the proportional change, not to the percent change between 2008 and 2013. For example, if a category comprised 20% of the total adult population in 2008 and 25% of the total adult population in 2013, the proportional change is equal to the difference between the two values (in this example, 5%).

**FIGURE 9: Educational Attainment of Adult Population in PCC Service Region by Gender**



**TABLE 9: Educational Attainment of Adult Population in PCC Service Region by Educational Attainment and Gender**

EDUCATION LEVEL	MALES	PROPORTION	FEMALES	PROPORTION
Less than high school diploma	40,112	23%	35,818	18%
High school diploma	54,955	31%	57,866	29%
Some college	35,830	20%	45,920	23%
Associate's degree	12,202	7%	21,223	11%
Bachelor's degree	21,764	12%	28,467	14%
Graduate degree and higher	11,031	6%	11,587	6%

Source: EMSI Complete Data 2014.2



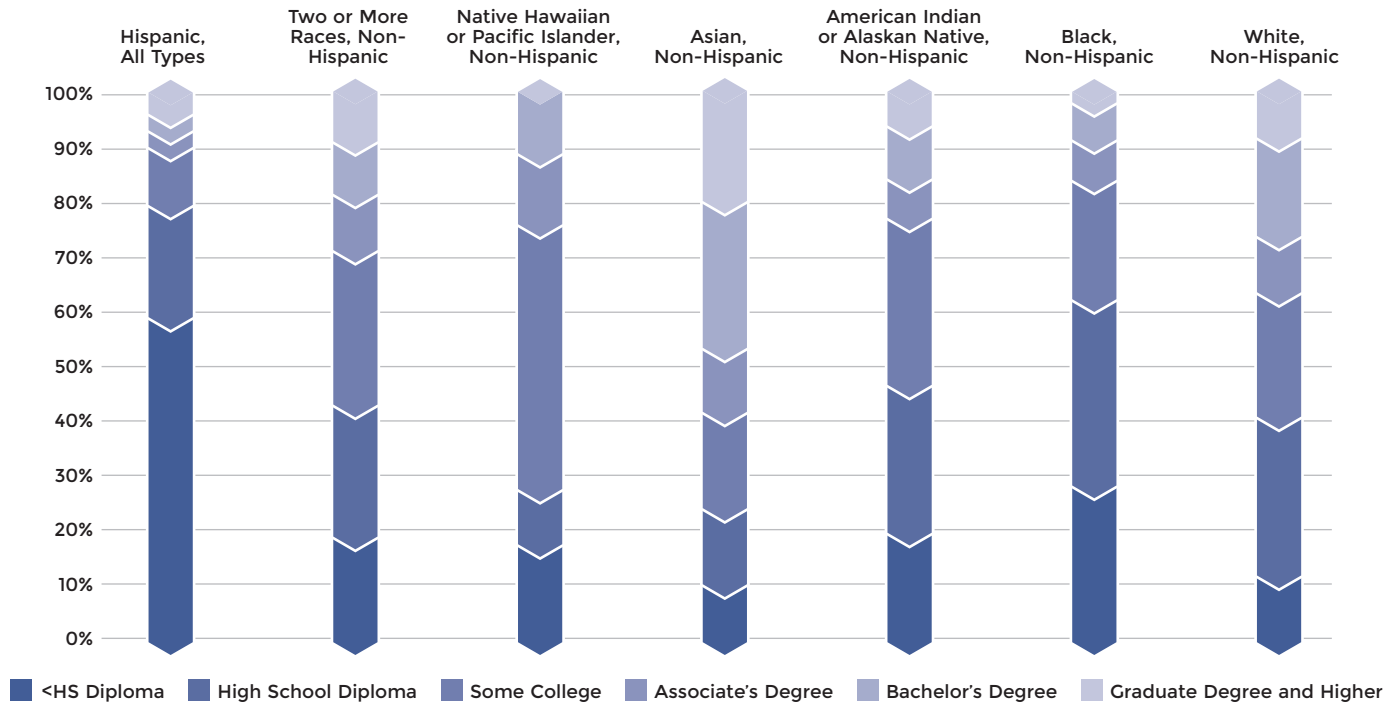
fairly even in the PCC Service Region. One notable difference is that females have a proportionally larger presence in the “Associate’s degree,” “Bachelor’s degree,” and “Graduate degree and higher” categories than males do (31% for females versus 26% for males). This information appears in Table 9 and Figure 9.

### Educational Attainment by Ethnicity

Figure 10 displays the educational attainment of the adult

population by ethnicity. The “Asian, Non-Hispanic” ethnicity category has the highest percentage of adults with post-secondary degrees (58%), followed by the “White, Non-Hispanics” category (36%). Apart from “Native Hawaiian or Pacific Islander, Non-Hispanic”—which is a relatively small category—the “American Indian or Alaskan Native, Non-Hispanic” and “Hispanic, All Types” categories have the lowest levels of education attainment. For “Hispanic, All Types,” only 10% of have a post-secondary degree.

**FIGURE 10: Educational Attainment of Adult Population in PCC Service Region by Ethnicity**



**TABLE 10: Breakdown of Adult Population in PCC Service Region by Educational Attainment and Ethnicity**

		< HS DIPLOMA	HIGH SCHOOL DIPLOMA	SOME COLLEGE	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	GRADUATE DEGREE AND HIGHER
White, Non-Hispanic	COUNT	26,810	63,908	49,953	22,577	39,489	18,257
	PERCENT	12%	29%	23%	10%	18%	8%
Black, Non-Hispanic	COUNT	36,468	43,374	27,759	9,375	8,589	2,419
	PERCENT	28%	34%	22%	7%	7%	2%
American Indian or Alaskan Native, Non-Hispanic	COUNT	241	327	369	87	117	74
	PERCENT	20%	27%	30%	7%	10%	6%
Asian, Non-Hispanic	COUNT	460	605	769	508	1,171	878
	PERCENT	10%	14%	18%	12%	27%	20%
Native Hawaiian or Pacific Islander, Non-Hispanic	COUNT	33	19	90	24	21	0
	PERCENT	18%	10%	48%	13%	11%	0%
Two or More Races, Non-Hispanic	COUNT	535	667	782	283	265	251
	PERCENT	19%	24%	28%	10%	10%	9%
Hispanic, All Types	COUNT	11,382	3,921	2,028	571	580	740
	PERCENT	59%	20%	11%	3%	3%	4%

Source: EMSI Complete Data 2014.2



## CHAPTER 2

# PROGRAM GAP ANALYSIS

The results that appear in this chapter present a focused view of the program groups projected to have a regional gap or surplus. Programs are analyzed at two different levels: postsecondary vocational certifications and associate's degrees, according to the training level offered at PCC.

Each table includes the CIP code and title, the average annual openings associated with that program (which have been de-duplicated using the process outlined in Appendix 3), the average annual completers between 2010 and 2012, and finally the gap or surplus figure. If the numbers are positive, there is a shortage or “gap” of completers—i.e., there are more job openings in those occupations than there are graduates or completers. If the numbers are negative, then there is a “surplus” of completers for those program groups compared to annual job openings.

### INTERPRETING GAP/SURPLUS ANALYSIS RESULTS

The gap analysis is intended to serve as a point of departure for PCC as the college discusses regional workforce needs. A surplus or deficit of workers in a particular category does not necessarily indicate a problem for the region and it is important that each occupation group be evaluated on a case-by-case basis. Evaluation of the program supply (surplus and gaps) will provide an understanding of the role skilled occupations play in economic sustainability and growth.

Other information should also be considered when evaluating these surpluses and gaps. For example, only the education supply pipeline is considered in this analysis because these numbers can be tracked at the county and school level. However, other sources of supply exist as well—unemployed workers, industry trained pipelines, in-migrators, and job changers from other occupational categories can also be a source of skilled occupations. These types of considerations are useful when evaluating specific types of occupations. Unfortunately, secondary data sources (e.g., regional, state, and federal data) do not

account for this, and primary data collection methods (i.e., interviews and surveys) are among the only ways to obtain information on this type of supply pipeline.

Lastly, it is important to keep in mind that the labor market is not so simple and mechanical that one could expect supply and demand to be at perfect equilibrium for any extended period of time. As such, as a general rule of thumb, only programs with considerable gaps or surpluses should be considered long-term strategic issues worthy of closer examination. Given the size and characteristics of the PCC Service Region, any gap or surplus within 10 jobs either above or below zero should be considered within the normal range of labor market fluctuations.

Once evaluated internally within the college, specific implications should be considered for programs with substantial surpluses or gaps. These implications include:

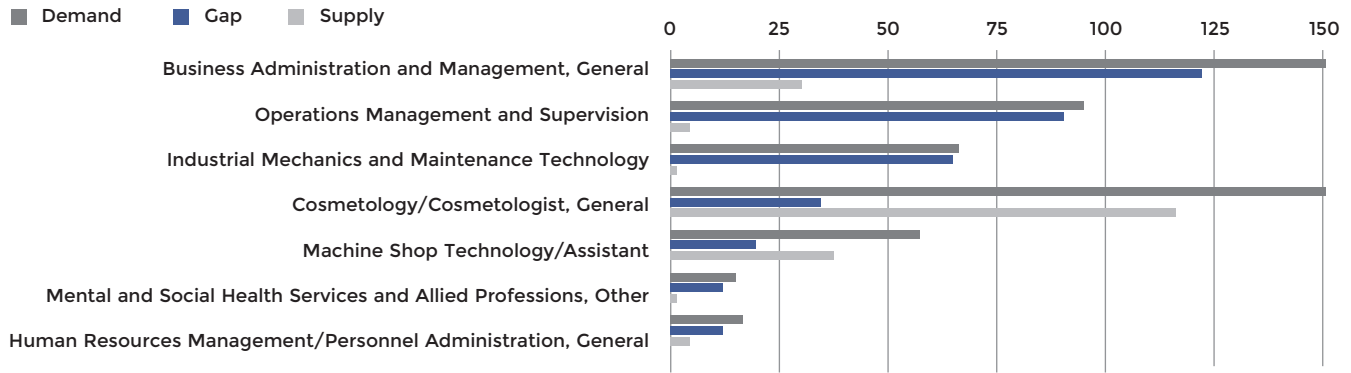
- **Surplus:** Oversupply of specific education completers may lead to higher attrition rates (i.e., brain drain). In other words, the region is educating a workforce that is leaving after program completion because of a lack of jobs. Note: In the analysis of the PCC Service Region where the neighboring population density is very high, a surplus of completers may indicate the need for service region residents to commute outside of the service region to find job opportunities. The commuting pattern flows described in Chapter 1 suggest that this is possible.
- **Gap:** Undersupply of specific program completers may lead to missed opportunities for economic growth and put stress on local businesses to find necessary human capital elsewhere. In other words, the region's education institutions are not providing the necessary workforce for the region and thereby shifting the burden on the industries to find workers in other economies to fill the needed occupations. This translates into higher human resources costs and decreased efficiencies in the economic system. This also provides an opportunity for institutions to develop new programs. Note: Given high population density in the region surrounding

**TABLE 11: Supply and Demand for PCC Certificate Level Programs**

CIP CODE	CIP TITLE	AVERAGE ANNUAL OPENINGS	AVERAGE ANNUAL COMPLETERS	PCC COMPLETERS	TOTAL GAP OR SURPLUS
52.0201	Business Administration and Management, General	151	30	3	121
52.0205	Operations Management and Supervision	94	4	1	90
47.0303	Industrial Mechanics and Maintenance Technology	66	2	2	65
12.0401	Cosmetology/Cosmetologist, General	151	116	7	35
48.0503	Machine Shop Technology/Assistant	57	37	2	20
51.1599	Mental and Social Health Services and Allied Professions, Other	15	2	1	12
52.1001	Human Resources Management/Personnel Administration, General	16	4	4	12
52.1401	Marketing/Marketing Management, General	7	1	1	6
50.0402	Commercial and Advertising Art	5	1	1	4
52.0301	Accounting	14	11	4	3
11.0401	Information Science/Studies	2	1	1	1
1.0604	Greenhouse Operations and Management	3	3	3	0
51.071	Medical Office Assistant/Specialist	23	23	<1	0
51.0917	Polysomnography	1	0	<1	0
22.0302	Legal Assistant/Paralegal	8	9	9	(1)
11.0201	Computer Programming/Programmer, General	9	13	9	(4)
46.0302	Electrician	54	58	12	(4)
51.0919	Mammography Technician/Technology	0	4	4	(4)
47.0604	Automobile/Automotive Mechanics Technology/Technician	56	60	15	(5)
52.0204	Office Management and Supervision	48	53	11	(5)
11.0901	Computer Systems Networking and Telecommunications	10	17	6	(7)
51.1501	Substance Abuse/Addiction Counseling	1	8	8	(7)
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	1	9	9	(8)
51.0905	Nuclear Medical Technology/Technologist	0	10	10	(10)
51.0801	Medical/Clinical Assistant	8	19	10	(11)
51.0901	Cardiovascular Technology/Technologist	1	15	15	(14)
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	21	36	9	(15)
51.0707	Health Information/Medical Records Technology/Technician	12	27	<1	(15)
51.3501	Massage Therapy/Therapeutic Massage	16	32	12	(16)
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	1	22	22	(21)
15.1301	Drafting and Design Technology/Technician, General	1	26	26	(25)
11.0103	Information Technology	6	34	13	(28)
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	2	30	23	(28)
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	68	123	3	(56)
13.121	Early Childhood Education and Teaching	15	89	33	(74)
43.0107	Criminal Justice/Police Science	33	113	31	(80)
48.0508	Welding Technology/Welder	30	114	68	(84)
51.0705	Medical Office Management/Administration	16	172	37	(156)

Source: EMSI Gap Analysis Model

**FIGURE 11: Supply and Demand for PCC Postsecondary Certificate Level Programs**



the service region, a completion gap may be filled by other institutions in the service region. This potential scenario will need to be taken into consideration from the leadership.

## POSTSECONDARY CERTIFICATE LEVEL GAP ANALYSIS

Figure 11 provides a graphical illustration that summarizes the top gaps for PCC postsecondary certificate level programs.

Table 11 on the previous page lists supply and demand for all certificate program types for which PCC offers a training program. While other program groups in the region may face larger surpluses, PCC did not offer any of the programs. For unique programs like Positron Emission Tomography (Allied Health Diagnostic, Intervention, and Treatment Professions, Other) the regional analysis was replaced by a statewide examination.

As shown in Table 11, General Business Administration & Management faces the largest gap: there are 151 annual openings, compared to 3 completions from PCC and a total of 30 completions from all regional institutions. A similar situation is also occurring with Operations Management & Supervision, with 4 completers and 94 projected job openings. The other programs with the highest gaps are Industrial Mechanics and Maintenance Technology, General Cosmetology/Cosmetologist, and Machine Shop Technology/Assistant. It is important to keep perspective when reviewing the gap analysis. In the instance of the Cosmetology/Cosmetologist program, there may be a large gap, but because the average wage for hairdressers, hairstylists, and cosmetologists is less than nine dollars an hour, expanding the program is not supported.

Programs that seem to be training for occupations with

significant surpluses include Medical Office Management/Administration; Welding Technology/Welder, Criminal Justice/Police Science; and Early Childhood Education and Teaching, among others. In some cases, PCC is producing a relatively modest number of completers, but when combined with output from other regional institutions there appears to be an oversupply of workers. For example in Criminal Justice/Police Science, PCC produced 31 completers, which if not for the other 82 regional completers, would be meeting but not oversupplying the 33 estimated annual openings.

## ASSOCIATE'S LEVEL GAP ANALYSIS

Figure 12 below provides a graphical illustration of the top gaps for PCC associate's degree level programs.

Similar to the table above, Table 12 displays supply and demand for all associate's level programs for which PCC provides training. Again, the table only includes program groups available at PCC. Other program groups in the region may face larger gaps, but PCC does not offer the program. Table 13 addresses programs that are not currently being offered but which would address considerable regional workforce gaps.

Operations Management and Supervision has the largest associate's degree level program gap. The next largest is General Business Administration & Management, a field with 179 projected annual openings, compared with 93 completers a year from PCC and other regional institutions. Industrial Mechanics and Maintenance Technology has the third largest gap with 74 annual openings and only 3 completers.

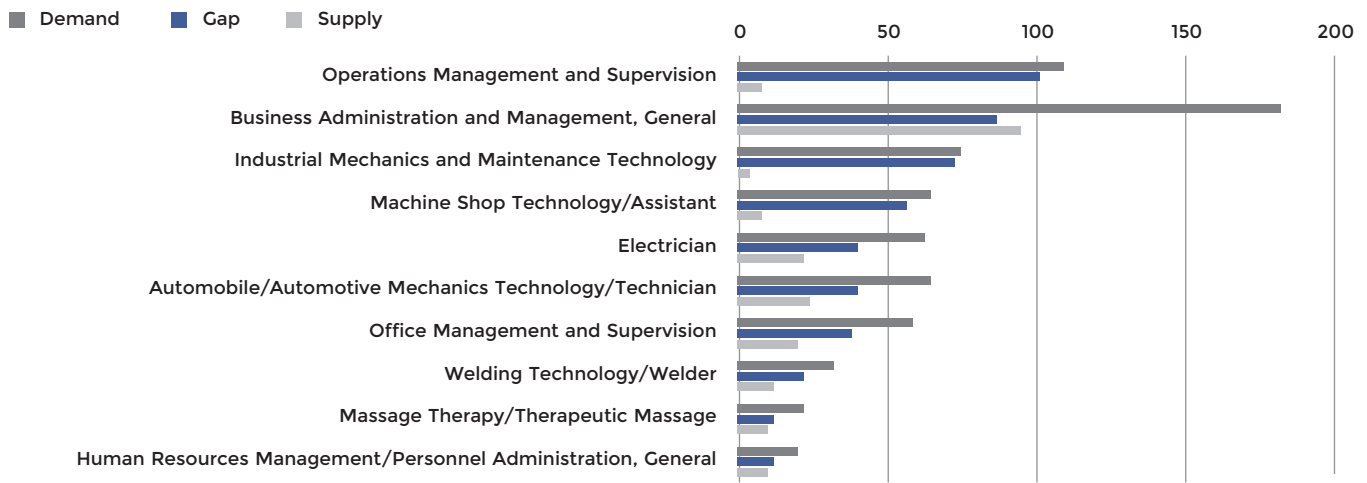
On the opposite side of the spectrum, there are some programs preparing students for fields where they will compete with many other potential workers. These include

**TABLE 12: Supply and Demand for PCC Associate's Degree Level Programs**

CIP CODE	CIP TITLE	AVERAGE ANNUAL OPENINGS	AVERAGE ANNUAL COMPLETERS	PCC COMPLETERS	GAP OR SURPLUS
52.0205	Operations Management and Supervision	108	8	2	100
52.0201	Business Administration and Management, General	179	93	26	85
47.0303	Industrial Mechanics and Maintenance Technology	74	3	3	71
48.0503	Machine Shop Technology/Assistant	63	8	1	55
46.0302	Electrician	61	21	11	40
47.0604	Automobile/Automotive Mechanics Technology/Technician	63	24	15	39
52.0204	Office Management and Supervision	58	20	8	37
48.0508	Welding Technology/Welder	31	11	7	21
51.3501	Massage Therapy/Therapeutic Massage	21	9	6	12
52.1001	Human Resources Management/Personnel Admin., General	20	9	9	11
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	24	15	11	9
11.0201	Computer Programming/Programmer, General	12	10	6	2
52.1401	Marketing/Marketing Management, General	9	8	8	1
11.1003	Computer and Information Systems Security/Info. Assurance	7	7	2	0
22.0301	Legal Administrative Assistant/Secretary	1	1	<1	0
43.0117	Financial Forensics and Fraud Investigation	0	1	1	0
11.0401	Information Science/Studies	3	4	4	(1)
50.0411	Game and Interactive Media Design	0	1	1	(1)
51.2706	Medical Informatics	0	1	1	(1)
19.0702	Adult Development and Aging	0	2	2	(2)
50.0402	Commercial and Advertising Art	7	11	11	(4)
15.0101	Architectural Engineering Technology/Technician	2	6	6	(5)
51.0905	Nuclear Medical Technology/Technologist	1	6	6	(5)
51.1501	Substance Abuse/Addiction Counseling	2	9	9	(7)
46.0499	Building/Construction Finishing, Mgmt., and Inspection, Other	2	12	12	(10)
22.0302	Legal Assistant/Paralegal	11	21	12	(10)
11.0901	Computer Systems Networking and Telecommunications	14	24	13	(10)
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	2	12	12	(10)
41.0101	Biology Technician/Biotechnology Laboratory Technician	4	15	15	(11)
51.0803	Occupational Therapist Assistant	4	15	15	(11)
51.1599	Mental & Social Health Services and Allied Professions, Other	18	30	22	(12)
52.0301	Accounting	23	35	11	(12)
51.0917	Polysomnography	1	17	12	(16)
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	3	22	9	(20)
51.0908	Respiratory Care Therapy/Therapist	4	26	14	(21)
11.0103	Information Technology	8	37	12	(29)
51.0707	Health Information/Medical Records Technology/Technician	15	46	21	(31)
15.0805	Mechanical Engineering/Mechanical Technology/Technician	2	36	18	(34)
51.0911	Radiologic Technology/Science - Radiographer	5	49	24	(44)
13.121	Early Childhood Education and Teaching	20	85	22	(64)
51.0801	Medical/Clinical Assistant	10	83	22	(72)
43.0104	Criminal Justice/Safety Studies	8	84	44	(75)
51.0705	Medical Office Management/Administration	21	134	68	(114)
51.3801	Registered Nursing/Registered Nurse	84	240	78	(156)

Source: EMSI Gap Analysis Model

**FIGURE 12: Supply and Demand for PCC Associate’s Degree Level Programs**



Registered Nursing/Registered Nurse, Medical Office Management/Administration, Criminal Justice/Safety Studies, and Medical/Clinical Assistant, among others.

**TRANSFER TRACK (LIBERAL ARTS) STUDENTS**

A substantial number of students attend PCC with the intention of transferring to a four-year school to receive a bachelor’s degree. Though these students study any number of topics, a large number of them receive associate of arts degrees in liberal arts. Over the past three years, an average of 495 students have completed associate of arts degrees, which composes 32% of the college’s annual production of certificates and degrees.

Once these students leave PCC, their educational and career track is difficult to predict. They could attend a four-year college in the region or outside the region, and they could study any number of different programs that will ultimately determine their future career. What can be shown is that over the next 10 years, jobs that require a bachelor’s degree are projected to be in high demand. In any given year between 2013 and 2023, 2,215 jobs will require a bachelor’s degree and 10,815 will require a bachelor’s degree or less, availing these students of 90% of all regional job openings.

**POTENTIAL NEW PROGRAMS**

In addition to knowing how well PCC’s current educational programs are serving the local labor market, it is helpful

to know the fields of opportunity where the college could create new program offerings. Table 13 on the next page contains a short list of programmatic areas of opportunity that could fill gaps in the labor market by postsecondary vocational certificates or associate’s degree. These selected occupations present unmet annual openings by completions within the region. Please note that these tables highlight particular occupations, and in many cases a program can be designed to train for multiple occupations. Once these occupations are grouped with other similar occupations the actual workforce gap may be larger. Therefore, several programs with relatively small gaps are included. The median hourly earnings for workers in the service region are included in the table.

At the postsecondary certificate level, institutions either are not training students or aren’t training a sufficient number of students for the following healthcare occupations: emergency medical technicians & paramedics, pharmacy technicians, and dental hygienists. Heavy and tractor-trailer truck drivers, and general maintenance & repair workers are two other areas of opportunity. Skilled trades like carpenters; cabinetmakers & bench carpenters; and plumbers, pipefitters, & steamfitters are also under-supplied in the service region.

**CONCLUSION**

Between both postsecondary certificate level and associate’s degree, there are a total of 17 programs associated with demonstrable workforce gaps. Five of these programs exhibit a significant gap in both award levels. The remaining 12 have a gap in one but not both levels. Two programs

**TABLE 13: Programmatic Areas of Opportunity**

SOC	SOC TITLE	AVERAGE ANNUAL OPENINGS	AVERAGE ANNUAL COMPLETERS	GAP	MEDIAN HOURLY EARNINGS
53-3032	Heavy and Tractor-Trailer Truck Drivers	209	0	209	\$15.15
49-9071	Maintenance and Repair Workers, General	180	6	180	\$18.18
47-2031	Carpenters	61	0	71	\$13.09
29-2041	Emergency Medical Technicians and Paramedics	57	19	57	\$14.90
47-2073	Operating Engineers & Other Constr. Equipment Operators	38	0	38	\$16.03
51-7011	Cabinetmakers and Bench Carpenters	37	0	37	\$14.40
33-2011	Firefighters	36	0	36	\$15.22
43-6011	Executive Secretaries & Executive Administrative Assistants	34	3	34	\$19.27
29-2052	Pharmacy Technicians	34	2	34	\$12.52
13-1199	Business Operations Specialists, All Other	34	0	34	\$28.14
49-9051	Electrical Power-Line Installers and Repairers	32	0	32	\$24.58
51-8091	Chemical Plant and System Operators	27	0	27	\$24.63
49-3011	Aircraft Mechanics and Service Technicians	27	8	27	\$26.35
47-2152	Plumbers, Pipefitters, and Steamfitters	22	0	22	\$17.04
47-2211	Sheet Metal Workers	19	0	19	\$19.55
51-9011	Chemical Equipment Operators and Tenders	18	0	18	\$23.26
51-8031	Water & Wastewater Treatment Plant & System Operators	15	11	15	\$16.66
13-2021	Appraisers and Assessors of Real Estate	15	0	15	\$16.40
49-9043	Maintenance Workers, Machinery	14	0	14	\$19.70
13-1031	Claims Adjusters, Examiners, and Investigators	13	0	13	\$28.19
29-2021	Dental Hygienists	10	0	10	\$29.82
51-9081	Dental Laboratory Technicians	10	0	10	\$18.42

Source: EMSI Gap Analysis Model

show a significant gap at one level but significant surplus at the other. While it will not always be the case, at times, there may be a substitution effect between completion levels. For instance, some of the 12 annual openings for Other Mental & Social Health Services & Allied Professions at the certificate level may be filled by the surplus of 12 annual completers at the associate's degree level. Similarly, some of the associate level gaps in Welding Technology/Welder may be filled certificate level completers.

At the postsecondary certificate level there are significant gaps in General Business Administration & Management, Operations Management & Supervision, General Cosmetology/Cosmetologist, Machine Shop Technology/Assistant, and Other Mental & Social Health Services & Allied Professions. The same level sees an oversupply of Medical Office Management/Administration; Welding Technology/Welder, Criminal Justice/Police Science; and Early Childhood Education and Teaching.

For the associate's degree analysis, the programs with the largest gaps are: Operations Management and Supervision, General Business Administration & Management,

Machine Shop Technology/Assistant, Electrician, and Automobile/Automotive Mechanics Technology/ Technician. The largest surpluses are associated with the following programs: Medical Office Management/Administration, Criminal Justice/Safety Studies, Medical/Clinical Assistant, Early Childhood Education & Teaching, and Mechanical Engineering/Mechanical Technology/Technician.

It is important to consider wages when considering programs to bolster or add. Cosmetology may show a gap, but the median hourly earnings are low. Carpenters are a relatively low paying occupation, making \$13 an hour, and are only considered as a potential program on the postsecondary certificate level. Industrial machinery mechanics by comparison make a median wage of \$22 an hour in the region. Dental hygienist is another desirable occupation with median hourly wage rate of \$30. Registered nurses make a median wage of \$28 an hour in the region. Several other occupations have higher median hourly wages: aircraft mechanics and service technicians (\$26); business operations specialists (\$28); and claims adjusters, examiners, and investigators (\$28).



# APPENDIX 1

## ABOUT EMSI DATA

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As stated in Chapter 2, EMSI data were used to calculate the projected number of annual job openings from 2013 to 2023. These projections take into account openings due to job growth and openings due to replacement needs. In order to capture a complete picture of industry employment, EMSI gathers and integrates economic, labor market, demographic, and education data from over 90 government and private-sector sources, creating a comprehensive and current database that includes both published data and detailed estimates with full coverage of the United States.

More specifically, EMSI develops this data by combining covered employment data from Quarterly Census of Employment and Wages (QCEW) produced by the Department of Labor with total employment data in Regional Economic Information System (REIS) published by the

Bureau of Economic Analysis (BEA). This is augmented with County Business Patterns (CBP) and Nonemployer Statistics (NES) published by the US Census Bureau. Projections are based on the latest-available EMSI industry data, 15-year past local trends in each industry, growth rates in statewide and (where available) sub-state area industry projections published by individual state agencies, and (in part) growth rates in national projections from the Bureau of Labor Statistics.

Through this combination of data sources, EMSI is able to fill gaps in individual sources (such as suppressions and missing proprietors). This yields a composite database that leverages the strengths of all its sources. Finally, EMSI's database is updated quarterly, providing the most up-to-date integrated information possible.



# APPENDIX 2

## PROGRAM-TO-OCCUPATION MAPPING

Table A2.1 displays the crosswalk between educational programs (CIP codes) and occupations (SOC codes) that EMSI used to complete the gap analysis. Also listed are the adjustment factors which were applied to the annual openings figures for each occupation within each program. The methodology for these factors is described in Appendix 3, with the program based weight figure recounted under “De-duplication of Annual Openings” and the educational level adjustments recounted under “Education Level Adjustments.”

**Table A2.1: Program to Occupation Mapping with Employment Adjustment Factors**

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK-FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSOCIATE'S DEGREE
1.0507	Equestrian/Equine Studies	39-2011	Animal Trainers	100	65	72
1.0601	Applied Horticulture/Horticulture Operations, General	11-9013	Farmers, Ranchers, and Other Agricultural Managers	95	71	79
		37-3019	Grounds Maintenance Workers, All Other	100	89	94
1.0604	Greenhouse Operations and Management	11-9013	Farmers, Ranchers, and Other Agricultural Managers	5	71	79
11.0103	Information Technology	15-1111	Computer and Information Research Scientists	94	6	9
		15-1121	Computer Systems Analysts	63	20	28
		15-1122	Information Security Analysts	49	29	43
		15-1132	Software Developers, Applications	76	11	16
		15-1133	Software Developers, Systems Software	72	11	16
		15-1134	Web Developers	49	23	31
		15-1143	Computer Network Architects	49	27	41
11.0201	Computer Programming/Programmer, General	15-1122	Information Security Analysts	15	29	43
		15-1131	Computer Programmers	100	19	28
		15-1132	Software Developers, Applications	24	11	16
		15-1133	Software Developers, Systems Software	23	11	16
		15-1134	Web Developers	15	23	31
		15-1143	Computer Network Architects	15	27	41
		15-1151	Computer User Support Specialists	30	40	57
		15-1152	Computer Network Support Specialists	30	40	57
		51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	100	82	93

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
11.0401	Information Science/Studies	11-3021	Computer and Information Systems Managers	23	19	27
		15-1111	Computer and Information Research Scientists	6	6	9
		15-1133	Software Developers, Systems Software	5	11	16
		15-1199	Computer Occupations, All Other	100	34	49
11.0901	Computer Systems Networking and Telecommunications	15-1121	Computer Systems Analysts	37	20	28
		15-1122	Information Security Analysts	28	29	43
		15-1134	Web Developers	28	23	31
		15-1143	Computer Network Architects	28	27	41
		15-1151	Computer User Support Specialists	54	40	57
		15-1152	Computer Network Support Specialists	54	40	57
11.1001	Network and System Administration/Administrator	11-3021	Computer and Information Systems Managers	17	19	27
		15-1122	Information Security Analysts	2	29	43
		15-1134	Web Developers	2	23	31
		15-1142	Network and Computer Systems Administrators	29	34	49
		15-1143	Computer Network Architects	2	27	41
		15-1151	Computer User Support Specialists	4	40	57
		15-1152	Computer Network Support Specialists	4	40	57
11.1002	System, Networking, and LAN/WAN Management/Manager	15-1122	Information Security Analysts	0	29	43
		15-1134	Web Developers	0	23	31
		15-1143	Computer Network Architects	0	27	41
		15-1151	Computer User Support Specialists	0	40	57
		15-1152	Computer Network Support Specialists	0	40	57
11.1003	Computer and Information Systems Security/Information Assurance	15-1122	Information Security Analysts	6	29	43
		15-1134	Web Developers	6	23	31
		15-1141	Database Administrators	100	22	32
		15-1142	Network and Computer Systems Administrators	71	34	49
		15-1143	Computer Network Architects	6	27	41
		15-1151	Computer User Support Specialists	11	40	57
		15-1152	Computer Network Support Specialists	11	40	57
12.0401	Cosmetology/Cosmetologist, General	39-5012	Hairdressers, Hairstylists, and Cosmetologists	98	86	95
		39-5091	Makeup Artists, Theatrical and Performance	100	83	90
		39-5092	Manicurists and Pedicurists	98	83	90
		39-5094	Skincare Specialists	94	83	90
12.0409	Aesthetician/Esthetician and Skin Care Specialist	39-5094	Skincare Specialists	6	83	90

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
12.041	Nail Technician/Specialist and Manicurist	39-5092	Manicurists and Pedicurists	2	83	90
12.0413	Cosmetology, Barber/Styling, and Nail Instructor	39-5011	Barbers	100	91	96
		39-5012	Hairdressers, Hairstylists, and Cosmetologists	2	86	95
12.0503	Culinary Arts/Chef Training	35-1011	Chefs and Head Cooks	100	70	86
		35-2013	Cooks, Private Household	63	90	95
		35-2014	Cooks, Restaurant	100	90	95
		35-2019	Cooks, All Other	100	90	95
12.0505	Food Preparation/Professional Cooking/Kitchen Assistant	35-2011	Cooks, Fast Food	100	90	95
		35-2012	Cooks, Institution and Cafeteria	100	90	95
		35-2013	Cooks, Private Household	37	90	95
		35-2015	Cooks, Short Order	100	90	95
		35-2021	Food Preparation Workers	100	87	92
		35-3021	Combined Food Preparation and Serving Workers, Including Fast Food	100	89	94
		35-9021	Dishwashers	100	94	97
13.1001	Special Education and Teaching, General	25-2051	Special Education Teachers, Preschool	100	10	13
		25-2052	Special Education Teachers, Kindergarten and Elementary School	100	10	13
		25-2053	Special Education Teachers, Middle School	100	10	13
		25-2054	Special Education Teachers, Secondary School	100	10	13
		25-2059	Special Education Teachers, All Other	100	10	13
		25-3098	Substitute Teachers	100	32	40
		25-3099	Teachers and Instructors, All Other	63	32	40
13.1202	Elementary Education and Teaching	25-2021	Elementary School Teachers, Except Special Education	100	3	5
13.121	Early Childhood Education and Teaching	25-2011	Preschool Teachers, Except Special Education	98	39	53
		25-2012	Kindergarten Teachers, Except Special Education	100	39	53
13.132	Trade and Industrial Teacher Education	25-2023	Career/Technical Education Teachers, Middle School	100	3	5
		25-2032	Career/Technical Education Teachers, Secondary School	100	3	4
13.1501	Teacher Assistant/Aide	25-9041	Teacher Assistants	100	62	76
13.9999	Education, Other	25-3099	Teachers and Instructors, All Other	38	32	40
		25-9099	Education, Training, and Library Workers, All Other	100	17	21
15.0101	Architectural Engineering Technology/Technician	17-3029	Engineering Technicians, Except Drafters, All Other	61	60	83
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	17-3023	Electrical and Electronics Engineering Technicians	66	60	83

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
15.0499	Electromechanical and Instrumentation and Maintenance Technologies/Technicians, Other	49-9069	Precision Instrument and Equipment Repairers, All Other	100	56	80
		51-2023	Electromechanical Equipment Assemblers	100	88	95
15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician	51-8031	Water and Wastewater Treatment Plant and System Operators	100	79	91
15.0607	Plastics and Polymer Engineering Technology/Technician	17-3029	Engineering Technicians, Except Drafters, All Other	39	60	83
15.0699	Industrial Production Technologies/Technicians, Other	17-3026	Industrial Engineering Technicians	100	60	83
15.0805	Mechanical Engineering/Mechanical Technology/Technician	17-3027	Mechanical Engineering Technicians	100	60	83
15.1201	Computer Engineering Technology/Technician	17-3023	Electrical and Electronics Engineering Technicians	34	60	83
15.1301	Drafting and Design Technology/Technician, General	17-3011	Architectural and Civil Drafters	100	41	73
		17-3019	Drafters, All Other	100	41	73
15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD	17-3013	Mechanical Drafters	100	41	73
16.0103	Language Interpretation and Translation	27-3091	Interpreters and Translators	34	37	50
16.1603	Sign Language Interpretation and Translation	27-3091	Interpreters and Translators	66	37	50
19.0706	Child Development	21-1093	Social and Human Service Assistants	8	50	60
		25-2011	Preschool Teachers, Except Special Education	2	39	53
		39-9011	Childcare Workers	100	75	84
22.0301	Legal Administrative Assistant/Secretary	43-6012	Legal Secretaries	100	67	81
22.0302	Legal Assistant/Paralegal	23-2011	Paralegals and Legal Assistants	100	38	58
		23-2093	Title Examiners, Abstractors, and Searchers	100	46	59
		23-2099	Legal Support Workers, All Other	100	46	59
24.0101	Liberal Arts and Sciences/Liberal Studies	25-1099	Postsecondary Teachers	100	3	5
30.1201	Historic Preservation and Conservation	19-3093	Historians	100	6	10
		25-4011	Archivists	100	12	16
41.0101	Biology Technician/Biotechnology Laboratory Technician	19-4021	Biological Technicians	100	37	46
43.0104	Criminal Justice/Safety Studies	33-1012	First-Line Supervisors of Police and Detectives	100	44	59
43.0107	Criminal Justice/Police Science	33-3011	Bailiffs	100	73	86
		33-3021	Detectives and Criminal Investigators	100	33	46

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
		33-3051	Police and Sheriff's Patrol Officers	100	49	66
		33-9021	Private Detectives and Investigators	100	38	50
		33-9031	Gaming Surveillance Officers and Gam- ing Investigators	100	74	84
43.0201	Fire Prevention and Safety Technology/Technician	33-1021	First-Line Supervisors of Fire Fighting and Prevention Workers	100	53	77
		33-2021	Fire Inspectors and Investigators	100	53	71
44	Human Services, General	11-9151	Social and Community Service Managers	11	25	31
		21-1011	Substance Abuse and Behavioral Disor- der Counselors	23	16	21
		21-1012	Educational, Guidance, School, and Voca- tional Counselors	100	16	21
		21-1013	Marriage and Family Therapists	100	16	21
		21-1014	Mental Health Counselors	23	16	21
		21-1015	Rehabilitation Counselors	100	16	21
		21-1019	Counselors, All Other	32	16	21
		21-1021	Child, Family, and School Social Workers	100	16	22
		21-1022	Healthcare Social Workers	87	16	22
		21-1023	Mental Health and Substance Abuse Social Workers	87	16	22
		21-1029	Social Workers, All Other	100	16	22
		21-1091	Health Educators	100	39	47
		21-1092	Probation Officers and Correctional Treatment Specialists	100	19	25
		21-1093	Social and Human Service Assistants	30	50	60
		21-1094	Community Health Workers	100	39	47
		21-1099	Community and Social Service Special- ists, All Other	32	39	47
46.0201	Carpentry/Carpenter	47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	0	82	89
		47-2031	Carpenters	100	87	93
		47-3012	Helpers--Carpenters	100	94	97
46.0302	Electrician	47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	78	82	89
		47-2111	Electricians	100	79	93
		47-3013	Helpers--Electricians	100	94	97
		49-2095	Electrical and Electronics Repairers, Pow- erhouse, Substation, and Relay	93	64	89
		49-2098	Security and Fire Alarm Systems Install- ers	100	76	90
		49-9097	Signal and Track Switch Repairers	100	80	90
46.0401	Building/Property Maintenance	37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	8	83	89
		47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	10	82	89
		49-9071	Maintenance and Repair Workers, Gen- eral	100	83	94

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
46.0499	Building/Construction Finishing, Management, and Inspection, Other	47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	12	82	89
		47-2053	Terrazzo Workers and Finishers	100	96	97
47.0105	Industrial Electronics Technology/Technician	49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	100	64	89
		49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	7	64	89
		51-2021	Coil Winders, Tapers, and Finishers	100	88	95
		51-2022	Electrical and Electronic Equipment Assemblers	100	88	95
		51-9141	Semiconductor Processors	100	89	95
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	100	83	96
47.0302	Heavy Equipment Maintenance Technology/Technician	49-3042	Mobile Heavy Equipment Mechanics, Except Engines	100	87	96
		49-3043	Rail Car Repairers	100	87	96
		51-2031	Engine and Other Machine Assemblers	100	85	96
47.0402	Gunsmithing/Gunsmith	49-9099	Installation, Maintenance, and Repair Workers, All Other	100	80	90
47.0603	Autobody/Collision and Repair Technology/Technician	49-3021	Automotive Body and Related Repairers	100	91	97
		49-3022	Automotive Glass Installers and Repairers	100	89	96
		51-9122	Painters, Transportation Equipment	100	93	97
47.0604	Automobile/Automotive Mechanics Technology/Technician	49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	100	64	89
		49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	100	76	95
		49-3023	Automotive Service Technicians and Mechanics	100	85	96
47.0605	Diesel Mechanics Technology/Technician	49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	100	87	97
47.0607	Airframe Mechanics and Aircraft Maintenance Technology/Technician	49-2091	Avionics Technicians	100	65	87
		49-3011	Aircraft Mechanics and Service Technicians	100	69	90
		51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	100	85	93
47.0699	Vehicle Maintenance and Repair Technologies, Other	49-3092	Recreational Vehicle Service Technicians	100	90	95
		49-3093	Tire Repairers and Changers	100	90	95
48.0503	Machine Shop Technology/Assistant	51-2041	Structural Metal Fabricators and Fitters	100	89	96
		51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	100	82	93

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
		51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	100	92	97
		51-4041	Machinists	100	86	97
		51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	100	91	96
		51-4191	Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	100	90	94
		51-4192	Layout Workers, Metal and Plastic	100	91	96
		51-4193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	100	87	94
		51-4194	Tool Grinders, Filers, and Sharpeners	100	90	95
		51-4199	Metal Workers and Plastic Workers, All Other	100	91	96
48.0507	Tool and Die Technology/Technician	51-4111	Tool and Die Makers	100	83	96
48.0508	Welding Technology/Welder	51-4121	Welders, Cutters, Solderers, and Brazers	100	92	98
		51-4122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	100	92	98
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	53-2011	Airline Pilots, Copilots, and Flight Engineers	100	19	28
		53-2012	Commercial Pilots	100	19	28
50.0402	Commercial and Advertising Art	27-1019	Artists and Related Workers, All Other	70	34	43
		27-1021	Commercial and Industrial Designers	100	31	44
		27-1024	Graphic Designers	70	31	44
50.0409	Graphic Design	27-1011	Art Directors	100	34	43
		27-1014	Multimedia Artists and Animators	84	34	43
		27-1019	Artists and Related Workers, All Other	30	34	43
		27-1024	Graphic Designers	30	31	44
		51-9123	Painting, Coating, and Decorating Workers	100	93	97
50.0411	Game and Interactive Media Design	25-1099	Postsecondary Teachers	0	3	5
		27-1014	Multimedia Artists and Animators	16	34	43
51.0601	Dental Assisting/Assistant	31-9091	Dental Assistants	100	75	91
51.0705	Medical Office Management/Administration	31-9092	Medical Assistants	71	69	91
51.0707	Health Information/Medical Records Technology/Technician	29-2071	Medical Records and Health Information Technicians	100	66	81
51.0708	Medical Transcription/Transcriptionist	31-9094	Medical Transcriptionists	100	60	84
51.071	Medical Office Assistant/Specialist	31-9092	Medical Assistants	5	69	91
		43-6013	Medical Secretaries	100	67	81
51.0801	Medical/Clinical Assistant	31-9092	Medical Assistants	24	69	91
		31-9093	Medical Equipment Preparers	99	77	87



CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
51.0803	Occupational Therapist Assistant	31-2011	Occupational Therapy Assistants	100	14	85
		31-2012	Occupational Therapy Aides	100	14	85
51.0805	Pharmacy Technician/Assistant	29-2052	Pharmacy Technicians	100	62	82
		31-9095	Pharmacy Aides	100	64	74
51.0806	Physical Therapy Technician/Assistant	31-2021	Physical Therapist Assistants	100	28	80
		31-2022	Physical Therapist Aides	100	28	80
51.0901	Cardiovascular Technology/Technologist	29-2031	Cardiovascular Technologists and Technicians	100	31	77
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	29-2041	Emergency Medical Technicians and Paramedics	100	65	85
		53-3011	Ambulance Drivers and Attendants, Except Emergency Medical Technicians	100	81	89
51.0905	Nuclear Medical Technology/Technologist	29-2033	Nuclear Medicine Technologists	100	31	77
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	29-1124	Radiation Therapists	100	13	56
		29-2034	Radiologic Technologists	22	31	77
		29-2035	Magnetic Resonance Imaging Technologists	31	31	77
51.0908	Respiratory Care Therapy/Therapist	29-1126	Respiratory Therapists	100	16	71
		29-2054	Respiratory Therapy Technicians	100	62	82
51.0909	Surgical Technology/Technologist	29-2055	Surgical Technologists	98	62	82
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	29-2032	Diagnostic Medical Sonographers	39	31	77
51.0911	Radiologic Technology/Science - Radiographer	29-2034	Radiologic Technologists	47	31	77
		29-2035	Magnetic Resonance Imaging Technologists	69	31	77
51.0917	Polysomnography	29-2099	Health Technologists and Technicians, All Other	31	56	69
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	29-2032	Diagnostic Medical Sonographers	61	31	77
		29-2034	Radiologic Technologists	31	31	77
		29-2099	Health Technologists and Technicians, All Other	57	56	69
		29-9099	Healthcare Practitioners and Technical Workers, All Other	87	32	40
51.1004	Clinical/Medical Laboratory Technician	29-2012	Medical and Clinical Laboratory Technicians	100	31	48
51.1009	Phlebotomy Technician/Phlebotomist	29-1199	Health Diagnosing and Treating Practitioners, All Other	100	10	13

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
		31-9097	Phlebotomists	100	77	90
51.1011	Renal/Dialysis Technologist/ Technician	29-2011	Medical and Clinical Laboratory Tech- nologists	100	31	48
		29-2099	Health Technologists and Technicians, All Other	3	56	69
51.1012	Sterile Processing Technology/ Technician	29-2055	Surgical Technologists	2	62	82
		31-9093	Medical Equipment Preparers	1	77	87
51.1105	Pre-Nursing Studies	29-1141	Registered Nurses	0	6	45
		29-2061	Licensed Practical and Licensed Voca- tional Nurses	1	78	95
51.1501	Substance Abuse/Addiction Counseling	21-1011	Substance Abuse and Behavioral Disor- der Counselors	25	16	21
		21-1014	Mental Health Counselors	25	16	21
51.1503	Clinical/Medical Social Work	21-1011	Substance Abuse and Behavioral Disor- der Counselors	3	16	21
		21-1014	Mental Health Counselors	3	16	21
		21-1022	Healthcare Social Workers	13	16	22
		21-1023	Mental Health and Substance Abuse Social Workers	13	16	22
51.1599	Mental and Social Health Ser- vices and Allied Professions, Other	21-1011	Substance Abuse and Behavioral Disor- der Counselors	49	16	21
		21-1014	Mental Health Counselors	49	16	21
		21-1019	Counselors, All Other	68	16	21
		21-1093	Social and Human Service Assistants	62	50	60
		21-1099	Community and Social Service Special- ists, All Other	68	39	47
51.3501	Massage Therapy/Therapeutic Massage	31-9011	Massage Therapists	100	58	74
51.3801	Registered Nursing/Registered Nurse	29-1141	Registered Nurses	100	6	45
51.3901	Licensed Practical/Vocational Nurse Training	29-2061	Licensed Practical and Licensed Voca- tional Nurses	99	78	95
51.9999	Health Professions and Related Clinical Sciences, Other	29-2099	Health Technologists and Technicians, All Other	8	56	69
		29-9099	Healthcare Practitioners and Technical Workers, All Other	13	32	40
52.0201	Business Administration and Management, General	11-1011	Chief Executives	100	27	33
		11-1021	General and Operations Managers	100	42	51
		11-2022	Sales Managers	93	27	33
		11-3011	Administrative Services Managers	100	48	59
		11-3051	Industrial Production Managers	91	47	56
		11-3071	Transportation, Storage, and Distribution Managers	97	63	71
		11-9021	Construction Managers	91	59	66
		11-9151	Social and Community Service Managers	89	25	31

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
		11-9199	Managers, All Other	100	38	46
		13-1051	Cost Estimators	100	55	67
		13-1111	Management Analysts	100	18	23
		37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	92	83	89
		39-1011	Gaming Supervisors	91	58	68
		39-1021	First-Line Supervisors of Personal Service Workers	91	64	74
52.0203	Logistics, Materials, and Supply Chain Management	11-3071	Transportation, Storage, and Distribution Managers	3	63	71
		13-1081	Logisticians	27	44	58
52.0204	Office Management and Supervision	43-1011	First-Line Supervisors of Office and Administrative Support Workers	100	57	68
52.0205	Operations Management and Supervision	11-3021	Computer and Information Systems Managers	60	19	27
		11-3051	Industrial Production Managers	9	47	56
		11-9021	Construction Managers	9	59	66
		13-1081	Logisticians	73	44	58
		39-1011	Gaming Supervisors	9	58	68
		39-1021	First-Line Supervisors of Personal Service Workers	9	64	74
		49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	100	74	86
		51-1011	First-Line Supervisors of Production and Operating Workers	100	76	84
		51-8012	Power Distributors and Dispatchers	100	68	84
		51-8013	Power Plant Operators	100	68	84
		51-8021	Stationary Engineers and Boiler Operators	100	77	88
		51-8092	Gas Plant Operators	100	80	91
		51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	100	80	91
		51-8099	Plant and System Operators, All Other	100	80	91
		53-1011	Aircraft Cargo Handling Supervisors	100	74	83
		53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	100	74	83
		53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	100	74	83
52.0208	E-Commerce/Electronic Commerce	41-1011	First-Line Supervisors of Retail Sales Workers	100	66	75
52.0301	Accounting	13-2011	Accountants and Auditors	100	12	22
		13-2031	Budget Analysts	100	23	32
		13-2041	Credit Analysts	100	29	37
		13-2061	Financial Examiners	100	17	20
		13-2081	Tax Examiners and Collectors, and Revenue Agents	100	42	52

CIP	PROGRAM	SOC	OCCUPATION	PROGRAM BASED WEIGHT	PERCENT OF WORK- FORCE WITH GIVEN EDUCATION LEVEL	
					PSV AWARD OR SOME COLLEGE	ASSO- CIATE'S DEGREE
52.0302	Accounting Technology/Tech- nician and Bookkeeping	13-2082	Tax Preparers	100	41	50
		43-3021	Billing and Posting Clerks	100	70	83
		43-3031	Bookkeeping, Accounting, and Auditing Clerks	100	72	83
		43-3041	Gaming Cage Workers	100	82	89
		43-3051	Payroll and Timekeeping Clerks	100	68	81
		43-4011	Brokerage Clerks	100	50	59
		43-9111	Statistical Assistants	100	56	67
52.0402	Executive Assistant/Executive Secretary	43-6011	Executive Secretaries and Executive Administrative Assistants	100	67	81
		43-6014	Secretaries and Administrative Assis- tants, Except Legal, Medical, and Execu- tive	100	67	81
52.0803	Banking and Financial Support Services	13-2071	Credit Counselors	100	40	49
		43-3011	Bill and Account Collectors	100	71	82
		43-3071	Tellers	100	72	83
		43-4041	Credit Authorizers, Checkers, and Clerks	100	68	77
		43-4131	Loan Interviewers and Clerks	100	67	78
		43-4141	New Accounts Clerks	100	68	77
52.1001	Human Resources Manage- ment/Personnel Administra- tion, General	11-3111	Compensation and Benefits Managers	100	31	40
		11-3121	Human Resources Managers	100	36	43
		11-3131	Training and Development Managers	100	25	34
		13-1071	Human Resources Specialists	100	33	43
		13-1075	Labor Relations Specialists	100	33	43
		13-1141	Compensation, Benefits, and Job Analysis Specialists	100	40	52
52.1401	Marketing/Marketing Manage- ment, General	13-1151	Training and Development Specialists	100	39	48
		11-2011	Advertising and Promotions Managers	100	21	26
		11-2021	Marketing Managers	100	27	33
		11-2022	Sales Managers	7	27	33
		13-1161	Market Research Analysts and Marketing Specialists	100	18	23

# APPENDIX 3

## PROGRAM GAP ANALYSIS

### METHODOLOGY

The chapter focuses on describing and understanding the methodology used in the program gap analysis. This requires data on both occupation demand (e.g., annual job openings) and education supply (e.g., number of postsecondary degree completions). These are then compared through an education “gap” analysis to determine whether an education program is potentially producing a surplus or shortage of workforce talent relative to the number of job openings. In this way, it is possible to see how the institution’s current programs are satisfying regional workforce needs.

#### SUPPLY AND DEMAND MODEL

Using demand-side data (average annual openings) and supply-side data (postsecondary education output), EMSI builds a model to compare workforce demand with education supply. The purpose of this analysis is to find the difference or “gap” between the average annual openings for an occupation and the number of people completing postsecondary degrees for that occupation, whether at PCC or at another training provider within one of the regions. This made it possible to identify whether there may be talent shortages or surpluses within the service region.

The first step involved mapping the linkage between annual openings for a SOC code and the number of completions for an education program CIP code. The BLS provides information on the occupations that completers of specific CIP codes are more likely to enter. Specific connections have been refined through previous engagements with education institutions and state departments of labor. Some programs have direct occupational ties. For example, a physical therapist assistant is a specific occupation that requires specialized postsecondary training. In this case, one CIP code (physical therapy technician/assistant) maps to only one SOC code (physical therapists assistants). This

provides an easy comparison of annual openings for physical therapist assistants to the number of people completing the relevant program to see whether a talent shortage or surplus exists. Unfortunately, this is not always the case. More often than not an educational program maps to multiple occupations and an occupation maps to multiple educational programs. For this reason, EMSI has pioneered a method of de-duplicating completers, such that the potential sources of supply are not double-counted for any occupation. The details of this process are outlined in this chapter, under “De-duplication of Annual Openings.”

#### OCCUPATION DEMAND

##### Educational Level Adjustments

To capture occupation demand, EMSI uses a proprietary employment dataset that reflects total employment (i.e., employment covered by unemployment insurance as well as proprietor employment). The employment data reflects jobs for the second quarter of 2014. Within this dataset, EMSI calculated the number of regional annual job openings for the occupations that require two different levels of postsecondary training.<sup>6</sup> The BLS also provides educational attainment data of current workers for each SOC code, broken out by their highest level of education attained. The data is presented as the percentage of workers in the SOC code with educational attainment ranging from less than a high school degree to an associate’s degree. Using these data, EMSI adjusted the annual opening estimates for each SOC code to only incorporate the percentage of workers for three different educational levels that correspond with PCC’s program offerings.

For example, as shown in Table 11, there are three occupations trained for by Corrections (CIP code 43.0102).

<sup>6</sup> See Appendix 1 for a description of the sources and processes of EMSI data.

**TABLE A3.1: Educational Level Adjustments**

CIP CODE	CIP TITLE	SOC	TITLE	"SOME COLLEGE, NO DEGREE" OR POSTSECONDARY AWARD OR LOWER	ASSOCIATE'S DEGREE OR LOWER
43.0102	Corrections	33-3012	Correctional Officers and Jailers	75%	88%
		33-1012	First-Line Supervisors of Police and Detectives	46%	62%
		33-1011	First-Line Supervisors of Correctional Officers	61%	75%
	Weighted Average			68%	85%

Within that cluster are an assortment of career fields, including correctional officers and jailers, first-line supervisors of police and detectives, and first-line supervisors of correctional officers. Among correctional officers, the majority of job openings (75%) are available to somebody with “some college” or a postsecondary vocational award. Alternatively, for first-line supervisors of police and detectives, only 46% of job openings are accessible to a person without a college degree. The weighted average of job openings is calculated for each program at each program/degree level where PCC has produced completers over the past three years. Not taking into account the educational attainment dynamics in this way would bias the result by over-counting potential job opportunities for completers.<sup>7</sup>

### De-duplication of Annual Openings

Most educational programs are designed to train people for multiple occupational types, many of which are simultaneously linked with other educational programs, presenting a complexity when comparing supply and demand for any particular educational program. For instance, the Computer Systems Networking & Telecommunications program is mapped to three different occupations: computer support specialists, information security analysts, and computer systems analysts. If we focus on just one of the occupations for this list—computer support specialists—it is also mapped to 10 different educational programs, spanning program titles such as Computer Systems Analysis and Medical Office Computer Specialist.

To ensure that no double-counting occurs, it is necessary to either realign the program groupings to eliminate the mapping of occupations to multiple programs, or to determine what proportion of demand should be compared with supply numbers from each program. EMSI takes the second approach in this analysis, which has the advan-

<sup>7</sup> Given the changing dynamics and need for more education in the existing workforce (i.e., skills-biased technology change in many occupations and industry sectors), this assumption is considered conservative.

tage of maintaining the program titles and descriptions in roughly the same format that completer data were originally delivered to EMSI. EMSI uses a formula that favors program types with the largest number of completers, attributing a greater proportion of demand to these than those which produce a smaller number of completers under the assumption that the higher output educational programs are likely feeding a higher degree of demand within the service region.<sup>8</sup> Appendix 2 contains the detailed mapping of each CIP code to all relevant occupations.

One possible criticism of this methodology is that it assumes, all else being equal, students from higher-output programs are more likely to obtain a job than students from lower-output programs, whereas in reality students are judged more by their skills and merits than their educational program of study. The intention of the analysis is not to rate students’ capability of competing for jobs, but rather to capture the unique dynamics of the local labor market. For example, in a region where a unique program such as Commercial and Advertising Art is more prevalent than Graphic Design, it can safely be assumed that the graduates of the Commercial and Advertising Art program will be offered a larger number of local openings than are students from the Graphic Design program. If such were not the case, it would be unlikely for the Commercial and Advertising Art program to remain the producer of local talent in the long-term, as the program would yield students to a program with a more successful job placement rate.

Recognizing that some smaller programs produce students who are more capable of obtaining local jobs than students from larger programs, EMSI also provides an alternative gap analysis, which does not reduce the number

<sup>8</sup> Note this adjustment is performed on a program-by-program basis without consideration of individual colleges or training providers. Therefore, a single program offered at one large institution has no advantage over a group of similar programs offered a number of smaller educational providers provided that the aggregate output of the smaller schools is near the output of the single larger school.

of annual openings based on the size of each educational program. Rather the total number of annual openings available for students at each educational level is provided without further modification. Due to this modification, these numbers have not been de-duplicated, unlike the annual openings figures shown in Chapter 3. These figures are provided in Appendix 4: Alternative Supply and Demand Calculations.

## EDUCATION OUTPUT

There are many educational institutions in the service region, some of which have programs similar to those offered at PCC. Hence completers at PCC will be competing for some jobs with completers from other regional institutions. EMSI determined education output by Classification of Instructional Program (CIP) codes and identified the number of completers for every award level within those CIP codes. To find the output for all public and private education institutions in the service region, EMSI used data from the Integrated Postsecondary Educational System (IPEDS).<sup>9</sup> These data are publicly available through the National Center for Educational Statistics. Completions data were averaged for a three-year period, 2010 through 2012, to smooth out any bumps in enrollment that may be unique to a particular academic year.

Table A3.2 displays the breakdown by institution for postsecondary certificate level completions. Nine institutions fall under this category, and they produced an average of 1,738 graduates per year. Of those, 33% graduated from PCC. Table A3.3 displays these data just at the associate's degree level. There are 10 institutions offering associate's degrees in the region, producing an average of 1,918 graduates per year. The majority receive their education at the PCC (42%), followed by a host of smaller schools. Considering all certificate and associate's degree level completers, there were 3,656 completers per year on average, and of those PCC produced 38%.

**TABLE A3.2: Summary of Postsecondary Certificate Level Regional Completions by Institution**

INSTITUTION	3-YEAR AVERAGE	PERCENT OF TOTAL
Beaufort County Community College	129	7%
Craven Community College	347	18%
Edgecombe Community College	155	8%
Lenoir Community College	368	19%
Martin Community College	75	4%
Miller-Motte College-Greenville	77	4%
Mitchells Hairstyling Academy-Greenville	5	0%
Mitchells Hairstyling Academy-Wilson	10	1%
Pitt Community College	607	32%
Wilson Community College	138	7%

Source: National Center for Education Statistics – IPEDS; PCC

**TABLE A3.3: Summary of Associate's Degree Regional Completions by Institution**

INSTITUTION	3-YEAR AVERAGE	PERCENT OF TOTAL
Beaufort County Community College	182	8%
Craven Community College	376	16%
Edgecombe Community College	259	11%
Lenoir Community College	292	12%
Martin Community College	63	3%
Miller-Motte College-Greenville	46	2%
Pitt Community College	928	40%
Wilson Community College	193	8%

Source: National Center for Education Statistics – IPEDS; PCC

9 These data come with inherent weaknesses. First, numbers are only available for institutions that participate in or are applicants for any federal financial assistance program authorized by the Higher Education Act (HEA). Also, IPEDS does not account for the fact that some people may receive multiple degrees or certifications, so when the number of degrees awarded exceeds the number of people receiving the degrees, the number of completers can be overstated. Nevertheless, this system is the best source for collecting data regarding a broad range of educational institutions.



## APPENDIX 4

# ALTERNATIVE GAP ANALYSIS CALCULATIONS

EMSI de-duplicated the annual openings shown in Chapter 3 to account for the magnitude of output from different educational programs in the region. The process is explained in detail in Appendix 3 under “De-duplication of Annual Openings.” This procedure is designed to reflect the unique supply and demand dynamics of each regional economy. However, EMSI also recognizes that in some cases a student from a less predominant educational program is a more likely candidate to be offered a local job. These alternative supply and demand calculations give equal weight to every job opportunity within students’ field of study, regardless of whether that program is a big or small player in talent development for the region. Therefore, these estimates should be considered as less conservative measures than those from Chapter 3.

### HIGHLIGHTS OF ALTERNATIVE GAP ANALYSIS

Most programs have a similar gap/surplus amount, as the previous calculations show in Tables 11 through 12, but there are a few notable changes. Among certificate level

programs, the following programs have a significantly larger gap using the less conservative method: Operations Management & Supervision (now has a gap of 118); Greenhouse Operations & Management (gap of 59); Medical Office Assistant/Specialist (gap of 20). Numerous other programs have smaller surpluses than indicated with the previous method. The largest ten surpluses experienced some reordering, but contain essentially the same programs. Other Allied Health Diagnostic, Intervention, & Treatment Professions changes from a surplus of 56 to a gap of 77.

Among associate level programs, the following programs have a much larger gap using the less conservative method: Operations Management & Supervision (gap of 133), Financial Forensics and Fraud Investigation (gap of 31) Computer & Information Systems Security/Information Assurance (gap of 23), and General Computer Programming/Programmer (gap of 22). Numerous other programs have smaller surpluses than indicated with the previous method. There are now 13 programs with gaps equal to or greater than ten in the associate degree analysis compared to 10 in the de-duplicated analysis. The programs with the largest surpluses are virtually unchanged.

## ALTERNATIVE GAP ANALYSIS TABLES

Table A4.1: Alternative Supply and Demand for PCC's Postsecondary Certificate Level Programs

CIP	PROGRAM	AVERAGE ANNUAL OPENINGS	AVERAGE ANNUAL COMPLETERS	PCC COMPLETERS	TOTAL GAP OR SURPLUS
52.0201	Business Administration and Management, General	156	30	3	126
52.0205	Operations Management and Supervision	122	4	1	118
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	201	123	3	77
47.0303	Industrial Mechanics and Maintenance Technology	72	2	2	70
1.0604	Greenhouse Operations and Management	62	3	3	59
12.0401	Cosmetology/Cosmetologist, General	154	116	7	38
51.1599	Mental and Social Health Services and Allied Professions, Other	24	2	1	22
48.0503	Machine Shop Technology/Assistant	57	37	2	20
51.071	Medical Office Assistant/Specialist	43	23	<1	20
52.1001	Human Resources Management/Personnel Administration, General	16	4	4	12
52.1401	Marketing/Marketing Management, General	12	1	1	11
11.0201	Computer Programming/Programmer, General	23	13	9	10
50.0402	Commercial and Advertising Art	7	1	1	6
51.0801	Medical/Clinical Assistant	25	19	10	6
11.0901	Computer Systems Networking and Telecommunications	21	17	6	4
11.0401	Information Science/Studies	4	1	1	3
52.0301	Accounting	14	11	4	3
51.0917	Polysomnography	2	0	<1	2
46.0302	Electrician	58	58	12	0
22.0302	Legal Assistant/Paralegal	8	9	9	(1)
51.0919	Mammography Technician/Technology	3	4	4	(1)
51.1501	Substance Abuse/Addiction Counseling	5	8	8	(3)
47.0604	Automobile/Automotive Mechanics Technology/Technician	56	60	15	(5)
52.0204	Office Management and Supervision	48	53	11	(5)
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	2	9	9	(6)
51.0905	Nuclear Medical Technology/Technologist	0	10	10	(10)
51.0901	Cardiovascular Technology/Technologist	1	15	15	(14)
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	21	36	9	(15)
51.0707	Health Information/Medical Records Technology/Technician	12	27	<1	(15)
51.3501	Massage Therapy/Therapeutic Massage	16	32	12	(16)
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	4	22	22	(18)
11.0103	Information Technology	9	34	13	(24)
15.1301	Drafting and Design Technology/Technician, General	1	26	26	(25)
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	3	30	23	(27)
13.121	Early Childhood Education and Teaching	15	89	33	(73)
43.0107	Criminal Justice/Police Science	33	113	31	(80)
48.0508	Welding Technology/Welder	30	114	68	(84)
51.0705	Medical Office Management/Administration	22	172	37	(150)

**TABLE A4.2: Alternative Supply and Demand for PCC's Associate's Degree Level Programs**

CIP	PROGRAM	AVERAGE ANNUAL OPENINGS	AVERAGE ANNUAL COMPLETERS	PCC COMPLETERS	TOTAL GAP OR SURPLUS
52.0205	Operations Management and Supervision	140	8	2	133
52.0201	Business Administration and Management, General	184	93	26	91
47.0303	Industrial Mechanics and Maintenance Technology	80	3	3	78
48.0503	Machine Shop Technology/Assistant	63	8	1	55
46.0302	Electrician	65	21	11	44
47.0604	Automobile/Automotive Mechanics Technology/Technician	63	24	15	39
52.0204	Office Management and Supervision	58	20	8	37
43.0117	Financial Forensics and Fraud Investigation	32	1	1	31
11.1003	Computer & Info. Systems Security/Information Assurance	30	7	2	23
11.0201	Computer Programming/Programmer, General	32	10	6	22
48.0508	Welding Technology/Welder	31	11	7	21
51.3501	Massage Therapy/Therapeutic Massage	21	9	6	12
52.1001	Human Resources Management/Personnel Admin., General	20	9	9	11
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	24	15	11	9
50.0411	Game and Interactive Media Design	9	1	1	8
52.1401	Marketing/Marketing Management, General	15	8	8	7
11.0901	Computer Systems Networking and Telecommunications	29	24	13	6
46.0499	Building/Construction Finishing, Mgmt., and Inspection, Other	18	12	12	5
11.0401	Information Science/Studies	6	4	4	3
51.2706	Medical Informatics	4	1	1	3
51.1599	Mental and Social Health Services and Allied Professions, Other	30	30	22	0
22.0301	Legal Administrative Assistant/Secretary	1	1	0	0
19.0702	Adult Development and Aging	0	2	2	(2)
50.0402	Commercial and Advertising Art	9	11	11	(2)
51.1501	Substance Abuse/Addiction Counseling	7	9	9	(2)
15.0101	Architectural Engineering Technology/Technician	2	6	6	(4)
51.0905	Nuclear Medical Technology/Technologist	1	6	6	(5)
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	6	12	12	(6)
22.0302	Legal Assistant/Paralegal	11	21	12	(10)
41.0101	Biology Technician/Biotechnology Laboratory Technician	4	15	15	(11)
51.0803	Occupational Therapist Assistant	4	15	15	(11)
52.0301	Accounting	23	35	11	(12)
51.0917	Polysomnography	3	17	12	(15)
15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	4	22	9	(18)
51.0908	Respiratory Care Therapy/Therapist	4	26	14	(21)
11.0103	Information Technology	13	37	12	(23)
51.0707	Health Information/Medical Records Technology/Technician	15	46	21	(31)
15.0805	Mechanical Engineering/Mechanical Technology/Technician	2	36	18	(34)
51.0911	Radiologic Technology/Science - Radiographer	9	49	24	(39)
51.0801	Medical/Clinical Assistant	32	83	22	(50)
13.121	Early Childhood Education and Teaching	21	85	22	(64)
43.0104	Criminal Justice/Safety Studies	8	84	44	(75)
51.0705	Medical Office Management/Administration	29	134	68	(105)
51.3801	Registered Nursing/Registered Nurse	84	240	78	(156)

# APPENDIX 5

## DETAILED EMPLOYMENT PROJECTIONS

Table A5.1 displays the occupations that align with one or more of PCC's educational programs. The programs with which they align can be found in Table A2.1. Table A5.2 displays the occupations that align with one or more of the programs discussed in the analysis of potential new programs (Tables 13 through 14). Note that if an occupation appears in Table A5.1 it is not included in Table A5.2.

**Table A5.1: Detailed Employment Projections Related to Existing Programs**

SOC	OCCUPATION	2013 JOBS	2018 JOBS	CHANGE	PERCENT CHANGE	PROJECTED ANNUAL OPENINGS
11-2011	Advertising and Promotions Managers	26	29	3	12%	2
11-2021	Marketing Managers	189	219	30	16%	10
11-2022	Sales Managers	431	477	46	11%	19
11-3011	Administrative Services Managers	222	254	32	14%	10
11-3021	Computer and Information Systems Managers	264	296	32	12%	10
11-3051	Industrial Production Managers	496	525	29	6%	17
11-3071	Transportation, Storage, and Distribution Managers	151	167	16	11%	7
11-3111	Compensation and Benefits Managers	20	22	2	10%	1
11-3121	Human Resources Managers	152	173	21	14%	9
11-3131	Training and Development Managers	22	26	4	18%	1
11-9013	Farmers, Ranchers, and Other Agricultural Managers	2,545	2,466	(79)	(3%)	88
11-9021	Construction Managers	665	580	(85)	(13%)	11
11-9151	Social and Community Service Managers	192	214	22	11%	9
11-9199	Managers, All Other	1,830	2,027	197	11%	84
11-1011	Chief Executives	467	536	69	15%	25
11-1021	General and Operations Managers	2,615	2,827	212	8%	94
13-1051	Cost Estimators	267	279	12	4%	12
13-1071	Human Resources Specialists	524	562	38	7%	19
13-1075	Labor Relations Specialists	26	26	0	0%	1
13-1081	Logisticians	302	345	43	14%	13
13-1111	Management Analysts	739	842	103	14%	34
13-1141	Compensation, Benefits, and Job Analysis Specialists	73	82	9	12%	3
13-1151	Training and Development Specialists	247	277	30	12%	11
13-1161	Market Research Analysts and Marketing Specialists	333	409	76	23%	21
13-2011	Accountants and Auditors	1,677	1,833	156	9%	85

SOC	OCCUPATION	2013 JOBS	2018 JOBS	CHANGE	PERCENT CHANGE	PROJECTED ANNUAL OPENINGS
13-2031	Budget Analysts	28	33	5	18%	2
13-2041	Credit Analysts	60	67	7	12%	3
13-2061	Financial Examiners	5	5	0	0%	1
13-2081	Tax Examiners and Collectors, and Revenue Agents	140	145	5	4%	6
15-1111	Computer and Information Research Scientists	11	13	2	18%	1
15-1121	Computer Systems Analysts	316	375	59	19%	18
15-1122	Information Security Analysts	57	67	10	18%	3
15-1131	Computer Programmers	200	224	24	12%	11
15-1132	Software Developers, Applications	197	233	36	18%	10
15-1133	Software Developers, Systems Software	120	143	23	19%	7
15-1134	Web Developers	121	152	31	26%	8
15-1141	Database Administrators	64	76	12	19%	4
15-1142	Network and Computer Systems Administrators	322	344	22	7%	10
15-1143	Computer Network Architects	143	148	5	3%	4
15-1151	Computer User Support Specialists	846	913	67	8%	28
15-1152	Computer Network Support Specialists	191	199	8	4%	5
15-1199	Computer Occupations, All Other	155	163	8	5%	5
17-3011	Architectural and Civil Drafters	78	74	(4)	(5%)	1
17-3019	Drafters, All Other	18	19	1	6%	1
17-3023	Electrical and Electronics Engineering Technicians	174	179	5	3%	5
17-3027	Mechanical Engineering Technicians	56	58	2	4%	2
21-1011	Substance Abuse and Behavioral Disorder Counselors	167	200	33	20%	12
21-1014	Mental Health Counselors	319	369	50	16%	19
21-1019	Counselors, All Other	30	33	3	10%	1
21-1093	Social and Human Service Assistants	599	671	72	12%	32
21-1099	Community and Social Service Specialists, All Other	180	197	17	9%	9
23-2011	Paralegals and Legal Assistants	542	552	10	2%	13
23-2093	Title Examiners, Abstractors, and Searchers	58	67	9	16%	3
23-2099	Legal Support Workers, All Other	80	85	5	6%	3
25-2011	Preschool Teachers, Except Special Education	977	921	(56)	(6%)	28
25-2012	Kindergarten Teachers, Except Special Education	256	272	16	6%	11
27-1019	Artists and Related Workers, All Other	43	48	5	12%	2
27-1021	Commercial and Industrial Designers	57	62	5	9%	3
27-1024	Graphic Designers	333	360	27	8%	16
29-1124	Radiation Therapists	21	22	1	5%	1
29-1141	Registered Nurses	5852	6157	305	5%	189
29-2031	Cardiovascular Technologists and Technicians	68	75	7	10%	3
29-2032	Diagnostic Medical Sonographers	173	198	25	14%	8
29-2033	Nuclear Medicine Technologists	38	40	2	5%	1
29-2034	Radiologic Technologists	341	360	19	6%	10
29-2035	Magnetic Resonance Imaging Technologists	49	53	4	8%	2
29-2071	Medical Records and Health Information Technicians	411	440	29	7%	18

SOC	OCCUPATION	2013 JOBS	2018 JOBS	CHANGE	PERCENT CHANGE	PROJECTED ANNUAL OPENINGS
29-2099	Health Technologists and Technicians, All Other	129	140	11	9%	4
29-9099	Healthcare Practitioners and Technical Workers, All Other	72	79	7	10%	3
31-9011	Massage Therapists	399	511	112	28%	28
31-9092	Medical Assistants	848	906	58	7%	32
31-9093	Medical Equipment Preparers	112	118	6	5%	4
33-1012	First-Line Supervisors of Police and Detectives	354	367	13	4%	14
33-3011	Bailiffs	39	40	1	3%	1
33-3021	Detectives and Criminal Investigators	257	271	14	5%	9
33-3051	Police and Sheriff's Patrol Officers	1,264	1,328	64	5%	55
33-9021	Private Detectives and Investigators	94	103	9	10%	5
33-9031	Gaming Surveillance Officers and Gaming Investigators	5	5	0	0%	1
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	598	636	38	6%	24
39-1011	Gaming Supervisors	38	42	4	11%	2
39-1021	First-Line Supervisors of Personal Service Workers	417	469	52	12%	19
39-5012	Hairdressers, Hairstylists, and Cosmetologists	2,050	2,534	484	24%	156
39-5091	Makeup Artists, Theatrical and Performance	14	16	2	14%	1
39-5092	Manicurists and Pedicurists	233	301	68	29%	16
39-5094	Skincare Specialists	134	165	31	23%	7
43-1011	First-Line Supervisors of Office and Administrative Support Workers	2,114	2,273	159	8%	85
43-6013	Medical Secretaries	887	988	101	11%	32
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	1,469	1,391	(78)	(5%)	20
47-2111	Electricians	1,283	1,232	(51)	(4%)	38
47-3013	Helpers--Electricians	235	235	0	0%	9
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	992	1,018	26	3%	36
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	5	10	0	0%	1
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	11	10	(1)	(9%)	0
49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	23	25	2	9%	1
49-2098	Security and Fire Alarm Systems Installers	66	71	5	8%	3
49-3023	Automotive Service Technicians and Mechanics	1,704	1,716	12	1%	64
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	759	755	(4)	(1%)	25
49-9041	Industrial Machinery Mechanics	713	779	66	9%	41
49-9097	Signal and Track Switch Repairers	5	5	0	0%	1
51-1011	First-Line Supervisors of Production and Operating Workers	1,353	1,403	50	4%	36
51-2041	Structural Metal Fabricators and Fitters	129	147	18	14%	11
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	324	337	13	4%	16

SOC	OCCUPATION	2013 JOBS	2018 JOBS	CHANGE	PERCENT CHANGE	PROJECTED ANNUAL OPENINGS
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	26	30	4	15%	2
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	76	73	(3)	(4%)	2
51-4041	Machinists	722	740	18	2%	28
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	140	141	1	1%	4
51-4121	Welders, Cutters, Solderers, and Brazers	656	635	(21)	(3%)	24
51-4122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	161	171	10	6%	8
51-4191	Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	18	18	0	0%	1
51-4192	Layout Workers, Metal and Plastic	23	18	(5)	(22%)	1
51-4193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	41	39	(2)	(5%)	1
51-4194	Tool Grinders, Filers, and Sharpeners	23	21	(2)	(9%)	1
51-4199	Metal Workers and Plastic Workers, All Other	49	49	0	0%	1
51-8012	Power Distributors and Dispatchers	14	13	(1)	(7%)	0
51-8013	Power Plant Operators	70	62	(8)	(11%)	2
51-8021	Stationary Engineers and Boiler Operators	55	58	3	5%	2
51-8092	Gas Plant Operators	5	5	0	0%	1
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	5	5	0	0%	1
51-8099	Plant and System Operators, All Other	15	17	2	13%	1
53-1011	Aircraft Cargo Handling Supervisors	5	5	0	0%	1
53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	339	360	21	6%	14
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	549	576	27	5%	22



**TABLE A5.2: Detailed Employment Projections Related to Potential Future Programs**

SOC	TITLE	2013 JOBS	2018 JOBS	CHANGE	% CHANGE	PROJECTED ANNUAL OPENINGS
13-1031	Claims Adjusters, Examiners, and Investigators	250	278	28	11%	13
13-1199	Business Operations Specialists, All Other	1344	1460	116	9%	43
13-2021	Appraisers and Assessors of Real Estate	532	578	46	9%	16
29-1141	Registered Nurses	5852	6157	305	5%	189
29-2012	Medical and Clinical Laboratory Technicians	286	313	27	9%	14
29-2021	Dental Hygienists	270	297	27	10%	14
29-2041	Emergency Medical Technicians and Paramedics	942	1050	108	11%	51
29-2052	Pharmacy Technicians	786	867	81	10%	25
33-2011	Firefighters	686	718	32	5%	26
43-6011	Executive Secretaries and Executive Administrative Assistants	1226	1261	35	3%	25
47-2031	Carpenters	1952	1804	(148)	(8%)	34
47-2073	Operating Engineers and Other Construction Equipment Operators	699	702	3	0%	20
47-2152	Plumbers, Pipefitters, and Steamfitters	614	593	(21)	(3%)	12
47-2211	Sheet Metal Workers	357	357	0	0%	10
49-3011	Aircraft Mechanics and Service Technicians	475	514	39	8%	22
49-9041	Industrial Machinery Mechanics	713	779	66	9%	41
49-9051	Electrical Power-Line Installers and Repairers	307	326	19	6%	18
49-9071	Maintenance and Repair Workers, General	3355	3538	183	5%	105
51-7011	Cabinetmakers and Bench Carpenters	304	383	79	26%	21
51-8091	Chemical Plant and System Operators	380	367	(13)	(3%)	16
51-9011	Chemical Equipment Operators and Tenders	186	202	16	9%	12
53-3032	Heavy and Tractor-Trailer Truck Drivers	3795	3926	131	3%	113