

PENNSYLVANIA'S STATE SYSTEM OF HIGHER EDUCATION



CALU



CLARION
UNIVERSITY



MANSFIELD
UNIVERSITY

Millersville
University



SlipperyRock
University

WCU
WEST CHESTER
UNIVERSITY

Mansfield University's

WORKFORCE CHARACTERISTICS TECHNICAL REPORT

A report for Pennsylvania's
State System of Higher Education

2016



Pennsylvania's
STATE SYSTEM
of Higher Education

CONTENTS

5	1. Introduction
6	1.1 Pennsylvania’s State System of Higher Education Gap Analysis Project
7	1.2 Goal of the Workforce Characteristics Report
9	2. Pennsylvania’s State System Learner Origin
10	2.1 Mansfield University’s Learner Origin
12	3. Summary of Mansfield University Workforce Region
13	3.1 Defining Mansfield University’s Workforce Region
15	4. Labor Market of Mansfield University’s Workforce Region
16	4.1 Employment Projections
18	5. Industries in Mansfield University’s Workforce Region
19	5.1 Top Employers in Mansfield University’s Workforce Region
21	6. Occupations in Mansfield University’s Workforce Region
21	6.1 Skilled Occupations
22	6.2 Top Skilled Occupations in Mansfield University’s Workforce Region
25	6.3 Key Skilled High Demand Occupations Aligning to University-level Education
29	6.4 Industry Staffing Patterns for Key Skilled High Demand Occupations in Mansfield University’s Workforce Region
31	6.5 Key Skilled High Demand Occupational Profiles

38	7. Demographic and Socio-economic Indicators of Mansfield University’s Workforce Region
38	7.1 Demographics of Mansfield University’s Workforce Region
40	7.2 Socio-economic Indicators of Mansfield University’s Workforce Region
44	8. Next Steps
45	Data Sources
46	Appendix A: Methodology for Identifying State System University Workforce Regions
52	Appendix B: Pennsylvania State and County Enrollment and Employment
54	Appendix C: Industry Projections 2014-2024 for Mansfield University’s Workforce Region
62	Appendix D: Occupation Projections 2014-2024 for Mansfield University’s Workforce Region
87	About The State System’s Gap Analysis Project

GLOSSARY OF TERMS

The following descriptions provide a point of reference to understand terminology as well as the types of data and analysis undertaken in this study, reflecting historic and contemporary narratives.

Industry Change: A measure of the change in employment within an industry, used to identify whether an industry is growing or declining, as well as the rate of change. Projected changes lay out expectations of growth/decline for specific industries.

Job Postings: The number of unique (de-duplicated) online postings for a job in a given occupation.

Location Quotient: A comparative statistic used to calculate the relative employment concentration of a given industry or occupation against the average employment of the industry in a larger geography (for example, countrywide). Industries with a higher location quotient (usually greater than 1.2) indicate that the region has a comparative advantage or specialization in the production of that good or service or has a high degree of specialization within its workforce. For example, in Silicon Valley, we would expect the concentration of computer programming occupations to be greater than the rest of the US, giving rise to the conclusion that Silicon Valley has a comparative advantage in the computer programming workforce.

New and Replacement Jobs: A demand-side estimate of the number of job openings in an occupation that result from new job growth as well as replacement demand. Replacement demand comprises occupation job leavers based on separations, retirement, and death.

Occupation Jobs: A measure of employment within an occupation category, used to identify which occupations have been growing or declining, as well as the rate of change. Projected changes lay out expectations of growth/decline for specific occupation categories.

State System Learner Capture Rate: The percentage of State System enrolled learners from a specific county that are attending a given Pennsylvania State System university. State System universities typically capture a higher proportion of State System enrolled learners from counties in proximity to the institution.

State System Learner Share: Represents the contribution of learners from a defined geographic area that are enrolled in a State System university.

Sub-regions: A geographic area within Pennsylvania defined for more focused workforce and education gap analyses. Sub-regions were determined primarily on Partnerships for Regional Economic Performance (PREP) boundaries. PREP is Pennsylvania's network of business assistance partners designed to help companies start, grow, and prosper. Please refer to Appendix A for mapping of the Sub-regions and PREP boundaries.

ACRONYMS USED

ACS: American Community Survey

BLS: Bureau of Labor Statistics

EMSI: Economic Modeling Specialists International

CEW: Center on Education and the Workforce (Georgetown University)

IPEDS: Integrated Postsecondary Education Data System

LAUS: Local Area Unemployment Statistics

LEHD: Longitudinal Employment and Housing Dynamics

NCES: National Center for Education Statistics

OES: Occupational Employment Statistics

O*NET: Occupational Network

PUMS: Public Use Microdata Sample

QCEW: Quarterly Census of Employment and Wages

SAIPE: Small Area Income and Poverty Estimates

USDOE: US Department of Education

USDOL: US Department of Labor

1. INTRODUCTION

Pennsylvania’s State System of Higher Education (State System) comprises 14 universities, four branch campuses, multiple regional centers and the McKeever Environmental Learning Center.¹ The universities are located in rural, suburban, and small-town settings around Pennsylvania. The State System’s two educational hubs (with locations in Harrisburg, the Dixon University Center, and Philadelphia, State System @ Center City) offer academic programs through a consortium of public and private colleges and universities. Per Act 188 of 1982, the State System’s mission “is the provision of instruction for undergraduate and graduate students to and beyond the master’s degree in the liberal arts and sciences, and in the applied fields, including the teaching profession.” In doing so, the State System’s purpose is “to provide high quality education at the lowest possible cost to students.”² Analysis and understanding of the economy and workforce the State System supports, as well as future demands for talent advances the State System’s mission and philosophy—a key component of this report. Further, it enables effective and targeted strategies and decision-making, grounded in data-driven evidence.

Like all institutions of higher education, the State System’s universities face challenges in their effort to identify and quantify program needs for Pennsylvania residents and businesses that demand talent. They must account for the changing economic and workforce dynamics within the region they support, such as industry and occupation growth/decline, as well as the changing quality of the area’s workforce. Furthermore, as technology progresses, a growing need to address increasingly complex and specialized occupational tasks requires additional customization to education. As a result, education institutions are increasingly called upon to incorporate relevant courses that meet the needs of students and businesses in their service area—a departure from traditional supply-based education towards a more employer demand-driven model.

A fundamental challenge for any higher education system is to first understand the characteristics of the economy and workforce it supports. This study and

1 One of the State System’s entities, System-wide Functions and Services, is primarily located at the Dixon University Center in Harrisburg and includes: System-wide shared administrative services; System leadership functions of the Chancellor and Board of Governors; some System-wide initiatives and grants managed on behalf of the universities; and the academic, student, and facilities support for the multi-university sites in Harrisburg and Philadelphia.

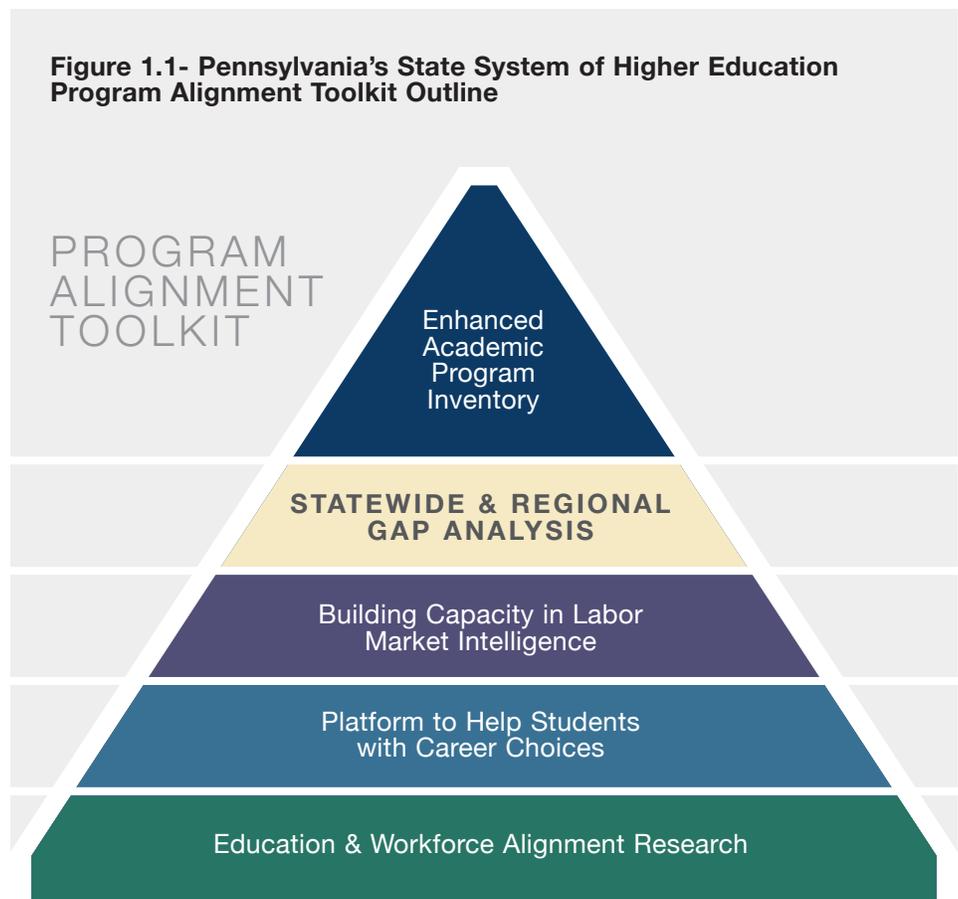
2 Source: The State System’s Economic and Employment Impact on the Commonwealth of Pennsylvania – released April 15, 2015.

the broader set of deliverables under the State System’s Supply/Demand Gap Analysis Project—hereinafter, Gap Analysis Project—will assist universities and education planners by providing an infrastructure of resources for internal planning, as well as external engagement. Understanding key economic aspects of the geography helps to better align policy and strategic direction in order to continue supporting the talent needs of Pennsylvania.

1.1 Pennsylvania’s State System of Higher Education Gap Analysis Project

In a fast-changing economic and social environment that is also experiencing rising costs for higher education, institutions are increasingly called upon to align their programs to the changing needs of the economy.

In response to improving career outcomes for its learners, Pennsylvania’s State System of Higher Education (State System) has produced a Program Alignment Toolkit—a central clearinghouse for key academic planning



information, developed in response to the State System's Strategic Plan "Rising to the Challenge 2020." The Program Alignment Toolkit helps provide multiple perspectives of how higher education can connect to the state's economy and lead to career success for students. A key component of this toolkit is the development of a statewide and regional gap analysis. Other high impact strategies that are a part of the State System's Program Alignment Toolkit are presented in Figure 1.1. The ultimate goal of this plan is to assist the State System's fourteen universities to increase their individual and collective impact on Pennsylvania's economy.

1.2 Goal of the Workforce Characteristics Report

The State System's Gap Analysis Project produced both a Workforce Characteristics Report and a Supply/Demand Gap Analysis Report for both the state and five sub-regions. The Workforce Characteristics Report contains a set of economic, workforce, demographic, and socio-economic information to contextualize the supply/demand gap analysis. The Supply/Demand Gap Analysis Report for Pennsylvania and its sub-regions provides a data-driven perspective of employer demand (new and replacement jobs by occupation in the state) and higher education supply (degree production by major program). The data sources utilized for the State System's Gap Analysis Project are diverse including Bureau of Labor Statistics (BLS), U.S. Census Bureau, American Community Survey (ACS), System Research Office, National Center for Education Statistics (NCES, Integrated Postsecondary Education Data System), IMPLAN (Input/Output Model), and Economic Modeling Specialists International (EMSI). Ultimately, the reports generated from this project will assist the State System universities with strategic engagement, program development and evaluation, student engagement, and marketing.

The intentions of this Workforce Characteristics Report are fourfold.

- First, it provides a baseline reporting structure to evaluate workforce characteristics at the state level and sub-region level within Pennsylvania, which can be repeated in the future.
- Second, it identifies sub-regions within Pennsylvania that will be used to conduct regionally specific analysis in subsequent reports.
- Third, it builds on CEW's State System degree production report. The Workforce Characteristics Report is a data-driven analysis and discussion of trends in Pennsylvania's economy, including projections of industry and occupational employment, key skilled high demand occupations, and changes in socio-economic characteristics.

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- Finally, this report creates the foundation to construct the State System's Gap Analysis reports for the state and its regions and complements the content of the supply/demand gap analysis reports.

While the main body of this report provides a high level summary, the Appendices provide an abundance of information for those seeking additional detail. Appendix A provides a map of the state sub-region boundaries along with PREP and WIA boundaries. Appendix B provides detail on the employment and enrollment by each county in Pennsylvania. Appendix C provides nearly 300 detailed industry employment projections for the region along with a measure of competitiveness for each industry. Lastly, Appendix D provides a description of occupation levels and employment projections for over 400 detailed occupations.

2. PENNSYLVANIA'S STATE SYSTEM LEARNER ORIGIN

This section provides an overview of where State System learners come from within Pennsylvania. It is then compared to where Pennsylvania's workforce is employed. This information is combined with other relevant economic data to define sub-regions as well as university workforce regions—adding valuable geographic granularity to the State System's program alignment toolkit.

Pennsylvania's total four year institution enrollment in 2013 was approximately 618,700 learners. Of this, the Pennsylvania State System of Higher Education comprised 112,225 enrolled learners—of which almost 90% were Pennsylvania residents.³ Based on analysis of the workforce size and the origin of learners, some counties within the Commonwealth appear to provide a higher or lower share of learners to the State System compared to other counties—indicating that learners in some counties are more prone to attending a State System university, compared to other counties. The map below (Figure 2.1) illustrates workforce size and the origin of Pennsylvania resident learners enrolled in Pennsylvania's State System of Higher Education. Counties that exceeded +/-1% difference of learners to workforce are found in Table 2.1 and Table 2.2. For example, Chester County provides a higher percentage of State System learners, compared to its workforce size, whereas Philadelphia County provides a low percentage of learners.

Table 2.1 – Counties with Higher Share of State System Learners vs. Workforce

County	State System Students from County	% of State System Students from PA	County Workforce	% of PA Workforce	Difference in Share
Chester	5,996	6.2%	272,270	4.3%	1.9%
Erie	3,469	3.6%	134,343	2.1%	1.5%
Monroe	2,532	2.6%	79,673	1.2%	1.4%

Source: Pennsylvania's State System of Higher Education Research Office, Bureau of Labor Statistics

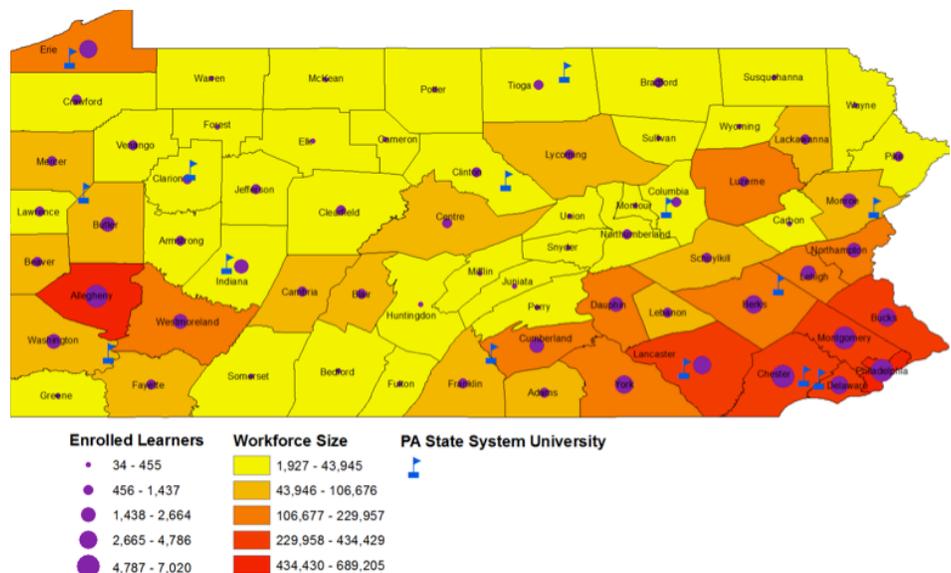
³ Based on Fall 2013 enrollment.

Table 2.2 – Counties with Lower Share of State System Learners vs. Workforce

County	State System Students from County	% of State System Students from PA	County Workforce	% of PA Workforce	Difference in Share
Montgomery	5,401	5.6%	434,429	6.8%	-1.2%
Allegheny	7,020	7.3%	644,822	10.1%	-2.8%
Philadelphia	5,263	5.5%	689,205	10.8%	-5.3%

Source: Pennsylvania's State System of Higher Education Research Office, Bureau of Labor Statistics

Figure 2.1 – State System Learner Origin and Workforce Size County

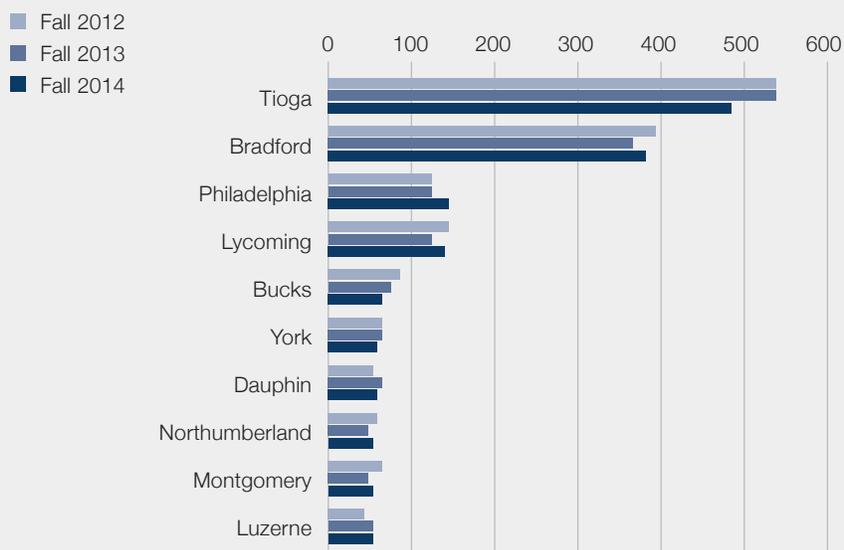


Source: Pennsylvania's State System of Higher Education, Oxford Economics mapping

2.1 Mansfield University's Learner Origin

Mansfield University learners, originally from Pennsylvania, come from nearly every county in the state. The vast majority of learners, however, come from counties that are in the southeast region. The top 10 learner enrollment counties account for about 65% of resident enrollment in Mansfield University. Figure 2.2 shows the Pennsylvania resident fall enrollment numbers between 2012 and 2014 for the top 10 counties. Table 2.3 provides enrollment detail for the top 10 counties.

Figure 2.2 – Mansfield University Learner Enrollment by County



Source: Pennsylvania's State System of Higher Education

Table 2.3 – Mansfield University Learner Enrollment by County

County	Fall 2012	Fall 2013	Fall 2014
Tioga	539	538	487
Bradford	394	369	382
Philadelphia	123	122	144
Lycoming	145	125	138
Bucks	86	78	64
York	63	63	61
Dauphin	56	66	57
Northumberland	57	49	56
Montgomery	66	50	55
Luzerne	44	54	53

Source: Pennsylvania's State System of Higher Education

3. SUMMARY OF MANSFIELD UNIVERSITY WORKFORCE REGION

Located in rural Tioga County, Pennsylvania, Mansfield University (Man U) supports the northeastern region of Pennsylvania’s State System of Higher Education. It provides a breadth of degree programs and serves a student population of about 3,000 learners, of which about 77% are Pennsylvania residents.⁴

The following sections outline the supporting data used to select Man U’s Pennsylvania workforce region—defined as Tioga, Bradford, Potter, Susquehanna, and Wyoming counties. Subsequent sections provide a brief analysis of economic, workforce, demographic and socio-economic information. The purpose of providing this analysis is to gain better insight into how the workforce region has changed over the past several years, as well as projections of how the area will continue to change over the next several years.

A BRIEF NOTE ON DEVELOPING THE WORKFORCE REGION

Part of the geographic research and analysis involves central place theory—a geographical theory that seeks to explain the location and connectedness of economic activity. More specifically, this research seeks to quantify the interconnectedness of local economies surrounding the State System universities. This is measured by workforce commuting and economic activity (i.e. industry production, supply chains, sales, etc.). An additional aspect involves the geographic connection between the university’s learners. The university’s ability to draw learners from the surrounding region helps contextualize the geographic footprint of the institution.

The full details of this process are described in Appendix A.

4 Based on Average Fall Enrollment 2012-2014.

3.1 Defining Mansfield University’s Workforce Region

The main factors used to identify the university-specific workforce region involved evaluation of commuting patterns, learner capture rate, and economic activity (business demand and household demand). The aim is to identify the workforce region that surrounds the university and is consequently supported by the university, while also being inclusive of less populated rural counties. A workforce region is defined as: a labor market area or an economically integrated region within which residents can find jobs within a reasonable commuting distance or can change their employment without changing their place of residence.⁵

The counties in the region were identified using a multi-step process. Table 3.1 provides a shortened snapshot of two iterations, with the final selection of counties highlighted in green.⁶

When taken in the context of regional economic activity, about 44% of regional demand for goods and services are produced by businesses located within the region. This indicates that regional business activity is locally contained. Similarly, 76% of household demand is satisfied by local production, meaning that households are not traveling outside the region to purchase goods or services to consume.

Table 3.1 - Mansfield Workforce Region Commuting Patterns, Learner Capture Rate, and Economic Activity

County Combination	Job Share of People Living in the Region	Job Share of People Employed in the Region	Business Demand	Household Demand	Learner Capture Rate
Tioga, Bradford	0.64	0.69	0.45	0.83	0.39
Tioga, Bradford, Potter, Susquehanna, Wyoming	0.66	0.71	0.44	0.76	0.44

Sources: US Census - LEHD, Minnesota IMPLAN Group, Pennsylvania’s State System of Higher Education

The majority of Man U workforce region residents also work in the region (66%). This reflects a very strong centralized connection between workers and economic activity in a region that has 63,500 jobs. Additionally, learners at Man U originate from nearby surrounding counties. When looking at the percentage

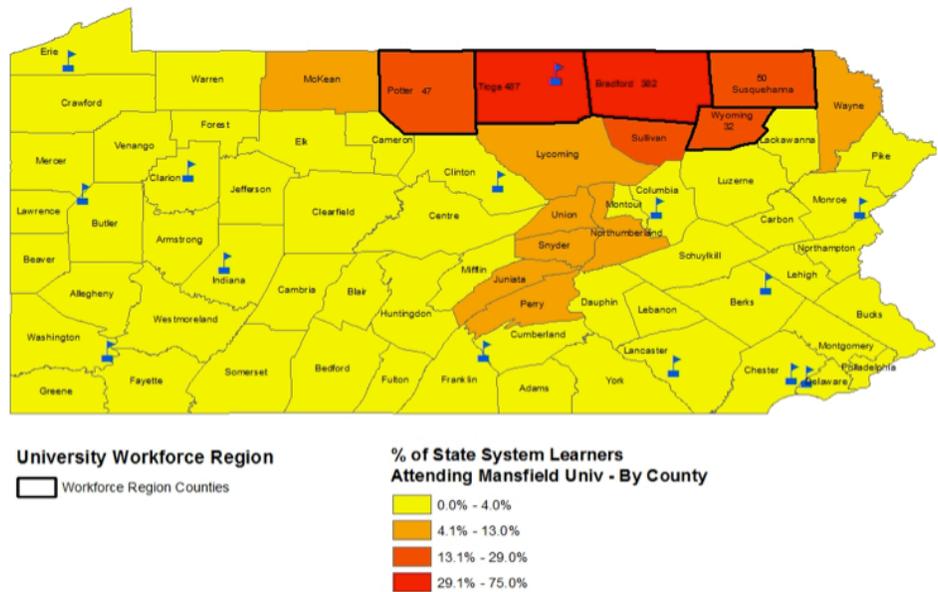
⁵ Bureau of Labor Statistics: Labor Market Area.

⁶ As mentioned in the methodology, no threshold values were explicitly set for each region. Rather the iterations sought to reasonably optimize each factor to meet the criteria for defining an economic area—recognizing the primary driving factor is workforce commuting.

of learners attending State System universities, 44% (the capture rate) of State System learners in Man U's workforce region attend Mansfield University.

Figure 3.1 illustrates learner capture rates for Man U's workforce region. This provides a strong indication of whether State System learners within the region ultimately attend Man U. Counties highlighted in yellow indicate that learners enrolled in a State System University are not generally going to Man U, whereas counties highlighted in dark orange or red indicate that Man U has a relatively high capture rate of State System enrolled learners.

Figure 3.1 – Mansfield Workforce Region Learner Origin by Percent of Total State System Student Population



Source: Pennsylvania's State System of Higher Education and Oxford Economics tabulations

4. LABOR MARKET OF MANSFIELD UNIVERSITY'S WORKFORCE REGION

The following sections provide a brief analysis of economic, workforce, demographic and socio-economic information. The purpose of providing this analysis is to gain better insight into how Mansfield University's workforce region has changed over the past several years, as well as projections of how the region will continue to change over the next several years. Table 4.1 provides a high level comparative summary of key workforce and economic indicators between Mansfield University's workforce region and Pennsylvania.

Table 4.1 – Summary of Man U's Workforce Region and Pennsylvania Workforce Characteristics

Workforce Characteristic	IUP Workforce Region	Pennsylvania	Source
Population	195,000	12.7 million	2009-2013 American Community Survey 5-Year Estimates
Employed	63,500	5.6 million	2014 BLS Quarterly Census of Employment and Wages
Unemployed	5,800	370,000	2014 BLS Local Area Unemployment Statistics
Unemployment Rate	6.1%	5.8%	2014 BLS Local Area Unemployment Statistics
Poverty Rate	13.5%	13.7%	2013 Census Small Area Income and Poverty Estimates
Business Establishments	5,000	347,000	2014 BLS Quarterly Census of Employment and Wages
Educational Attainment (25+ Population with Bachelor's or Higher)	18.8%	27.4%	2009-2013 American Community Survey 5-Year Estimates
Bachelor's or Higher Completions	950	137,000	Integrated Postsecondary Education Data System 3-Year Average AY2010-11 to AY2012-13
Projected Jobs 2024	70,200	6.2 million	Oxford Economics Projections 2024

The analysis in the following sections is broken into three key sections, namely:

1. Industries – an evaluation of historic and current changes in sector employment, as well as top employers in the state.

2. Occupations – an evaluation of historic and projected changes in occupations, as well as more detailed analysis of key skilled occupations that align to university education.

- Top Skilled Occupations: largest skilled employed occupations and new & replacement job demand.
- Key Skilled High Demand Occupations: five key skilled occupations and new & replacement job demand.
- Job Posting Analytics: analysis of job postings vs. hires for five key skilled high demand occupations.
- Industry Staffing Patterns: industry employment breakdown for five key skilled high demand occupations.
- Key Occupational Profiles: regional demographic profile for five key skilled high demand occupations.

3. Demographics and Socio-economic Indicators – an evaluation of the demographic profile of the population of Mansfield University’s workforce region. Also, a brief analysis of three key socio-economic indicators— educational attainment, unemployment, and poverty.

Each section is designed to provide additional context to the economic environment for the universities to consider broader aspects of strategic vision and program planning. Each section also provides the data-driven preparation for the next phase of research—namely the Supply/Demand Gap Analysis Report.

4.1 Employment Projections

Currently, the industry and occupation employment projections available from Pennsylvania’s Department of Labor and Industry reflect the time period from 2012–2022 and therefore do not incorporate much of the post-recession recovery that has taken place between 2012 and 2014. In order to capture recovery and reflect current employment data, the State System used 4-digit NAICS (industry) and 5-digit SOC (occupation) projections to 2024 at the county level for Pennsylvania. The projections incorporate Quarterly Census of Employment and Wages (QCEW) data through 2014, and therefore contain the most recent employment data that further reflects the economic recovery.

See Appendix C for 4-digit industry projections and Appendix D for 5-digit occupation projections.

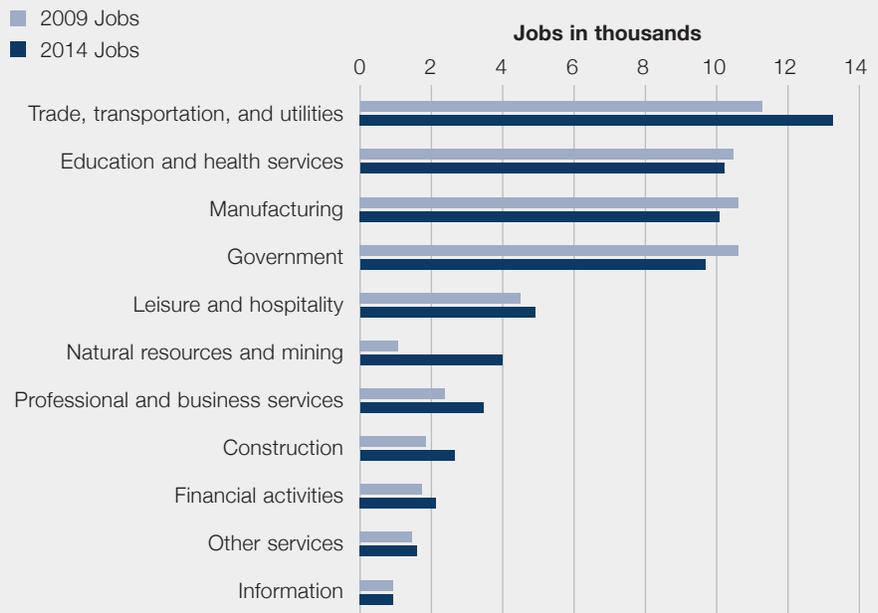
Oxford Economics, a premier economic modeling and consulting firm, produced the projections. By updating projections, Oxford Economics provided insight into new job growth which better measures occupational demand over the next 10 years.

The next section provides an analysis of industries in Mansfield University's workforce region with a focus on the post-recession recovery period 2009 to 2014, as well as top employers in the region.

5. INDUSTRIES IN MANSFIELD UNIVERSITY'S WORKFORCE REGION

Over the five years of 2009 to 2014, Mansfield University's (Man U) workforce region experienced job growth in both goods-producing and service-based sectors. Sectors such as trade, transportation, and utilities; professional and business services; and construction added a combined 3,600 new jobs between 2009 and 2014. Natural resources and mining experienced 283% growth, adding nearly 2,900 new jobs during this time period. Government experienced the largest nominal employment loss, while other job losses occurred within manufacturing and education and health services. Overall, the economy added about 5,500 jobs during the recovery period, 2009 to 2014. This growth reflects the recovery period for Pennsylvania from one of the worst recessions since the Great Depression—the Great Recession which lasted from 2007 to 2009.

Figure 5.1 – Mansfield University's Workforce Region Industry Employment, 2009-2014



Source: Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW)

Table 5.1 – Mansfield University’s Workforce Region Industry Employment, 2009-2014

Industry Employment	2009 Jobs	2014 Jobs	Absolute Change 09-14	% Change 09-14
Total, all industries	56,747	62,294	5,547	9.8%
Trade, transportation, and utilities	11,254	13,172	1,918	17.0%
Education and health services	10,488	10,142	-346	-3.3%
Manufacturing	10,595	9,990	-605	-5.7%
Government	10,521	9,677	-844	-8.0%
Leisure and hospitality	4,526	4,877	351	7.8%
Natural resources and mining	1,032	3,953	2,921	283.0%
Professional and business services	2,436	3,382	946	38.8%
Construction	1,843	2,602	759	41.2%
Financial activities	1,672	2,099	427	25.5%
Other services	1,479	1,524	45	3.0%
Information	903	877	-26	-2.9%

Source: Bureau of Labor Statistics’ Quarterly Census of Employment and Wages (QCEW)

Figure 5.1 illustrates historic and current employment, while Table 5.1 provides data on broad industry categories by employment, growth, and percent change.

5.1 Top Employers in Mansfield University’s Workforce Region

Amongst the top employers within Man U’s workforce region, education and health service establishments comprise a majority of the list. Other top employers in the region include federal, state, and local government as several manufacturing and utility establishments.

Major employers in Man U’s workforce region are listed in Table 5.2 on the next page.

While this section focused on the places where people in Man U’s workforce region work, the next section builds a perspective of occupational employment. This perspective describes the types of jobs people have in Man U’s workforce region and identifies the skills and characteristics of those people.

Table 5.2: Top Employers in Mansfield University’s Workforce Region

Establishment Name
Barnes-Kasson County Hospital
Bradford County Commissioners
Cargill Meat Solutions
Charles Cole Memorial Hospital
Cole Care
Elk Lake School District
Empereon Marketing
Endless Mountains Health Systems
GTP Corp
Guthrie Medical Group
Hitachi Metals Automotive
Lackawanna Trail School District
Montrose Area School District
Morris Compressors
Mountain View School District
Northern Tioga School District
Pennsylvania State System of Higher Education
Procter & Gamble Paper Products
Robert Packer Hospital
Somerset Regional Water Resources
State Government
Susquehanna Health System
Tunkhannock Area School District
Wal-Mart
Ward Manufacturing

Source: Pennsylvania Department of Labor and Industry Quarterly Census of Employment and Wages (QCEW)

6. OCCUPATIONS IN MANSFIELD UNIVERSITY'S WORKFORCE REGION

The workforce within the region can be evaluated from many different angles in order to build a deeper profile of the qualities and attributes of workers. The next five sub-sections provide insight into the qualities of Man U's workforce region, answering questions such as:

- What are the largest skilled occupations employed within the region?
- What are the key skilled high demand occupations that typically align to university-level education?
- Within the key skilled high demand occupations what is the current market demand in terms of jobs postings and hires?
- What sectors typically employ the key skilled high demand occupations?
- What type of demographic is typically found in key skilled high demand occupations?

Each perspective provides data-driven content for the universities to consider when engaging businesses, learners and program planners.

6.1 Skilled Occupations

The O*NET program is the nation's primary source of occupational information. Essential to the project is the O*NET database, containing information on hundreds of standardized and occupation-specific descriptors.⁷

For this analysis a "skilled" occupation is defined as an occupation in O*NET Job Zones Three, Four, or Five. A Job Zone is a group of occupations that are similar in how much education people need to do the work, how much related experience people need to do the work, and how much on-the-job training people need to do the work.⁸

Most occupations in Job Zone Three require training in vocational schools, related on-the-job experience, or an associate's degree. Most occupations in

⁷ <http://www.onetcenter.org/overview.html>

⁸ <https://www.onetonline.org/help/online/zones>

Job Zone Four require a four-year bachelor's degree, but some do not. Most occupations in Job Zone Five require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree). For a more detailed description of O*NET Job Zones and training requirements see Appendix D.

For the five key skilled high demand occupations, over 50% of those employed have attained an associate's degree or higher and are generally associated with university-level education.

6.2 Top Skilled Occupations in Mansfield University's Workforce Region

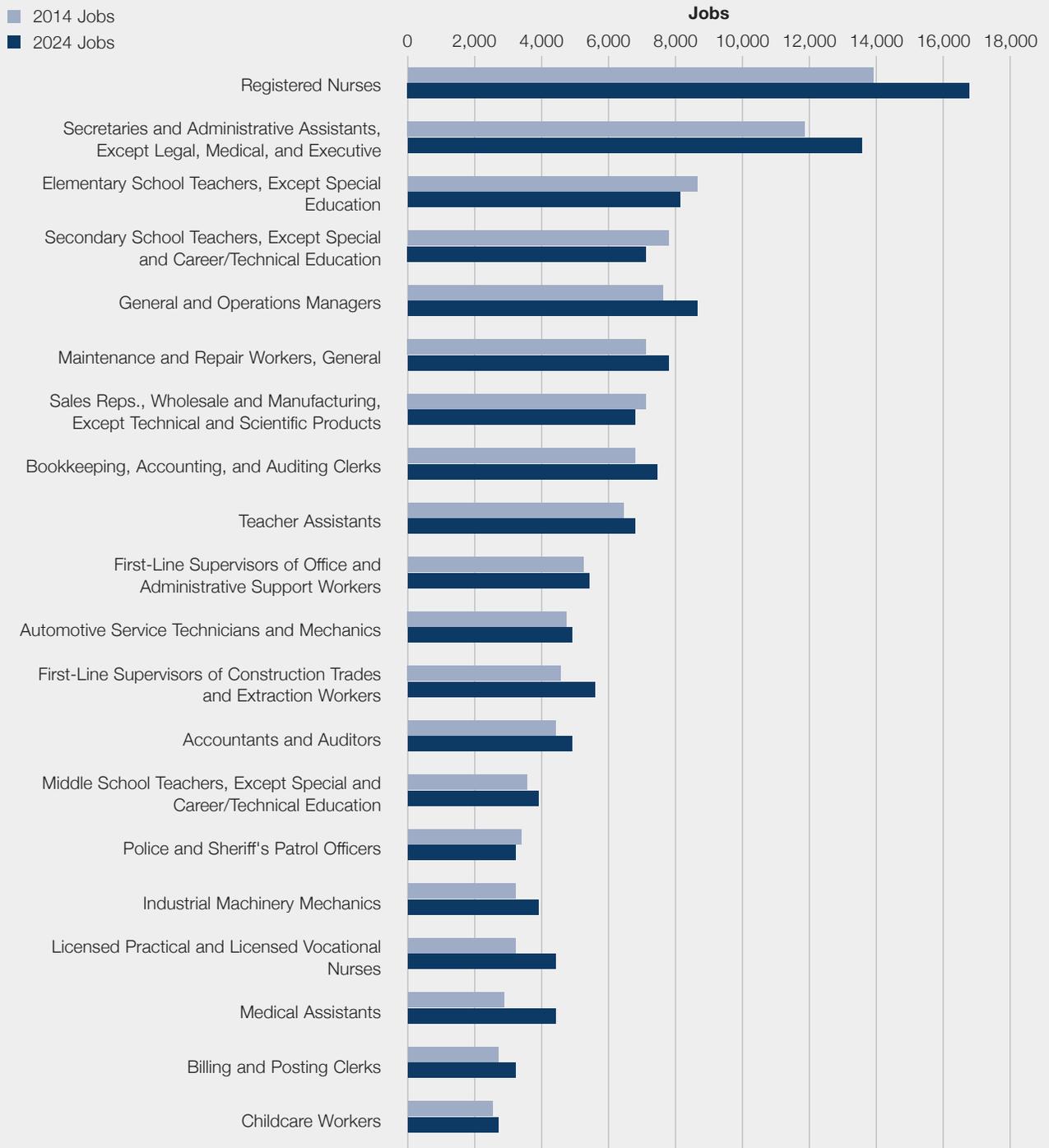
Top skilled occupations in the region are driven by industry composition. Medical centers employ a cadre of health professionals, while enterprise management companies employ a range of business professionals. Given the dominating presence of trade, transportation and utilities; education and health services; and manufacturing establishments in Man U's workforce region, top skilled occupations include: teachers, nurses, sales representatives, managers, and assistants. Figure 6.1 and Table 6.1 highlight the top 20 skilled occupations in the region, 10-year job growth projections, and new and replacement jobs.⁹

An important aspect to distinguish skilled occupations, in this sub-section, is that post-secondary education is not necessarily a pre-requisite for employment. However, a high percentage of those employed in the skilled occupation have a post-secondary education.

The next section provides a more narrow view of skilled occupations, focusing specifically on occupations that align to university-level education and have high demand for new and replacement jobs.

⁹ New and replacement job change takes into account demand for occupations based on: industry growth (new jobs), occupation productivity, workforce ageing, migration and other factors that would contribute to new and replacement job openings.

Figure 6.1 – Largest Skilled Occupations in Man U's Workforce Region and Projections, 2014-2024



Source: BLS (QCEW and OES); Pennsylvania Department of Labor & Industry; Oxford Economics Projections

Table 6.1 – Largest Skilled Occupations in Man U’s Workforce Region and Projections, 2014-2024

SOC Code	Occupation Title	2014 Jobs	2024 Jobs	10-year New and Replacement Demand
29-1141	Registered Nurses	1,395	1,677	564
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	1,184	1,358	328
25-2021	Elementary School Teachers, Except Special Education	859	823	180
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	785	718	200
11-1021	General and Operations Managers	761	870	244
49-9071	Maintenance and Repair Workers, General	714	789	232
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	713	677	129
43-3031	Bookkeeping, Accounting, and Auditing Clerks	686	755	137
25-9041	Teacher Assistants	651	680	191
43-1011	First-Line Supervisors of Office and Administrative Support Workers	522	552	156
49-3023	Automotive Service Technicians and Mechanics	480	493	152
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	451	563	167
13-2011	Accountants and Auditors	434	493	203
25-2022	Middle School Teachers, Except Special and Career/Technical Education	354	386	121
33-3051	Police and Sheriff’s Patrol Officers	342	319	100
49-9041	Industrial Machinery Mechanics	327	395	175
29-2061	Licensed Practical and Licensed Vocational Nurses	327	450	209
31-9092	Medical Assistants	290	438	207
43-3021	Billing and Posting Clerks	270	319	104
39-9011	Childcare Workers	255	267	88

Source: BLS (QCEW and OES); Pennsylvania Department of Labor & Industry; Oxford Economics Projections

6.3 Key Skilled High Demand Occupations Aligning to University-level Education

Occupation demand can represent different perspectives of employment need. One perspective evaluates demand due to growth of new jobs. It also represents the need for replacement jobs. When combined, new and replacement job projections provide a more realistic perspective of labor demand.

To support the occupational demand for new and replacement jobs, this analysis also evaluates real-time job posting data. By measuring the number of unique job postings for a specific job title, which is then translated into an occupation classification, it is possible to gauge real-time demand—another perspective of employment need. The number of unique postings provides guidance on real-time changes in occupations that companies may be seeking to hire. As with all datasets, job posting data have caveats. Discrepancies between postings and actual hires can be challenging to measure—wherein a job posting may not result in a hire for one occupation, but another job posting for a different occupation may result in multiple hires.¹⁰

This section looks at both perspectives—occupation demand using projections of new and replacement jobs as well as real-time job postings—in order to draw specific insight into occupation demand within Man U's workforce region.

6.3.1 New and Replacement Demand for Key Skilled High Demand Occupations

Many skilled occupations exist in Pennsylvania. Demand for new and replacement jobs for key skilled high demand occupations that tie more closely to university-level programs are typically determined by the sheer size of the employment within the occupation and the demographic characteristics of those who are currently employed—specifically age. For example, Pennsylvania businesses employ approximately 54,400 accountants and auditors. Projections indicate that new employment for accountants and auditors will increase to about 60,000 by 2024—5,600 new jobs in 10 years. However, 47% of the employed accountants and auditors are over the age of 45, meaning that many of the currently employed accountants and auditors will likely retire over the next 10 years. This retirement will drive up the need to replace outgoing

¹⁰ When evaluating jobs postings, a specific caveat focuses on net openings and jobs filled (i.e. openings that result in an opportunity for a new entrant, rather than normal job turn wherein a worker moves to a different company in the region and their vacant job is filled by yet another incumbent worker at another company).

accountants and auditors will new workers—hence the reason we see nearly 23,700 new and replacement jobs (5,600 new and 18,100 replacement) for the occupation over the next 10 years.¹¹

Figure 6.2 and Table 6.2 outline the five key skilled high demand occupations for new and replacement jobs over the next 10 years, specifically: registered nurses, accountants and auditors, general and operations managers, physical therapists, and civil engineers.¹²

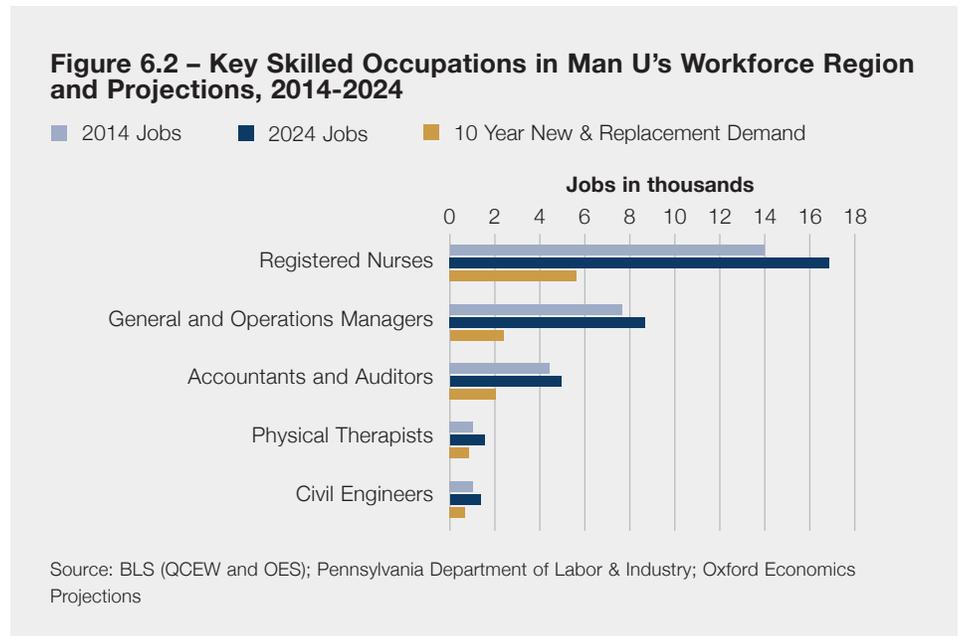


Table 6.2 – Key Skilled Occupations in Man U’s Workforce Region and Projections, 2014-2024

SOC Code	Occupation Title	2014 Jobs	2024 Jobs	10 Year New & Replacement Demand
29-1141	Registered Nurses	1,395	1,677	564
11-1021	General and Operations Managers	761	870	244
13-2011	Accountants and Auditors	434	493	203
29-1123	Physical Therapists	104	152	77
17-2051	Civil Engineers	105	137	60

Source: BLS (QCEW and OES); Pennsylvania Department of Labor & Industry; Oxford Economics Projections

11 Retirement is only one of the metrics factored into new and replacement jobs. Other metrics include out-migration and death.
 12 Teachers (elementary and secondary) were found in the top skilled high demand occupations. However, the analysis focuses on private sector jobs and opportunities.

While this section focused on 10-year new and replacement demand, the next section highlights the importance of current demand using real-time job posting analytics.

6.3.2 Real-Time Job Postings for Key Skilled High Demand Occupations

Analysis of job postings for key skilled high demand occupations generally supports the findings from Section 6.3.1. Between July 2014 and July 2015 approximately 130 unique (de-duplicated) job postings appeared in Man U's Workforce Region for the top five key skilled high demand occupations (registered nurses, accountants and auditors, general and operations managers, physical therapists, and civil engineers). Sizable job postings include: registered nurses (84 unique postings per month), and physical therapists (27 unique postings per month).

Table 6.3 provides details on the average monthly job postings and the estimated average monthly hires between July 2014 and July 2015 for the key skilled occupations.

Job posting analytics also provide insight into the skills and certifications that employers seek from qualified job candidates. Individuals seeking jobs in the key skilled high demand occupations would increase their competitiveness by demonstrating skill proficiency and/or certifications. The following lists specific unique skills or certifications for each occupation that employers demand.

Table 6.3 – Job Postings and Hires for Key Skilled High Demand Occupations in Pennsylvania

Occupation	Average Monthly Postings (Jul 2014 - Jul 2015)	Estimated Average Monthly Hires (Jul 2014 - Jul 2015)	Ratio of Postings to Hires
Registered Nurses	84	80	1.1
Physical Therapists	27	7	3.9
General and Operations Managers	11	43	0.3
Accountants and Auditors	6	26	0.2
Civil Engineers	4	7	0.6

Source: Economic Modeling Specialists International (EMSI)

Registered Nurses

Unique skills: acute care, surgery, schedule/record keeping

Certifications: Cardiopulmonary Resuscitation (CPR), Basic Life Support (BLS), Advanced Life Support (ALS), Registered Nurse (RN) license

Accountants and Auditors

Unique skills: audits, finance, Generally Accepted Accounting Principles (GAAP)

Certifications: Certified Public Accountant (CPA)

General and Operations Managers

Unique skills: inventory management, payroll, recruiting/staffing, budgeting, meetings/presentations

Certifications: Six Sigma, Project Management Professional (PMP)

Physical Therapists

Unique skills: physical therapy, rehabilitation services, injuries, plan of care

Certifications: accreditation, licenses to practice, current CPR certification

Civil Engineers

Unique skills: structural engineering, design, construction management, structural analysis

Certifications: Professional Engineer (PE), Abet accredited, Chartered Engineer (C.Eng)

This list of skills and certifications do not encompass the entirety of skills and certifications that may be required for different industry sectors and job functions. However, these skills reflect the general online job posting minimum qualifications for those seeking to apply to one of the occupations.

The next section builds a broader sense of which industry sectors typically employ each of the top five skilled high demand occupations.

6.4 Industry Staffing Patterns for Key Skilled High Demand Occupations in Mansfield University's Workforce Region

Understanding which industries employ key skilled occupations is helpful when engaging businesses as well as communicating programs and potential career opportunities to learners. Also knowing the industries that predominately employ certain occupations can help align program planning.

The following tables show the staffing patterns for the key skilled high demand occupations by identifying the top five industries that employ each respective key skilled high demand occupation within the region. For each occupation, the table contains:

- The number of the occupation jobs in each respective industry in 2014 (e.g. general medical and surgical hospitals employ over 966 registered nurses);
- The percent of the occupation's employment in the region that is employed in the industry (e.g. the 966 registered nurses employed in general medical and surgical hospitals represent nearly 69% of the total registered nurse workforce in the region);
- The percent of the industry sector's employment that is made up of the occupation (e.g. the 966 registered nurses make up about 27% of employment within general medical and surgical hospitals).

Staffing Patterns for Registered Nurses Employed in Man U's Workforce Region

Industry	Occupation Jobs in Industry (2014)	% of Occupation in Industry (2014)	% of Total Jobs in Industry (2014)
General Medical and Surgical Hospitals	966	69.2%	27.2%
Offices of Physicians	141	10.1%	9.4%
Nursing Care Facilities (Skilled Nursing Facilities)	88	6.3%	9.9%
Outpatient Care Centers	56	4.0%	15.9%
Elementary and Secondary Schools	33	2.4%	0.7%

Source: Bureau of Labor Statistics – OES & QCEW Annual Data

Staffing Patterns for General and Operations Managers Employed in Man U's Workforce Region

Industry	Occupation Jobs in Industry (2014)	% of Occupation in Industry (2014)	% of Total Jobs in Industry (2014)
Support Activities for Mining	58	7.6%	2.2%
Specialized Freight Trucking	24	3.1%	1.8%
Other Wood Product Manufacturing	19	2.4%	2.1%
Executive, Legislative, and Other General Government Support	18	2.4%	0.8%
Individual and Family Services	18	2.4%	1.2%

Source: Bureau of Labor Statistics – OES & QCEW Annual Data

Staffing Patterns for Accountants and Auditors Employed in Man U's Workforce Region

Industry	Occupation Jobs in Industry (2014)	% of Occupation in Industry (2014)	% of Total Jobs in Industry (2014)
Accounting, Tax Preparation, Bookkeeping, and Payroll Services	69	15.8%	38.6%
Management of Companies and Enterprises	28	6.5%	5.0%
Support Activities for Mining	26	6.0%	1.0%
Executive, Legislative, and Other General Government Support	19	4.3%	0.8%
Depository Credit Intermediation	14	3.2%	1.3%

Source: Bureau of Labor Statistics – OES & QCEW Annual Data

Staffing Patterns for Physical Therapists Employed in Man U's Workforce Region

Industry	Occupation Jobs in Industry (2014)	% of Occupation in Industry (2014)	% of Total Jobs in Industry (2014)
Offices of Other Health Practitioners	53	51.0%	10.4%
General Medical and Surgical Hospitals	31	30.1%	0.9%
Nursing Care Facilities (Skilled Nursing Facilities)	7	6.4%	0.7%
Offices of Physicians	6	5.4%	0.4%
Home Health Care Services	2	1.7%	2.9%

Source: Bureau of Labor Statistics – OES & QCEW Annual Data

Staffing Patterns for Civil Engineers Employed in Man U's Workforce Region

Industry	Occupation Jobs in Industry (2014)	% of Occupation in Industry (2014)	% of Total Jobs in Industry (2014)
Architectural, Engineering, and Related Services	55	52.6%	14.4%
Executive, Legislative, and Other General Government Support	14	13.7%	0.6%
Nonresidential Building Construction	8	7.2%	2.5%
Utility System Construction	7	6.4%	0.9%
Highway, Street, and Bridge Construction	5	5.1%	1.3%

Source: Bureau of Labor Statistics – OES & QCEW Annual Data

The above data establishes the top sectors where the key skilled high demand occupations are employed. However, to further place the perspective of these occupation profiles, it is important to consider the types of people who generally fill these roles. The next section contains a demographic profile for people from Pennsylvania who work in these key skilled occupations.

6.5 Key Skilled High Demand Occupational Profiles

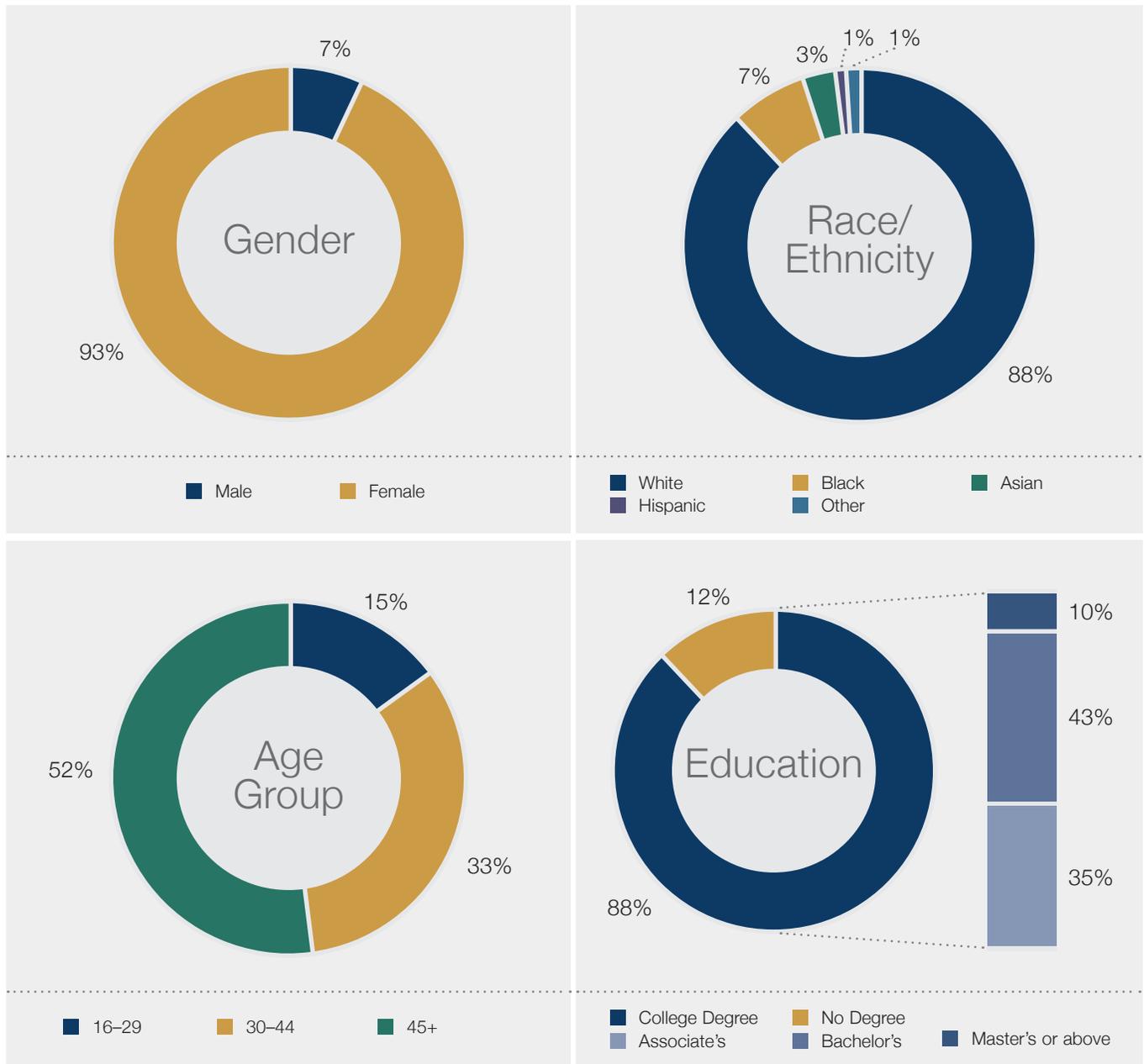
In addition to understanding the industries that employ key skilled high demand occupations, another lens to view key skilled high demand occupations focuses on the characteristics of those employed. The following section outlines the demographics for people from Pennsylvania who work in these key skilled occupations by showing each occupation's composition by gender, race/ethnicity, age, and education. This lends further insight into who generally works in the career and answers questions such as:

- Are women or men typically found in the occupation?
- Do certain races/ethnicities occupy larger shares of the occupation?
- What is the age distribution of the occupation?
- What is the educational attainment of workers in the occupation?

For comparative purposes, the demographic composition for the entire population of Man U's workforce region is further described in Section 7 of the report.

REGISTERED NURSES IN PENNSYLVANIA

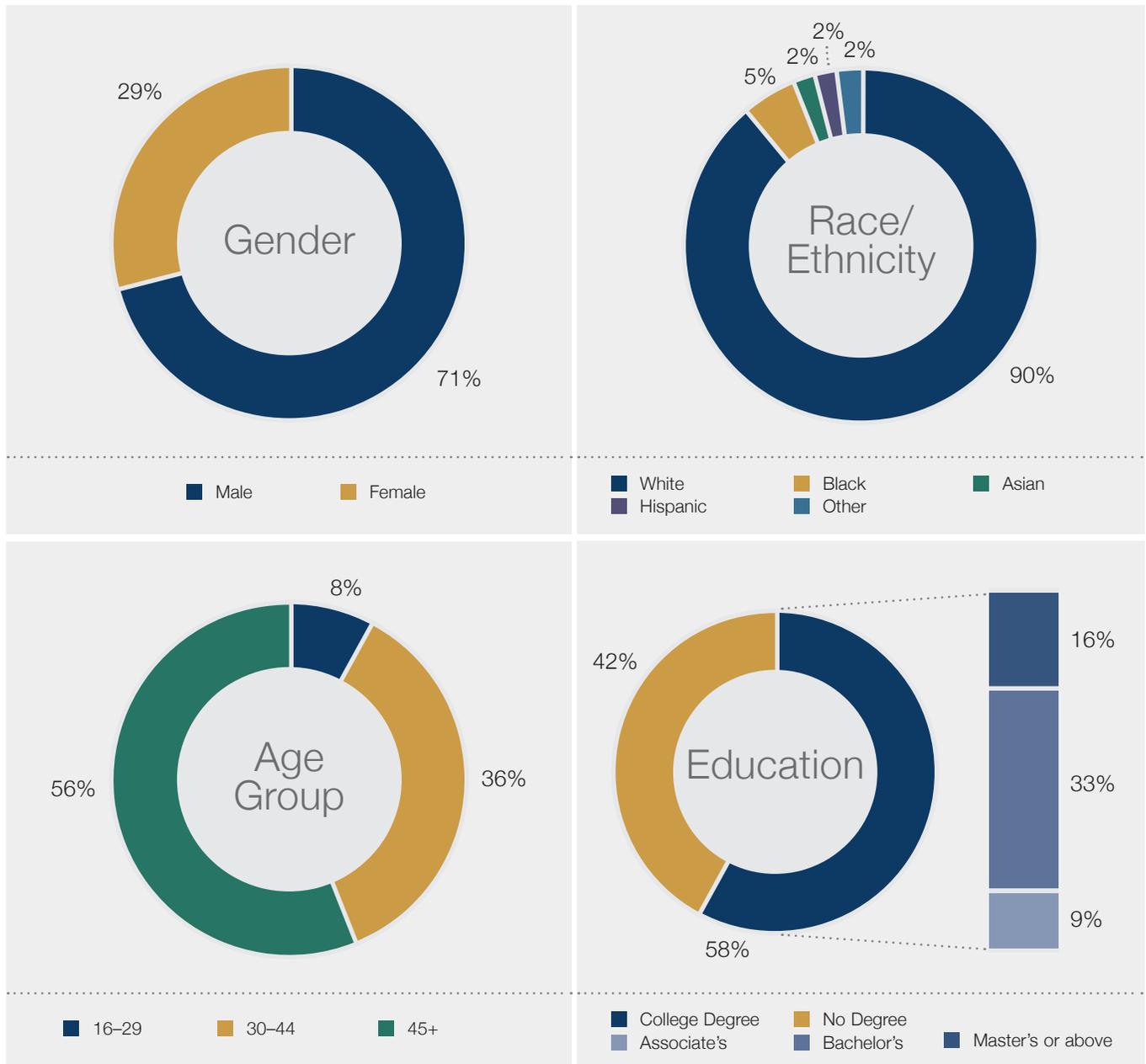
The demographic profile of registered nurses is largely dominated by white females. Age distribution indicates that registered nurses are a more mature cohort of workers (45 years and older), which can put increasing pressure on replacement jobs due to retirements over the next 10 years. Nearly 90% of registered nurses have an associate's degree or higher indicating that this is a highly educated occupation.



Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

GENERAL AND OPERATIONS MANAGERS IN PENNSYLVANIA

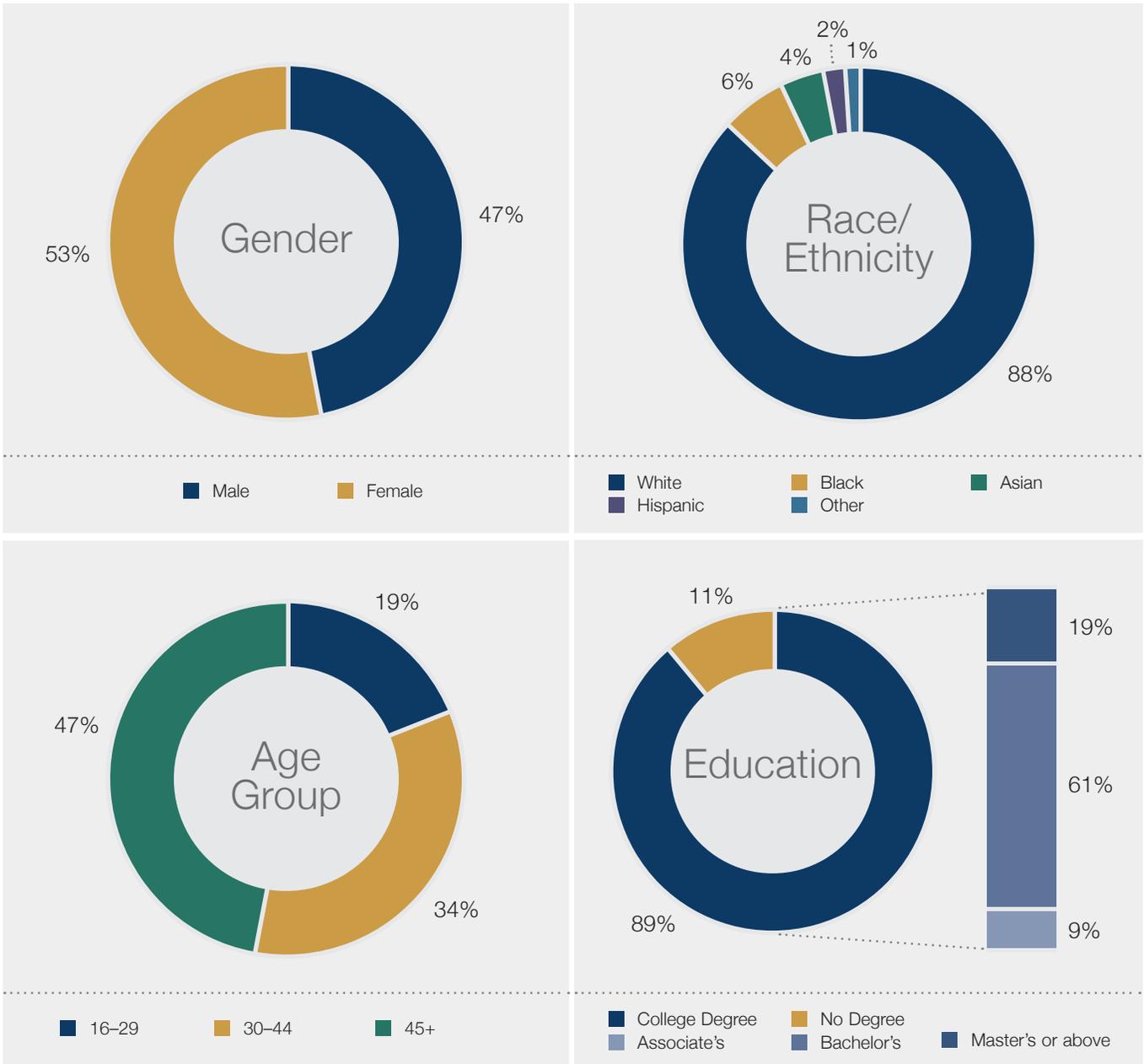
General and operations managers are typically male, though females occupy almost 30% of the employed population. The majority of those in this occupation are white. This occupation is represented by a more mature cohort of workers (45 years and older), though mid-career workers also occupy a significant proportion of the employment. Nearly 60% of general and operations managers have an associate's degree or higher.



Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

ACCOUNTANTS AND AUDITORS IN PENNSYLVANIA

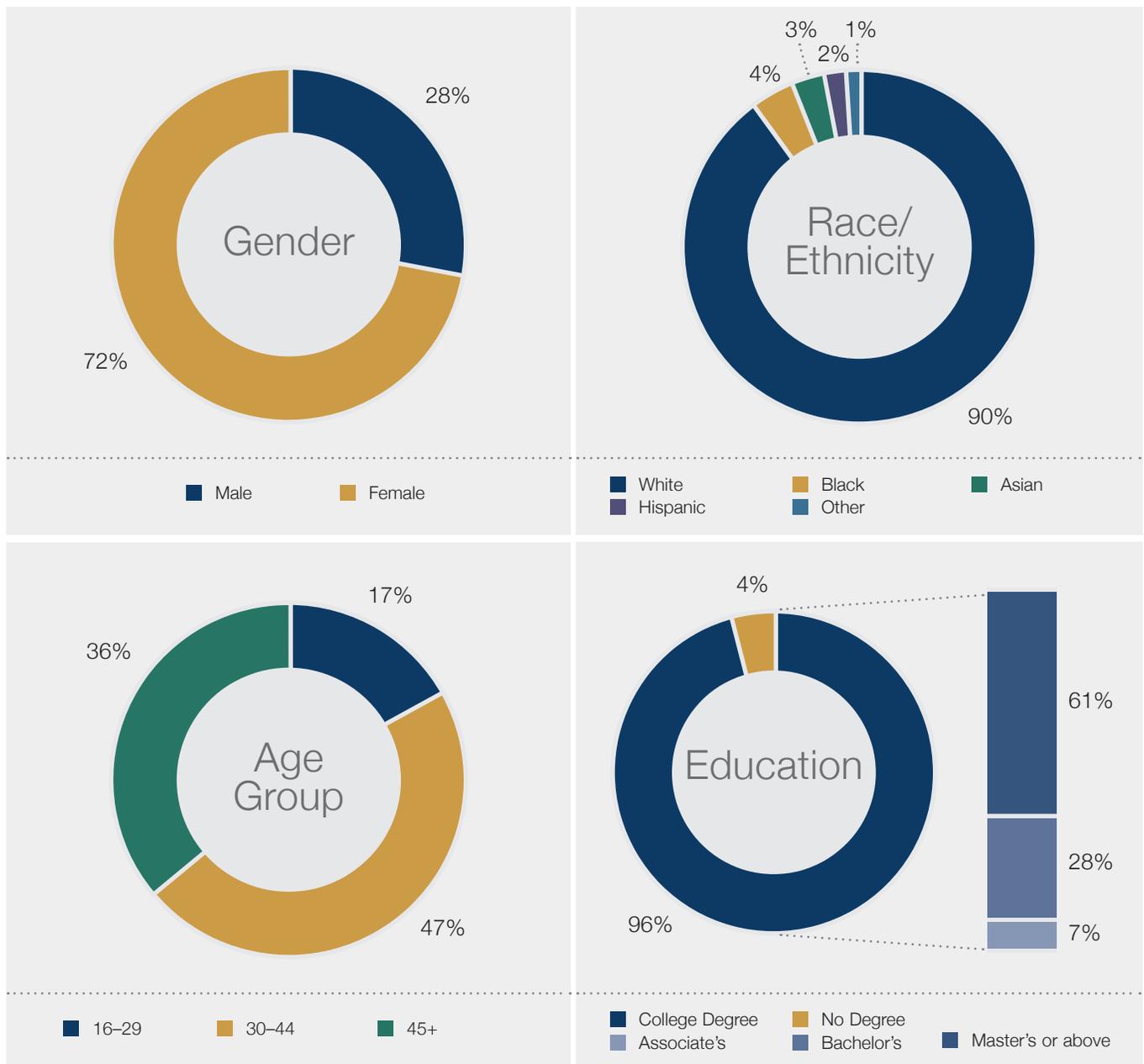
Accountants and auditors are fairly equally split between male and female, though a slightly higher percent of employed accountants and auditors are female. A high proportion of white individuals are found in the occupation. Additionally, the age distribution is fairly even between entry-level and mature workers, indicating that the occupation provides good opportunities for first destinations of recent college graduates. Nearly 90% of accountants and auditors have an associate's degree or higher indicating that this is a highly educated occupation.



Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

PHYSICAL THERAPISTS IN PENNSYLVANIA

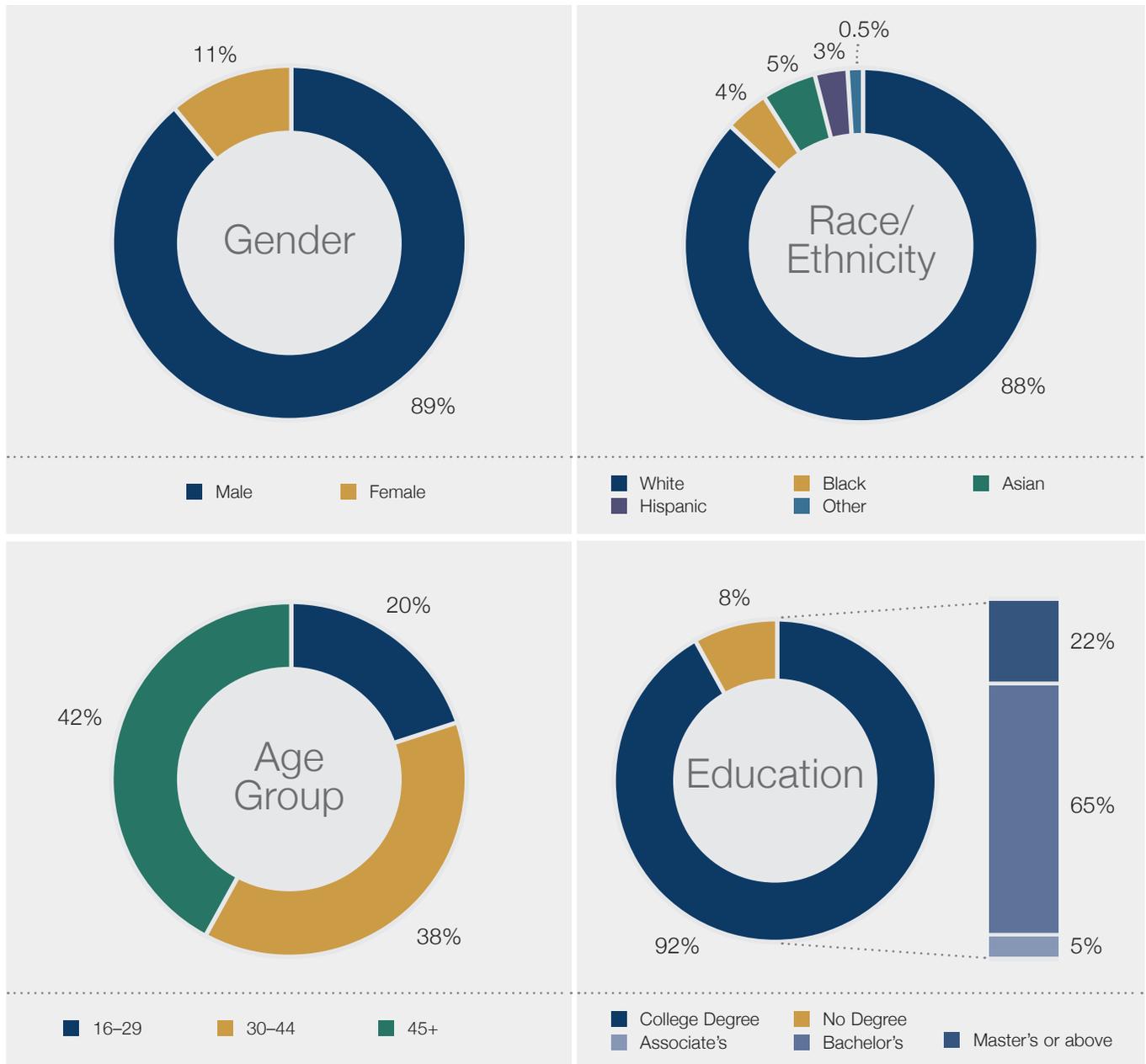
Physical therapists are typically female, though males make up almost 30% of the employed population. The majority of those in this occupation are white. The age distribution of this occupation is represented by mostly mid-career workers (ages 30-44), though older workers also make up a large portion of the occupation. Over 95% of physical therapists have an associate's degree or higher indicating that this is a highly educated occupation.



Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

CIVIL ENGINEERS IN PENNSYLVANIA

Civil engineers show a larger proportion of males in the occupation compared to females. A high proportion of white individuals are found in the occupation. Additionally, the age distribution is fairly even between entry-level and mature workers, indicating that the occupation provides good opportunities for first destinations of recent college graduates. Over 90% of civil engineers have an associate's degree or higher indicating that this is a highly educated occupation.



Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

The final section of this report explores Man U's workforce region demographic and socio-economic characteristics. While not tied to a specific occupation, the analysis further contextualizes the region's population and workforce.

7. DEMOGRAPHIC AND SOCIO-ECONOMIC INDICATORS OF MANSFIELD UNIVERSITY'S WORKFORCE REGION

This section provides further information about the demographic and socio-economic composition of Man U's Workforce Region in order to better understand the characteristics of the population. An additional focus evaluates changes in age cohorts for university-age residents.

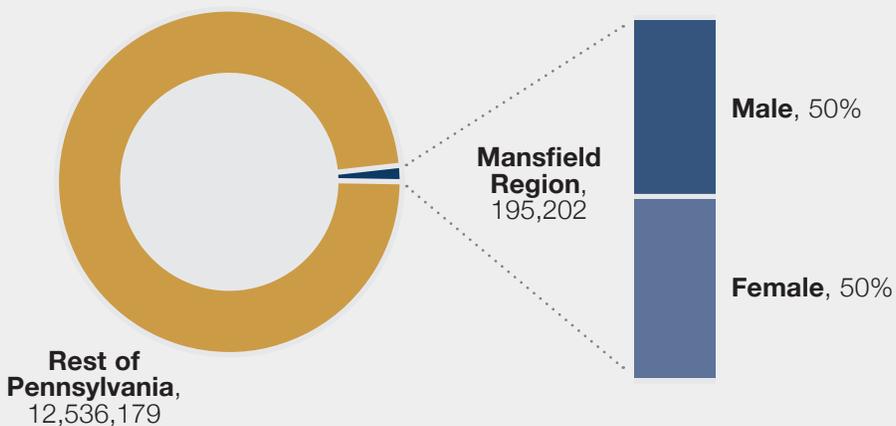
Analysis of three socio-economic indicators—education, unemployment, and poverty—also provides insight into the segment of the population that may be considered economically disadvantaged. Areas with high proportions of economically disadvantaged learners may require additional considerations in education and financial support.

7.1 Demographics of Mansfield University's Workforce Region

The Man U workforce region has a population of about 195,000 people. As shown in Figure 7.1, females and males make up an equal share of the population. Figure 7.2 illustrates that the majority of the region is represented by a White demographic, with Hispanics representing the next largest group, followed by Blacks.

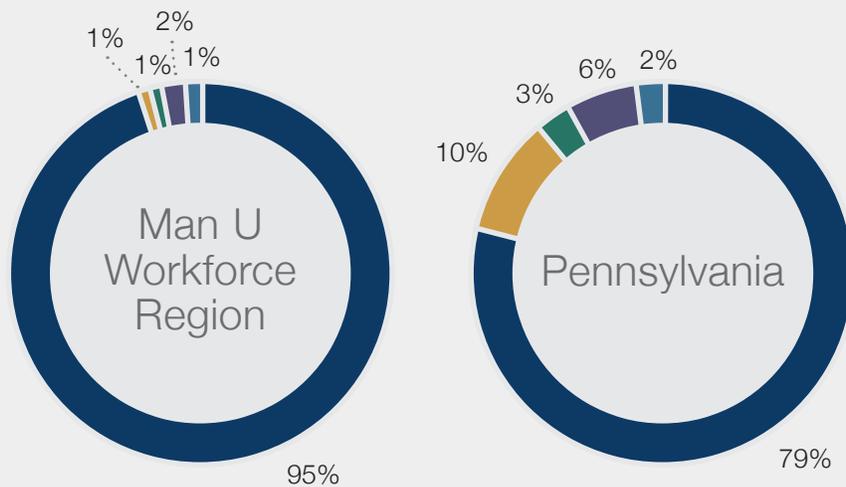
Fall 2014 data from the State System Research Office indicates that approximately 83% (90,966) of learners within the State System are traditional students—ages 18- to 22-year-old high school graduates—and 17% (18,640) are adult learners. A view of the change in population by age demographic indicates a diminishing number in the traditional age cohort and a growing rate of adults aged 25 to 34 years old. As illustrated in figure 7.3, the 10 to 19 year old cohort population declined by nearly 2,300 people between 2010 and 2014—a 9% decline. Conversely, the 25-34 year old cohort increased nearly 9%, or 1,650 people, over the same time period. This demographic shift presents an opportunity to incorporate a broader university recruitment strategy.

Figure 7.1 – Mansfield University’s Workforce Region Population and Gender Distribution



Source: U.S. Census - ACS

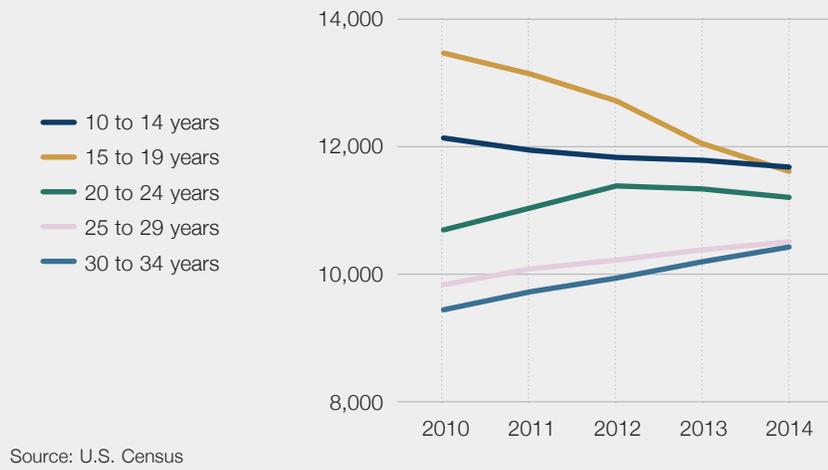
Figure 7.2 – Mansfield University’s Workforce Region Race/Ethnicity Composition



■ White ■ Black ■ Asian ■ Hispanic ■ Other

Source: U.S. Census - American Community Survey (ACS) 2009-2013 5-year file

Figure 7.3 – Mansfield University’s Workforce Region Changes in Population of Age Cohorts



The next sub-section further explores the shifting socio-economic characteristics in Man U’s workforce region by identifying three inter-related variables.

7.2 Socio-economic Indicators of Mansfield University’s Workforce Region

This final section outlines three key socio-economic variables—educational attainment, poverty, and unemployment. Poverty data provides understanding on relative income inequality within an area. If poverty rates decline, then the standard of living, social inclusion, and equality of opportunity are typically considered to be increasing. Economic opportunities are often linked with access to jobs and training. Regions with high unemployment indicate the population is unable to find work or is not adequately trained to perform work in the jobs available within the region.

7.2.1 Educational Attainment in Mansfield University’s Workforce Region

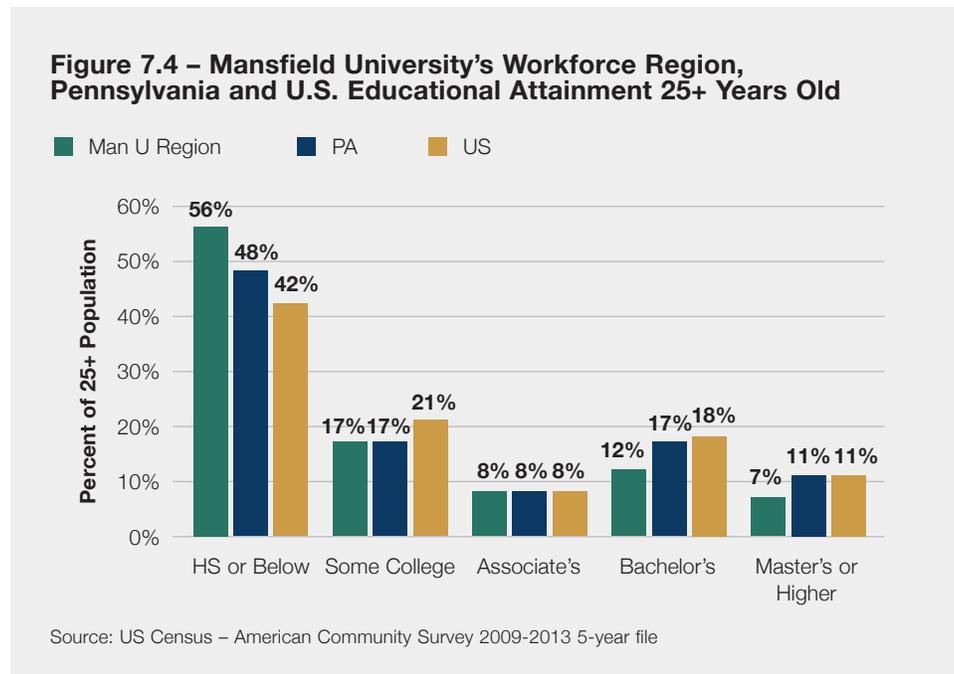
The levels of educational attainment of a population indicate several characteristics in an economy. Areas with better educated workers earn higher wages, are more productive and can typically adjust more quickly to changing economic conditions. Additionally, an educated workforce is less likely to be

unemployed, require social assistance, and more likely to lead a healthier lifestyle—aspects that bolster value in an economy.^{13, 14}

A view of educational attainment in Man U’s workforce region indicates that under than half (44%) of those over 25 years old have had some post-secondary education or higher. Some college is defined by ACS as having some college, but less than one year or one or more years of college credit, but no degree. This is the below the national average of 58% of the population having had at least some post-secondary education or higher.

When comparing degree completion, Man U’s workforce region is near the national average for the proportion of the population with an associate’s degree but below the national average for the proportion of the population with a bachelor’s degree and master’s degrees or higher.

Figure 7.4 compares the educational attainment of the 25 years and older population in the U.S., Pennsylvania, and Man U’s workforce region.



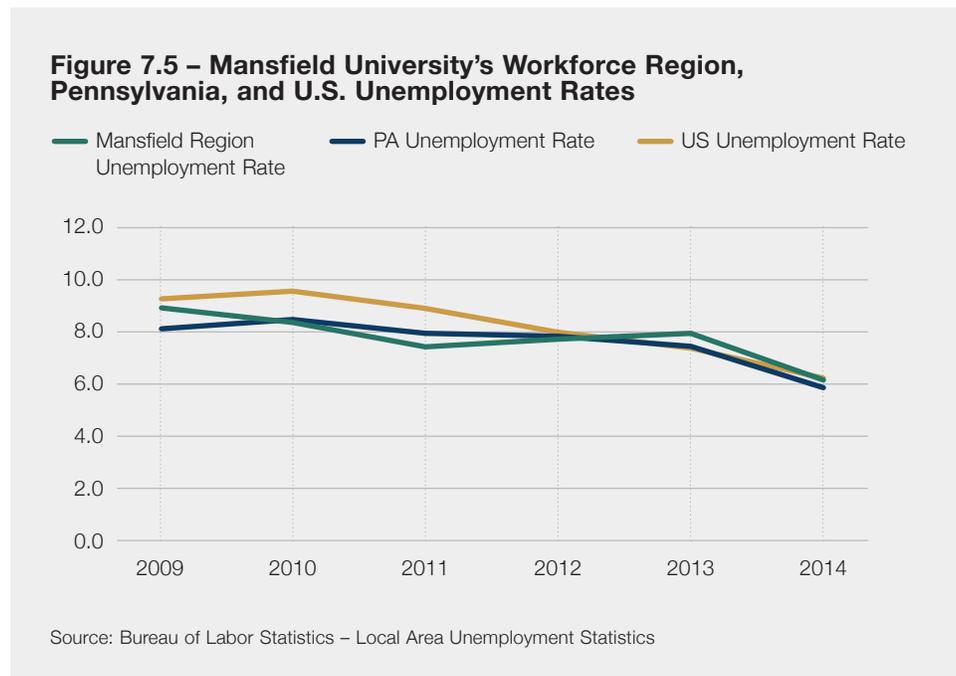
13 Feinstein et. al. (2006), “The effects of education on health: Concepts, evidence and policy implications: A review for the OECD Center for Educational Research and Innovation (CERI)”, unpublished manuscript, OECD, Paris.

14 Mitra, Dana (2011), “Pennsylvania’s Best Investment: The Social and Economic Benefits of Public Education.” Report published for the Education Law Center.

7.2.2 Unemployment and Poverty in Mansfield University's Workforce Region

Man U's workforce region unemployment rate—6.1% in 2014—has trended closely with the state and national unemployment rate since 2012. This suggests that opportunities for dislocated workers on average are roughly the same compared to the rest of the nation.

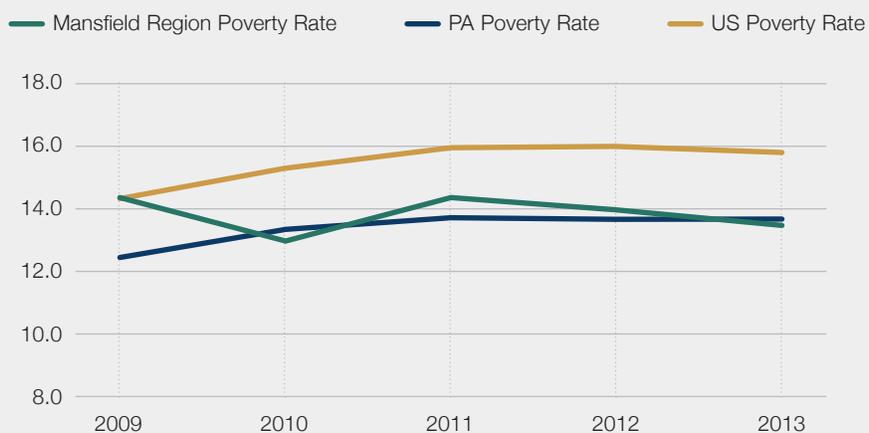
Figure 7.5 shows the convergence of the unemployment rates of Man U's workforce region, Pennsylvania, and the U.S. from 2009 to 2014.



In Man U's workforce region, the poverty rate trended downward since 2009. The region's poverty rate is near the state poverty rate; however, it has trended below the U.S. average.¹⁵ Given the lower poverty rate compared with the nation, there is an underlying assumption that the compensation associated with the jobs in Man U's workforce region may be higher than the national average.

¹⁵ Poverty estimates are based on U.S. Census Bureau's Small Area Income and Poverty Estimates data series. Calculations comprise the total number of individuals (all ages) in the geography, divided by the number of individuals (all ages) that are classified as being in poverty.

Figure 7.6 – Mansfield University's Workforce Region, Pennsylvania, and U.S. Poverty Rates



Source: U.S. Census – Small Area Income & Poverty Estimates (SAIPE)

Figure 7.6 compares the poverty rates of Man U's workforce region, Pennsylvania, and the U.S. from 2009 to 2013.

When unemployment and poverty are evaluated together, a significant decline in unemployment to pre-recession levels, coupled with a small uptick in the poverty rate, suggests an underlying cause that is contributing to marginally increased poverty rates. This cause may be associated with the quality of new jobs that have emerged since the recession, which have done little to abate poverty rates, despite decreasing unemployment.

Although the poverty rate indicates an overall small increasing trend, the unemployment rate shows a decreasing trend, meaning a larger proportion of the workforce is either employed or is no longer seeking employment.

8. NEXT STEPS

This report sets the foundation for program planning by accomplishing three key tasks:

- Defining the university's workforce region.
- Describing key economic, workforce, and demographic attributes in the regional economy.
- Forecasting the demand for skilled occupations.

The next steps for research to support Pennsylvania's State System of Higher Education Program Alignment Toolkit are the development of an education supply and workforce demand gap analysis. Key data-driven aspects in the gap analysis research include:

- Development of an education program to occupation crosswalk.
- Analysis of completion data from the State System institutions as well as other institutions in the university's workforce region.
- Comparison of the occupation forecasts against the recent completions of education programs.
- Identification of programs that may require expansion or development, as well as programs that indicate a potential surplus of talent within the region.

DATA SOURCES

Bureau of Labor Statistics (BLS):

- QCEW - Quarterly Census of Employment & Wages (Bureau of Labor Statistics) - <http://www.bls.gov/cew/>
- OES – Occupational Employment Statistics (Bureau of Labor Statistics) - <http://www.bls.gov/oes/>
- LAUS – Local Area Unemployment Statistics (Bureau of Labor Statistics) - <http://www.bls.gov/lau/>

U.S. Census Bureau (Census):

- LEHD – Longitudinal Employer-Household Dynamics - <http://lehd.census.gov/>
- ACS – American Community Survey - <http://www.census.gov/acs/www/>
- SAIPE – Small Area Income and Poverty Estimates - <http://www.census.gov/did/www/saipe/>

National Center for Education Statistics (NCES):

- IPEDS – Integrated Postsecondary Education Data System (National Center for Education Statistics) - <https://nces.ed.gov/ipeds/>

Pennsylvania Department of Labor and Industry (PADLI):

- CWIA – Center for Workforce Information & Analysis (PA Department of Labor & Industry) – www.paworkstats.pa.gov

O*NET Resource Center (O*NET)

- Job Zones www.onetonline.org/help/online/zones

Economic Modeling Specialists International (EMSI)

APPENDIX A: METHODOLOGY FOR IDENTIFYING STATE SYSTEM UNIVERSITY WORKFORCE REGIONS

Introduction

Economic and workforce analysis is best undertaken at a geographic level that reflects how the economic market operates. In order to effectively analyze a relevant market area, a systematic approach to define the geography should be completed. This report provides a university-specific workforce characteristics analysis based on a defined workforce region. The following outlines the methodology for identifying university workforce regions.

A workforce region is defined as: a labor market area or an economically integrated region within which residents can find jobs within a reasonable commuting distance or can change their employment without changing their place of residence.¹⁶ When determining a workforce region, there is no universal approach.¹⁷ Given the target audience for the workforce region—State System universities—the context used to define the region should reflect multiple regional characteristics that the universities are tasked to support, while still conforming to the broader definition of what is often called a functional economic market area (FEMA). A FEMA is best described as an area that contains key economic markets. These economic markets best reflect drivers of the local economy such as the workforce and inter-industry business activity. For the purposes of this analysis, three drivers are measured in order to best define workforce regions, specifically:

- 1. Workforce flows** (primary input) - measured through commuting patterns.
- 2. Learner origin** (secondary input) - measured by the proportion of state system learners from a given county who are attending the university.
- 3. Economic activity** (secondary input) - measured through inter-industry

¹⁶ Bureau of Labor Statistics: Labor Market Area.

¹⁷ *Functional Economic Market Areas: An economic note*. Communities and Local Government. February 2010. <http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/documents/localgovernment/pdf/1469713.pdf>

exchange within the region and consumer purchasing activity within the region using an input-output model.

Further information on each of the measurements is detailed later.

Geographic Consideration

In order to define regions for State System universities, county-level data provide the best units of economic and workforce information. As such, county groupings serve as the best structure for describing the regions.

However, no one county is identical. Each county has different industry and workforce structures, as well as different learner populations. Additionally, some universities are located in areas that are near large metropolitan areas, while other universities are not. Therefore, a blanket approach of setting threshold primary driver values when defining a workforce region for each university would ultimately favor universities located near large metropolitan areas. In order to allow for broader geographic coverage, three specific considerations were taken into account:

1. Percent of commuters working and/or living in the workforce region.

Specifically, small population counties that contain a State System university do not contain a large workforce. Furthermore, the commuting flows of the workforce may seemingly favor the county containing the State System University. However, if a reasonable proportion of in commuters and out commuters (generally 10% or more) are traveling to work in contiguous counties, then these counties were included in the workforce region of the university.¹⁸

2. Inclusiveness of counties in Pennsylvania. The State System seeks to include all counties as part of the Rising to the Challenge Strategy. However, given the small population and workforce counties that exist across Pennsylvania, combined with many State System universities located within geographic proximity of these small counties, a second criterion of learner “capture rate” is used. The capture rate is simply the proportion of State System enrolled learners within a county that are attending a given

¹⁸ The contiguous region approach employs the U.S. Department of Labor, Bureau of Labor Statistics’ (BLS) Small Labor Market Areas’ criteria to designating a labor market area. However, the 25% threshold set by the BLS was relaxed in order to adhere to an additional criterion of inclusiveness, wherein every county in Pennsylvania is assigned to at least one university. To meet this criteria, the proportion of county-level State System learner enrollment within PA attending the university was also included to identify a contiguous geographic area that captures both labor shed and county-level learner enrollment density (i.e. a percentage of State System learners from within the county and nearby counties that are attending the university—a “capture rate”).

State System university. For example, about 75% of State System enrolled learners from Erie County attend Edinboro University. Therefore Edinboro's capture rate for Erie County is 75%.

3. Level of inter-industry exchange and ability to satisfy household demand for goods and services. To provide additional context to regional economic activity and ensure that a final regional description can be considered a functional economic market area (FEMA), input-output modeling is used. In short, an input-output model is an inter-industry accounting framework, wherein a proportion of demand for inputs by one industry is satisfied through the production of an output by another industry within a supply chain. Regions with well-developed supply chains and integrated markets typically retain a higher proportion inter-industry trade, thus reducing the level of economic leakage. Similarly, the ability for a region's businesses to satisfy the demand for household consumption reduces economic leakage. This analysis considers both inter-industry exchange (called "output supply/demand") and household consumption (called "household supply/demand").

Process

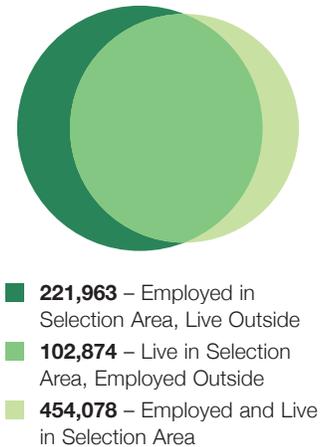
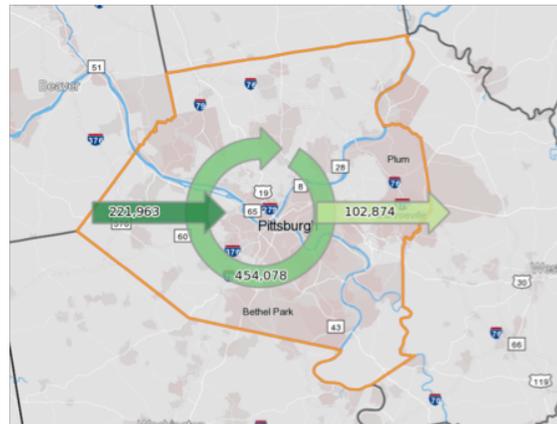
Given the workforce/commute, learner and economic variances that exist within the different geographies across Pennsylvania, an iterative process is used to define the workforce region. This multiple step, iterative process seeks to maximize the primary driver value (workforce flows), while adhering to the guiding principles of a functional economic area. It also ensures that each county in Pennsylvania is assigned to at least one university workforce region— from which the secondary driver values (learner capture rate and economic activity) were used. The process can be broken into the following steps for each driver:

Workforce Flows:

Defined by commuting patterns, workforce flows represent the flow of workers into and out of the region. The following two illustrations for Allegheny County provide better understanding of commuting flows. The map indicates the commuting flow of workers. In short, 454,000 people who live in the county also work in the county. Additionally, almost 222,000 workers commute into Allegheny County for work, while nearly 103,000 county residents commute outside of Allegheny for their jobs.

When these numbers are converted into percentages, we find that

Inflow/Outflow Job Counts in 2013



Source: U.S. Census Bureau – Longitudinal Employment and Housing Dynamics 2013

67% of people who work in Allegheny county live in Allegheny County $((454,078+221,963)/454,078 = 67.2\%)$. This is represented by the darker green circle and center shaded area of the Venn diagram. Another way to describe this is that more than 30% of the jobs in Allegheny County are filled by workers outside of the county (i.e. in commuters).

Additionally, we find that 81.5% of people who live in Allegheny County work in the county $((454,078+102,874)/454,078 = 81.5\%)$. This is represented by the lighter green circle and center shaded area of the Venn diagram. Another way to describe this is less than 20% of Allegheny County's employed residents commute outside of the county for their job (i.e. out commuters).

When defining the workforce region for a University, the analysis begins with the county that the University is located, followed by:

- Identification of the top counties (by percent) of in commuters, using a cut-off of 10%.
- Identification of the top counties (by percent) of out commuters, using a cut-off of 10%.

The counties identified in these initial steps were carried forward to the next set of criterion (i.e. inclusiveness and proportion of learner capture rates).

Learner Capture Rates and Inclusiveness:

Characterized by the proportion of State System enrolled learners from a given Pennsylvania county who are attending a given State System university, the learner capture rate indicates how well the university is providing education to learners within a geographic proximity. This second set of criteria helps to shape the regional backdrop of learners supported within a contiguous area around the university. Not to be confused with the headcount of where a University's learners are coming from, this analysis is specifically designed to broaden the contiguous region to help ensure inclusiveness of other counties (many of which are often low population areas).

Counties were selected based on two criteria for learner origin. First, to evaluate each county, we consider the total number of State System learners who come from each respective county. We sum all students enrolled in the State System for each county and then calculate the share of students going to each State System university. Although a particular county may not contribute a large proportion of total State System students, this method ensured inclusiveness based upon each respective county's relative contribution. Second, to consider the university perspective, we calculate where the majority of learners come from within Pennsylvania for each respective university. This ensured that Chester County, for example, was included as part of Millersville's workforce region even though a majority of learners in Chester County do not attend Millersville University. Greater weight was given to the first criteria to ensure inclusiveness of all counties. Note that counties must be contiguous in order to conform to the definition of a workforce region.

Economic Activity and Concentration:

Concurrently, we measured the economic activity of the region using supply/demand ratios for businesses and households. After each workforce region was defined using the criteria for commuting and learner origin, the gross commodity demand was calculated for that region using IMPLAN. Gross commodity demand is the total demand for supply chain products and services by businesses in the region. The Output Supply/Demand ratio represents the percent of industry demand for supply chain products and services that are satisfied by businesses in the region. The Household Supply/Demand ratio represents the percent of household demand for goods and services that are satisfied by businesses in the region. For example, when defining Bloomsburg University's workforce region several county combinations were evaluated. The fourth iteration included Columbia, Montour, Luzerne, and Northumberland. The supply/demand ratios for businesses and households were 54% and

84% respectively. In the fifth iteration, Northampton was added to the region. Although this did increase the learner origin measure (marginally), it actually reduced the supply/demand ratios for businesses and households to 53% and 79% respectively. This indicated that Northampton was not as connected to the region economically as the other counties and it was not included in the workforce region as a result.

Table A.1 – State System Workforce Region by University

University	Counties
Bloomsburg University	Columbia, Montour, Luzerne, Northumberland, Union, Sullivan, Snyder, Schuylkill
California University	Washington, Allegheny, Fayette, Westmoreland, Greene
Cheyney University	Chester, Delaware, Philadelphia, Montgomery
Clarion University	Clarion, Armstrong, Butler, Venango, Jefferson, Forest, Elk, Allegheny
East Stroudsburg University	Monroe, Northampton, Lackawanna, Pike, Wayne, Carbon, Lehigh
Edinboro University	Erie, Crawford, Warren, McKean
Indiana University	Indiana, Allegheny, Westmoreland, Cambria, Armstrong, Blair, Bedford, Somerset, Jefferson
Kutztown University	Berks, Lehigh, Montgomery, Northampton, Schuylkill, Chester, Bucks
Lock Haven University	Clinton, Lycoming, Centre, Clearfield, Cameron, Mifflin, Juniata
Mansfield University	Tioga, Bradford, Potter, Susquehanna, Wyoming
Millersville University	Lancaster, Dauphin, Chester, York, Lebanon
Shippensburg University	Cumberland, Franklin, Dauphin, York, Perry, Huntingdon, Fulton, Adams
Slippery Rock University	Butler, Allegheny, Mercer, Lawrence, Beaver, Westmoreland
West Chester University	Chester, Delaware, Philadelphia, Montgomery, Bucks

Source: Oxford Economics modeling and tabulations

APPENDIX B: PENNSYLVANIA STATE AND COUNTY ENROLLMENT AND EMPLOYMENT

County	Fall 2014 Enrollment in Mansfield University	2014 QCEW Employment
Adams	6	34,139
Allegheny	12	683,111
Armstrong	0	17,582
Beaver	1	52,811
Bedford	3	15,397
Berks	38	166,792
Blair	7	58,233
Bradford	382	24,568
Bucks	64	250,889
Butler	4	84,472
Cambria	6	53,915
Cameron	1	2,015
Carbon	12	16,974
Centre	13	67,147
Chester	21	240,469
Clarion	4	13,586
Clearfield	6	29,938
Clinton	25	13,043
Columbia	14	24,974
Crawford	2	31,113
Cumberland	44	126,939
Dauphin	57	176,004
Delaware	31	216,261
Elk	9	14,994
Erie	4	124,095
Fayette	0	39,979
Forest	0	2,053
Franklin	6	56,715
Fulton	0	4,807
Greene	2	14,844
Huntingdon	4	12,343

County	Fall 2014 Enrollment in Mansfield University	2014 QCEW Employment
Indiana	2	32,653
Jefferson	0	15,435
Juniata	7	6,146
Lackawanna	43	97,259
Lancaster	40	225,673
Lawrence	0	29,500
Lebanon	13	48,869
Lehigh	21	180,757
Luzerne	53	140,329
Lycoming	138	53,197
McKean	15	15,770
Mercer	1	48,028
Mifflin	7	15,544
Monroe	21	52,933
Montgomery	55	472,655
Montour	14	15,578
Northampton	27	105,825
Northumberland	56	27,985
Perry	21	7,661
Philadelphia	144	640,987
Pike	11	10,748
Potter	47	5,291
Schuylkill	16	50,049
Snyder	21	15,522
Somerset	1	24,398
Sullivan	6	1,772
Susquehanna	50	9,281
Tioga	487	12,973
Union	28	16,597
Venango	0	19,251
Warren	6	15,031
Washington	2	86,961
Wayne	38	14,651
Westmoreland	1	132,312
Wyoming	32	10,181
York	61	172,145
Total Pennsylvania	2,263	5,643,676

Source: Enrollment - Pennsylvania State System of Higher Education, Employment - BLS QCEW

APPENDIX C: INDUSTRY PROJECTIONS 2014-2024 FOR MANSFIELD UNIVERSITY'S WORKFORCE REGION

A common measure of industry competitiveness is through the use of a location quotient statistic. Location quotients (LQ) provide a relative perspective on local comparative advantages in specific industry classifications by comparing employment within a local or state economy to a larger geographic area (e.g. nation). On its own, the analysis achieves little. However, when evaluated jointly with the employment data and growth, one gains a sense of the industry sectors that might benefit from efforts to align educational opportunities with economic development (i.e. industries that State System universities may consider engaging in larger conversations about aligning employer and educational needs).

To interpret results, LQs equal to 1 indicate that the area's industry concentration is equal the national concentration of the same industry. Industries with a higher location quotient (usually greater than 1.2) indicate that an area has a relatively higher concentration of jobs in the sector and therefore concludes that the area has a comparative advantage or specialization in the production of that good or service, compared to the national average. Note: High employment industries do not necessarily result in large location quotients, as this is a comparative statistic. The following table provides the industry LQs at the 4-digit NAICS level in Man U's workforce region. Included in the table are the number of jobs in 2014 and the projected job growth/decline in 2024.

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
Total	All Industries	63,538	70,253	10.6%	1.0
1111	Oilseed and Grain Farming	2	2	0.0%	0.1
1112	Vegetable and Melon Farming	39	47	20.5%	0.9
1114	Greenhouse, Nursery, and Floriculture Production	40	44	10.0%	0.6
1119	Other Crop Farming	11	12	9.1%	0.4
1121	Cattle Ranching and Farming	176	164	-6.8%	2.6
1122	Hog and Pig Farming	24	27	12.5%	1.7
1125	Aquaculture	9	10	11.1%	3.1
1129	Other Animal Production	42	41	-2.4%	4.7
1131	Timber Tract Operations	20	25	25.0%	6.0
1132	Forest Nurseries and Gathering of Forest Products	3	3	0.0%	2.7
1133	Logging	83	71	-14.5%	3.5
1142	Hunting and Trapping	2	2	0.0%	1.8
1151	Support Activities for Crop Production	6	5	-16.7%	0.0
1152	Support Activities for Animal Production	123	147	19.5%	9.4
1153	Support Activities for Forestry	18	15	-16.7%	2.3
2111	Oil and Gas Extraction	487	630	29.4%	5.3
2123	Nonmetallic Mineral Mining and Quarrying	742	673	-9.3%	17.8
2131	Support Activities for Mining	2,677	3,342	24.8%	13.1
2211	Electric Power Generation, Transmission and Distribution	245	224	-8.6%	1.1
2212	Natural Gas Distribution	112	126	12.5%	2.1
2213	Water, Sewage and Other Systems	174	175	0.6%	1.8
2361	Residential Building Construction	306	354	15.7%	1.0
2362	Nonresidential Building Construction	303	371	22.4%	0.9
2371	Utility System Construction	748	1,023	36.8%	3.5
2372	Land Subdivision	15	22	46.7%	0.8
2373	Highway, Street, and Bridge Construction	409	585	43.0%	2.2
2379	Other Heavy and Civil Engineering Construction	5	5	0.0%	0.1
2381	Foundation, Structure, and Building Exterior Contractors	153	191	24.8%	0.4
2382	Building Equipment Contractors	452	502	11.1%	0.5
2383	Building Finishing Contractors	41	48	17.1%	0.1
2389	Other Specialty Trade Contractors	681	778	14.2%	2.5
3111	Animal Food Manufacturing	149	148	-0.7%	5.9
3113	Sugar and Confectionery Product Manufacturing	48	52	8.3%	1.5
3115	Dairy Product Manufacturing	358	358	0.0%	5.7
3116	Animal Slaughtering and Processing	876	1,057	20.7%	3.9
3118	Bakeries and Tortilla Manufacturing	175	212	21.1%	1.3

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
3119	Other Food Manufacturing	134	163	21.6%	1.5
3121	Beverage Manufacturing	113	111	-1.8%	1.2
3141	Textile Furnishings Mills	28	33	17.9%	1.1
3149	Other Textile Product Mills	50	54	8.0%	1.7
3152	Cut and Sew Apparel Manufacturing	11	13	18.2%	0.2
3169	Other Leather and Allied Product Manufacturing	12	15	25.0%	2.3
3211	Sawmills and Wood Preservation	323	441	36.5%	7.7
3212	Veneer, Plywood, and Engineered Wood Product Manufacturing	533	696	30.6%	16.1
3219	Other Wood Product Manufacturing	900	1,170	30.0%	9.3
3222	Converted Paper Product Manufacturing	1,241	1,452	17.0%	10.0
3231	Printing and Related Support Activities	68	36	-47.1%	0.3
3254	Pharmaceutical and Medicine Manufacturing	107	87	-18.7%	0.8
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	65	53	-18.5%	1.4
3259	Other Chemical Product and Preparation Manufacturing	43	35	-18.6%	1.1
3261	Plastics Product Manufacturing	579	641	10.7%	2.3
3262	Rubber Product Manufacturing	68	77	13.2%	1.1
3271	Clay Product and Refractory Manufacturing	15	18	20.0%	0.8
3272	Glass and Glass Product Manufacturing	90	70	-22.2%	2.3
3273	Cement and Concrete Product Manufacturing	199	190	-4.5%	2.5
3279	Other Nonmetallic Mineral Product Manufacturing	111	122	9.9%	3.3
3314	Nonferrous Metal (except Aluminum) Production and Processing	754	786	4.2%	26.1
3315	Foundries	617	527	-14.6%	10.5
3321	Forging and Stamping	139	167	20.1%	3.0
3322	Cutlery and Handtool Manufacturing	10	12	20.0%	0.6
3323	Architectural and Structural Metals Manufacturing	115	108	-6.1%	0.7
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	236	210	-11.0%	1.4
3329	Other Fabricated Metal Product Manufacturing	88	59	-33.0%	0.7
3332	Industrial Machinery Manufacturing	61	66	8.2%	1.2
3334	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing	141	169	19.9%	2.4
3335	Metalworking Machinery Manufacturing	228	270	18.4%	2.7
3339	Other General Purpose Machinery Manufacturing	14	14	0.0%	0.1
3341	Computer and Peripheral Equipment Manufacturing	94	114	21.3%	1.3
3344	Semiconductor and Other Electronic Component Manufacturing	123	150	22.0%	0.7
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	7	6	-14.3%	0.0
3353	Electrical Equipment Manufacturing	37	39	5.4%	0.6

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
3359	Other Electrical Equipment and Component Manufacturing	79	81	2.5%	1.3
3363	Motor Vehicle Parts Manufacturing	495	520	5.1%	2.0
3364	Aerospace Product and Parts Manufacturing	112	124	10.7%	0.5
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing	42	45	7.1%	0.4
3391	Medical Equipment and Supplies Manufacturing	43	45	4.7%	0.3
3399	Other Miscellaneous Manufacturing	249	256	2.8%	1.9
4231	Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers	90	110	22.2%	0.6
4233	Lumber and Other Construction Materials Merchant Wholesalers	419	485	15.8%	4.5
4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers	109	107	-1.8%	0.4
4235	Metal and Mineral (except Petroleum) Merchant Wholesalers	7	8	14.3%	0.1
4236	Household Appliances and Electrical and Electronic Goods Merchant Wholesalers	156	167	7.1%	1.0
4237	Hardware, and Plumbing and Heating Equipment and Supplies Merchant Wholesalers	26	31	19.2%	0.2
4238	Machinery, Equipment, and Supplies Merchant Wholesalers	356	327	-8.1%	1.1
4239	Miscellaneous Durable Goods Merchant Wholesalers	78	87	11.5%	0.6
4241	Paper and Paper Product Merchant Wholesalers	6	7	16.7%	0.1
4242	Drugs and Druggists' Sundries Merchant Wholesalers	34	42	23.5%	0.4
4244	Grocery and Related Product Merchant Wholesalers	56	62	10.7%	0.2
4245	Farm Product Raw Material Merchant Wholesalers	1	1	0.0%	0.0
4246	Chemical and Allied Products Merchant Wholesalers	65	78	20.0%	1.1
4247	Petroleum and Petroleum Products Merchant Wholesalers	131	141	7.6%	2.9
4248	Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers	54	61	13.0%	0.6
4249	Miscellaneous Nondurable Goods Merchant Wholesalers	90	104	15.6%	0.6
4251	Wholesale Electronic Markets and Agents and Brokers	202	128	-36.6%	0.5
4411	Automobile Dealers	652	691	6.0%	1.2
4412	Other Motor Vehicle Dealers	86	94	9.3%	1.3
4413	Automotive Parts, Accessories, and Tire Stores	316	356	12.7%	1.3
4421	Furniture Stores	66	64	-3.0%	0.7
4422	Home Furnishings Stores	47	55	17.0%	0.4
4431	Electronics and Appliance Stores	45	40	-11.1%	0.2
4441	Building Material and Supplies Dealers	798	872	9.3%	1.6
4442	Lawn and Garden Equipment and Supplies Stores	213	220	3.3%	3.1
4451	Grocery Stores	1,360	1,243	-8.6%	1.1
4452	Specialty Food Stores	115	95	-17.4%	1.1
4453	Beer, Wine, and Liquor Stores	218	214	-1.8%	3.0

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
4461	Health and Personal Care Stores	453	447	-1.3%	1.0
4471	Gasoline Stations	1,355	1,258	-7.2%	3.3
4481	Clothing Stores	19	19	0.0%	0.0
4482	Shoe Stores	35	35	0.0%	0.4
4483	Jewelry, Luggage, and Leather Goods Stores	17	19	11.8%	0.3
4511	Sporting Goods, Hobby, and Musical Instrument Stores	74	81	9.5%	0.3
4512	Book Stores and News Dealers	14	11	-21.4%	0.3
4521	Department Stores	436	367	-15.8%	0.7
4529	Other General Merchandise Stores	1,089	1,187	9.0%	1.3
4531	Florists	51	46	-9.8%	1.8
4532	Office Supplies, Stationery, and Gift Stores	23	23	0.0%	0.2
4533	Used Merchandise Stores	67	70	4.5%	0.9
4539	Other Miscellaneous Store Retailers	184	174	-5.4%	1.3
4541	Electronic Shopping and Mail-Order Houses	43	50	16.3%	0.3
4542	Vending Machine Operators	57	67	17.5%	3.3
4543	Direct Selling Establishments	159	153	-3.8%	2.6
4832	Inland Water Transportation	6	8	33.3%	0.4
4841	General Freight Trucking	746	877	17.6%	1.7
4842	Specialized Freight Trucking	1,341	1,704	27.1%	6.5
4851	Urban Transit Systems	55	65	18.2%	0.5
4853	Taxi and Limousine Service	13	14	7.7%	0.4
4854	School and Employee Bus Transportation	395	396	0.3%	3.4
4855	Charter Bus Industry	27	32	18.5%	1.9
4862	Pipeline Transportation of Natural Gas	179	215	20.1%	13.2
4881	Support Activities for Air Transportation	25	29	16.0%	0.2
4882	Support Activities for Rail Transportation	67	57	-14.9%	4.5
4884	Support Activities for Road Transportation	20	25	25.0%	0.4
4885	Freight Transportation Arrangement	37	47	27.0%	0.4
4889	Other Support Activities for Transportation	44	46	4.5%	3.0
4911	Postal Service	416	363	-12.7%	1.5
4922	Local Messengers and Local Delivery	101	119	17.8%	4.0
4931	Warehousing and Storage	251	298	18.7%	0.7
5111	Newspaper, Periodical, Book, and Directory Publishers	209	148	-29.2%	1.1
5121	Motion Picture and Video Industries	15	14	-6.7%	0.1
5151	Radio and Television Broadcasting	55	57	3.6%	0.5
5171	Wired Telecommunications Carriers	447	368	-17.7%	1.6
5179	Other Telecommunications	30	21	-30.0%	0.8

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
5182	Data Processing, Hosting, and Related Services	16	14	-12.5%	0.1
5191	Other Information Services	156	171	9.6%	1.0
5221	Depository Credit Intermediation	1,043	992	-4.9%	1.3
5222	Nondepository Credit Intermediation	50	48	-4.0%	0.2
5231	Securities and Commodity Contracts Intermediation and Brokerage	13	13	0.0%	0.1
5239	Other Financial Investment Activities	14	15	7.1%	0.1
5241	Insurance Carriers	79	95	20.3%	0.1
5242	Agencies, Brokerages, and Other Insurance Related Activities	325	365	12.3%	0.7
5311	Lessors of Real Estate	44	50	13.6%	0.2
5312	Offices of Real Estate Agents and Brokers	26	32	23.1%	0.2
5313	Activities Related to Real Estate	17	22	29.4%	0.1
5321	Automotive Equipment Rental and Leasing	32	43	34.4%	0.4
5322	Consumer Goods Rental	75	80	6.7%	1.0
5323	General Rental Centers	63	82	30.2%	3.5
5324	Commercial and Industrial Machinery and Equipment Rental and Leasing	394	407	3.3%	6.0
5411	Legal Services	257	301	17.1%	0.5
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	178	212	19.1%	0.4
5413	Architectural, Engineering, and Related Services	385	436	13.2%	0.6
5414	Specialized Design Services	15	21	40.0%	0.3
5415	Computer Systems Design and Related Services	30	40	33.3%	0.0
5416	Management, Scientific, and Technical Consulting Services	192	235	22.4%	0.3
5417	Scientific Research and Development Services	57	78	36.8%	0.2
5418	Advertising, Public Relations, and Related Services	43	66	53.5%	0.2
5419	Other Professional, Scientific, and Technical Services	427	534	25.1%	1.4
5511	Management of Companies and Enterprises	558	593	6.3%	0.6
5611	Office Administrative Services	8	10	25.0%	0.0
5612	Facilities Support Services	27	38	40.7%	0.4
5613	Employment Services	267	336	25.8%	0.2
5614	Business Support Services	149	141	-5.4%	0.4
5615	Travel Arrangement and Reservation Services	68	78	14.7%	0.7
5616	Investigation and Security Services	257	315	22.6%	0.6
5617	Services to Buildings and Dwellings	420	532	26.7%	0.5
5619	Other Support Services	86	66	-23.3%	0.6
5621	Waste Collection	154	205	33.1%	2.0
5622	Waste Treatment and Disposal	71	85	19.7%	1.2
5629	Remediation and Other Waste Management Services	96	133	38.5%	1.5

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
6111	Elementary and Secondary Schools	4,695	4,567	-2.7%	1.3
6112	Junior Colleges	13	12	-7.7%	0.0
6113	Colleges, Universities, and Professional Schools	392	317	-19.1%	0.3
6114	Business Schools and Computer and Management Training	78	63	-19.2%	2.3
6115	Technical and Trade Schools	1	2	100.0%	0.0
6116	Other Schools and Instruction	128	138	7.8%	0.7
6117	Educational Support Services	71	84	18.3%	1.0
6211	Offices of Physicians	1,491	2,022	35.6%	1.3
6212	Offices of Dentists	197	253	28.4%	0.5
6213	Offices of Other Health Practitioners	508	725	42.7%	1.4
6214	Outpatient Care Centers	350	418	19.4%	1.0
6215	Medical and Diagnostic Laboratories	9	14	55.6%	0.1
6216	Home Health Care Services	60	92	53.3%	0.1
6219	Other Ambulatory Health Care Services	127	176	38.6%	0.9
6221	General Medical and Surgical Hospitals	3,552	4,001	12.6%	1.4
6231	Nursing Care Facilities (Skilled Nursing Facilities)	891	1,246	39.8%	1.1
6232	Residential Intellectual and Developmental Disability, Mental Health, and Substance Abuse Facilities	276	388	40.6%	0.8
6233	Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly	300	356	18.7%	0.8
6239	Other Residential Care Facilities	101	116	14.9%	1.3
6241	Individual and Family Services	1,489	2,055	38.0%	1.5
6242	Community Food and Housing, and Emergency and Other Relief Services	10	11	10.0%	0.1
6243	Vocational Rehabilitation Services	309	364	17.8%	1.9
6244	Child Day Care Services	476	598	25.6%	1.2
7111	Performing Arts Companies	1	1	0.0%	0.0
7112	Spectator Sports	8	11	37.5%	0.1
7113	Promoters of Performing Arts, Sports, and Similar Events	50	55	10.0%	0.8
7115	Independent Artists, Writers, and Performers	3	3	0.0%	0.1
7121	Museums, Historical Sites, and Similar Institutions	39	47	20.5%	0.4
7131	Amusement Parks and Arcades	4	3	-25.0%	0.0
7139	Other Amusement and Recreation Industries	393	426	8.4%	0.6
7211	Traveler Accommodation	719	787	9.5%	0.8
7212	RV (Recreational Vehicle) Parks and Recreational Camps	120	143	19.2%	4.4
7223	Special Food Services	244	266	9.0%	0.8
7224	Drinking Places (Alcoholic Beverages)	309	306	-1.0%	1.8
7225	Restaurants and Other Eating Places	3,004	3,127	4.1%	0.7

NAICS Code	Industry Title	2014 Jobs	2024 Jobs	% Change 2014-2024	2014 LQ
8111	Automotive Repair and Maintenance	480	477	-0.6%	1.2
8112	Electronic and Precision Equipment Repair and Maintenance	25	31	24.0%	0.5
8113	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	56	52	-7.1%	0.6
8114	Personal and Household Goods Repair and Maintenance	16	17	6.3%	0.5
8121	Personal Care Services	165	173	4.8%	0.5
8122	Death Care Services	100	104	4.0%	1.6
8123	Drycleaning and Laundry Services	64	63	-1.6%	0.5
8129	Other Personal Services	31	36	16.1%	0.2
8131	Religious Organizations	107	126	17.8%	1.2
8132	Grantmaking and Giving Services	17	15	-11.8%	0.3
8133	Social Advocacy Organizations	43	50	16.3%	0.4
8134	Civic and Social Organizations	324	401	23.8%	1.8
8139	Business, Professional, Labor, Political, and Similar Organizations	82	116	41.5%	0.4
8141	Private Households	35	40	14.3%	0.3
9211	Executive, Legislative, and Other General Government Support	2,350	2,289	-2.6%	1.7
9221	Justice, Public Order, and Safety Activities	222	210	-5.4%	0.3
9231	Administration of Human Resource Programs	73	87	19.2%	0.2
9241	Administration of Environmental Quality Programs	211	211	0.0%	1.4
9251	Administration of Housing Programs, Urban Planning, and Community Development	101	97	-4.0%	2.6
9261	Administration of Economic Programs	44	41	-6.8%	0.2

Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES), Pennsylvania Department of Labor & Industry, Oxford Economics Projections

APPENDIX D: OCCUPATION PROJECTIONS 2014-2024 FOR MANSFIELD UNIVERSITY'S WORKFORCE REGION

For this analysis a “skilled” occupation is defined as an occupation in O*NET Job Zones¹⁹ Three, Four or Five. Most occupations in Job Zone Three require training in vocational schools, related on-the-job experience, or an associate’s degree.

The O*NET program is the nation’s primary source of occupational information. Central to the project is the O*NET database, containing information on hundreds of standardized and occupation-specific descriptors. The database, which is available to the public at no cost, is continually updated by surveying a broad range of workers from each occupation.²⁰

JOB ZONE ONE: Little or No Preparation Needed

- *Education* – Some of these occupations may require a high school diploma or GED certificate.
- *Related Experience* – Little or no previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a waiter or waitress even if he/she has never worked before.
- *Job Training* – Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job.
- *Job Zone Examples* – These occupations involve following instructions and helping others. Examples include taxi drivers, amusement and recreation attendants, counter and rental clerks, nonfarm animal caretakers, continuous mining machine operators, and waiters/waitresses.

JOB ZONE TWO: Some Preparation Needed

- *Education* – These occupations usually require a high school diploma.

¹⁹ <https://www.onetonline.org/help/online/zones>

²⁰ <http://www.onetcenter.org/overview.html>

- *Related Experience* – Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.
- *Job Training* – Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.
- *Job Zone Examples* – These occupations often involve using your knowledge and skills to help others. Examples include sheet metal workers, forest fire fighters, customer service representatives, physical therapist aides, salespersons (retail), and tellers.

JOB ZONE THREE: Medium Preparation Needed

- *Education* – Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.
- *Related Experience* – Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
- *Job Training* – Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.
- *Job Zone Examples* – These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include food service managers, electricians, agricultural technicians, legal secretaries, occupational therapy assistants, and medical assistants.

JOB ZONE FOUR: Considerable Preparation Needed

- *Education* – Most of these occupations require a four-year bachelor's degree, but some do not.
- *Related Experience* – A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

- *Job Training* – Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.
- *Job Zone Examples* – Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, art directors, and cost estimators.

JOB ZONE FIVE: Extensive Preparation Needed

- *Education* – Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).
- *Related Experience* – Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.
- *Job Training* – Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.
- *Job Zone Examples* – These occupations often involve coordinating, training, supervising, or managing the activities of others to accomplish goals. Very advanced communication and organizational skills are required. Examples include librarians, lawyers, sports medicine physicians, wildlife biologists, school psychologists, surgeons, treasurers, and controllers.

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
Total	All Occupations	NA	63,531	70,247	10.6%	25,242
11-1011	Chief Executives	5	105	108	2.9%	28
11-1021	General and Operations Managers	4	761	870	14.3%	244
11-1031	Legislators	4	26	21	-19.2%	2
11-2011	Advertising and Promotions Managers	4	4	4	0.0%	1
11-2021	Marketing Managers	4	26	29	11.5%	9
11-2022	Sales Managers	4	78	74	-5.1%	13
11-2031	Public Relations and Fundraising Managers	4	8	8	0.0%	2
11-3011	Administrative Services Managers	3	54	49	-9.3%	4
11-3021	Computer and Information Systems Managers	4	52	73	40.4%	29
11-3031	Financial Managers	4	106	109	2.8%	23
11-3051	Industrial Production Managers	4	130	149	14.6%	49
11-3061	Purchasing Managers	4	14	22	57.1%	11
11-3071	Transportation, Storage, and Distribution Managers	4	35	37	5.7%	11
11-3111	Compensation and Benefits Managers	4	3	3	0.0%	1
11-3121	Human Resources Managers	4	21	29	38.1%	13
11-3131	Training and Development Managers	4	4	4	0.0%	1
11-9021	Construction Managers	4	106	125	17.9%	34
11-9031	Education Administrators, Preschool and Childcare Center/Program	4	23	23	0.0%	6
11-9032	Education Administrators, Elementary and Secondary School	5	123	114	-7.3%	32
11-9033	Education Administrators, Postsecondary	5	15	11	-26.7%	0
11-9039	Education Administrators, All Other	5	6	7	16.7%	2
11-9041	Architectural and Engineering Managers	5	49	51	4.1%	14
11-9051	Food Service Managers	3	50	52	4.0%	12
11-9061	Funeral Service Managers	3	7	6	-14.3%	1
11-9081	Lodging Managers	3	15	16	6.7%	8
11-9111	Medical and Health Services Managers	5	117	141	20.5%	53
11-9121	Natural Sciences Managers	5	7	7	0.0%	1
11-9131	Postmasters and Mail Superintendents	3	16	11	-31.3%	1
11-9141	Property, Real Estate, and Community Association Managers	4	9	10	11.1%	3
11-9151	Social and Community Service Managers	4	57	79	38.6%	35
11-9161	Emergency Management Directors	4	5	4	-20.0%	0
11-9199	Managers, All Other	4	44	42	-4.5%	7
13-1021	Buyers and Purchasing Agents, Farm Products	4	3	4	33.3%	1

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
13-1022	Wholesale and Retail Buyers, Except Farm Products	3	34	36	5.9%	12
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	4	166	180	8.4%	50
13-1031	Claims Adjusters, Examiners, and Investigators	4	64	107	67.2%	62
13-1032	Insurance Appraisers, Auto Damage	3	1	2	100.0%	1
13-1041	Compliance Officers	4	121	142	17.4%	46
13-1051	Cost Estimators	4	133	152	14.3%	65
13-1071	Human Resources Specialists	4	147	185	25.9%	69
13-1075	Labor Relations Specialists	4	25	31	24.0%	13
13-1081	Logisticians	4	45	45	0.0%	6
13-1111	Management Analysts	4	115	134	16.5%	38
13-1121	Meeting, Convention, and Event Planners	4	18	21	16.7%	6
13-1131	Fundraisers	4	13	17	30.8%	6
13-1141	Compensation, Benefits, and Job Analysis Specialists	4	24	28	16.7%	9
13-1151	Training and Development Specialists	4	78	83	6.4%	21
13-1161	Market Research Analysts and Marketing Specialists	4	144	194	34.7%	74
13-1199	Business Operations Specialists, All Other	4	152	168	10.5%	35
13-2011	Accountants and Auditors	4	434	493	13.6%	203
13-2021	Appraisers and Assessors of Real Estate	4	9	8	-11.1%	0
13-2031	Budget Analysts	4	14	15	7.1%	7
13-2041	Credit Analysts	4	16	18	12.5%	6
13-2051	Financial Analysts	4	59	72	22.0%	28
13-2052	Personal Financial Advisors	4	23	24	4.3%	5
13-2053	Insurance Underwriters	4	14	17	21.4%	8
13-2061	Financial Examiners	4	9	9	0.0%	3
13-2071	Credit Counselors	4	9	10	11.1%	3
13-2072	Loan Officers	3	110	119	8.2%	39
13-2081	Tax Examiners and Collectors, and Revenue Agents	3	51	44	-13.7%	13
13-2082	Tax Preparers	3	11	10	-9.1%	3
13-2099	Financial Specialists, All Other	4	28	26	-7.1%	2
15-1111	Computer and Information Research Scientists	5	1	1	0.0%	0
15-1121	Computer Systems Analysts	4	83	102	22.9%	34
15-1122	Information Security Analysts	4	9	10	11.1%	2
15-1131	Computer Programmers	4	42	36	-14.3%	8
15-1132	Software Developers, Applications	4	83	92	10.8%	22
15-1133	Software Developers, Systems Software	4	35	32	-8.6%	2
15-1134	Web Developers	3	16	18	12.5%	5

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
15-1141	Database Administrators	4	23	24	4.3%	7
15-1142	Network and Computer Systems Administrators	4	96	87	-9.4%	8
15-1143	Computer Network Architects	4	17	16	-5.9%	1
15-1151	Computer User Support Specialists	3	144	176	22.2%	58
15-1152	Computer Network Support Specialists	4	35	28	-20.0%	1
15-1199	Computer Occupations, All Other	4	49	56	14.3%	15
15-2011	Actuaries	4	5	6	20.0%	3
15-2031	Operations Research Analysts	5	11	12	9.1%	3
15-2041	Statisticians	5	9	11	22.2%	5
17-1011	Architects, Except Landscape and Naval	4	19	24	26.3%	12
17-1012	Landscape Architects	4	5	8	60.0%	4
17-1021	Cartographers and Photogrammetrists	4	2	2	0.0%	1
17-1022	Surveyors	4	12	17	41.7%	8
17-2011	Aerospace Engineers	4	4	5	25.0%	2
17-2031	Biomedical Engineers	4	6	6	0.0%	1
17-2041	Chemical Engineers	4	9	9	0.0%	2
17-2051	Civil Engineers	4	105	137	30.5%	60
17-2061	Computer Hardware Engineers	4	8	10	25.0%	3
17-2071	Electrical Engineers	4	50	54	8.0%	16
17-2072	Electronics Engineers, Except Computer	4	19	18	-5.3%	3
17-2081	Environmental Engineers	5	30	38	26.7%	17
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	4	21	25	19.0%	10
17-2112	Industrial Engineers	4	94	94	0.0%	32
17-2131	Materials Engineers	4	25	31	24.0%	15
17-2141	Mechanical Engineers	4	99	116	17.2%	54
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	4	8	7	-12.5%	2
17-2161	Nuclear Engineers	4	23	25	8.7%	9
17-2171	Petroleum Engineers	4	84	108	28.6%	55
17-2199	Engineers, All Other	4	23	29	26.1%	10
17-3011	Architectural and Civil Drafters	4	39	43	10.3%	13
17-3012	Electrical and Electronics Drafters	3	11	9	-18.2%	0
17-3013	Mechanical Drafters	3	31	30	-3.2%	6
17-3019	Drafters, All Other	3	2	2	0.0%	0
17-3021	Aerospace Engineering and Operations Technicians	4	1	1	0.0%	0
17-3022	Civil Engineering Technicians	3	16	19	18.8%	7
17-3023	Electrical and Electronics Engineering Technicians	3	58	60	3.4%	16

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
17-3024	Electro-Mechanical Technicians	3	2	2	0.0%	1
17-3025	Environmental Engineering Technicians	4	9	10	11.1%	4
17-3026	Industrial Engineering Technicians	3	26	30	15.4%	11
17-3027	Mechanical Engineering Technicians	3	11	13	18.2%	4
17-3029	Engineering Technicians, Except Drafters, All Other	3	19	24	26.3%	10
17-3031	Surveying and Mapping Technicians	3	16	23	43.8%	11
19-1012	Food Scientists and Technologists	4	8	10	25.0%	5
19-1013	Soil and Plant Scientists	5	1	1	0.0%	1
19-1021	Biochemists and Biophysicists	5	4	6	50.0%	3
19-1022	Microbiologists	5	5	6	20.0%	3
19-1023	Zoologists and Wildlife Biologists	5	2	2	0.0%	0
19-1029	Biological Scientists, All Other	5	4	4	0.0%	2
19-1031	Conservation Scientists	4	6	6	0.0%	2
19-1032	Foresters	4	17	20	17.6%	8
19-1041	Epidemiologists	5	2	2	0.0%	0
19-1042	Medical Scientists, Except Epidemiologists	5	20	21	5.0%	6
19-1099	Life Scientists, All Other	5	2	2	0.0%	1
19-2012	Physicists	5	1	1	0.0%	0
19-2021	Atmospheric and Space Scientists	4	1	1	0.0%	0
19-2031	Chemists	4	24	26	8.3%	10
19-2032	Materials Scientists	5	2	2	0.0%	0
19-2041	Environmental Scientists and Specialists, Including Health	4	35	44	25.7%	20
19-2042	Geoscientists, Except Hydrologists and Geographers	4	35	44	25.7%	22
19-2043	Hydrologists	4	1	1	0.0%	0
19-2099	Physical Scientists, All Other	5	4	3	-25.0%	0
19-3011	Economists	5	4	5	25.0%	2
19-3022	Survey Researchers	5	38	51	34.2%	25
19-3031	Clinical, Counseling, and School Psychologists	5	63	62	-1.6%	19
19-3039	Psychologists, All Other	5	5	6	20.0%	3
19-3051	Urban and Regional Planners	5	18	17	-5.6%	8
19-3093	Historians	5	1	1	0.0%	0
19-3099	Social Scientists and Related Workers, All Other	4	6	6	0.0%	1
19-4011	Agricultural and Food Science Technicians	3	17	15	-11.8%	4
19-4021	Biological Technicians	4	18	18	0.0%	6
19-4031	Chemical Technicians	3	18	19	5.6%	6

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
19-4041	Geological and Petroleum Technicians	4	70	88	25.7%	52
19-4051	Nuclear Technicians	3	18	19	5.6%	8
19-4061	Social Science Research Assistants	4	2	3	50.0%	2
19-4091	Environmental Science and Protection Technicians, Including Health	4	11	13	18.2%	7
19-4092	Forensic Science Technicians	4	2	2	0.0%	1
19-4093	Forest and Conservation Technicians	3	4	5	25.0%	2
19-4099	Life, Physical, and Social Science Technicians, All Other	3	10	10	0.0%	4
21-1011	Substance Abuse and Behavioral Disorder Counselors	5	66	72	9.1%	25
21-1012	Educational, Guidance, School, and Vocational Counselors	5	125	132	5.6%	36
21-1013	Marriage and Family Therapists	5	14	18	28.6%	6
21-1014	Mental Health Counselors	5	104	124	19.2%	48
21-1015	Rehabilitation Counselors	5	96	131	36.5%	61
21-1019	Counselors, All Other	5	10	11	10.0%	3
21-1021	Child, Family, and School Social Workers	4	186	218	17.2%	76
21-1022	Healthcare Social Workers	5	76	103	35.5%	45
21-1023	Mental Health and Substance Abuse Social Workers	5	86	117	36.0%	55
21-1029	Social Workers, All Other	5	11	12	9.1%	4
21-1091	Health Educators	4	26	27	3.8%	8
21-1092	Probation Officers and Correctional Treatment Specialists	4	52	50	-3.8%	15
21-1093	Social and Human Service Assistants	4	198	235	18.7%	96
21-1094	Community Health Workers	4	10	11	10.0%	4
21-1099	Community and Social Service Specialists, All Other	4	16	19	18.8%	7
21-2011	Clergy	5	19	24	26.3%	10
21-2021	Directors, Religious Activities and Education	4	19	26	36.8%	15
21-2099	Religious Workers, All Other	4	5	4	-20.0%	1
23-1011	Lawyers	5	149	170	14.1%	47
23-1012	Judicial Law Clerks	5	15	16	6.7%	4
23-1021	Administrative Law Judges, Adjudicators, and Hearing Officers	5	9	8	-11.1%	1
23-1022	Arbitrators, Mediators, and Conciliators	5	3	3	0.0%	1
23-1023	Judges, Magistrate Judges, and Magistrates	5	3	3	0.0%	0
23-2011	Paralegals and Legal Assistants	3	58	69	19.0%	21
23-2091	Court Reporters	3	8	8	0.0%	2
23-2093	Title Examiners, Abstractors, and Searchers	3	14	15	7.1%	5

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
23-2099	Legal Support Workers, All Other	3	9	9	0.0%	1
25-1011	Business Teachers, Postsecondary	5	12	9	-25.0%	0
25-1021	Computer Science Teachers, Postsecondary	5	5	4	-20.0%	0
25-1022	Mathematical Science Teachers, Postsecondary	5	7	5	-28.6%	0
25-1031	Architecture Teachers, Postsecondary	5	1	1	0.0%	0
25-1032	Engineering Teachers, Postsecondary	5	8	7	-12.5%	0
25-1041	Agricultural Sciences Teachers, Postsecondary	5	1	1	0.0%	0
25-1042	Biological Science Teachers, Postsecondary	5	10	7	-30.0%	0
25-1051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	5	2	2	0.0%	0
25-1052	Chemistry Teachers, Postsecondary	5	4	3	-25.0%	0
25-1053	Environmental Science Teachers, Postsecondary	5	1	1	0.0%	0
25-1054	Physics Teachers, Postsecondary	5	3	2	-33.3%	0
25-1061	Anthropology and Archeology Teachers, Postsecondary	5	1	1	0.0%	0
25-1062	Area, Ethnic, and Cultural Studies Teachers, Postsecondary	5	1	1	0.0%	0
25-1063	Economics Teachers, Postsecondary	5	3	2	-33.3%	0
25-1064	Geography Teachers, Postsecondary	5	1	1	0.0%	0
25-1065	Political Science Teachers, Postsecondary	5	3	2	-33.3%	0
25-1066	Psychology Teachers, Postsecondary	5	6	4	-33.3%	0
25-1067	Sociology Teachers, Postsecondary	5	4	3	-25.0%	0
25-1069	Social Sciences Teachers, Postsecondary, All Other	5	1	1	0.0%	0
25-1071	Health Specialties Teachers, Postsecondary	5	21	17	-19.0%	0
25-1072	Nursing Instructors and Teachers, Postsecondary	5	12	12	0.0%	1
25-1081	Education Teachers, Postsecondary	5	9	7	-22.2%	0
25-1082	Library Science Teachers, Postsecondary	5	1	1	0.0%	0
25-1111	Criminal Justice and Law Enforcement Teachers, Postsecondary	5	1	1	0.0%	0
25-1112	Law Teachers, Postsecondary	5	1	1	0.0%	0
25-1113	Social Work Teachers, Postsecondary	5	2	1	-50.0%	0
25-1121	Art, Drama, and Music Teachers, Postsecondary	5	17	16	-5.9%	2
25-1122	Communications Teachers, Postsecondary	5	4	3	-25.0%	0
25-1123	English Language and Literature Teachers, Postsecondary	5	10	8	-20.0%	0
25-1124	Foreign Language and Literature Teachers, Postsecondary	5	4	3	-25.0%	0
25-1125	History Teachers, Postsecondary	5	4	3	-25.0%	0
25-1126	Philosophy and Religion Teachers, Postsecondary	5	4	3	-25.0%	0

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
25-1191	Graduate Teaching Assistants	5	4	3	-25.0%	0
25-1193	Recreation and Fitness Studies Teachers, Postsecondary	5	2	2	0.0%	0
25-1194	Vocational Education Teachers, Postsecondary	3	22	19	-13.6%	0
25-1199	Postsecondary Teachers, All Other	5	11	10	-9.1%	0
25-2011	Preschool Teachers, Except Special Education	3	168	236	40.5%	116
25-2012	Kindergarten Teachers, Except Special Education	4	92	90	-2.2%	26
25-2021	Elementary School Teachers, Except Special Education	4	859	823	-4.2%	180
25-2022	Middle School Teachers, Except Special and Career/Technical Education	4	354	386	9.0%	121
25-2023	Career/Technical Education Teachers, Middle School	4	10	11	10.0%	4
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	4	785	718	-8.5%	200
25-2032	Career/Technical Education Teachers, Secondary School	4	72	63	-12.5%	15
25-2051	Special Education Teachers, Preschool	4	11	13	18.2%	4
25-2052	Special Education Teachers, Kindergarten and Elementary School	4	170	175	2.9%	43
25-2053	Special Education Teachers, Middle School	4	60	60	0.0%	14
25-2054	Special Education Teachers, Secondary School	4	119	123	3.4%	33
25-2059	Special Education Teachers, All Other	4	4	5	25.0%	1
25-3011	Adult Basic and Secondary Education and Literacy Teachers and Instructors	4	18	16	-11.1%	2
25-3021	Self-Enrichment Education Teachers	3	83	78	-6.0%	13
25-3097	Teachers and Instructors, All Other, Except Substitute Teachers	3	52	57	9.6%	14
25-3098	Substitute Teachers	3	238	201	-15.5%	13
25-4011	Archivists	5	2	3	50.0%	1
25-4012	Curators	5	3	3	0.0%	1
25-4013	Museum Technicians and Conservators	4	3	3	0.0%	1
25-4021	Librarians	5	67	68	1.5%	17
25-4031	Library Technicians	4	37	39	5.4%	23
25-9011	Audio-Visual and Multimedia Collections Specialists	4	2	2	0.0%	1
25-9031	Instructional Coordinators	5	47	45	-4.3%	2
25-9041	Teacher Assistants	3	651	680	4.5%	191
25-9099	Education, Training, and Library Workers, All Other	4	8	8	0.0%	1
27-1011	Art Directors	4	6	6	0.0%	2
27-1013	Fine Artists, Including Painters, Sculptors, and Illustrators	3	2	2	0.0%	0

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
27-1014	Multimedia Artists and Animators	4	2	2	0.0%	0
27-1019	Artists and Related Workers, All Other	4	1	1	0.0%	0
27-1021	Commercial and Industrial Designers	4	11	9	-18.2%	1
27-1022	Fashion Designers	3	1	2	100.0%	1
27-1023	Floral Designers	2	31	24	-22.6%	9
27-1024	Graphic Designers	4	68	72	5.9%	26
27-1025	Interior Designers	4	7	8	14.3%	4
27-1026	Merchandise Displayers and Window Trimmers	3	15	18	20.0%	7
27-1027	Set and Exhibit Designers	5	2	2	0.0%	1
27-2011	Actors	2	2	2	0.0%	1
27-2012	Producers and Directors	4	12	12	0.0%	5
27-2021	Athletes and Sports Competitors	2	2	3	50.0%	1
27-2022	Coaches and Scouts	4	66	59	-10.6%	14
27-2023	Umpires, Referees, and Other Sports Officials	3	2	1	-50.0%	0
27-2032	Choreographers	4	2	2	0.0%	1
27-2041	Music Directors and Composers	3	13	10	-23.1%	2
27-2042	Musicians and Singers	3	7	6	-14.3%	2
27-3011	Radio and Television Announcers	3	9	10	11.1%	5
27-3012	Public Address System and Other Announcers	2	1	1	0.0%	0
27-3022	Reporters and Correspondents	4	14	6	-57.1%	0
27-3031	Public Relations Specialists	4	52	56	7.7%	13
27-3041	Editors	4	29	23	-20.7%	3
27-3042	Technical Writers	4	7	7	0.0%	2
27-3043	Writers and Authors	4	10	9	-10.0%	1
27-3091	Interpreters and Translators	4	15	16	6.7%	3
27-3099	Media and Communication Workers, All Other	4	1	1	0.0%	0
27-4011	Audio and Video Equipment Technicians	3	19	21	10.5%	6
27-4012	Broadcast Technicians	3	4	4	0.0%	1
27-4014	Sound Engineering Technicians	3	2	2	0.0%	0
27-4021	Photographers	3	29	32	10.3%	12
27-4031	Camera Operators, Television, Video, and Motion Picture	3	2	2	0.0%	0
27-4032	Film and Video Editors	3	1	1	0.0%	0
27-4099	Media and Communication Equipment Workers, All Other	3	1	1	0.0%	0
29-1011	Chiropractors	5	16	23	43.8%	11
29-1021	Dentists, General	5	24	35	45.8%	17

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
29-1022	Oral and Maxillofacial Surgeons	5	1	1	0.0%	0
29-1023	Orthodontists	5	1	1	0.0%	0
29-1029	Dentists, All Other Specialists	5	1	1	0.0%	0
29-1031	Dietitians and Nutritionists	5	31	34	9.7%	7
29-1041	Optometrists	5	17	24	41.2%	13
29-1051	Pharmacists	5	121	117	-3.3%	28
29-1061	Anesthesiologists	5	21	26	23.8%	11
29-1062	Family and General Practitioners	5	86	111	29.1%	49
29-1063	Internists, General	5	14	15	7.1%	5
29-1064	Obstetricians and Gynecologists	5	5	7	40.0%	3
29-1065	Pediatricians, General	5	5	7	40.0%	3
29-1066	Psychiatrists	5	8	9	12.5%	3
29-1067	Surgeons	5	29	42	44.8%	21
29-1069	Physicians and Surgeons, All Other	5	186	240	29.0%	102
29-1071	Physician Assistants	5	63	107	69.8%	57
29-1081	Podiatrists	5	6	9	50.0%	5
29-1122	Occupational Therapists	5	60	79	31.7%	28
29-1123	Physical Therapists	5	104	152	46.2%	77
29-1124	Radiation Therapists	3	11	10	-9.1%	2
29-1125	Recreational Therapists	4	12	14	16.7%	5
29-1126	Respiratory Therapists	3	62	72	16.1%	19
29-1127	Speech-Language Pathologists	5	53	73	37.7%	28
29-1128	Exercise Physiologists	5	5	6	20.0%	2
29-1129	Therapists, All Other	4	5	7	40.0%	2
29-1131	Veterinarians	5	43	57	32.6%	29
29-1141	Registered Nurses	3	1,395	1,677	20.2%	564
29-1151	Nurse Anesthetists	5	28	36	28.6%	14
29-1161	Nurse Midwives	5	2	3	50.0%	1
29-1171	Nurse Practitioners	5	46	64	39.1%	27
29-1181	Audiologists	5	7	10	42.9%	4
29-1199	Health Diagnosing and Treating Practitioners, All Other	5	6	6	0.0%	1
29-2011	Medical and Clinical Laboratory Technologists	4	81	85	4.9%	28
29-2012	Medical and Clinical Laboratory Technicians	3	89	109	22.5%	45
29-2021	Dental Hygienists	3	55	72	30.9%	32
29-2031	Cardiovascular Technologists and Technicians	3	39	49	25.6%	15
29-2032	Diagnostic Medical Sonographers	3	30	34	13.3%	9

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
29-2033	Nuclear Medicine Technologists	3	15	17	13.3%	5
29-2034	Radiologic Technologists	3	120	137	14.2%	35
29-2035	Magnetic Resonance Imaging Technologists	3	16	21	31.3%	7
29-2041	Emergency Medical Technicians and Paramedics	3	100	125	25.0%	58
29-2051	Dietetic Technicians	2	27	39	44.4%	15
29-2052	Pharmacy Technicians	3	142	154	8.5%	29
29-2053	Psychiatric Technicians	3	7	7	0.0%	2
29-2054	Respiratory Therapy Technicians	3	7	6	-14.3%	0
29-2055	Surgical Technologists	3	44	56	27.3%	16
29-2056	Veterinary Technologists and Technicians	3	65	85	30.8%	27
29-2057	Ophthalmic Medical Technicians	3	15	23	53.3%	10
29-2061	Licensed Practical and Licensed Vocational Nurses	3	327	450	37.6%	209
29-2071	Medical Records and Health Information Technicians	3	85	114	34.1%	53
29-2081	Opticians, Dispensing	3	36	52	44.4%	28
29-2091	Orthotists and Prosthetists	5	1	2	100.0%	1
29-2092	Hearing Aid Specialists	3	1	2	100.0%	0
29-2099	Health Technologists and Technicians, All Other	3	27	32	18.5%	7
29-9011	Occupational Health and Safety Specialists	4	48	54	12.5%	20
29-9012	Occupational Health and Safety Technicians	3	32	42	31.3%	19
29-9091	Athletic Trainers	5	14	19	35.7%	9
29-9099	Healthcare Practitioners and Technical Workers, All Other	4	10	9	-10.0%	2
31-1011	Home Health Aides	2	448	602	34.4%	278
31-1013	Psychiatric Aides	2	5	5	0.0%	2
31-1014	Nursing Assistants	2	755	1,006	33.2%	404
31-1015	Orderlies	2	31	37	19.4%	12
31-2011	Occupational Therapy Assistants	3	26	38	46.2%	20
31-2012	Occupational Therapy Aides	3	6	9	50.0%	4
31-2021	Physical Therapist Assistants	3	50	81	62.0%	45
31-2022	Physical Therapist Aides	2	25	35	40.0%	16
31-9011	Massage Therapists	3	18	25	38.9%	8
31-9091	Dental Assistants	3	79	99	25.3%	37
31-9092	Medical Assistants	3	290	438	51.0%	207
31-9093	Medical Equipment Preparers	2	24	29	20.8%	9
31-9094	Medical Transcriptionists	3	46	42	-8.7%	8
31-9095	Pharmacy Aides	2	16	13	-18.8%	1

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	3	36	45	25.0%	16
31-9097	Phlebotomists	3	49	55	12.2%	17
31-9099	Healthcare Support Workers, All Other	3	14	13	-7.1%	1
33-1011	First-Line Supervisors of Correctional Officers	3	17	19	11.8%	8
33-1012	First-Line Supervisors of Police and Detectives	3	35	45	28.6%	21
33-1021	First-Line Supervisors of Fire Fighting and Prevention Workers	3	10	12	20.0%	7
33-1099	First-Line Supervisors of Protective Service Workers, All Other	3	18	22	22.2%	9
33-2011	Firefighters	3	62	65	4.8%	21
33-2021	Fire Inspectors and Investigators	3	3	3	0.0%	1
33-3011	Bailiffs	2	3	2	-33.3%	0
33-3012	Correctional Officers and Jailers	3	206	194	-5.8%	52
33-3021	Detectives and Criminal Investigators	3	34	33	-2.9%	8
33-3041	Parking Enforcement Workers	2	5	6	20.0%	3
33-3051	Police and Sheriff's Patrol Officers	3	342	319	-6.7%	100
33-3052	Transit and Railroad Police	3	1	1	0.0%	0
33-9011	Animal Control Workers	2	2	3	50.0%	1
33-9021	Private Detectives and Investigators	3	11	12	9.1%	5
33-9032	Security Guards	2	342	433	26.6%	187
33-9091	Crossing Guards	1	50	37	-26.0%	0
33-9092	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	2	49	61	24.5%	47
33-9093	Transportation Security Screeners	2	16	13	-18.8%	1
33-9099	Protective Service Workers, All Other	2	43	54	25.6%	42
35-1011	Chefs and Head Cooks	3	42	45	7.1%	11
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	2	286	307	7.3%	109
35-2011	Cooks, Fast Food	1	78	69	-11.5%	8
35-2012	Cooks, Institution and Cafeteria	2	188	194	3.2%	46
35-2014	Cooks, Restaurant	2	393	465	18.3%	164
35-2015	Cooks, Short Order	1	81	95	17.3%	34
35-2021	Food Preparation Workers	1	385	354	-8.1%	91
35-3011	Bartenders	2	361	387	7.2%	179
35-3021	Combined Food Preparation and Serving Workers, Including Fast Food	1	1,321	1,467	11.1%	714
35-3022	Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	1	96	93	-3.1%	59
35-3031	Waiters and Waitresses	1	911	955	4.8%	526

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
35-3041	Food Servers, Nonrestaurant	1	112	111	-0.9%	35
35-9011	Dining Room and Cafeteria Attendants and Bartender Helpers	1	145	142	-2.1%	68
35-9021	Dishwashers	1	194	182	-6.2%	82
35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	1	135	134	-0.7%	108
35-9099	Food Preparation and Serving Related Workers, All Other	1	12	14	16.7%	9
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	2	55	61	10.9%	21
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	3	20	20	0.0%	3
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	2	823	889	8.0%	255
37-2012	Maids and Housekeeping Cleaners	2	361	410	13.6%	142
37-2019	Building Cleaning Workers, All Other	2	2	2	0.0%	0
37-2021	Pest Control Workers	2	10	12	20.0%	6
37-3011	Landscaping and Groundskeeping Workers	1	241	278	15.4%	107
37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation	2	3	3	0.0%	1
37-3013	Tree Trimmers and Pruners	2	16	23	43.8%	13
37-3019	Grounds Maintenance Workers, All Other	2	1	1	0.0%	0
39-1021	First-Line Supervisors of Personal Service Workers	3	63	89	41.3%	39
39-2011	Animal Trainers	2	1	1	0.0%	0
39-2021	Nonfarm Animal Caretakers	1	29	33	13.8%	8
39-3021	Motion Picture Projectionists	2	1	1	0.0%	0
39-3031	Ushers, Lobby Attendants, and Ticket Takers	2	22	26	18.2%	18
39-3091	Amusement and Recreation Attendants	1	79	94	19.0%	60
39-3093	Locker Room, Coatroom, and Dressing Room Attendants	2	6	5	-16.7%	2
39-3099	Entertainment Attendants and Related Workers, All Other	2	2	2	0.0%	1
39-4021	Funeral Attendants	2	27	30	11.1%	11
39-4031	Morticians, Undertakers, and Funeral Directors	3	17	26	52.9%	15
39-5011	Barbers	3	3	3	0.0%	1
39-5012	Hairdressers, Hairstylists, and Cosmetologists	3	115	125	8.7%	43
39-5092	Manicurists and Pedicurists	2	15	13	-13.3%	0
39-5093	Shampooers	2	7	7	0.0%	1
39-5094	Skincare Specialists	3	7	5	-28.6%	0
39-6011	Baggage Porters and Bellhops	2	9	12	33.3%	6
39-6012	Concierges	3	5	7	40.0%	3
39-7011	Tour Guides and Escorts	3	7	7	0.0%	4

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
39-7012	Travel Guides	3	1	1	0.0%	0
39-9011	Childcare Workers	3	255	267	4.7%	88
39-9021	Personal Care Aides	2	584	971	66.3%	465
39-9031	Fitness Trainers and Aerobics Instructors	3	95	124	30.5%	45
39-9032	Recreation Workers	4	140	188	34.3%	65
39-9041	Residential Advisors	3	63	88	39.7%	56
39-9099	Personal Care and Service Workers, All Other	3	14	11	-21.4%	1
41-1011	First-Line Supervisors of Retail Sales Workers	2	545	552	1.3%	130
41-1012	First-Line Supervisors of Non-Retail Sales Workers	4	71	58	-18.3%	1
41-2011	Cashiers	1	2,350	2,096	-10.8%	851
41-2021	Counter and Rental Clerks	1	201	223	10.9%	82
41-2022	Parts Salespersons	2	128	141	10.2%	52
41-2031	Retail Salespersons	2	1,823	1,976	8.4%	815
41-3011	Advertising Sales Agents	3	37	31	-16.2%	10
41-3021	Insurance Sales Agents	4	88	89	1.1%	28
41-3031	Securities, Commodities, and Financial Services Sales Agents	4	56	54	-3.6%	13
41-3041	Travel Agents	3	23	27	17.4%	16
41-3099	Sales Representatives, Services, All Other	4	273	346	26.7%	151
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	4	72	77	6.9%	21
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	4	713	677	-5.0%	129
41-9011	Demonstrators and Product Promoters	2	9	10	11.1%	4
41-9021	Real Estate Brokers	4	4	4	0.0%	1
41-9022	Real Estate Sales Agents	3	48	56	16.7%	16
41-9031	Sales Engineers	4	20	17	-15.0%	2
41-9041	Telemarketers	2	41	30	-26.8%	9
41-9091	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	2	1	1	0.0%	0
41-9099	Sales and Related Workers, All Other	3	16	12	-25.0%	0
43-1011	First-Line Supervisors of Office and Administrative Support Workers	3	522	552	5.7%	156
43-2011	Switchboard Operators, Including Answering Service	2	48	36	-25.0%	5
43-2021	Telephone Operators	2	5	3	-40.0%	0
43-3011	Bill and Account Collectors	2	91	88	-3.3%	28
43-3021	Billing and Posting Clerks	2	270	319	18.1%	104
43-3031	Bookkeeping, Accounting, and Auditing Clerks	3	686	755	10.1%	137
43-3051	Payroll and Timekeeping Clerks	2	79	84	6.3%	24

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
43-3061	Procurement Clerks	3	25	23	-8.0%	8
43-3071	Tellers	2	312	256	-17.9%	127
43-3099	Financial Clerks, All Other	2	7	7	0.0%	3
43-4011	Brokerage Clerks	3	11	12	9.1%	5
43-4021	Correspondence Clerks	2	4	4	0.0%	1
43-4031	Court, Municipal, and License Clerks	3	31	32	3.2%	7
43-4041	Credit Authorizers, Checkers, and Clerks	3	13	10	-23.1%	0
43-4051	Customer Service Representatives	2	917	1,005	9.6%	365
43-4061	Eligibility Interviewers, Government Programs	3	109	99	-9.2%	13
43-4071	File Clerks	2	44	40	-9.1%	9
43-4081	Hotel, Motel, and Resort Desk Clerks	2	110	118	7.3%	75
43-4111	Interviewers, Except Eligibility and Loan	2	88	100	13.6%	31
43-4121	Library Assistants, Clerical	2	62	61	-1.6%	28
43-4131	Loan Interviewers and Clerks	3	53	56	5.7%	10
43-4141	New Accounts Clerks	2	15	16	6.7%	7
43-4151	Order Clerks	2	69	65	-5.8%	21
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	3	58	54	-6.9%	14
43-4171	Receptionists and Information Clerks	2	403	440	9.2%	149
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks	2	1	1	0.0%	0
43-4199	Information and Record Clerks, All Other	2	31	24	-22.6%	2
43-5011	Cargo and Freight Agents	2	9	8	-11.1%	2
43-5021	Couriers and Messengers	2	36	37	2.8%	9
43-5031	Police, Fire, and Ambulance Dispatchers	2	36	38	5.6%	14
43-5032	Dispatchers, Except Police, Fire, and Ambulance	2	117	139	18.8%	59
43-5041	Meter Readers, Utilities	2	23	18	-21.7%	4
43-5051	Postal Service Clerks	2	52	45	-13.5%	16
43-5052	Postal Service Mail Carriers	2	205	183	-10.7%	96
43-5053	Postal Service Mail Sorters, Processors, and Processing Machine Operators	2	95	79	-16.8%	19
43-5061	Production, Planning, and Expediting Clerks	3	139	150	7.9%	50
43-5071	Shipping, Receiving, and Traffic Clerks	2	288	293	1.7%	91
43-5081	Stock Clerks and Order Fillers	2	864	815	-5.7%	253
43-5111	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	2	42	35	-16.7%	4
43-6011	Executive Secretaries and Executive Administrative Assistants	3	163	162	-0.6%	25
43-6012	Legal Secretaries	3	66	82	24.2%	29
43-6013	Medical Secretaries	3	250	328	31.2%	107

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	3	1,184	1,358	14.7%	328
43-9011	Computer Operators	3	21	19	-9.5%	4
43-9021	Data Entry Keyers	2	46	44	-4.3%	14
43-9022	Word Processors and Typists	2	72	52	-27.8%	0
43-9031	Desktop Publishers	3	5	4	-20.0%	1
43-9041	Insurance Claims and Policy Processing Clerks	3	40	40	0.0%	13
43-9051	Mail Clerks and Mail Machine Operators, Except Postal Service	2	32	24	-25.0%	5
43-9061	Office Clerks, General	2	1,254	1,229	-2.0%	264
43-9071	Office Machine Operators, Except Computer	2	13	11	-15.4%	3
43-9081	Proofreaders and Copy Markers	4	3	2	-33.3%	0
43-9111	Statistical Assistants	4	3	3	0.0%	1
43-9199	Office and Administrative Support Workers, All Other	3	27	30	11.1%	11
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	3	15	15	0.0%	5
45-2011	Agricultural Inspectors	2	5	4	-20.0%	1
45-2091	Agricultural Equipment Operators	2	7	7	0.0%	3
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	1	33	27	-18.2%	8
45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals	1	63	71	12.7%	34
45-4011	Forest and Conservation Workers	3	2	2	0.0%	0
45-4021	Fallers	1	2	2	0.0%	0
45-4022	Logging Equipment Operators	1	21	20	-4.8%	8
45-4023	Log Graders and Scalers	3	7	9	28.6%	3
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	3	451	563	24.8%	167
47-2011	Boilermakers	3	18	26	44.4%	17
47-2021	Brickmasons and Blockmasons	2	21	26	23.8%	7
47-2022	Stonemasons	3	2	3	50.0%	0
47-2031	Carpenters	2	383	459	19.8%	132
47-2041	Carpet Installers	2	7	8	14.3%	3
47-2042	Floor Layers, Except Carpet, Wood, and Hard Tiles	2	1	1	0.0%	0
47-2044	Tile and Marble Setters	2	6	7	16.7%	2
47-2051	Cement Masons and Concrete Finishers	2	67	85	26.9%	26
47-2061	Construction Laborers	2	698	920	31.8%	391
47-2071	Paving, Surfacing, and Tamping Equipment Operators	2	50	63	26.0%	24
47-2072	Pile-Driver Operators	2	1	1	0.0%	1

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
47-2073	Operating Engineers and Other Construction Equipment Operators	2	535	595	11.2%	214
47-2081	Drywall and Ceiling Tile Installers	2	4	4	0.0%	1
47-2082	Tapers	2	1	1	0.0%	0
47-2111	Electricians	3	212	255	20.3%	100
47-2121	Glaziers	2	9	11	22.2%	5
47-2131	Insulation Workers, Floor, Ceiling, and Wall	2	2	2	0.0%	1
47-2132	Insulation Workers, Mechanical	2	3	4	33.3%	1
47-2141	Painters, Construction and Maintenance	2	19	21	10.5%	7
47-2151	Pipelayers	2	25	27	8.0%	9
47-2152	Plumbers, Pipefitters, and Steamfitters	3	208	238	14.4%	68
47-2161	Plasterers and Stucco Masons	1	1	1	0.0%	0
47-2171	Reinforcing Iron and Rebar Workers	2	4	6	50.0%	2
47-2181	Roofers	2	26	32	23.1%	16
47-2211	Sheet Metal Workers	2	32	34	6.3%	9
47-2221	Structural Iron and Steel Workers	2	19	24	26.3%	12
47-3011	Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	2	5	6	20.0%	1
47-3012	Helpers--Carpenters	2	8	9	12.5%	2
47-3013	Helpers--Electricians	2	13	16	23.1%	5
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	2	12	11	-8.3%	1
47-3016	Helpers--Roofers	2	2	3	50.0%	1
47-3019	Helpers, Construction Trades, All Other	2	3	3	0.0%	0
47-4011	Construction and Building Inspectors	3	47	59	25.5%	24
47-4021	Elevator Installers and Repairers	3	3	2	-33.3%	1
47-4031	Fence Erectors	2	22	21	-4.5%	5
47-4041	Hazardous Materials Removal Workers	3	33	43	30.3%	21
47-4051	Highway Maintenance Workers	2	153	155	1.3%	32
47-4061	Rail-Track Laying and Maintenance Equipment Operators	2	1	1	0.0%	0
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	1	20	34	70.0%	20
47-4099	Construction and Related Workers, All Other	3	8	8	0.0%	0
47-5011	Derrick Operators, Oil and Gas	1	87	80	-8.0%	41
47-5012	Rotary Drill Operators, Oil and Gas	2	310	384	23.9%	303
47-5013	Service Unit Operators, Oil, Gas, and Mining	2	186	231	24.2%	165
47-5021	Earth Drillers, Except Oil and Gas	2	74	88	18.9%	47
47-5031	Explosives Workers, Ordnance Handling Experts, and Blasters	2	19	20	5.3%	6
47-5041	Continuous Mining Machine Operators	1	13	12	-7.7%	5

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
47-5042	Mine Cutting and Channeling Machine Operators	2	20	17	-15.0%	5
47-5051	Rock Splitters, Quarry	1	74	70	-5.4%	24
47-5071	Roustabouts, Oil and Gas	1	200	252	26.0%	146
47-5081	Helpers--Extraction Workers	2	127	160	26.0%	97
47-5099	Extraction Workers, All Other	2	31	28	-9.7%	6
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	3	228	253	11.0%	90
49-2011	Computer, Automated Teller, and Office Machine Repairers	3	20	21	5.0%	7
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairers	3	6	7	16.7%	2
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	3	72	67	-6.9%	13
49-2091	Avionics Technicians	3	4	4	0.0%	2
49-2092	Electric Motor, Power Tool, and Related Repairers	3	9	9	0.0%	2
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	3	2	2	0.0%	0
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	3	35	33	-5.7%	8
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	3	21	27	28.6%	12
49-2097	Electronic Home Entertainment Equipment Installers and Repairers	3	3	3	0.0%	2
49-2098	Security and Fire Alarm Systems Installers	3	21	23	9.5%	7
49-3011	Aircraft Mechanics and Service Technicians	3	5	4	-20.0%	1
49-3021	Automotive Body and Related Repairers	2	88	93	5.7%	28
49-3022	Automotive Glass Installers and Repairers	2	12	13	8.3%	4
49-3023	Automotive Service Technicians and Mechanics	3	480	493	2.7%	152
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	3	247	286	15.8%	102
49-3041	Farm Equipment Mechanics and Service Technicians	3	12	10	-16.7%	3
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	3	95	97	2.1%	34
49-3043	Rail Car Repairers	2	25	19	-24.0%	4
49-3051	Motorboat Mechanics and Service Technicians	3	3	3	0.0%	1
49-3052	Motorcycle Mechanics	3	19	22	15.8%	10
49-3053	Outdoor Power Equipment and Other Small Engine Mechanics	2	35	40	14.3%	13
49-3091	Bicycle Repairers	2	1	1	0.0%	1
49-3092	Recreational Vehicle Service Technicians	2	6	6	0.0%	2
49-3093	Tire Repairers and Changers	2	41	45	9.8%	20
49-9011	Mechanical Door Repairers	2	2	2	0.0%	1

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	3	23	27	17.4%	13
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	3	111	119	7.2%	42
49-9031	Home Appliance Repairers	3	9	9	0.0%	4
49-9041	Industrial Machinery Mechanics	3	327	395	20.8%	175
49-9043	Maintenance Workers, Machinery	3	113	130	15.0%	37
49-9044	Millwrights	3	19	24	26.3%	10
49-9051	Electrical Power-Line Installers and Repairers	3	84	106	26.2%	58
49-9052	Telecommunications Line Installers and Repairers	2	144	151	4.9%	65
49-9062	Medical Equipment Repairers	3	24	29	20.8%	13
49-9063	Musical Instrument Repairers and Tuners	3	2	2	0.0%	1
49-9064	Watch Repairers	3	1	1	0.0%	0
49-9069	Precision Instrument and Equipment Repairers, All Other	3	2	2	0.0%	1
49-9071	Maintenance and Repair Workers, General	3	714	789	10.5%	232
49-9091	Coin, Vending, and Amusement Machine Servicers and Repairers	2	36	39	8.3%	14
49-9092	Commercial Divers	3	9	8	-11.1%	3
49-9094	Locksmiths and Safe Repairers	2	3	3	0.0%	1
49-9095	Manufactured Building and Mobile Home Installers	2	2	3	50.0%	1
49-9096	Riggers	2	2	3	50.0%	1
49-9098	Helpers--Installation, Maintenance, and Repair Workers	2	80	113	41.3%	59
49-9099	Installation, Maintenance, and Repair Workers, All Other	2	27	33	22.2%	10
51-1011	First-Line Supervisors of Production and Operating Workers	2	466	499	7.1%	127
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	2	14	16	14.3%	7
51-2021	Coil Winders, Tapers, and Finishers	2	4	4	0.0%	1
51-2022	Electrical and Electronic Equipment Assemblers	2	97	103	6.2%	29
51-2023	Electromechanical Equipment Assemblers	2	20	20	0.0%	5
51-2031	Engine and Other Machine Assemblers	2	51	48	-5.9%	16
51-2041	Structural Metal Fabricators and Fitters	3	25	23	-8.0%	11
51-2091	Fiberglass Laminators and Fabricators	2	8	9	12.5%	3
51-2092	Team Assemblers	2	632	665	5.2%	179
51-2099	Assemblers and Fabricators, All Other	2	53	64	20.8%	21
51-3011	Bakers	2	102	105	2.9%	35
51-3021	Butchers and Meat Cutters	2	142	152	7.0%	52
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	1	73	78	6.8%	27
51-3023	Slaughterers and Meat Packers	1	159	194	22.0%	94

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
51-3091	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	2	5	6	20.0%	3
51-3092	Food Batchmakers	2	103	100	-2.9%	41
51-3093	Food Cooking Machine Operators and Tenders	2	20	25	25.0%	11
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	3	118	153	29.7%	76
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	3	11	10	-9.1%	3
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	2	97	100	3.1%	38
51-4022	Forging Machine Setters, Operators, and Tenders, Metal and Plastic	2	17	18	5.9%	7
51-4023	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	2	30	26	-13.3%	6
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	2	113	115	1.8%	24
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2	16	13	-18.8%	3
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2	82	81	-1.2%	31
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2	35	32	-8.6%	10
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	3	28	29	3.6%	11
51-4041	Machinists	3	254	267	5.1%	88
51-4051	Metal-Refining Furnace Operators and Tenders	2	114	102	-10.5%	22
51-4052	Pourers and Casters, Metal	2	47	46	-2.1%	17
51-4061	Model Makers, Metal and Plastic	3	5	6	20.0%	2
51-4062	Patternmakers, Metal and Plastic	3	18	17	-5.6%	6
51-4071	Foundry Mold and Coremakers	2	44	32	-27.3%	1
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	2	137	127	-7.3%	25
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2	116	129	11.2%	54
51-4111	Tool and Die Makers	3	82	88	7.3%	21
51-4121	Welders, Cutters, Solderers, and Brazers	3	152	177	16.4%	74
51-4122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	2	10	9	-10.0%	3
51-4191	Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	2	22	18	-18.2%	3
51-4192	Layout Workers, Metal and Plastic	2	2	2	0.0%	0
51-4193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	2	15	14	-6.7%	4
51-4194	Tool Grinders, Filers, and Sharpeners	2	11	10	-9.1%	3

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
51-4199	Metal Workers and Plastic Workers, All Other	2	3	4	33.3%	1
51-5111	Prepress Technicians and Workers	3	22	17	-22.7%	5
51-5112	Printing Press Operators	3	85	79	-7.1%	22
51-5113	Print Binding and Finishing Workers	2	9	5	-44.4%	0
51-6011	Laundry and Dry-Cleaning Workers	1	70	84	20.0%	39
51-6021	Pressers, Textile, Garment, and Related Materials	1	8	7	-12.5%	1
51-6031	Sewing Machine Operators	1	45	49	8.9%	25
51-6041	Shoe and Leather Workers and Repairers	2	8	10	25.0%	9
51-6051	Sewers, Hand	2	18	21	16.7%	5
51-6052	Tailors, Dressmakers, and Custom Sewers	3	2	2	0.0%	1
51-6062	Textile Cutting Machine Setters, Operators, and Tenders	2	13	15	15.4%	10
51-6063	Textile Knitting and Weaving Machine Setters, Operators, and Tenders	2	6	8	33.3%	6
51-6064	Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	2	2	2	0.0%	1
51-6091	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	2	7	6	-14.3%	1
51-6092	Fabric and Apparel Patternmakers	3	1	2	100.0%	1
51-6093	Upholsterers	2	6	6	0.0%	3
51-6099	Textile, Apparel, and Furnishings Workers, All Other	2	2	2	0.0%	0
51-7011	Cabinetmakers and Bench Carpenters	2	40	49	22.5%	25
51-7021	Furniture Finishers	1	19	24	26.3%	16
51-7031	Model Makers, Wood	3	6	7	16.7%	2
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	2	203	296	45.8%	185
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	2	257	360	40.1%	161
51-7099	Woodworkers, All Other	2	3	3	0.0%	1
51-8011	Nuclear Power Reactor Operators	3	6	6	0.0%	2
51-8012	Power Distributors and Dispatchers	3	10	11	10.0%	4
51-8013	Power Plant Operators	2	33	31	-6.1%	13
51-8021	Stationary Engineers and Boiler Operators	3	32	39	21.9%	20
51-8031	Water and Wastewater Treatment Plant and System Operators	3	85	84	-1.2%	35
51-8091	Chemical Plant and System Operators	2	2	1	-50.0%	1
51-8092	Gas Plant Operators	3	62	75	21.0%	47
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	2	23	29	26.1%	18
51-8099	Plant and System Operators, All Other	2	3	2	-33.3%	1
51-9011	Chemical Equipment Operators and Tenders	2	24	22	-8.3%	11

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	2	26	24	-7.7%	10
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	2	90	83	-7.8%	30
51-9022	Grinding and Polishing Workers, Hand	1	23	21	-8.7%	6
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	2	85	91	7.1%	39
51-9031	Cutters and Trimmers, Hand	2	7	6	-14.3%	1
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	2	89	92	3.4%	28
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	2	51	48	-5.9%	18
51-9051	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	2	24	16	-33.3%	2
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	2	301	326	8.3%	103
51-9071	Jewelers and Precious Stone and Metal Workers	3	5	4	-20.0%	1
51-9081	Dental Laboratory Technicians	2	5	6	20.0%	4
51-9082	Medical Appliance Technicians	3	4	4	0.0%	2
51-9083	Ophthalmic Laboratory Technicians	2	10	11	10.0%	5
51-9111	Packaging and Filling Machine Operators and Tenders	2	196	187	-4.6%	51
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	2	51	60	17.6%	22
51-9122	Painters, Transportation Equipment	2	15	13	-13.3%	3
51-9123	Painting, Coating, and Decorating Workers	2	9	8	-11.1%	2
51-9141	Semiconductor Processors	2	4	5	25.0%	3
51-9151	Photographic Process Workers and Processing Machine Operators	2	10	8	-20.0%	3
51-9191	Adhesive Bonding Machine Operators and Tenders	2	19	23	21.1%	10
51-9192	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	2	17	18	5.9%	6
51-9193	Cooling and Freezing Equipment Operators and Tenders	2	20	20	0.0%	7
51-9194	Etchers and Engravers	2	6	6	0.0%	2
51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	2	41	38	-7.3%	16
51-9196	Paper Goods Machine Setters, Operators, and Tenders	2	373	440	18.0%	154
51-9197	Tire Builders	2	6	8	33.3%	4
51-9198	Helpers--Production Workers	2	408	413	1.2%	109
51-9199	Production Workers, All Other	2	19	19	0.0%	5
53-1021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	2	68	81	19.1%	35

SOC Code	Occupation Title	Job Zone	2014	2024	% Change 2014-2024	New and Replacement Jobs
53-1031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	2	164	202	23.2%	88
53-2012	Commercial Pilots	3	1	2	100.0%	1
53-2021	Air Traffic Controllers	3	5	5	0.0%	2
53-3011	Ambulance Drivers and Attendants, Except Emergency Medical Technicians	2	12	16	33.3%	6
53-3021	Bus Drivers, Transit and Intercity	2	55	65	18.2%	26
53-3022	Bus Drivers, School or Special Client	2	406	413	1.7%	110
53-3031	Driver/Sales Workers	2	197	209	6.1%	50
53-3032	Heavy and Tractor-Trailer Truck Drivers	2	2,021	2,431	20.3%	835
53-3033	Light Truck or Delivery Services Drivers	2	368	385	4.6%	87
53-3041	Taxi Drivers and Chauffeurs	1	53	56	5.7%	14
53-3099	Motor Vehicle Operators, All Other	2	9	10	11.1%	4
53-4013	Rail Yard Engineers, Dinkey Operators, and Hostlers	2	6	4	-33.3%	0
53-5011	Sailors and Marine Oilers	2	6	8	33.3%	5
53-6011	Bridge and Lock Tenders	1	2	1	-50.0%	0
53-6021	Parking Lot Attendants	2	33	40	21.2%	26
53-6031	Automotive and Watercraft Service Attendants	1	50	47	-6.0%	14
53-6041	Traffic Technicians	3	1	1	0.0%	0
53-6051	Transportation Inspectors	3	3	2	-33.3%	1
53-6061	Transportation Attendants, Except Flight Attendants	2	14	13	-7.1%	2
53-6099	Transportation Workers, All Other	2	3	4	33.3%	2
53-7011	Conveyor Operators and Tenders	2	24	26	8.3%	11
53-7021	Crane and Tower Operators	3	31	34	9.7%	15
53-7032	Excavating and Loading Machine and Dragline Operators	2	113	117	3.5%	21
53-7051	Industrial Truck and Tractor Operators	2	352	440	25.0%	203
53-7061	Cleaners of Vehicles and Equipment	2	132	134	1.5%	44
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	2	1,513	1,792	18.4%	824
53-7063	Machine Feeders and Offbearers	2	106	123	16.0%	44
53-7064	Packers and Packagers, Hand	2	415	425	2.4%	141
53-7071	Gas Compressor and Gas Pumping Station Operators	2	101	122	20.8%	81
53-7072	Pump Operators, Except Wellhead Pumps	2	145	181	24.8%	119
53-7073	Wellhead Pumps	2	96	114	18.8%	89
53-7081	Refuse and Recyclable Material Collectors	2	88	105	19.3%	46
53-7121	Tank Car, Truck, and Ship Loaders	2	6	6	0.0%	2
53-7199	Material Moving Workers, All Other	2	1	1	0.0%	0

Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES), O*NET OnLine, Pennsylvania Department of Labor & Industry, Oxford Economics Projections

ABOUT THE STATE SYSTEM'S GAP ANALYSIS PROJECT

The Workforce Characteristics Report was produced through a multi-organization collaboration that consisted of Pennsylvania's State System of Higher Education Office of the Chancellor, Oxford Economics USA Inc., and Georgetown University's Center on Education and the Workforce. Oxford Economics completed the analysis and research work for this report, under the guidance of The State System's Office of the Chancellor, the team sought feedback and insight from senior administration and representatives from each of the 14 State System Universities. The team also drew on insight and feedback from subject matter experts involved in labor market intelligence and education program alignment.

The modeling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

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