

LABOR MARKET OVERVIEW: NORTH CENTRAL VALLEY/ NORTHERN MOTHER LODE SUBREGION

Prepared by the
Central Valley/Mother Lode Subregion
Center of Excellence

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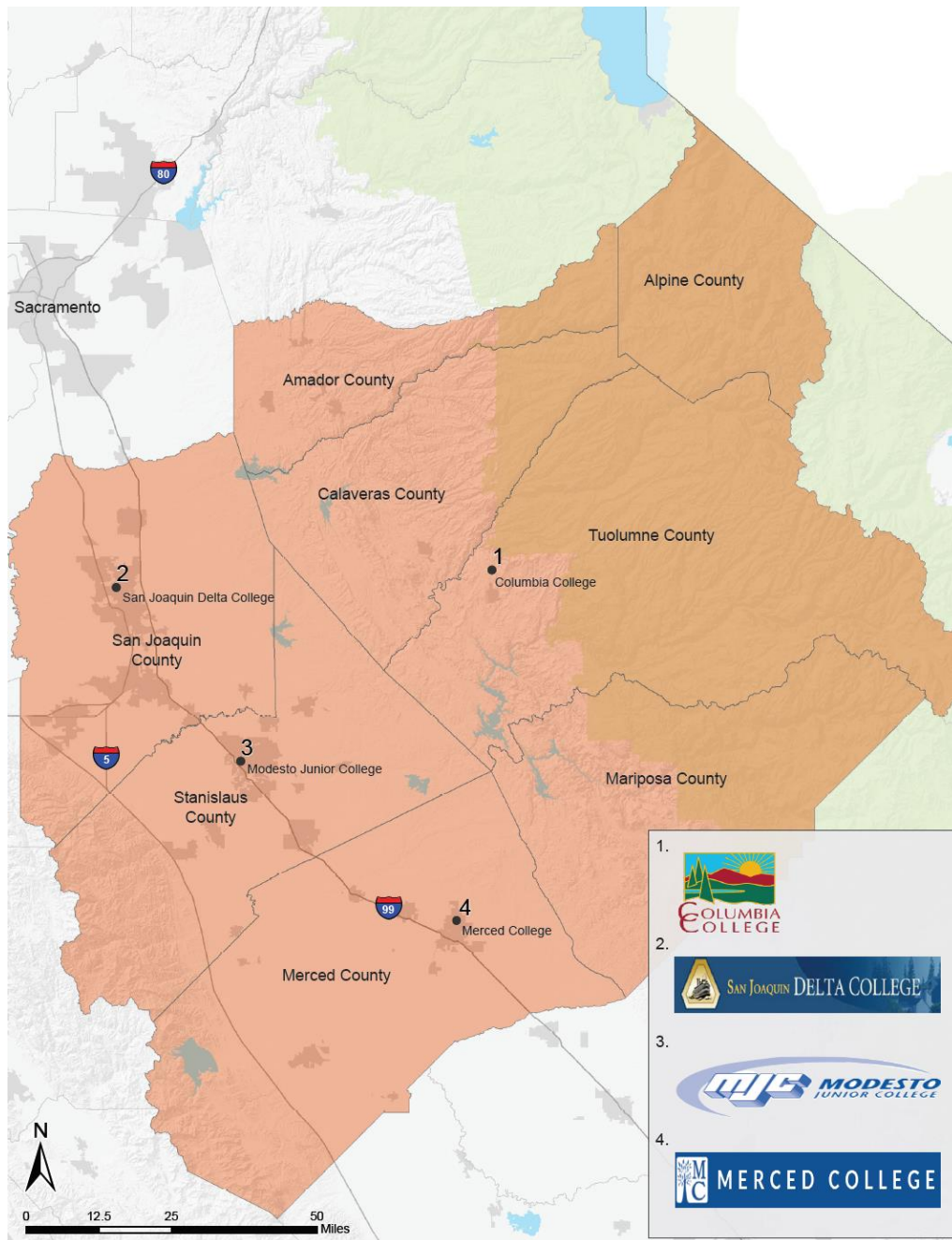


Exhibit 1: Map of community colleges in the North Central Valley/Northern Mother Lode Subregion

INTRODUCTION

The Center of Excellence conducted a labor market analysis focusing on the North Central Valley/Northern Mother Lode Subregion. This subregion is served by four community colleges—Columbia College, San Joaquin Delta College, Modesto Junior College and Merced College (Exhibit 1). The following report details current employment numbers, projected employment, job postings for in-demand occupations, the most sought-after skills by employers for each of the industries analyzed, five-year demand projections, entry-level and median wages, typical-entry level education, work experience, typical on-the-job training, current population survey results for those workers in the occupation having at least some college to an associate degree, and three-year average supply of degrees and certificates from two-year higher education institutions.

This report is organized by eight top industries in the subregion:

- Agriculture, water and environmental technologies;
- Energy, construction and utilities;
- Global trade and logistics;
- Retail, hospitality and tourism;
- Protective services;
- Information and communication technologies (ICT)/digital media;
- Health care; and
- Manufacturing.

METHODOLOGY

Quantitative and qualitative data collection and analysis were conducted for this report. Labor market data, particularly primary and secondary data related to industry workforce demands and occupational employment, informed the report's findings. The North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) System were used to source data. Burning Glass, an online job posting aggregation tool, was employed to identify job titles with the most openings in the North Central Valley/Northern Mother Lode Subregion.¹

Job postings were selected for inclusion in the analysis based on four criteria: The five-year change from the industry staffing patterns contained 10 or more jobs; the minimum education requirement was a high school diploma or vocational training,* or associate degree; the job posting was listed within the last 12 months; and, the job posting indicated the position was physically located in one of the eight service counties of Alpine, Amador Calaveras, Mariposa, Merced, San Joaquin, Stanislaus or Tuolumne. The study analyzed business types within the eight industries that are projected to add jobs over the next five years.

The skills data were analyzed using two lenses to provide a more comprehensive understanding of skills desired by employers: skills were analyzed by industry and by analyzing occupations collectively that are associated with that specific industry, referred to in this report as occupational clusters. Plugging these occupations into Burning Glass independent of industry provides an understanding of what skill sets all businesses, regardless of sector, desire in new hires.

The criteria for the staffing patterns occupations were pre-determined by the Central Valley/Mother Lode Center of Excellence based on consortium discussions and recommendations. The occupational demand

¹ Burning glass is an online job posting aggregation tool that uses intelligent “spidering” programs to search the Internet for job listings and integrates the information into a searchable database. While efforts have been made to remove duplication, it is possible that a posting removed and re-entered over the 12-month period is counted more than once.

*Selection option is high school diploma or vocational training; these two can no longer be isolated from one another.

data include only those jobs directly related to the industry having 10 or more annual openings. However, a few exceptions were made in cases of emerging or complementary occupations where there were fewer than 10 jobs. The tables under the occupational demand sections have different five-year projections from the preceding projected employment tables because the occupational data provide projections for the entire occupation, which may span more than one industry.

For more information on the data sources employed by this study, please refer to Appendix A. Living wages were determined using the MIT Living Wage Calculator. Business occupations and maintenance occupations are relevant to every industry; therefore, these occupations along with their wages, educational attainment and community college supply data are shown in Appendix B through Appendix D to avoid duplication and over-estimation of projected demand.

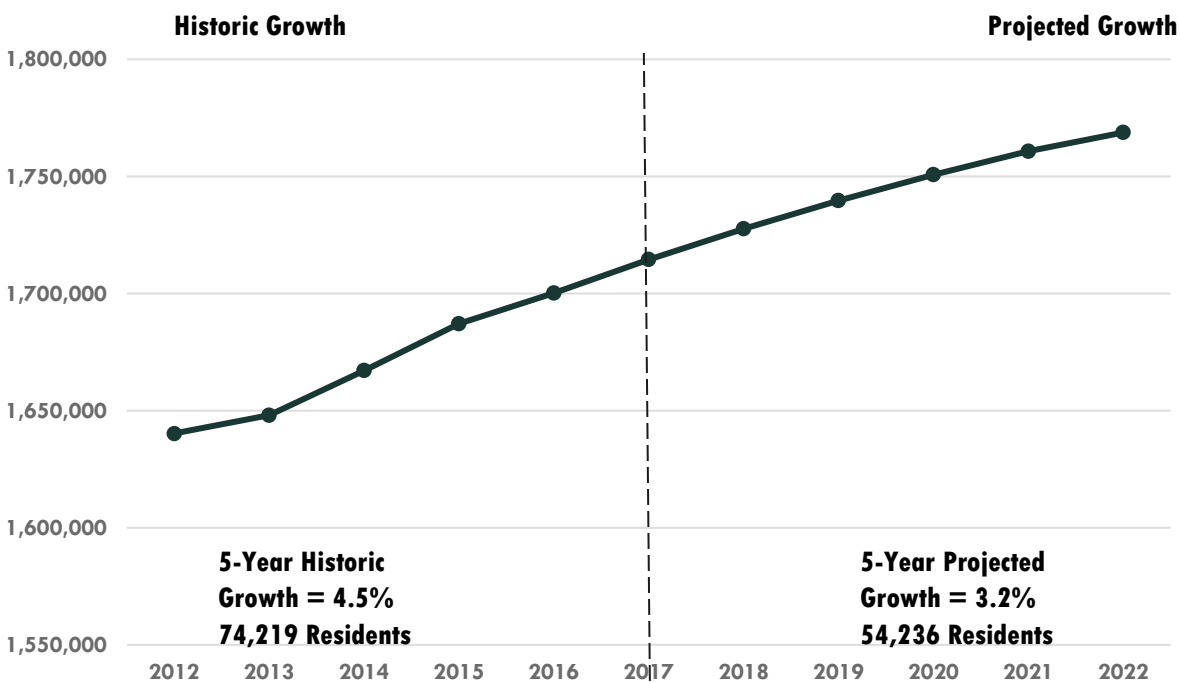
SUBREGIONAL OVERVIEW

Residential Population

The North Central Valley/Northern Mother Lode Subregion's population currently totals more than 1.7 million residents. By 2022, the subregion is projected to add more than 54,000 new residents (Exhibit 2). Over the last five years, the subregion grew by 4.5%, somewhat slower than the state's growth of 5%. The projected growth rate of 3.2% is lower than in the previous five years, but is slightly greater than the projected 3% growth rate for the state.

Each year, the subregion is expected to add from 8,000 to 13,000 new residents, with the most rapid growth occurring between 2017 and 2020.

Exhibit 2: Population estimates and projections in the subregion



Demographics

Exhibit 3 shows projected changes in the North Central Valley/Northern Mother Lode Subregion's demographics by 2022. Populations identifying as Hispanic are all projected to increase over the next five years. There will be growth in individuals identifying as:

- White, Hispanic, representing an increase of 42,348 residents;
- Asian, non-Hispanic, an increase of 10,598 residents; and
- Two or more races, non-Hispanic, an increase of 3,375 residents.

The subregion's white, non-Hispanic population is expected to decrease by 2%, a decline of 13,900 by 2022.

Exhibit 3: Projected changes in race/ethnicity in the subregion

| Race/Ethnicity | 2017 | 2022 | Change | % Change |
|---|------------------|------------------|---------------|-----------|
| White, Hispanic | 648,029 | 690,377 | 42,348 | 7% |
| White, Non-Hispanic | 670,284 | 656,384 | (13,900) | (2%) |
| Asian, Non-Hispanic | 161,872 | 172,470 | 10,598 | 7% |
| Black, Non-Hispanic | 76,358 | 78,821 | 2,463 | 3% |
| Two or More Races, Non-Hispanic | 48,216 | 51,591 | 3,375 | 7% |
| Two or More Races, Hispanic | 27,739 | 30,832 | 3,093 | 11% |
| American Indian or Alaskan Native, Hispanic | 26,526 | 28,908 | 2,382 | 9% |
| Asian, Hispanic | 17,301 | 18,658 | 1,357 | 8% |
| Black, Hispanic | 15,884 | 17,288 | 1,404 | 9% |
| American Indian or Alaskan Native, Non-Hispanic | 9,920 | 9,837 | (83) | (1%) |
| Native Hawaiian or Pacific Islander, Non-Hispanic | 8,992 | 9,892 | 900 | 10% |
| Native Hawaiian or Pacific Islander, Hispanic | 3,396 | 3,693 | 297 | 9% |
| Total | 1,714,515 | 1,768,751 | 54,236 | 3% |

Living Wage Data

Exhibit 4 shows living wages for the subregion and by county. The average living wage for the subregion is \$11.02/hour for one adult. The highest living wage is attributed to Tuolumne County, \$11.68/hour, while the lowest is Merced County, \$10.26/hour.

Exhibit 4: Living wages for the subregion by county

| County | Living Wage: 1 Adult |
|----------------|-------------------------|
| Alpine | \$10.90 |
| Amador | \$11.12 |
| Calaveras | \$11.10 |
| Mariposa | \$11.18 |
| Merced | \$10.26 |
| San Joaquin | \$10.91 |
| Stanislaus | \$11.03 |
| Tuolumne | \$11.68 |
| Average | \$11.02 |

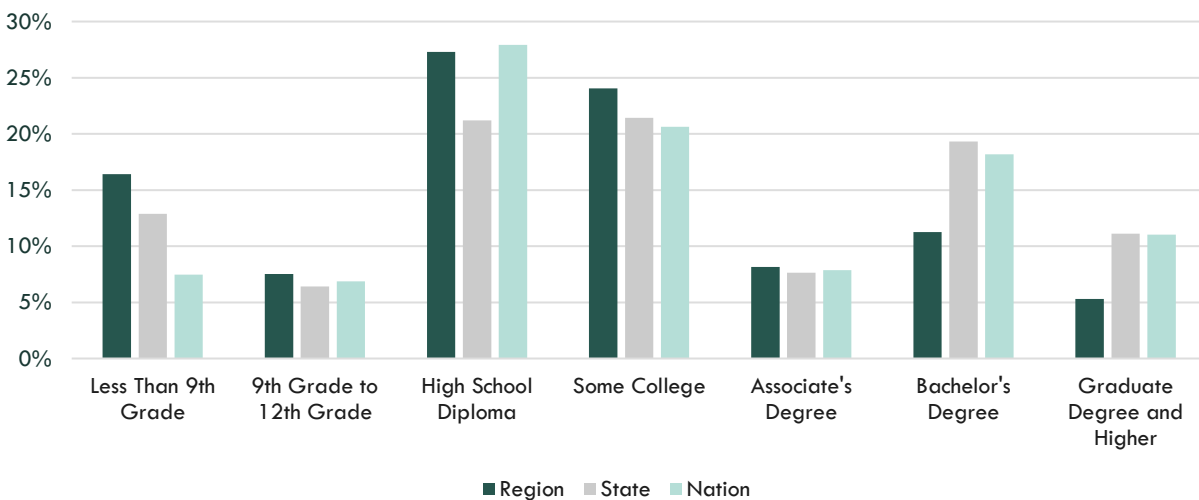
Educational Attainment

The subregion trails both the nation and the state for bachelor's and graduate degree attainment, with only 11% of the adult population holding a bachelor's degree, compared to 19% statewide and 18% nationwide (Exhibit 5).

Regarding associate degree attainment, the subregion, state and nation are the same, 8%. The subregion slightly leads the state in the completion of some college or a high school diploma.

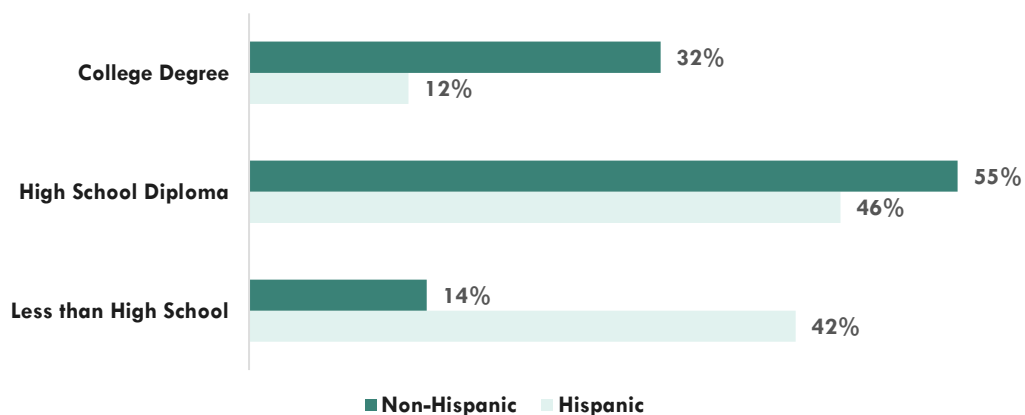
In the North Central Valley/Northern Mother Lode subregion, 24% of the population has completed some college, compared to 21% of the state. Similarly, 27% of the population has obtained a high school diploma, above the state's 21% of the population.

Exhibit 5: Educational attainment comparison of the nation, state and subregion



Hispanic educational attainment in the North Central Valley/Northern Mother Lode Subregion is lower than non-Hispanic educational attainment. Only 12% of the Hispanic population holds a college degree (associate degree or higher) compared to 32% of the non-Hispanic population (Exhibit 6). In addition, 42% of the Hispanic population did not complete high school, compared to 14% of the non-Hispanic population.

Exhibit 6: 2017 Hispanic/non-Hispanic educational attainment



Labor Force & Employment

The size and characteristics of a subregion's labor force are important considerations in workforce planning. Labor force, employment and unemployment data are based upon "place of residence" – where people live, regardless of where they work. Individuals who have more than one job are counted only once. These data elements differ from industry employment estimates that are "place-of-work" based – where the employer/workplace is located, regardless of where the employee resides. For terms and definitions, see Appendix A.

Since 2011, the labor force in the North Central Valley/Northern Mother Lode Subregion has grown from 736,150 to 744,230 workers, an increase of more than 8,000 workers. Total employment increased by 65,590 persons (Exhibit 7).

In 2011, more than 120,000 individuals were unemployed. By 2016, this number had declined by nearly half, to 62,520 individuals. Because total employment increased more than the labor force, the unemployment rate decreased from 16% in 2011 (compared to 11.5% statewide) to 8% in 2016 (compared to 5.2% statewide).

Exhibit 7: Labor force size, employment and unemployment, 2011-2016

| | 2011 | 2016 | 5-Year Change |
|-------------------|---------|---------|---------------|
| Labor Force | 736,150 | 744,230 | 8,080 |
| Employment | 616,190 | 681,780 | 65,590 |
| Unemployment | 120,060 | 62,540 | (57,520) |
| Unemployment Rate | 16.3% | 8.4% | -7.9% |

INDUSTRY OVERVIEW

Employment Composition

According to 2016 data, the eight industries of focus for this report employed 453,685 workers in the North Central Valley/Northern Mother Lode Subregion. Exhibit 8 shows how employment is distributed among the eight major industrial groups. The largest shares of employment are attributed to retail, hospitality and tourism (114,543 jobs); health care (74,959 jobs); and global trade and logistics (71,262).

These are followed by agriculture, water and environmental technologies (52,553 jobs); manufacturing (52,350 jobs); protective services (47,806 jobs); and energy, construction and utilities (34,384). ICT/digital media is the smallest industry, with only 5,828 jobs in the subregion.

The industries shown in Exhibit 8 are each discussed in detail—including current and projected employment, job postings and in-demand skills—in the following sections.

Exhibit 8: Employment by industry in the subregion

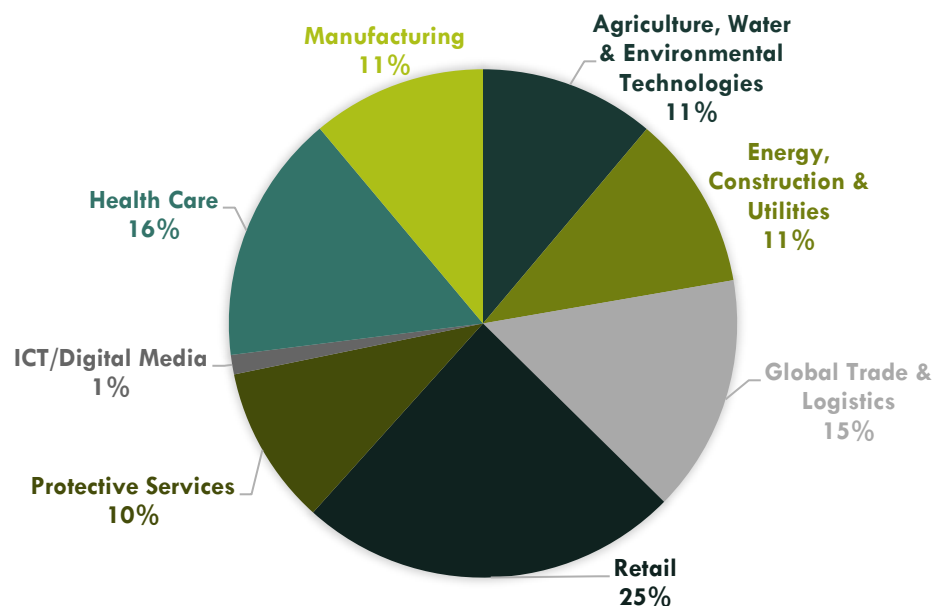


Exhibit 9 details the current and projected employment for each industry analyzed for this study. More than 35,098 new jobs are projected across the eight industries.

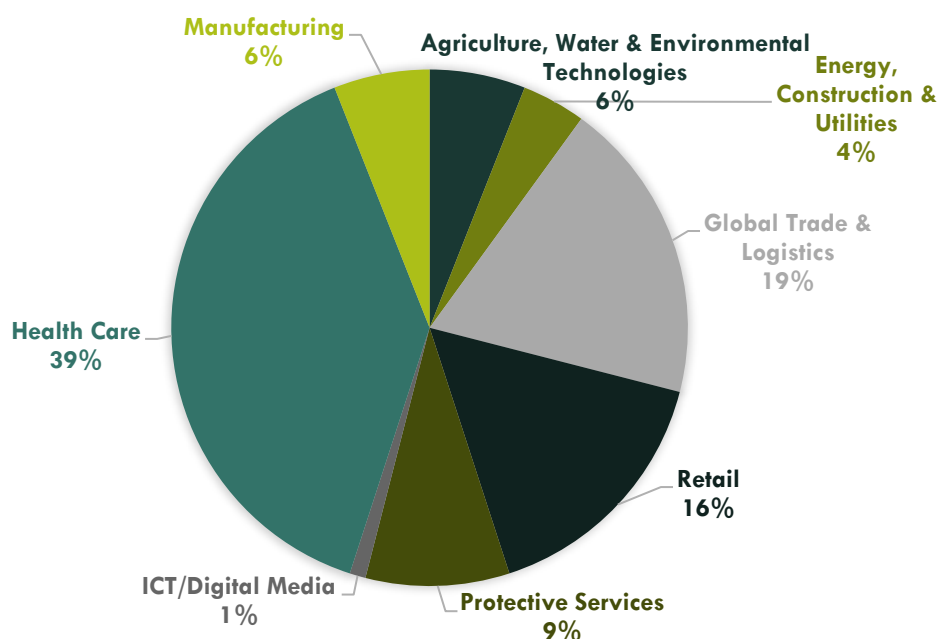
Exhibit 9: Current and projected employment by industry in the subregion

| Industry | 2016 Employment | Projected New Jobs by 2021 |
|---|-----------------|----------------------------|
| Retail, hospitality and tourism | 114,543 | 5,813 |
| Health care | 74,959 | 13,549 |
| Global trade & logistics | 71,262 | 6,646 |
| Agriculture, water and environmental technologies | 52,553 | 2,282 |
| Manufacturing | 52,350 | 2,058 |
| Protective services | 47,806 | 3,077 |
| Energy, construction and utilities | 34,384 | 1,285 |
| ICT/digital media | 5,828 | 388 |
| TOTAL | 453,685 | 35,098 |

Exhibit 10 shows the industries that will produce the greatest percentage of new jobs in the next five years. Of the eight industries analyzed, the health care industry accounts for 39% of projected job growth by 2021. Other industries where substantial job growth is expected are global trade and logistics; retail, hospitality and tourism; and to a lesser degree protective services. The smallest amount of job growth will occur in ICT/digital media, which overall employs the fewest workers in the subregion; however, the ability to use and manipulate software is becoming an integral skill set for most occupations across all industries.

In summary, the largest job growth projections are in health care, which will generate 13,549 new jobs; global trade and logistics, 6,646; retail, hospitality and tourism, 5,813; and protective services, 3,077. Agriculture, water and environmental technologies will add 2,282 new jobs; manufacturing, 2,058; energy, construction and utilities, 1,285; and ICT/digital media, 388.

Exhibit 10: Percent of new jobs by industry in the subregion



AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES

Current & Projected Employment

Business types adding the most jobs will be support activities for crop production, crop production and commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance. Support activities for crop production will add more than 1,900 jobs over the next five years, and crop production will add 550 jobs (Exhibit 11). It should be noted that the animal production and aquaculture business type (NAICS 1120) is expected to undergo a significant decline in coming years. This occupation is expected to shrink 4% by 2021, a loss of 387 jobs during that period.

Exhibit 11: Agriculture, water and environmental technologies current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|--------------------|---------------|
| Support Activities for Crop Production (1151) | 20,550 | 22,453 | 1,903 | 9% | 520 |
| Crop Production (1110) | 19,345 | 19,895 | 550 | 3% | 1,548 |
| Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance (8113) | 1,476 | 1,695 | 219 | 15% | 130 |
| Remediation and Other Waste Management Services (5629) | 339 | 369 | 30 | 9% | 31 |
| Logging (1133) | 210 | 233 | 23 | 11% | 23 |
| Forest Nurseries and Gathering of Forest Products (1132) | 33 | 44 | 11 | 33% | 6 |

Industry Staffing Patterns

The industry staffing patterns data for occupations in agriculture, water and environmental technologies that indicate an addition of 10 or more jobs in the next five years are shown in Exhibit 12. With 2,577 workers currently employed, agricultural equipment operators is the largest occupation in the agriculture, water and environmental technologies industry and is adding the largest number of jobs over the five-year period, 290 positions.

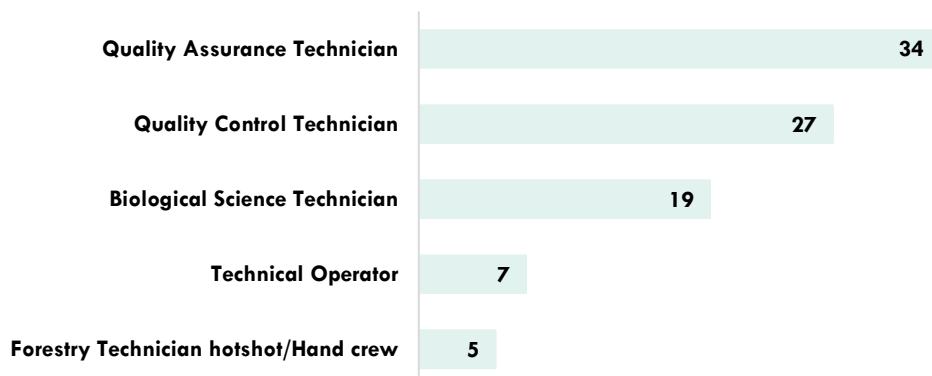
Exhibit 12: Agriculture, water and environmental technologies staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|--|------------|-------|------------------|--------------------|
| | | 2016 | 2021 | | |
| 45-2091 | Agricultural Equipment Operators | 2,577 | 2,867 | 290 | 11% |
| 45-2041 | Graders and Sorters, Agricultural Products | 1,405 | 1,474 | 69 | 5% |
| 53-7051 | Industrial Truck and Tractor Operators | 447 | 493 | 46 | 10% |
| 45-4022 | Logging Equipment Operators | 138 | 153 | 15 | 11% |
| 37-3012 | Pesticide Handlers, Sprayers, and Applicators, Vegetation | 111 | 125 | 14 | 13% |
| 45-1011 | First-Line Supervisors of Farming, Fishing, and Forestry Workers | 1,038 | 1,051 | 13 | 1% |
| 49-3041 | Farm Equipment Mechanics and Service Technicians | 152 | 165 | 13 | 9% |

Job Postings

An analysis of job posting data for the seven staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 13 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 13: Agriculture, water and environmental technologies job postings



Skills

English, physical demand and work area maintenance are the most commonly listed baseline skills (Exhibit 14). The industry-level skills data provides a slightly different picture with the latter two of the three top skills being soft skills related to communication as opposed to the business-related hard skills.

Exhibit 14: Agriculture, water and environmental technologies baseline skills

| Occupational Cluster | | Industry: Farming, Fishing & Forestry | |
|-----------------------|--------------|---------------------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| English | 53 | English | 20 |
| Physical Demand | 50 | Physical Demand | 13 |
| Work Area Maintenance | 34 | Communication Skills | 12 |
| Mathematics | 33 | Writing | 11 |
| Organizational Skills | 30 | Spanish | 10 |

Exhibit 15 shows specialized skills commonly listed in job ads. Forklift operation, inspection and labeling are highly ranked. The industry perspective on specialized skills mirrors the value placed on forklift operation, but also shows machinery and food safety as two top skills.

Exhibit 15: Agriculture, water and environmental technologies specialized skills

| Occupational Cluster | | Industry: Farming, Fishing & Forestry | |
|----------------------|--------------|---------------------------------------|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Forklift Operation | 183 | Forklift Operation | 14 |
| Inspection | 44 | Machinery | 13 |
| Labeling | 42 | Food Safety | 11 |
| Scheduling | 30 | Supervisory Skills | 10 |
| Scanners | 27 | Inspection | 8 |

Top software skills for jobs related to agriculture, water and environmental technologies are shown in Exhibit 16. In comparing the two datasets, it is evident that the Microsoft Office suite of products are the preferred software skills. However, software skills appear to be far less in demand at the industry level.

Exhibit 16: Agriculture, water and environmental technologies software skills

| Occupational Cluster | | Industry: Farming, Fishing & Forestry | |
|----------------------|--------------|---------------------------------------|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Excel | 15 | Microsoft Excel | 6 |
| Microsoft Word | 4 | Microsoft PowerPoint | 4 |
| SAP | 4 | Microsoft Word | 4 |
| Microsoft Office | 3 | Microsoft Office | 3 |
| Microsoft PowerPoint | 3 | Microsoft Access | 1 |

Occupational Demand Projections

Analysis of the agriculture, water and environmental technologies industry shows that the occupation of industrial truck and tractor operators has the largest growth projection (Exhibit 17). This occupation is anticipating 693 new jobs overall with 301 annual openings over the five-year period. This is followed by agricultural equipment operators adding 305 new jobs by 2021 with 139 annual openings.

There are three agriculture-related occupations emerging within the occupation of life, physical and social science technicians:

- Quality control analysts,
- Precision agriculture technicians, and
- Remote sensing technicians.

Exhibit 17: Agriculture, water and environmental technologies occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|---|-------|-------|-------------|---------------|-----------------|
| Industrial Truck and Tractor Operators | 6,012 | 6,705 | 693 | 12% | 301 |
| Agricultural Equipment Operators | 2,737 | 3,042 | 305 | 11% | 139 |
| Graders and Sorters, Agricultural Products | 2,289 | 2,335 | 46 | 2% | 51 |
| First-Line Supervisors of Farming, Fishing and Forestry Workers | 1,140 | 1,157 | 17 | 1% | 33 |
| Water and Wastewater Treatment Plant and System Operators | 748 | 789 | 41 | 5% | 29 |
| Life, Physical and Social Science Technicians, All Other | 370 | 418 | 48 | 13% | 27 |
| Compliance Officers | 648 | 712 | 64 | 10% | 23 |
| Veterinary Assistants and Laboratory Animal Caretakers | 482 | 532 | 50 | 10% | 21 |
| Farm Equipment Mechanics and Service Technicians | 469 | 512 | 43 | 9% | 20 |
| Veterinary Technologists and Technicians | 438 | 513 | 75 | 17% | 20 |
| First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers | 818 | 829 | 11 | 1% | 17 |
| Agricultural and Food Science Technicians | 363 | 379 | 16 | 4% | 15 |
| Agricultural Inspectors | 279 | 294 | 15 | 5% | 10 |
| Pesticide Handlers, Sprayers and Applicators, Vegetation | 303 | 323 | 20 | 7% | 10 |
| Logging Equipment Operators | 172 | 192 | 20 | 12% | 9 |

Wages

Compliance officers have the highest entry-level wages, \$20.84/hour, followed by water and wastewater treatment plant and system operators, \$17.31/hour, and life, physical and social science technicians (all other), \$16.36/hour (Exhibit 18).

The entry-level wages of the six occupations that fall below the subregion's average living wage of \$11.02/hour are: veterinary technologists and technicians; agricultural and food science technicians; farm equipment mechanics and service technicians; agricultural equipment operators; veterinary assistants and laboratory animal caretakers; and graders and sorters (agricultural products).

Exhibit 18: Agriculture, water and environmental technologies wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Compliance Officers | \$20.84 | \$29.43 |
| Water and Wastewater Treatment Plant and System Operators | \$17.31 | \$26.89 |
| Life, Physical, and Social Science Technicians, All Other | \$16.26 | \$21.23 |
| Logging Equipment Operators | \$15.36 | \$19.03 |
| First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers | \$13.63 | \$18.06 |
| Agricultural Inspectors | \$13.57 | \$18.57 |
| Pesticide Handlers, Sprayers and Applicators, Vegetation | \$12.78 | \$19.25 |
| Industrial Truck and Tractor Operators | \$12.25 | \$19.13 |
| First-Line Supervisors of Farming, Fishing and Forestry Workers | \$11.13 | \$15.66 |
| Veterinary Technologists and Technicians | \$10.54 | \$15.21 |
| Agricultural and Food Science Technicians | \$10.53 | \$15.91 |
| Farm Equipment Mechanics and Service Technicians | \$10.34 | \$16.57 |
| Agricultural Equipment Operators | \$9.98 | \$12.66 |
| Veterinary Assistants and Laboratory Animal Caretakers | \$9.25 | \$11.05 |
| Graders and Sorters, Agricultural Products | \$9.15 | \$9.40 |

Education Level

The typical education level for compliance officers is a bachelor's degree. This occupation falls just under the required 33% of the Census Bureau's Current Population Survey (CPS) to be relevant to community-college education. Only two of the occupations—life, physical and social science technicians (all other) and agricultural food science and technicians—have a typical entry-level education that is at the community college level (Exhibit 19).

For the remaining occupations that fall below the community college education level, nearly all require work experience and/or typically require some level of on-the-job-training. Local community college programs designed to address these upskilling needs and other occupational training gaps can increase the odds of job seeker employment.

Exhibit 19: Agriculture, water and environmental technologies education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|--|--------------------------------------|---------------------------------|------------------------------------|------------|
| Industrial Truck and Tractor Operators | No formal credential | None | Short-term | 24.2% |
| Agricultural Equipment Operators | No formal credential | None | Short-term | 12.7% |
| Graders and Sorters, Agricultural Products | No formal credential | None | Short-term | 11.7% |
| First-Line Supervisors of Farming, Fishing and Forestry Workers | High school diploma or equivalent | Less than 5 years | None | 22.8% |
| Water and Wastewater Treatment Plant and System Operators | High school diploma or equivalent | None | Long-term | 45.4% |
| Life, Physical and Social Science Technicians, All Other | Associate degree | None | None | 33.9% |
| Compliance Officers | Bachelor's degree | None | Moderate-term | 28.3% |
| Veterinary Assistants and Laboratory Animal Caretakers | High school diploma or equivalent | None | Short-term | 47.1% |
| Farm Equipment Mechanics and Service Technicians | High school diploma or equivalent | None | Long-term | 37% |
| Veterinary Technologists and Technicians | Associate degree | None | None | 56.4% |
| First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers | High school diploma or equivalent | Less than 5 years | None | 32.9% |
| Agricultural and Food Science Technicians | Associate degree | None | Moderate-term | 36.3% |
| Agricultural Inspectors | Bachelor's degree | None | Moderate-term | 28.7% |
| Pesticide Handlers, Sprayers and Applicators, Vegetation | High school diploma or equivalent | None | Moderate-term | 19.7% |
| Logging Equipment Operators | High school diploma or equivalent | None | Moderate-term | 14.9% |

Community College Supply

Exhibit 20 shows annual job openings and corresponding program titles with student completion data.

Exhibit 20: Agriculture, water and environmental technologies community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|--|------------------------------------|---|
| Industrial Truck and Tractor Operators (53-7051) | 301 | No corresponding programs | | |
| Agricultural Equipment Operators (45-2091) | 139 | No corresponding programs | | |
| Graders and Sorters, Agricultural Products (45-2041) | 51 | No corresponding programs | | |
| First-Line Supervisors of Farming, Fishing and Forestry Workers (45-1011) | 33 | Animal Science - 010200 | 21 | 1 |
| | | Dairy Science - 010230 | 3 | - |
| | | Plant Science - 010300 | 13 | 1 |
| | | Agricultural Pest Control Adviser and Operator (Licensed) - 010310 | - | - |
| | | Viticulture, Enology, and Wine Business - 010400 | - | - |
| | | Forestry - 011400 | 4 | 1 |
| | | Natural Resources - 011500 | 8 | 5 |
| Water and Wastewater Treatment Plant and System Operators (51-8031) | 29 | Water and Wastewater Technology - 095800 | - | - |
| Life, Physical and Social Science Technicians, All Other (19-4099) | 27 | Biotechnology and Biomedical Technology - 043000 | 2 | 0 |
| | | Electron Microscopy - 093470 | 0 | 19 |
| | | Ocean Technology - 192000 | - | - |
| Compliance Officers (13-1041) | 23 | No corresponding programs | | |
| Veterinary Assistants and Laboratory Animal Caretakers (31-9096) | 21 | No corresponding programs | | |
| Farm Equipment Mechanics and Service Technicians (49-3041) | 20 | Agricultural Power Equipment Technology - 011600 | 6 | 52 |
| Veterinary Technologists and Technicians (29-2056) | 20 | Veterinary Technician (Licensed) - 010210 | 47 | 24 |
| First-Line Supervisors of Landscaping, Lawn Service and Groundskeeping Workers (37-1012) | 17 | Horticulture - 010900 | 12 | 2 |
| | | Landscape Design and Maintenance - 010910 | - | - |
| | | Nursery Technology - 010930 | - | - |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|--|------------------------------------|---|
| | | Turfgrass Technology - 010940 | - | - |
| | | Parks and Outdoor Recreation - 011510 | 0 | 0 |
| Agricultural and Food Science Technicians (19-4011) | 15 | Agriculture Technology and Sciences, General - 010100 | 11 | - |
| | | Viticulture, Enology, and Wine Business - 010400 | - | - |
| | | Food Processing and Related Technologies - 011300 | - | - |
| Agricultural Inspectors (45-2011) | 10 | No corresponding programs | | |
| Pesticide Handlers, Sprayers and Applicators, Vegetation (37-3012) | 10 | Plant Science - 010300 | 13 | 1 |
| | | Agricultural Pest Control Adviser and Operator (Licensed) - 010310 | - | - |
| | | Landscape Design and Maintenance - 010910 | - | - |
| | | Nursery Technology - 010930 | - | - |
| | | Turfgrass Technology - 010940 | - | - |
| Logging Equipment Operators (45-4022) | 9 | No corresponding programs | | |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



ENERGY, CONSTRUCTION & UTILITIES

Current & Projected Employment

While the energy, construction and utilities industry accounts for a substantial share of employment in the North Central Valley/Northern Mother Lode Subregion, some of the largest business types are projected to undergo only moderate growth (1%-3%), such as building and finishing contractors, residential building construction, other specialty trade contractors, nonresidential building construction and natural gas distribution (Exhibit 21).

The business type comprising building equipment contractors will experience robust growth of 9%, representing the addition of 654 jobs in the North Central Valley/Northern Mother Lode subregion. Utility system construction will expand by 32%, adding 413 jobs.

Not shown in Exhibit 21 is the foundation, structure and building exterior contractors business type (NAICS 2381) which is projected to contract by 3%, shedding 122 jobs.

Exhibit 21: Energy, construction and utilities current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|---|--------------|--------------|------------------|--------------------|------------|
| Building Equipment Contractors (2382) | 7,460 | 8,114 | 654 | 9% | 619 |
| Building Finishing Contractors (2383) | 5,836 | 5,931 | 95 | 2% | 457 |
| Residential Building Construction (2361) | 5,624 | 5,779 | 155 | 3% | 648 |
| Other Specialty Trade Contractors (2389) | 3,875 | 3,951 | 76 | 2% | 255 |
| Nonresidential Building Construction (2362) | 2,302 | 2,382 | 80 | 3% | 149 |
| Natural Gas Distribution (2212) | 1,719 | 1,741 | 22 | 1% | 8 |
| Utility System Construction (2371) | 1,300 | 1,713 | 413 | 32% | 72 |
| Water, Sewage and Other Systems (2213) | 256 | 287 | 31 | 12% | 33 |
| Electric Power Generation, Transmission and Distribution (2211) | 184 | 205 | 21 | 11% | 9 |
| Metal Ore Mining (2122) | 58 | 80 | 22 | 38% | 2 |

Industry Staffing Patterns

The staffing patterns data for energy, construction and utilities that indicated an addition of 10 or more jobs in the next five years as shown in Exhibit 22.

The largest occupation in the energy, construction and utilities industry is plumbers, pipefitters and steamfitters having 1,363 jobs in 2016 and the largest growth rate, with 157 new jobs projected over the next five years. This is followed by heating, air conditioning and refrigeration mechanics and installers, adding 114 new jobs over the next five years, and brickmasons and blockmasons, adding 93 new jobs.

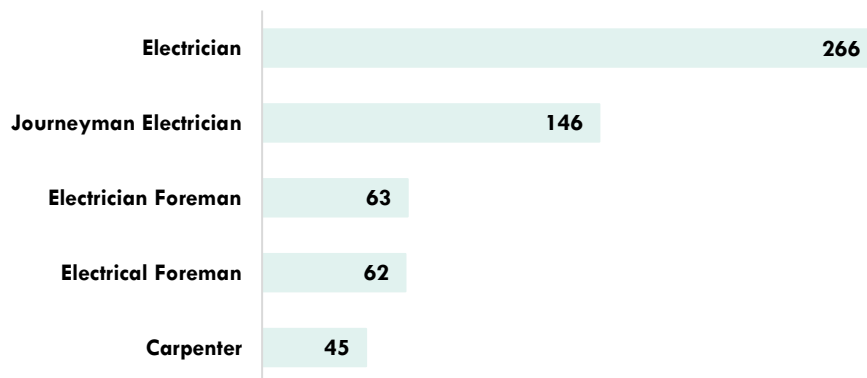
Exhibit 22: Energy, construction and utilities staffing patterns

| SOC | Description | Employment 2016 | 2021 | 5-Year Change | 5-Year % Change |
|---------|---|--------------------|-------|------------------|--------------------|
| 47-2152 | Plumbers, Pipefitters, and Steamfitters | 1,363 | 1,520 | 157 | 12% |
| 49-9021 | Heating, Air Conditioning, and Refrigeration Mechanics and Installers | 851 | 965 | 114 | 13% |
| 47-2021 | Brickmasons and Blockmasons | 442 | 535 | 93 | 21% |
| 47-2141 | Painters, Construction and Maintenance | 1,714 | 1,800 | 86 | 5% |
| 47-2111 | Electricians | 1,545 | 1,604 | 59 | 4% |
| 47-2073 | Operating Engineers and Other Construction Equipment Operators | 797 | 854 | 57 | 7% |
| 49-9051 | Electrical Power-Line Installers and Repairers | 135 | 173 | 38 | 28% |
| 13-1051 | Cost Estimators | 645 | 680 | 35 | 5% |
| 47-2161 | Plasterers and Stucco Masons | 587 | 614 | 27 | 5% |
| 49-9052 | Telecommunications Line Installers and Repairers | 117 | 143 | 26 | 22% |
| 47-2211 | Sheet Metal Workers | 360 | 382 | 22 | 6% |
| 49-1011 | First-Line Supervisors of Mechanics, Installers, and Repairers | 173 | 194 | 21 | 12% |
| 47-2022 | Stonemasons | 81 | 95 | 14 | 17% |
| 47-1011 | First-Line Supervisors of Construction Trades and Extraction Workers | 1,574 | 1,587 | 13 | 1% |

Job Postings

An analysis of job posting data for the 14 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 23 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 23: Energy, construction and utilities job postings



Skills

Troubleshooting, communication skills and writing are the most commonly listed baseline skills (Exhibit 24). Planning and detail-oriented skills are complementary, whereas, preventative maintenance requires more specific skill sets.

Exhibit 24: Energy, construction and utilities baseline skills

| Occupational Cluster | | Industry: Construction & Extraction | |
|------------------------|--------------|-------------------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Troubleshooting | 216 | Troubleshooting | 132 |
| Preventive Maintenance | 155 | Communication Skills | 78 |
| Communication Skills | 134 | Writing | 76 |
| Writing | 134 | Physical Demand | 67 |
| Planning | 124 | Detail-Oriented | 41 |

Exhibit 25 shows specialized skills commonly listed in job ads. Repair, electrical work and electrical system installation are highly ranked in both tables.

Exhibit 25: Energy, construction and utilities specialized skills

| Occupational Cluster | | Industry: Construction & Extraction | |
|--------------------------------|--------------|-------------------------------------|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Repair | 375 | Repair | 210 |
| Electrical Work | 164 | Electrical Work | 161 |
| Supervisory Skills | 162 | Electrical System Installation | 139 |
| Scheduling | 141 | Screwdrivers | 130 |
| Electrical System Installation | 139 | Hacksaws | 124 |

Top software skills for jobs related to energy, construction and utilities are shown in Exhibit 26. The two tables share four of the five same skills, with the top three being Microsoft Office, Excel and Word.

Exhibit 26: Energy, construction and utilities software skills

| Occupational Cluster | | Industry: Construction & Extraction | |
|----------------------|--------------|-------------------------------------|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Office | 85 | Microsoft Office | 47 |
| Microsoft Excel | 73 | Microsoft Excel | 24 |
| Microsoft Word | 39 | Microsoft Word | 13 |
| SAP | 28 | Word Processing | 6 |
| Microsoft Outlook | 24 | SAP | 5 |

Occupational Demand Projections

The occupation of painters (construction and maintenance) is the largest, with 102 new jobs projected by 2021 and the greatest number of projected annual openings, 61 (Exhibit 27).

Exhibit 27: Energy, construction and utilities occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|-------|-------|-------------|---------------|-----------------|
| Painters, Construction and Maintenance | 1,911 | 2,013 | 102 | 5% | 61 |
| Plumbers, Pipefitters and Steamfitters | 1,552 | 1,723 | 171 | 11% | 58 |
| Electricians | 1,894 | 1,986 | 92 | 5% | 54 |
| Heating, Air Conditioning and Refrigeration Mechanics and Installers | 1,106 | 1,243 | 137 | 12% | 47 |
| Operating Engineers and Other Construction Equipment Operators | 1,297 | 1,396 | 99 | 8% | 44 |
| First-Line Supervisors of Construction Trades and Extraction Workers | 1,889 | 1,935 | 46 | 2% | 39 |
| Brickmasons and Blockmasons | 457 | 551 | 94 | 21% | 26 |
| Cabinetmakers and Bench Carpenters | 585 | 656 | 71 | 12% | 21 |
| Plasterers and Stucco Masons | 623 | 651 | 28 | 4% | 20 |
| Electrical Power-Line Installers and Repairers | 240 | 284 | 44 | 18% | 20 |
| Highway Maintenance Workers | 329 | 368 | 39 | 12% | 17 |
| Construction and Building Inspectors | 247 | 262 | 15 | 6% | 11 |

Wages

Electrical power-line installers and repairers earn the highest wages, followed by construction and building inspectors (Exhibit 28).

Exhibit 28: Energy, construction and utilities wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Electrical Power-Line Installers and Repairers | \$23.86 | \$43.64 |
| Construction and Building Inspectors | \$19.87 | \$32.25 |
| Highway Maintenance Workers | \$18.03 | \$23.27 |
| Brickmasons and Blockmasons | \$17.92 | \$23.99 |
| Operating Engineers and Other Construction Equipment Operators | \$17.34 | \$25.75 |
| First-Line Supervisors of Construction Trades and Extraction Workers | \$17.34 | \$26.72 |
| Electricians | \$17.00 | \$25.54 |
| Plumbers, Pipefitters and Steamfitters | \$15.24 | \$20.92 |
| Plasterers and Stucco Masons | \$13.95 | \$20.88 |
| Heating, Air Conditioning and Refrigeration Mechanics and Installers | \$13.10 | \$19.47 |
| Painters, Construction and Maintenance | \$11.42 | \$16.43 |
| Cabinetmakers and Bench Carpenters | \$10.12 | \$14.20 |

Education Level

For those occupations that fall within the energy, construction and utilities industry, only the occupation of heating, air conditioning and refrigeration mechanics and installers requires a community college education. However, three occupations below require apprenticeships, and eight require moderate- to long-term on-the-job training. See Exhibit 29.

Exhibit 29: Energy, construction and utilities education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|--|--------------------------------------|---------------------------------|------------------------------------|------------|
| Painters, Construction and Maintenance | No formal educational credential | None | Moderate-term | 20.5% |
| Plumbers, Pipefitters and Steamfitters | High school diploma or equivalent | None | Apprenticeship | 31.4% |
| Electricians | High school diploma or equivalent | None | Apprenticeship | 47.3% |
| Heating, Air Conditioning and Refrigeration Mechanics and Installers | Postsecondary nondegree award | None | Long-term | 43.9% |
| Operating Engineers and Other Construction Equipment Operators | High school diploma or equivalent | None | Moderate-term | 24.3% |
| First-Line Supervisors of Construction Trades and Extraction Workers | High school diploma or equivalent | 5 years or more | None | 32.8% |
| Brickmasons and Blockmasons | High school diploma or equivalent | None | Apprenticeship | 20% |
| Cabinetmakers and Bench Carpenters | High school diploma or equivalent | None | Moderate-term | 25.7% |
| Plasterers and Stucco Masons | No formal educational credential | None | Long-term | 14.5% |
| Electrical Power-Line Installers and Repairers | High school diploma or equivalent | None | Long-term | 49.8% |
| Highway Maintenance Workers | High school diploma or equivalent | None | Moderate-term | 27.1% |
| Construction and Building Inspectors | High school diploma or equivalent | 5 years or more | Moderate-term | 44.5% |

Community College Supply

Exhibit 30 shows annual job openings and corresponding program titles with student completion data. There appears to be an under supply of students in many areas, including plumbers, pipefitters and steamfitters, and operating engineers and other construction equipment operators.

Exhibit 30: Energy, construction and utilities community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|---|------------------------------------|---|
| Painters, Construction and Maintenance (47-2141) | 61 | Painting, Decorating, and Flooring - 095270 | - | - |
| Plumbers, Pipefitters and Steamfitters (47-2152) | 58 | Plumbing, Pipefitting and Steamfitting - 095230 | - | - |
| Electricians (47-2111) | 54 | Electrical - 095220 | 3 | 15 |
| Heating, Air Conditioning and Refrigeration Mechanics and Installers (49-9021) | 47 | Environmental Control Technology - 094600 | 6 | 22 |
| | | Energy Systems Technology - 094610 | - | - |
| Operating Engineers and Other Construction Equipment Operators (47-2073) | 44 | Heavy Equipment Operation - 094730 | - | - |
| First-Line Supervisors of Construction Trades and Extraction Workers (47-1011) | 39 | Construction Crafts Technology - 095200 | - | - |
| | | Carpentry - 095210 | - | 1 |
| | | Electrical - 095220 | 3 | 15 |
| | | Glazing - 095240 | - | - |
| | | Masonry, Tile, Cement, Lath and Plaster - 095260 | - | - |
| | | Painting, Decorating, and Flooring - 095270 | - | - |
| | | Drywall and Insulation - 095280 | - | - |
| | | Roofing - 095290 | - | - |
| | | Civil and Construction Management Technology - 095700 | 1 | 1 |
| | | Public Works - 210210 | - | - |
| Brickmasons and Blockmasons (47-2021) | 26 | Masonry, Tile, Cement, Lath and Plaster - 095260 | - | - |
| Cabinetmakers and Bench Carpenters (51-7011) | 21 | Mill and Cabinet Work - 095250 | - | - |
| Plasterers and Stucco Masons (47-2161) | 20 | Masonry, Tile, Cement, Lath and Plaster - 095260 | - | - |
| Electrical Power-Line Installers and Repairers (49-9051) | 20 | Electrical Systems and Power Transmission - 093440 | - | - |
| Highway Maintenance Workers (47-4051) | 17 | Heavy Equipment Operation - 094730 | - | - |
| | | Public Works - 210210 | - | - |
| Construction and Building Inspectors (47-4011) | 11 | Construction Inspection - 095720 | - | - |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

GLOBAL TRADE & LOGISTICS

Current & Projected Employment

Business types comprising the largest percentage of global trade and logistics jobs in the North Central Valley/Northern Mother Lode Subregion include warehousing and storage, general freight trucking and grocery and related product merchant wholesalers (Exhibit 31). Warehousing and storage has a growth projection of 24%, adding more than 3,400 jobs by 2021. General freight trucking will grow by 9%, adding 811 jobs. Specialized freight trucking will experience 9% growth, increasing by 352 jobs, and the business type comprising agencies, brokerages and other insurance will add 301 jobs, 8% growth.

It should be noted that the offices of real estate agents and brokers (NAICS 5312) falls within this industry grouping. However, this business type is not shown because it is projected to decline by 15% over the next five years, eliminating 252 jobs in the subregion.

Exhibit 31: Global trade and logistics current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|--------------------|---------------|
| Warehousing and Storage (4931) | 14,581 | 18,044 | 3,463 | 24% | 135 |
| General Freight Trucking (4841) | 9,410 | 10,221 | 811 | 9% | 430 |
| Grocery and Related Product Merchant Wholesalers (4244) | 6,528 | 6,715 | 187 | 3% | 149 |
| Specialized Freight Trucking (4842) | 3,817 | 4,169 | 352 | 9% | 230 |
| Agencies, Brokerages and Other Insurance Related Activities (5242) | 3,753 | 4,054 | 301 | 8% | 435 |
| Machinery, Equipment and Supplies Merchant Wholesalers (4238) | 2,579 | 2,796 | 217 | 8% | 184 |
| Activities Related to Real Estate (5313) | 2,087 | 2,266 | 179 | 9% | 309 |
| Miscellaneous Nondurable Goods Merchant Wholesalers (4249) | 1,812 | 1,881 | 69 | 4% | 121 |
| Wholesale Electronic Markets and Agents and Brokers (4251) | 1,688 | 1,951 | 263 | 16% | 123 |
| Couriers and Express Delivery Services (4921) | 1,179 | 1,293 | 114 | 10% | 21 |

Industry Staffing Patterns

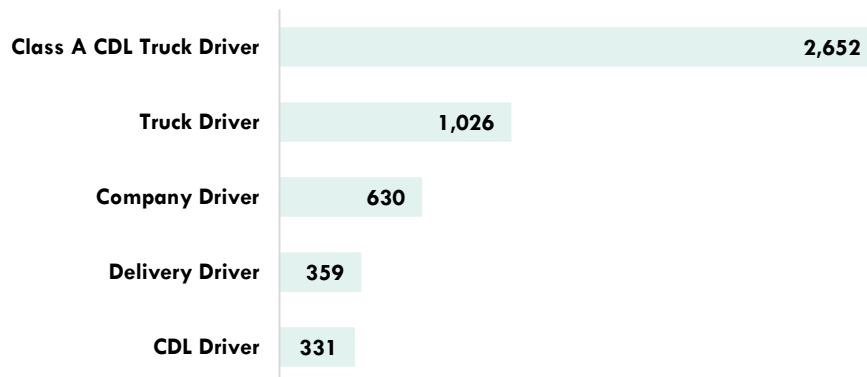
The occupation of heavy and tractor-trailer truck drivers is the largest with the greatest growth projection in both the global trade and logistics industry and the subregion, with 10,795 current jobs and 1,000 new jobs projected over the next five years. The next largest occupation in the industry is industrial truck and tractor operators, with 501 new jobs projected, followed by wholesale and manufacturing sales representatives (except technical and scientific products), with 230 new jobs projected by 2021 (Exhibit 32).

Exhibit 32: Global trade and logistics staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|--|------------|--------|---------------|-----------------|
| | | 2016 | 2021 | | |
| 53-3032 | Heavy and Tractor-Trailer Truck Drivers | 10,795 | 11,859 | 1,064 | 10% |
| 53-7051 | Industrial Truck and Tractor Operators | 3,215 | 3,716 | 501 | 16% |
| 41-4012 | Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | 2,238 | 2,468 | 230 | 10% |
| 53-1021 | First-Line Supervisors of Helpers, Laborers and Material Movers, Hand | 771 | 892 | 121 | 16% |
| 53-1031 | First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators | 573 | 655 | 82 | 14% |
| 11-3071 | Transportation, Storage and Distribution Managers | 394 | 458 | 64 | 16% |
| 41-4011 | Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products | 430 | 479 | 49 | 11% |
| 43-5061 | Production, Planning and Expediting Clerks | 209 | 249 | 40 | 19% |
| 49-3043 | Rail Car Repairers | 118 | 139 | 21 | 18% |
| 43-5011 | Cargo and Freight Agents | 103 | 123 | 20 | 19% |
| 13-1022 | Wholesale and Retail Buyers, Except Farm Products | 171 | 188 | 17 | 10% |
| 13-1081 | Logisticians | 60 | 73 | 13 | 22% |
| 53-4013 | Rail Yard Engineers, Dinkey Operators and Hostlers | 58 | 68 | 10 | 17% |
| 53-4031 | Railroad Conductors and Yardmasters | 146 | 156 | 10 | 7% |

Job Postings

An analysis of job posting data for the 14 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 33 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 33: Global trade and logistics job postings

Skills

Communication skills, organizational skills and physical demand are three of the most commonly listed baseline skills in both the occupational and industry tables (Exhibit 34). Problem solving and mathematics are complementary skills as are writing and English.

Exhibit 34: Global trade and logistics baseline skills

| Occupational Cluster | | Industry: Transportation & Warehousing | |
|-----------------------|--------------|--|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 1091 | Physical Demand | 728 |
| Organizational Skills | 522 | Communication Skills | 464 |
| Physical Demand | 480 | English | 360 |
| Writing | 436 | Organizational Skills | 310 |
| Problem Solving | 394 | Mathematics | 242 |

Exhibit 35 shows specialized skills most commonly listed. Sales ranks highest among the top job titles, whereas, customer service and forklift operation are desired skills across the two perspectives. Inspection and repair are also highly valued skills in the transportation and warehousing industry.

Exhibit 35: Global trade and logistics specialized skills

| Occupational Cluster | | Industry: Transportation & Warehousing | |
|----------------------|--------------|--|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Sales | 1313 | Forklift Operation | 789 |
| Customer Service | 623 | Inspection | 514 |
| Forklift Operation | 419 | Repair | 483 |
| Customer Contact | 416 | Customer Service | 291 |
| Microsoft Excel | 381 | Scheduling | 267 |

Top software skills for jobs related to global trade and logistics are shown in Exhibit 36. The Microsoft Office suite of tools are the dominate software skills desired by employers.

Exhibit 36: Global trade and logistics software skills

| Occupational Cluster | | Industry: Transportation & Warehousing | |
|----------------------|--------------|--|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Excel | 381 | Microsoft Excel | 100 |
| Microsoft Office | 372 | Microsoft Office | 84 |
| Microsoft Word | 176 | Microsoft Word | 40 |
| Microsoft PowerPoint | 147 | SAP | 39 |
| Microsoft Outlook | 134 | Microsoft PowerPoint | 28 |

Occupational Demand Projections

Heavy and tractor-trailer drivers is the largest occupation across all sectors in the subregion. It also has the greatest five-year growth projection of 1,303 new jobs with 516 annual openings (Exhibit 37). The next few occupations are significantly smaller across all three metrics, but do indicate sizeable growth and moderate annual openings in the next five years.

Exhibit 37: Global trade and logistics occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|--------|--------|-------------|---------------|-----------------|
| Heavy and Tractor-Trailer Truck Drivers | 14,023 | 15,326 | 1303 | 9% | 516 |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | 3,792 | 4,145 | 353 | 9% | 156 |
| First-Line Supervisors of Helpers, Laborers and Material Movers, Hand | 1,267 | 1,427 | 160 | 13% | 76 |
| First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators | 972 | 1,089 | 117 | 12% | 57 |
| Transportation, Storage and Distribution Managers | 659 | 733 | 74 | 11% | 30 |
| Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products | 723 | 790 | 67 | 9% | 29 |
| Wholesale and Retail Buyers, Except Farm Products | 471 | 499 | 28 | 6% | 22 |

Wages

The highest earning global trade and logistics occupations are shown in Exhibit 38. The wages for the occupations shown below are higher than the average living wage for a single adult in the subregion.

Exhibit 38: Global trade and logistics wages

| Occupation | Entry-level Hourly Wages | Median Hourly Wages |
|--|--------------------------|---------------------|
| Transportation, Storage and Distribution Managers | \$23.23 | \$41.01 |
| Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products | \$20.81 | \$33.97 |
| First-Line Supervisors of Helpers, Laborers and Material Movers, Hand | \$16.83 | \$24.60 |
| First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators | \$15.26 | \$26.53 |
| Wholesale and Retail Buyers, Except Farm Products | \$15.17 | \$25.87 |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | \$14.13 | \$27.39 |
| Heavy and Tractor-Trailer Truck Drivers | \$12.61 | \$18.12 |

Education Level

Exhibit 39 shows education levels required for occupations that fall within the global trade and logistics industry. Sales representatives (wholesale and manufacturing, except technical and scientific products) and wholesale and retail buyers (except farm products) indicate a bachelor's degree level of education, but have 32% and 37% CPS results, indicating these are middle-skill occupations.

The occupation of heavy and tractor-trailer truck drivers typically requires community college education, whereas, the remaining occupations require only a high school diploma. However, supervisorial positions are viewed as relevant to community colleges because of the need for management skills.

Exhibit 39: Global trade and logistics education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|--|--------------------------------------|---------------------------------|------------------------------------|------------|
| Heavy and Tractor-Trailer Truck Drivers | Postsecondary nondegree award | None | Short-term | 28.3% |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products | High school diploma or equivalent | None | Moderate-term | 31.6% |
| First-Line Supervisors of Helpers, Laborers and Material Movers, Hand | High school diploma or equivalent | Less than 5 years | None | 39.5% |
| First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators | High school diploma or equivalent | Less than 5 years | None | 39.5% |
| Transportation, Storage and Distribution Managers | High school diploma or equivalent | 5 years or more | None | 34.5% |
| Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products | Bachelor's degree | None | Moderate-term | 31.6% |
| Wholesale and Retail Buyers, Except Farm Products | Bachelor's degree | None | Long-term | 36.7% |



Community College Supply

Exhibit 40 shows annual job openings and corresponding program titles with student completion data. Occupations where there is a potential undersupply include heavy and tractor-trailer truck drivers, and sales representatives (wholesale and manufacturing, except technical and scientific products).

Exhibit 40: Global trade and logistics community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|---|------------------------------------|---|
| Heavy and Tractor-Trailer Truck Drivers (53-3032) | 516 | Truck and Bus Driving - 094750 | 0 | 1 |
| Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products (41-4012) | 156 | International Business and Trade - 050800 | - | 2 |
| | | Marketing and Distribution - 050900 | 4 | 5 |
| | | Display - 050920 | - | - |
| First-Line Supervisors of Helpers, Laborers and Material Movers, Hand (53-1021) | 76 | No corresponding programs | | |
| First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators (53-1031) | 57 | Logistics and Materials Transportation - 051000 | 0 | 1 |
| Transportation, Storage and Distribution Managers (11-3071) | 30 | Logistics and Materials Transportation - 051000 | 0 | 1 |
| | | Aviation and Airport Management and Services - 302000 | - | - |
| | | Aviation and Airport Management - 302010 | - | - |
| Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (41-4011) | 29 | International Business and Trade - 050800 | - | 2 |
| | | Sales and Salesmanship - 050940 | - | - |
| Wholesale and Retail Buyers, Except Farm Products (13-1022) | 22 | International Business and Trade - 050800 | - | 2 |
| | | Marketing and Distribution - 050900 | 4 | 5 |
| | | Purchasing - 050920 | - | - |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

RETAIL, HOSPITALITY & TOURISM

Current & Projected Employment

Analysis of the retail, hospitality and tourism industry employment data reveals that restaurants and other eating places are projected to experience a significant expansion by 2021 with a growth rate of 9% translating to 3,393 new jobs (Exhibit 41).

Other business types adding employment include building material and supplies dealers, other amusement and recreation industries, and gasoline stations.

Department stores represent the third largest business type within the industry and in 2016 employed nearly 9,000 workers in the subregion. However, this business type, which is not shown in the table below, is projected to decline by 10% over the next five years, shedding 904 jobs.

Exhibit 41: Retail, hospitality and tourism current and projected employment

| Description | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|--------------------|---------------|
| Restaurants and Other Eating Places (7225) | 38,768 | 42,161 | 3,393 | 9% | 2,089 |
| Grocery Stores (4451) | 11,103 | 11,147 | 44 | 0% | 488 |
| Building Material and Supplies Dealers (4441) | 5,706 | 6,029 | 323 | 6% | 225 |
| Other Amusement and Recreation Industries (7139) | 5,507 | 6,097 | 590 | 11% | 224 |
| Automobile Dealers (4411) | 4,605 | 4,806 | 201 | 4% | 167 |
| Traveler Accommodation (7211) | 4,437 | 4,692 | 255 | 6% | 194 |
| Health and Personal Care Stores (4461) | 4,329 | 4,484 | 155 | 4% | 367 |
| Clothing Stores (4481) | 3,364 | 3,481 | 117 | 3% | 251 |
| Gasoline Stations (4471) | 3,269 | 3,566 | 297 | 9% | 359 |
| Automotive Parts, Accessories and Tire Stores (4413) | 2,836 | 3,034 | 198 | 7% | 291 |



Industry Staffing Patterns

The staffing patterns data for the retail, hospitality and tourism industry is shown in Exhibit 42. Cooks (restaurant) has the largest five-year, industry-level job change, 377, followed by first-line supervisors of food preparation and serving workers, 335 new jobs by 2021.

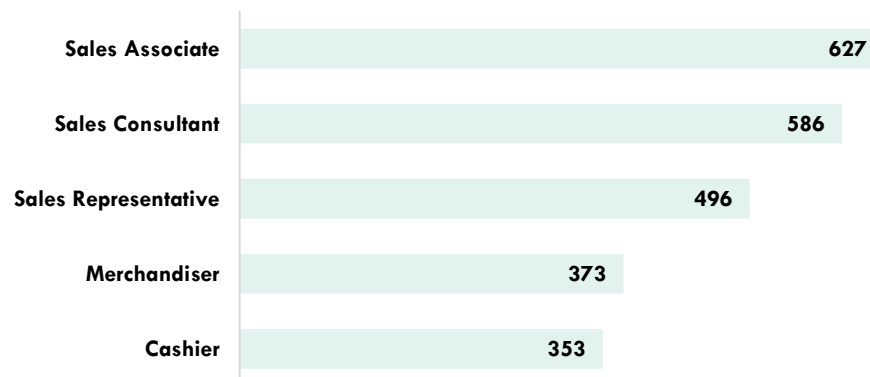
Exhibit 42: Retail, hospitality and tourism staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|--|------------|-------|---------------|-----------------|
| | | 2016 | 2021 | | |
| 35-2014 | Cooks, Restaurant | 3,701 | 4,078 | 377 | 10% |
| 35-1012 | First-Line Supervisors of Food Preparation and Serving Workers | 2,772 | 3,107 | 335 | 12% |
| 39-9031 | Fitness Trainers and Aerobics Instructors | 873 | 1,011 | 138 | 16% |
| 11-9051 | Food Service Managers | 1,492 | 1,566 | 74 | 5% |
| 41-2022 | Parts Salespersons | 979 | 1,038 | 59 | 6% |
| 43-4051 | Customer Service Representatives | 935 | 994 | 59 | 6% |
| 29-2052 | Pharmacy Technicians | 1,041 | 1,078 | 37 | 4% |
| 41-3099 | Sales Representatives, Services, All Other | 434 | 463 | 29 | 7% |
| 51-3011 | Bakers | 305 | 325 | 20 | 7% |
| 25-3021 | Self-Enrichment Education Teachers | 151 | 167 | 16 | 11% |
| 27-2042 | Musicians and Singers | 281 | 297 | 16 | 6% |
| 41-2012 | Gaming Change Persons and Booth Cashiers | 48 | 62 | 14 | 29% |
| 43-3041 | Gaming Cage Workers | 52 | 66 | 14 | 27% |
| 49-3091 | Bicycle Repairers | 78 | 91 | 13 | 17% |
| 41-1011 | First-Line Supervisors of Retail Sales Workers | 5,003 | 5,014 | 11 | 0% |

Job Postings – Retail, Hospitality and Tourism Selected Occupations

An analysis of job posting data for the 15 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 43 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 43: Retail, hospitality and tourism job postings for selected occupations



Skills

Skills data for retail, hospitality and tourism skills data were pulled for the dominant occupations and then by each of three industry-related areas: arts, design, entertainment, sports and media; food preparation and serving related; and sales and related. The comparison of these perspectives reveals that communication skills, writing, organization skills and physical demand are the most commonly sought baseline skills (Exhibit 44).

Exhibit 44: Retail, hospitality and tourism baseline skills

| Occupational Cluster | | Industry: Arts, Design, Entertainment, Sports and Media | |
|-----------------------|--------------|---|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 1536 | Communication Skills | 334 |
| Writing | 833 | Physical Demand | 282 |
| Physical Demand | 778 | Writing | 212 |
| Organizational Skills | 740 | Organizational Skills | 182 |
| Problem Solving | 618 | Building Effective Relationships | 133 |

| Industry: Food Preparation & Serving Related | | Industry: Sales & Related | |
|--|--------------|---------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 621 | Communication Skills | 2750 |
| Physical Demand | 385 | Writing | 1298 |
| Organizational Skills | 296 | Physical Demand | 1192 |
| Writing | 281 | Organizational Skills | 1141 |
| Mathematics | 178 | Team Work/ Collaboration | 861 |

Exhibit 45 shows specialized skills most commonly sought by employers, including customer service and retail setting, which are present in three of the four tables. Store management, scheduling, sales and merchandising were each reflected in two of the four perspectives.

Exhibit 45: Retail, hospitality and tourism specialized skills

| Occupational Cluster | | Industry: Arts, Design, Entertainment, Sports and Media | |
|----------------------|--------------|---|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Customer Service | 1655 | Merchandising | 431 |
| Retail Setting | 1092 | Retail Setting | 280 |
| Store Management | 964 | Customer Service | 197 |
| Scheduling | 885 | Sales | 120 |
| Supervisory Skills | 787 | Scheduling | 118 |

Industry: Food Preparation & Serving Related

| Specialized Skills | Job Postings |
|---------------------------|---------------------|
| Cleaning | 476 |
| Food Preparation | 353 |
| Customer Service | 318 |
| Cooking | 313 |
| Food Service Experience | 253 |

Industry: Sales & Related

| Specialized Skills | Job Postings |
|---------------------------|---------------------|
| Sales | 4433 |
| Customer Service | 2779 |
| Retail Setting | 2359 |
| Store Management | 1232 |
| Merchandising | 1159 |

Top software skills for jobs related to retail are shown in Exhibit 46. Microsoft Office tools were the highest in demand across all the perspectives except for arts, design, entertainment, sports and media where the Adobe product line was most prevalent.

Exhibit 46: Retail, hospitality and tourism software skills**Occupational Cluster**

| Software Skills | Job Postings |
|------------------------|---------------------|
| Microsoft Excel | 385 |
| Microsoft Office | 280 |
| Microsoft Word | 215 |
| Microsoft Outlook | 102 |
| Microsoft PowerPoint | 92 |

Industry: Arts, Design, Entertainment, Sports and Media

| Software Skills | Job Postings |
|------------------------|---------------------|
| Microsoft Office | 98 |
| Microsoft Excel | 71 |
| Adobe Photoshop | 50 |
| Adobe Illustrator | 41 |
| Adobe Acrobat | 39 |

Industry: Food Preparation & Serving Related

| Software Skills | Job Postings |
|------------------------|---------------------|
| Microsoft Excel | 30 |
| Microsoft Word | 24 |
| Microsoft Office | 23 |
| Microsoft Outlook | 9 |
| Microsoft PowerPoint | 7 |

Industry: Sales & Related

| Software Skills | Job Postings |
|------------------------|---------------------|
| Microsoft Excel | 552 |
| Microsoft Office | 525 |
| Microsoft Word | 275 |
| Palm OS | 186 |
| Microsoft Outlook | 177 |

Occupational Demand Projections

The occupation of first-line supervisors of retail sales workers has the largest employment pool, 5,923 jobs, with the greatest number of annual openings, 211 (Exhibit 47). First-line supervisors of food preparation and serving workers has the largest five-year change, adding 394 new jobs by 2021. Cooks (restaurant) will add 391 new jobs. These two occupations each have annual projected openings of 188.

Exhibit 47: Retail, hospitality and tourism occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|-------|-------|-------------|---------------|-----------------|
| First-Line Supervisors of Retail Sales Workers | 5,923 | 6,178 | 255 | 4% | 211 |
| Cooks, Restaurant | 3,889 | 4,280 | 391 | 10% | 188 |
| First-Line Supervisors of Food Preparation and Serving Workers | 3,387 | 3,781 | 394 | 12% | 188 |
| Hairdressers, Hairstylists and Cosmetologists | 2,651 | 2,895 | 244 | 9% | 122 |
| Sales Representatives, Services, All Other | 2,547 | 2,776 | 229 | 9% | 103 |
| Cooks, Institution and Cafeteria | 1,426 | 1,574 | 148 | 10% | 71 |
| Fitness Trainers and Aerobics Instructors | 1,178 | 1,337 | 159 | 13% | 56 |
| Food Service Managers | 1,699 | 1,787 | 88 | 5% | 53 |
| Self-Enrichment Education Teachers | 1,333 | 1,448 | 115 | 9% | 52 |
| Parts Salespersons | 1,315 | 1,396 | 81 | 6% | 47 |
| First-Line Supervisors of Personal Service Workers | 706 | 834 | 128 | 18% | 44 |
| Manicurists and Pedicurists | 1,158 | 1,270 | 112 | 10% | 32 |
| Demonstrators and Product Promoters | 721 | 762 | 41 | 6% | 31 |
| Butchers and Meat Cutters | 1,096 | 1,113 | 17 | 2% | 25 |
| Bakers | 655 | 703 | 48 | 7% | 25 |
| Musicians and Singers | 554 | 586 | 32 | 6% | 24 |
| Interpreters and Translators | 556 | 625 | 69 | 12% | 23 |
| Merchandise Displayers and Window Trimmers | 321 | 340 | 19 | 6% | 12 |
| Gaming Change Persons and Booth Cashiers | 118 | 135 | 17 | 14% | 9 |

Wages

The highest hourly wages are earned by: interpreters and translators; fitness trainers and aerobics instructors; and first-line supervisors of retail sales workers (Exhibit 48). More than two-thirds of these occupations have entry-level wages below the \$11.02 average living wage for one adult in the subregion.

Exhibit 48: Retail, hospitality and tourism wages

| Occupation | Entry-level Hourly Wages | Median Hourly Wages |
|--|--------------------------|---------------------|
| Interpreters and Translators | \$14.92 | \$18.44 |
| Fitness Trainers and Aerobics Instructors | \$12.18 | \$20.29 |
| First-Line Supervisors of Retail Sales Workers | \$12.07 | \$16.93 |
| Food Service Managers | \$11.85 | \$15.73 |
| Self-Enrichment Education Teachers | \$11.29 | \$19.38 |
| Musicians and Singers | \$11.24 | \$17.34 |
| Cooks, Institution and Cafeteria | \$10.99 | \$14.90 |
| First-Line Supervisors of Personal Service Workers | \$10.85 | \$16.92 |
| Butchers and Meat Cutters | \$10.49 | \$14.63 |
| Hairdressers, Hairstylists and Cosmetologists | \$10.37 | \$11.31 |
| Sales Representatives, Services, All Other | \$10.22 | \$19.90 |
| First-Line Supervisors of Food Preparation and Serving Workers | \$10.14 | \$14.66 |
| Demonstrators and Product Promoters | \$9.92 | \$11.49 |
| Merchandise Displayers and Window Trimmers | \$9.88 | \$14.11 |
| Gaming Change Persons and Booth Cashiers | \$9.71 | \$10.55 |
| Bakers | \$9.46 | \$11.98 |
| Cooks, Restaurant | \$9.38 | \$11.04 |
| Parts Salespersons | \$9.29 | \$13.03 |
| Manicurists and Pedicurists | \$8.76 | \$9.63 |

Education Level

Exhibit 49 shows education levels required for occupations that fall within the retail, hospitality and tourism industry. One of the occupations, interpreters and translators, typically requires a bachelor's degree, but meets the CPS requirement for being relevant to community college education. Only two occupations have community college educational expectations; however, 10 of the occupations requiring lower educational attainment are relevant to community college training due to specialized or managerial training needs.

Exhibit 49: Retail, hospitality and tourism education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|--|--------------------------------------|---------------------------------|------------------------------------|------------|
| First-Line Supervisors of Retail Sales Workers | High school diploma or equivalent | Less than 5 years | None | 38.1% |
| Cooks, Restaurant | No formal educational credential | Less than 5 years | Moderate-term | 23.4% |
| First-Line Supervisors of Food Preparation and Serving Workers | High school diploma or equivalent | Less than 5 years | None | 37.9% |
| Hairdressers, Hairstylists and Cosmetologists | Postsecondary nondegree award | None | None | 41.6% |
| Sales Representatives, Services, All Other | High school diploma or equivalent | None | Moderate-term | 34.3% |
| Cooks, Institution and Cafeteria | No formal educational credential | None | Short-term | 23.4% |
| Fitness Trainers and Aerobics Instructors | High school diploma or equivalent | None | Short-term | 34.1% |
| Food Service Managers | High school diploma or equivalent | Less than 5 years | None | 37.7% |
| Self-Enrichment Education Teachers | High school diploma or equivalent | Less than 5 years | None | 26.7% |
| Parts Salespersons | No formal educational credential | None | Moderate-term | 36.6% |
| First-Line Supervisors of Personal Service Workers | High school diploma or equivalent | Less than 5 years | None | 37.6% |
| Manicurists and Pedicurists | Postsecondary nondegree award | None | None | 30.2% |
| Demonstrators and Product Promoters | High school diploma or equivalent | None | Short-term | 36.4% |
| Butchers and Meat Cutters | No formal educational credential | None | Long-term | 20.5% |
| Bakers | No formal educational credential | None | Long-term | 27.8% |
| Musicians and Singers | No formal educational credential | None | Long-term | 27.4% |
| Interpreters and Translators | Bachelor's degree | None | Short-term | 36% |
| Merchandise Displayers and Window Trimmers | High school diploma or equivalent | None | Moderate-term | 30.3% |
| Gaming Change Persons and Booth Cashiers | High school diploma or equivalent | None | Short-term | 33% |

Community College Supply

Exhibit 50 shows annual job openings and corresponding program titles with student completion data.

Exhibit 50: Retail, hospitality and tourism community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|--|------------------------------------|---|
| First-Line Supervisors of Retail Sales Workers (41-1011) | 211 | Retail Store Operations and Management - 050650 | 15 | 0 |
| | | Sales and Salesmanship - 050940 | - | - |
| | | Display - 050960 | - | - |
| Cooks, Restaurant (35-2014) | 188 | Culinary Arts - 130630 | 23 | 33 |
| First-Line Supervisors of Food Preparation and Serving Workers (35-1012) | 188 | Nutrition, Foods and Culinary Arts - 130600 | - | - |
| | | Dietetic Services and Management - 130620 | - | - |
| | | Culinary Arts - 130630 | 23 | 33 |
| | | Hospitality - 130700 | - | 1 |
| | | Restaurant and Food Services and Management - 130710 | 4 | 20 |
| Hairdressers, Hairstylists and Cosmetologists (39-5012) | 122 | Cosmetology and Barbering - 300700 | 2 | 615 |
| Sales Representatives, Services, All Other (41-3099) | 103 | Sales and Salesmanship - 050940 | - | - |
| Cooks, Institution and Cafeteria (35-2012) | 71 | Dietetic Services and Management - 130620 | - | - |
| | | Culinary Arts - 130630 | 23 | 33 |
| Fitness Trainers and Aerobics Instructors (39-9031) | 56 | Physical Education - 083500 | - | - |
| | | Physical Fitness and Body Movement - 083510 | - | - |
| | | Fitness Trainer - 083520 | - | 5 |
| | | Intercollegiate Athletics - 083550 | - | - |
| | | Health Education - 083700 | - | - |
| | | Athletic Training and Sports Medicine - 122800 | 18 | - |
| Food Service Managers (11-9051) | 53 | Dietetic Services and Management - 130620 | - | - |
| | | Hospitality - 130700 | - | 1 |
| | | Restaurant and Food Service and Management - 130710 | 4 | 20 |
| | | Lodging Management - 130720 | - | - |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|--|------------------------------------|---|
| Self-Enrichment Education Teachers (25-3021) | 52 | No Corresponding Programs | | |
| Parts Salespersons (41-2022) | 47 | Sales and Salesmanship - 050940 | - | - |
| First-Line Supervisors of Personal Service Workers (39-1021) | 44 | No Corresponding Programs | | |
| Manicurists and Pedicurists (39-5092) | 32 | Cosmetology and Barbering - 300700 | 2 | 615 |
| Demonstrators and Product Promoters (41-9011) | 31 | No Corresponding Programs | | |
| Butchers and Meat Cutters (51-3021) | 25 | No Corresponding Programs | | |
| Bakers (51-3011) | 25 | No Corresponding Programs | | |
| Musicians and Singers (27-2042) | 24 | Music - 100400 | - | - |
| Interpreters and Translators (27-3091) | 23 | Sign Language - 085000 | - | - |
| | | Sign Language Interpreting - 085010 | - | - |
| | | Foreign Languages, General - 110100 | - | - |
| | | French - 110200 | - | - |
| | | German - 110300 | - | - |
| | | Italian - 110400 | - | - |
| | | Spanish - 110500 | - | - |
| | | Russian - 110600 | - | - |
| | | Chinese - 110700 | - | - |
| | | Japanese - 110800 | - | - |
| | | Latin - 110900 | - | - |
| | | Greek - 111000 | - | - |
| | | Hebrew and Semitic - 111100 | - | - |
| | | Arabic - 111200 | - | - |
| | | African Languages (Non-Semitic) - 111600 | - | - |
| | | Asian, South Asian and Pacific Islands (Chinese and Japanese excluded) | - | - |
| | | Filipino (Tagalog) - 111710 | - | - |
| | | Vietnamese - 111720 | - | - |
| | | Korean - 111730 | - | - |
| | | Portuguese - 111900 | - | - |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|---|------------------------------------|---|
| | | Other Foreign Languages - 119900 | - | - |
| | | Linguistics - 150110 | - | - |
| | | Classics - 150400 | - | - |
| | | Legal and Community Interpretation - 214000 | - | - |
| Merchandise Displayers and Window Trimmers (27-1026) | 12 | Display - 050960 | - | - |
| | | Fashion Merchandising - 130320 | 3 | 3 |
| Gaming Change Persons and Booth Cashiers (41-2012) | 9 | No Corresponding Programs | | |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



PROTECTIVE SERVICES

Current & Projected Employment

In the North Central Valley/Northern Mother Lode Subregion, the business type comprising state government (excluding education and hospitals) is projected to rapidly expand, adding more than 2,000 jobs by 2021, a 20% growth rate (Exhibit 51). Local government (excluding education and hospitals) will add more than 1,500 jobs, and investigation and security services will increase by 351 jobs. Not shown below is data indicating the federal government (civilian) business type will shrink by 800 jobs, a 13% decline in employment over the next five years.

Exhibit 51: Protective services current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|--------------------|---------------|
| Local Government, Excluding Education and Hospitals (9039) | 29,113 | 30,615 | 1,502 | 5% | 403 |
| State Government, Excluding Education and Hospitals (9029) | 9,922 | 11,945 | 2,023 | 20% | 317 |
| Investigation and Security Services (5616) | 2,627 | 2,978 | 351 | 13% | 102 |

Industry Staffing Patterns

Compliance officers, forensic science technicians and emergency medical technicians, and paramedics show robust growth (Exhibit 52). Data related to compliance officers can be found in the Agriculture, Water and Environmental Technologies section.

Exhibit 52: Protective services staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|--|------------|-------|------------------|-----------------------|
| | | 2016 | 2021 | | |
| 33-3012 | Correctional Officers and Jailers | 3,141 | 3,501 | 360 | 11% |
| 33-3051 | Police and Sheriff's Patrol Officers | 2,083 | 2,267 | 184 | 9% |
| 33-2011 | Firefighters | 1,527 | 1,612 | 85 | 6% |
| 33-1011 | First-Line Supervisors of Correctional Officers | 391 | 435 | 44 | 11% |
| 13-1041 | Compliance Officers | 392 | 424 | 32 | 8% |
| 33-3021 | Detectives and Criminal Investigators | 256 | 281 | 25 | 10% |
| 33-1012 | First-Line Supervisors of Police and Detectives | 197 | 219 | 22 | 11% |
| 33-9099 | Protective Service Workers, All Other | 276 | 293 | 17 | 6% |
| 19-4092 | Forensic Science Technicians | 72 | 89 | 17 | 24% |
| 29-2041 | Emergency Medical Technicians and Paramedics | 122 | 136 | 14 | 11% |
| 33-1021 | First-Line Supervisors of Fire Fighting and Prevention Workers | 127 | 139 | 12 | 9% |
| 33-1099 | First-Line Supervisors of Protective Service Workers, All Other | 117 | 129 | 12 | 10% |
| 33-9021 | Private Detectives and Investigators | 171 | 183 | 12 | 7% |
| 33-9092 | Lifeguards, Ski Patrol and Other Recreational Protective Service Workers | 163 | 175 | 12 | 7% |

Job Postings

An analysis of job posting data for the 14 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 53 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 53: Protective services job postings

| | |
|-----------------------------|-----|
| Security Officer | 324 |
| Store Protection Specialist | 55 |
| Loss Prevention Detective | 43 |
| Loss Prevention Associate | 41 |
| Security Guard | 31 |

Skills

Communication skills, writing, physical demand and building effective relationships are the most commonly listed baseline skills from both perspectives (Exhibit 54).

Exhibit 54: Protective services baseline skills

| Occupational Cluster | | Industry: Protective Services | |
|----------------------------------|--------------|----------------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 207 | Writing | 528 |
| Writing | 202 | Communication Skills | 479 |
| Physical Demand | 120 | Physical Demand | 474 |
| Building Effective Relationships | 104 | English | 329 |
| Team Work/ Collaboration | 90 | Building Effective Relationships | 322 |

Exhibit 55 shows specialized skills commonly listed in job ads. Loss prevention, asset protection and surveillance are those most highly ranked skills in the two tables.

Exhibit 55: Protective services specialized skills

| Occupational Cluster | | Industry: Protective Services | |
|----------------------|--------------|--|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Loss Prevention | 241 | Loss Prevention | 250 |
| Asset Protection | 190 | Handling of Crisis or Emergency Situations | 214 |
| Surveillance | 165 | Asset Protection | 201 |
| CPR | 124 | Surveillance | 190 |
| Customer Service | 117 | Law Enforcement or Criminal Justice Experience | 180 |

Top software skills for jobs related to protective services are shown in Exhibit 56. The top four requested skills shared between the two perspectives are Microsoft Office, Excel, Word and PowerPoint.

Exhibit 56: Protective services software skills

| Occupational Cluster | | Industry: Protective Services | |
|----------------------|--------------|-------------------------------|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Office | 48 | Notepad | 163 |
| Microsoft Excel | 41 | Microsoft Office | 57 |
| Microsoft PowerPoint | 30 | Microsoft Excel | 48 |
| Microsoft Word | 20 | Microsoft Word | 34 |
| Microsoft Access | 8 | Microsoft PowerPoint | 15 |

Occupational Demand Projections

Corrections officers and jailers is the largest occupation in the industry and will add the greatest number of new jobs by 2021, 364, with 167 annual openings (Exhibit 57). This is followed by police and sheriff's patrol officers, 199 new jobs and 117 annual openings; and firefighters, 88 new jobs and 67 annual openings.

Exhibit 57: Protective services occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|-------|-------|-------------|---------------|-----------------|
| Correctional Officers and Jailers | 3,159 | 3,523 | 364 | 12% | 167 |
| Police and Sheriff's Patrol Officers | 2,193 | 2,392 | 199 | 9% | 117 |
| Firefighters | 1,553 | 1,641 | 88 | 6% | 67 |
| Emergency Medical Technicians and Paramedics | 722 | 804 | 82 | 11% | 38 |
| Protective Service Workers, All Other | 943 | 1021 | 78 | 8% | 30 |
| First-Line Supervisors of Correctional Officers | 393 | 438 | 45 | 11% | 21 |
| Lifeguards, Ski Patrol and Other Recreational Protective Service Workers | 319 | 356 | 37 | 12% | 13 |
| Police, Fire and Ambulance Dispatchers | 389 | 399 | 10 | 3% | 12 |
| First-Line Supervisors of Police and Detectives | 200 | 223 | 23 | 12% | 12 |
| Detectives and Criminal Investigators | 259 | 284 | 25 | 10% | 12 |
| First-Line Supervisors of Protective Service Workers, All Other | 180 | 202 | 22 | 12% | 9 |
| Private Detectives and Investigators | 221 | 235 | 14 | 6% | 9 |
| First-Line Supervisors of Fire Fighting and Prevention Workers | 128 | 140 | 12 | 9% | 9 |
| Forensic Science Technicians | 75 | 93 | 18 | 24% | 7 |

Wages

The highest occupational hourly wages are earned by: first-line supervisors of police and detectives; detectives and criminal investigators; and first-line supervisors of correctional officers (Exhibit 58).

Only two occupations have entry-level wages that fall below the subregion's average living wage for one adult: emergency medical technicians and paramedics; and lifeguards, ski patrol and other recreational service workers.

Exhibit 58: Protective services wages

| Occupation | Entry-level Hourly Wages | Median Hourly Wages |
|--|--------------------------|---------------------|
| First-Line Supervisors of Police and Detectives | \$34.92 | \$57.89 |
| Detectives and Criminal Investigators | \$32.61 | \$45.51 |
| First-Line Supervisors of Correctional Officers | \$32.41 | \$49.70 |
| First-Line Supervisors of Fire Fighting and Prevention Workers | \$25.59 | \$37.87 |
| Police and Sheriff's Patrol Officers | \$24.71 | \$37.81 |
| Forensic Science Technicians | \$22.93 | \$32.60 |
| Correctional Officers and Jailers | \$22.36 | \$35.40 |
| First-Line Supervisors of Protective Service Workers, All Other | \$16.34 | \$25.82 |
| Private Detectives and Investigators | \$15.88 | \$27.38 |
| Police, Fire and Ambulance Dispatchers | \$15.70 | \$24.36 |
| Firefighters | \$15.51 | \$24.23 |
| Protective Service Workers, All Other | \$11.54 | \$16.05 |
| Emergency Medical Technicians and Paramedics | \$10.61 | \$16.64 |
| Lifeguards, Ski Patrol and Other Recreational Protective Service Workers | \$9.42 | \$11.75 |



Education Level

Exhibit 59 shows education levels required for occupations that fall within the protective services industry. Only three of the occupations typically require a community college education; however, all but two require formal (academy) training certifications.

Exhibit 59: Protective services education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|--|--------------------------------------|---------------------------------|------------------------------------|------------|
| Correctional Officers and Jailers | High school diploma or equivalent | None | Moderate-term | 52.4% |
| Police and Sheriff's Patrol Officers | High school diploma or equivalent | None | Moderate-term | 51.6% |
| Firefighters | Postsecondary nondegree award | None | Long-term | 63.6% |
| Emergency Medical Technicians and Paramedics | Postsecondary nondegree award | None | None | 68.3% |
| Protective Service Workers, All Other | High school diploma or equivalent | None | Short-term | 36.4% |
| First-Line Supervisors of Correctional Officers | High school diploma or equivalent | Less than 5 years | Moderate-term | 46.3% |
| Lifeguards, Ski Patrol and Other Recreational Protective Service Workers | No formal educational credential | None | Short-term | 36.4% |
| Police, Fire and Ambulance Dispatchers | High school diploma or equivalent | None | Moderate-term | 47.6% |
| First-Line Supervisors of Police and Detectives | High school diploma or equivalent | Less than 5 years | Moderate-term | 43.4% |
| Detectives and Criminal Investigators | High school diploma or equivalent | Less than 5 years | Moderate-term | 35.2% |
| First-Line Supervisors of Protective Service Workers, All Other | High school diploma or equivalent | Less than 5 years | None | 43.1% |
| Private Detectives and Investigators | High school diploma or equivalent | Less than 5 years | Moderate-term | 32.1% |
| First-Line Supervisors of Fire Fighting and Prevention Workers | Postsecondary nondegree award | Less than 5 years | Moderate-term | 59.2% |
| Forensic Science Technicians | Bachelor's degree | None | Moderate-term | 33.9% |

Community College Supply

Exhibit 60 shows annual job openings and corresponding program titles with student completion data.

Exhibit 60: Protective services community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|---|------------------------------------|---|
| Correctional Officers and Jailers (33-3012) | 167 | Corrections - 210510 | 22 | 11 |
| | | Probation and Parole - 210520 | - | - |
| Police and Sheriff's Patrol Officers (33-3051) | 117 | Administration of Justice - 210500 | 284 | 13 |
| | | Police Academy - 210550 | - | - |
| Firefighters (33-2011) | 67 | Fire Technology - 213300 | 36 | 37 |
| | | Wildland Fire Technology - 213310 | - | - |
| | | Fire Academy - 213350 | - | 14 |
| Emergency Medical Technicians and Paramedics (29-2041) | 38 | Emergency Medical Services - 125000 | 0 | 15 |
| | | Paramedic - 125100 | - | - |
| Protective Service Workers, All Other (33-9099) | 30 | No corresponding programs | | |
| First-Line Supervisors of Correctional Officers (33-1011) | 21 | Corrections - 210510 | 22 | 11 |
| | | Probation and Parole - 210520 | - | - |
| Lifeguards, Ski Patrol and Other Recreational Protective Service Workers (33-9092) | 13 | No corresponding programs | | |
| Police, Fire and Ambulance Dispatchers (43-5031) | 12 | No corresponding programs | | |
| First-Line Supervisors of Police and Detectives (33-1012) | 12 | Corrections - 210510 | 22 | 11 |
| Detectives and Criminal Investigators (33-3021) | 12 | Administration of Justice - 210500 | 284 | 13 |
| | | Police Academy - 210550 | - | - |
| First-Line Supervisors of Protective Service Workers, All Other (33-1099) | 9 | No corresponding programs | | |
| Private Detectives and Investigators (33-9021) | 9 | Administration of Justice - 210500 | 284 | 13 |
| | | Police Academy - 210550 | - | - |
| First-Line Supervisors of Fire Fighting and Prevention Workers (33-1021) | 9 | Fire Technology - 213300 | 36 | 37 |
| Forensic Science Technicians (19-4092) | 7 | Forensics, Evidence, and Investigation - 210540 | - | - |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC

ICT/DIGITAL MEDIA

Current & Projected Employment

The wired telecommunications business type is projected to produce the most new jobs in the ICT/digital media industry in the next five years, resulting in 412 new positions, a 32% growth rate (Exhibit 61). The motion picture and video business type will expand by 8%, creating 169 new jobs. Computer design and related services will undergo moderate growth, 8%, adding 91 new jobs. While several other business types in ICT/digital media will experience rapid growth rates of 30% or higher, only a handful of new jobs will be created due to the small size of these business types. Examples include: software publishers; data processing, hosting and related services; and sound recording industries.

Exhibit 61: ICT/digital media current and projected employment

| Description | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|-----------------------|---------------|
| Wired Telecommunications Carriers (5171) | 1,278 | 1,690 | 412 | 32% | 55 |
| Computer Systems Design and Related Services (5415) | 1,154 | 1,245 | 91 | 8% | 118 |
| Motion Picture and Video Industries (5121) | 949 | 1,118 | 169 | 18% | 21 |
| Specialized Design Services (5414) | 575 | 613 | 38 | 7% | 28 |
| Software Publishers (5112) | 79 | 104 | 25 | 32% | 11 |
| Other Information Services (5191) | 56 | 59 | 3 | 5% | 10 |
| Data Processing, Hosting and Related Services (5182) | 52 | 68 | 16 | 31% | 8 |
| Sound Recording Industries (5122) | 37 | 48 | 11 | 30% | 4 |

Industry Staffing Patterns

The staffing patterns data for the ICT/digital media industry that indicated an addition of 10 or more jobs in the next five years are shown in Exhibit 62. Telecommunications equipment installers and repairers (except line installers) is the largest occupation with the greatest number of job gains projected at the industry level over the next five years.

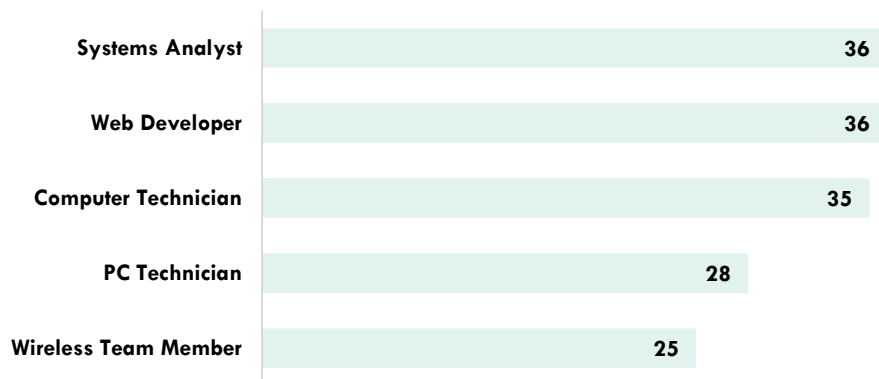
Exhibit 62: ICT/digital media staffing patterns

| SOC | Description | Employment 2016 | 2021 | 5-Year Change | 5-Year % Change |
|---------|---|--------------------|------|------------------|-----------------------|
| 49-2022 | Telecommunications Equipment Installers and Repairers, Except Line Installers | 483 | 579 | 96 | 20% |
| 49-9052 | Telecommunications Line Installers and Repairers | 144 | 173 | 29 | 20% |
| 15-1151 | Computer User Support Specialists | 140 | 157 | 17 | 12% |
| 27-4011 | Audio and Video Equipment Technicians | 56 | 69 | 13 | 23% |
| 15-1134 | Web Developers | 101 | 113 | 12 | 12% |
| 15-1142 | Network and Computer Systems Administrators | 87 | 97 | 10 | 11% |
| 15-1152 | Computer Network Support Specialists | 66 | 76 | 10 | 15% |

Job Postings

An analysis of job posting data for the seven staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 63 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 63: ICT/digital media job postings



Skills

Troubleshooting, communication skills and writing are the three most commonly listed baseline skills from both perspectives (Exhibit 64).

Exhibit 64: ICT/digital media baseline skills

| Occupational Cluster | | Industry: Computers & Mathematical | |
|-------------------------|--------------|------------------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Troubleshooting | 247 | Communication Skills | 612 |
| Communication Skills | 163 | Troubleshooting | 484 |
| Writing | 136 | Writing | 416 |
| Problem Solving | 130 | Problem Solving | 385 |
| Team Work/Collaboration | 89 | Team Work/Collaboration | 307 |

Exhibit 65 shows specialized skills commonly listed in job ads. Technical support, repair and customer service are highly ranked. From the industry perspective, however, Microsoft Excel, Word and Office are valued more highly than the skills shown in the occupational cluster table.

Exhibit 65: ICT/digital media specialized skills

| Occupational Cluster | | Industry: Computers & Mathematical | |
|------------------------------------|--------------|------------------------------------|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Technical Support | 198 | Microsoft Excel | 287 |
| Repair | 163 | Microsoft Word | 264 |
| Customer Service | 134 | Microsoft Office | 215 |
| Hardware and Software Installation | 96 | Word Processing | 90 |
| Microsoft Windows | 86 | Microsoft Windows | 82 |

Top software skills for jobs related to ICT/digital media are shown in Exhibit 66. The top three requested skills are Microsoft Windows, Office and Excel. Microsoft Excel and Office are also highly valued from the industry perspective, as is SQL, the No. 1 valued specialized skill.

Exhibit 66: ICT/digital media software skills

| Occupational Cluster | | Industry: Computers & Mathematical | |
|----------------------|--------------|------------------------------------|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Windows | 86 | SQL | 413 |
| Microsoft Office | 72 | Microsoft Excel | 302 |
| Microsoft Excel | 58 | Microsoft Office | 216 |
| SQL | 58 | Microsoft Word | 173 |
| JavaScript | 45 | JavaScript | 136 |

Occupational Demand Projections

Occupations of note in Exhibit 67 include: computer user support specialists, 121 new jobs, 42 annual openings; telecommunications equipment installers and repairers (except line installers), 112 new jobs, 30 annual openings; and network and system administrators, 59 new jobs, 22 annual openings.

Exhibit 67: ICT/digital media occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|---|-------|-------|-------------|---------------|-----------------|
| Computer User Support Specialists | 1,262 | 1,383 | 121 | 10% | 42 |
| Telecommunications Equipment Installers and Repairers, Except Line Installers | 698 | 810 | 112 | 16% | 30 |
| Network and Computer Systems Administrators | 769 | 828 | 59 | 8% | 22 |
| Graphic Designers | 631 | 654 | 23 | 4% | 20 |
| Computer Network Support Specialists | 352 | 392 | 40 | 11% | 13 |
| Computer Occupations, All Other | 533 | 553 | 20 | 4% | 11 |
| Web Developers | 211 | 243 | 32 | 15% | 9 |
| Audio and Video Equipment Technicians | 215 | 238 | 23 | 11% | 9 |

Wages

The highest hourly wages are earned by network and computer systems administrators and computer occupations (all other) (Exhibit 68). All of the listed occupations have wages above the subregion's average living wage for a single adult.

Exhibit 68: ICT/digital media wages

| Occupation | Entry-Level Hourly Wages | Median Hourly Wages |
|---|--------------------------|---------------------|
| Network and Computer Systems Administrators | \$22.61 | \$36.36 |
| Computer Occupations, All Other | \$21.08 | \$32.67 |
| Computer Network Support Specialists | \$18.42 | \$30.42 |
| Telecommunications Equipment Installers and Repairers, Except Line Installers | \$16.16 | \$24.92 |
| Web Developers | \$15.31 | \$26.25 |
| Computer User Support Specialists | \$14.67 | \$22.03 |
| Graphic Designers | \$13.90 | \$20.11 |
| Audio and Video Equipment Technicians | \$13.37 | \$18.20 |

Education Level

Exhibit 69 shows education levels required for occupations that fall within the ICT/digital media industry. Network and computer systems administrators, graphic designers and computer occupations (all other) have a typical entry-level education of a bachelor's degree. However, two of these occupations meet the 33% CPS threshold for being relevant to community college training. All remaining ICT/digital media occupations typically require community college education.

Exhibit 69: ICT/digital media education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-the-Job Training | CPS |
|---|-------------------------------|--------------------------|-----------------------------|-------|
| Computer User Support Specialists | Some college, no degree | None | None | 45.2% |
| Telecommunications Equipment Installers and Repairers, Except Line Installers | Postsecondary nondegree award | None | Moderate-term | 52.8% |
| Network and Computer Systems Administrators | Bachelor's degree | None | None | 39.5% |
| Graphic Designers | Bachelor's degree | None | None | 30.3% |
| Computer Network Support Specialists | Associate degree | None | None | 45.2% |
| Computer Occupations, All Other | Bachelor's degree | None | None | 36.9% |
| Web Developers | Associate degree | None | None | 27.2% |
| Audio and Video Equipment Technicians | Postsecondary nondegree award | None | Short-term | 44.6% |

Community College Supply

Exhibit 70 shows annual job openings and corresponding program titles with student completion data. There appears to be an undersupply for a number of occupations, notably: computer user support specialists; telecommunications equipment installers and repairers (except line installers); and network and computer systems administrators.

In addition, there may be an oversupply of students to fill graphic designer positions, computer network support specialist positions, computer occupations (all other) and web developer positions.

Exhibit 70: ICT/digital media community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|---|---------------------------|--|------------------------------------|---|
| Computer User Support Specialists (15-1151) | 42 | Computer Information Systems - 070200 | 25 | 0 |
| | | Computer Support - 070820 | - | 2 |
| Telecommunications Equipment Installers and Repairers, Except Line Installers (49-2022) | 30 | Telecommunications Technology - 093430 | - | - |
| Network and Computer Systems Administrators (15-1142) | 22 | Computer Infrastructure and Support - 070800 | - | 1 |
| Graphic Designers (27-1024) | 20 | Digital Media - 061400 | - | 4 |
| | | Computer Graphics and Digital Imagery - 061460 | 9 | 2 |
| | | Applied Design - 100900 | - | - |
| | | Commercial Art - 101300 | - | - |
| | | Graphic Art and Design - 103000 | 17 | 5 |
| Computer Network Support Specialists (15-1152) | 13 | Computer Science (transfer) - 070600 | 27 | - |
| | | Computer Systems Analysis - 070730 | - | - |
| | | Computer Infrastructure and Support - 070800 | - | 1 |
| | | Computer Networking - 070810 | 50 | 25 |
| | | Computer Support - 070820 | - | 2 |
| Computer Occupations, All Other (15-1199) | 11 | Electronic Game Design - 061420 | - | - |
| | | Information Technology, General - 070100 | 34 | 2 |
| | | Computer Information Systems - 070200 | 25 | 0 |
| | | Computer Science (transfer) - 070600 | 27 | - |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|---|---------------------------|---|------------------------------------|---|
| | | Other Information Technology - 079900 | - | - |
| | | Geographic Information Systems - 220610 | - | 9 |
| Web Developers (15-1134) | 9 | Website Design and Development - 061430 | - | 2 |
| | | Computer Science (transfer) - 070600 | 27 | - |
| | | Computer Software Development - 070700 | - | - |
| | | Computer Programming - 070710 | - | 7 |
| | | World Wide Web Administration - 070900 | - | - |
| | | E-Commerce (technology emphasis) - 070910 | - | - |
| | | | | |
| Audio and Video Equipment Technicians (27-4011) | 9 | Commercial Music | - | 2 |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



HEALTH CARE

Current & Projected Employment

Of all the industries analyzed, the health care industry is expected to offer the most employment opportunities in the North Central Valley/Northern Mother Lode Subregion over the next five years. Overall, more than 13,500 new jobs are anticipated.

Only one business type is projected to contract, general medical and surgical hospitals (NAICS 6221), which is expected to shed 202 jobs, 1% of total employment in this business type, by 2021.

Individual and family services will create the most new jobs, 5,887, with a growth rate of 31% (Exhibit 71).

Another job generator will be outpatient care centers. This business type also has a 31% growth rate and will add more than 2,000 positions. Offices of physicians and nursing care facilities (skilled nursing facilities) will each add more than 1,100 jobs. Home health care services will grow by 53%, resulting in 1,410 new positions.

Exhibit 71: Health care current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|--|--------------|--------------|------------------|--------------------|---------------|
| Individual and Family Services (6241) | 19,286 | 25,173 | 5,887 | 31% | 12,856 |
| Offices of Physicians (6211) | 8,688 | 9,818 | 1,130 | 13% | 982 |
| Nursing Care Facilities (Skilled Nursing Facilities) (6231) | 7,064 | 8,220 | 1,156 | 16% | 83 |
| Outpatient Care Centers (6214) | 6,548 | 8,580 | 2,032 | 31% | 155 |
| Offices of Dentists (6212) | 4,446 | 4,932 | 486 | 11% | 609 |
| Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly (6233) | 3,186 | 3,741 | 555 | 17% | 129 |
| Offices of Other Health Practitioners (6213) | 2,803 | 3,205 | 402 | 14% | 390 |
| Home Health Care Services (6216) | 2,677 | 4,087 | 1,410 | 53% | 65 |
| Residential Intellectual and Developmental Disability, Mental Health and Substance Abuse Facilities (6232) | 1,794 | 1,988 | 194 | 11% | 101 |
| Other Ambulatory Health Care Services (6219) | 1,474 | 1,602 | 128 | 9% | 27 |
| Vocational Rehabilitation Services (6243) | 953 | 975 | 22 | 2% | 31 |
| Medical and Diagnostic Laboratories (6215) | 728 | 876 | 148 | 20% | 78 |
| Other Residential Care Facilities (6239) | 473 | 502 | 29 | 6% | 37 |
| Psychiatric and Substance Abuse Hospitals (6222) | 231 | 339 | 108 | 47% | 3 |
| Specialty Hospitals (except Psychiatric and Substance Abuse) (6223) | 146 | 210 | 64 | 44% | 3 |

Industry Staffing Patterns

The staffing patterns data for the health care industry that indicated an addition of 10 or more jobs in the next five years are shown in Exhibit 72. The registered nurses occupation is the largest and has the greatest projected five-year change, 1,046 new jobs, followed by nursing assistants, which employed 4,567 workers in 2016 and has a projected increase of 860 new jobs by 2021. Home health aides has the next greatest growth projection, 860 new jobs.

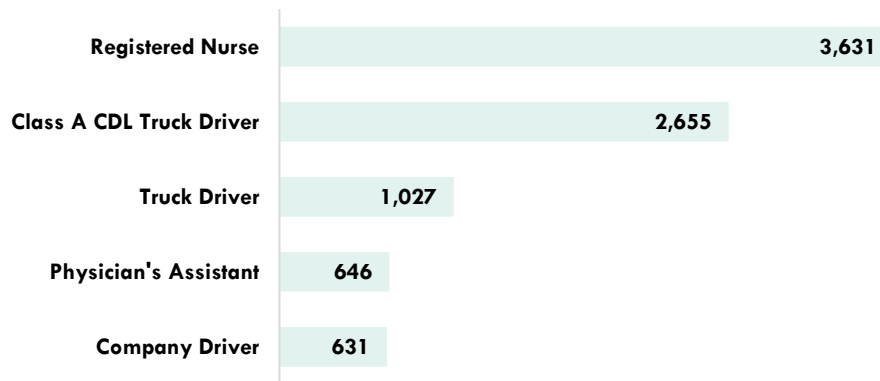
Exhibit 72: Health care staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|---|------------|-------|------------------|-----------------------|
| | | 2016 | 2021 | | |
| 29-1141 | Registered Nurses | 7,321 | 8,367 | 1,046 | 14% |
| 31-1014 | Nursing Assistants | 4,567 | 5,427 | 860 | 19% |
| 31-1011 | Home Health Aides | 1,240 | 2,008 | 768 | 62% |
| 31-9092 | Medical Assistants | 3,414 | 3,863 | 449 | 13% |
| 29-2061 | Licensed Practical and Licensed Vocational Nurses | 1,905 | 2,322 | 417 | 22% |
| 43-6013 | Medical Secretaries | 2,272 | 2,550 | 278 | 12% |
| 31-9091 | Dental Assistants | 1,714 | 1,908 | 194 | 11% |
| 29-2021 | Dental Hygienists | 726 | 824 | 98 | 13% |
| 29-2071 | Medical Records and Health Information Technicians | 512 | 579 | 67 | 13% |
| 31-9097 | Phlebotomists | 561 | 624 | 63 | 11% |
| 29-2041 | Emergency Medical Technicians and Paramedics | 570 | 630 | 60 | 11% |
| 29-2012 | Medical and Clinical Laboratory Technicians | 371 | 421 | 50 | 13% |
| 31-2021 | Physical Therapist Assistants | 154 | 202 | 48 | 31% |
| 29-2034 | Radiologic Technologists | 509 | 551 | 42 | 8% |
| 31-2022 | Physical Therapist Aides | 225 | 266 | 41 | 18% |
| 29-2055 | Surgical Technologists | 269 | 308 | 39 | 14% |
| 29-2011 | Medical and Clinical Laboratory Technologists | 332 | 362 | 30 | 9% |
| 31-9099 | Healthcare Support Workers, All Other | 287 | 315 | 28 | 10% |
| 29-2053 | Psychiatric Technicians | 211 | 236 | 25 | 12% |
| 29-2032 | Diagnostic Medical Sonographers | 178 | 202 | 24 | 13% |
| 29-2081 | Opticians, Dispensing | 197 | 219 | 22 | 11% |
| 29-2052 | Pharmacy Technicians | 324 | 345 | 21 | 6% |
| 31-9093 | Medical Equipment Preparers | 326 | 347 | 21 | 6% |
| 29-2057 | Ophthalmic Medical Technicians | 140 | 160 | 20 | 14% |
| 31-2011 | Occupational Therapy Assistants | 40 | 59 | 19 | 48% |
| 31-1013 | Psychiatric Aides | 31 | 49 | 18 | 58% |
| 29-1126 | Respiratory Therapists | 402 | 418 | 16 | 4% |
| 29-2031 | Cardiovascular Technologists and Technicians | 144 | 157 | 13 | 9% |
| 29-9099 | Healthcare Practitioners and Technical Workers, All Other | 116 | 129 | 13 | 11% |
| 29-2051 | Dietetic Technicians | 146 | 158 | 12 | 8% |

Job Postings

An analysis of job posting data for the 30 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 73 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 73: Health care job postings



Skills

Communication skills, English, writing and computer skills are the most commonly listed baseline skills from both perspectives (Exhibit 74).

Exhibit 74: Health care baseline skills

| Occupational Cluster | | Industry: Health Care | |
|----------------------|--------------|--------------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 1593 | Communication Skills | 2118 |
| English | 1103 | Writing | 1320 |
| Writing | 929 | English | 1312 |
| Computer Skills | 867 | Team Work/ Collaboration | 1030 |
| Planning | 774 | Computer Skills | 1010 |

Exhibit 75 shows specialized skills commonly listed by health care employers. Patient care, advanced cardiac life support, acute care and cardiopulmonary resuscitation are the most highly ranked among the selected occupations and across the industry.

Exhibit 75: Health care specialized skills

| Occupational Cluster | | Industry: Health Care | |
|--------------------------------------|---------------------|--------------------------------------|---------------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Patient Care | 2052 | Patient Care | 2634 |
| Advanced Cardiac Life Support (ACLS) | 1565 | Treatment Planning | 1761 |
| Acute Care | 1236 | Advanced Cardiac Life Support (ACLS) | 1671 |
| Cardiopulmonary Resuscitation (CPR) | 1231 | Cardiopulmonary Resuscitation (CPR) | 1660 |
| Treatment Planning | 1034 | Acute Care | 1445 |

Top software skills for jobs related to health care are shown in Exhibit 76. The top three requested skills are Microsoft Excel, Word and Office. The industry-level software skills data mirrors that contained in the occupational cluster table.

Exhibit 76: Health care software skills

| Occupational Cluster | | Industry: Health Care | |
|-----------------------------|---------------------|------------------------------|---------------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Excel | 252 | Microsoft Excel | 287 |
| Microsoft Word | 248 | Microsoft Word | 264 |
| Microsoft Office | 169 | Microsoft Office | 215 |
| Word Processing | 64 | Word Processing | 90 |
| Microsoft Windows | 61 | Microsoft Windows | 82 |

Occupational Demand Projections

The occupation of registered nurses had the largest employment in the health care sector, with 8,945 jobs in 2016 (Exhibit 77). This occupation also has the greatest projected gain by 2021, 1,247 new jobs, as well as the most annual openings, 481. This is followed by nursing assistants, 922 new jobs and 313 annual openings, and home health aides, 779 new jobs and 200 annual openings.

Exhibit 77: Health care occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|-------|--------|-------------|---------------|-----------------|
| Registered Nurses | 8,945 | 10,192 | 1 247 | 14% | 481 |
| Nursing Assistants | 5,040 | 5,962 | 922 | 18% | 313 |
| Home Health Aides | 1,307 | 2,086 | 779 | 60% | 200 |
| Medical Assistants | 3,642 | 4,119 | 477 | 13% | 178 |
| Licensed Practical and Licensed Vocational Nurses | 2240 | 2691 | 451 | 20% | 163 |
| Medical Secretaries | 2526 | 2830 | 304 | 12% | 90 |
| Dental Assistants | 1786 | 1989 | 203 | 11% | 88 |
| Pharmacy Technicians | 1585 | 1701 | 116 | 7% | 40 |
| Dental Hygienists | 742 | 844 | 102 | 14% | 34 |
| Medical Records and Health Information Technicians | 663 | 744 | 81 | 12% | 32 |
| Phlebotomists | 630 | 700 | 70 | 11% | 28 |
| Medical and Clinical Laboratory Technicians | 440 | 501 | 61 | 14% | 24 |
| Radiologic Technologists | 573 | 622 | 49 | 9% | 21 |
| Opticians, Dispensing | 354 | 400 | 46 | 13% | 20 |
| Medical and Clinical Laboratory Technologists | 400 | 440 | 40 | 10% | 18 |
| Healthcare Support Workers, All Other | 457 | 496 | 39 | 9% | 18 |
| Respiratory Therapists | 478 | 505 | 27 | 6% | 17 |
| Physical Therapist Aides | 243 | 287 | 44 | 18% | 17 |
| Physical Therapist Assistants | 166 | 218 | 52 | 31% | 16 |
| Psychiatric Technicians | 382 | 438 | 56 | 15% | 15 |
| Massage Therapists | 495 | 550 | 55 | 11% | 15 |
| Medical Equipment Preparers | 370 | 395 | 25 | 7% | 13 |
| Surgical Technologists | 297 | 340 | 43 | 14% | 12 |
| Diagnostic Medical Sonographers | 194 | 222 | 28 | 14% | 10 |

Wages

The highest hourly wages are earned by registered nurses, diagnostic medical sonographers, and medical and clinical laboratory technologists (Exhibit 78). However, five occupations have entry-level wages that fall below the subregion's average living wage for one adult, \$11.02/hour: medical assistants, nursing assistants, massage therapists, physical therapy aides and home health aides.

Exhibit 78: Health care wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Registered Nurses | \$34.39 | \$49.09 |
| Diagnostic Medical Sonographers | \$32.05 | \$45.56 |
| Medical and Clinical Laboratory Technologists | \$28.56 | \$38.98 |
| Respiratory Therapists | \$27.51 | \$38.61 |
| Dental Hygienists | \$26.76 | \$41.30 |
| Radiologic Technologists | \$22.27 | \$38.96 |
| Psychiatric Technicians | \$21.20 | \$27.38 |
| Surgical Technologists | \$20.89 | \$31.15 |
| Licensed Practical and Licensed Vocational Nurses | \$18.54 | \$24.96 |
| Physical Therapist Assistants | \$16.14 | \$29.77 |
| Medical and Clinical Laboratory Technicians | \$14.29 | \$21.28 |
| Healthcare Support Workers, All Other | \$13.74 | \$18.72 |
| Phlebotomists | \$13.64 | \$19.20 |
| Medical Equipment Preparers | \$13.28 | \$18.84 |
| Medical Records and Health Information Technicians | \$13.14 | \$19.93 |
| Opticians, Dispensing | \$12.64 | \$16.93 |
| Pharmacy Technicians | \$12.04 | \$18.09 |
| Medical Secretaries | \$11.83 | \$16.42 |
| Dental Assistants | \$11.75 | \$15.96 |
| Medical Assistants | \$10.51 | \$15.14 |
| Nursing Assistants | \$10.40 | \$13.89 |
| Massage Therapists | \$10.16 | \$14.45 |
| Physical Therapist Aides | \$9.97 | \$12.77 |
| Home Health Aides | \$9.41 | \$11.46 |

Education Level

Exhibit 79 shows education levels required for occupations that fall within the health care industry. Although the occupation of registered nurses at the national level has a typical education level of a bachelor's degree, California only requires an associate degree. Nearly two-thirds of the health care occupations below typically require community college education. Most of the remaining occupations that indicate no formal educational credential or a high school diploma/equivalent do require some formal training and accompanying third-party certification.

Exhibit 79: Health care education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical OTJ Training | CPS |
|--|--|---|-------------------------------------|------------|
| Registered Nurses | Bachelor's degree | None | None | 42.1% |
| Nursing Assistants | Postsecondary nondegree award | None | None | 41.7% |
| Home Health Aides | No formal educational credential | None | Short-term | 41.7% |
| Medical Assistants | Postsecondary nondegree award | None | None | 65% |
| Licensed Practical and Licensed Vocational Nurses | Postsecondary nondegree award | None | None | 74.1% |
| Medical Secretaries | High school diploma or equivalent | None | Moderate-term | 47.5% |
| Dental Assistants | Postsecondary nondegree award | None | None | 58.3% |
| Pharmacy Technicians | High school diploma or equivalent | None | Moderate-term | 56.4% |
| Dental Hygienists | Associate degree | None | None | 60.8% |
| Medical Records and Health Information Technicians | Postsecondary nondegree award | None | None | 54.9% |
| Phlebotomists | Postsecondary nondegree award | None | None | 61.1% |
| Medical and Clinical Laboratory Technicians | Associate degree | None | None | 36.2% |
| Radiologic Technologists | Associate degree | None | None | 66.1% |
| Opticians, Dispensing | High school diploma or equivalent | None | Long-term | 56.1% |
| Medical and Clinical Laboratory Technologists | Bachelor's degree | None | None | 36.2% |
| Healthcare Support Workers, All Other | High school diploma or equivalent | None | None | 38.1% |
| Respiratory Therapists | Associate degree | None | None | 69.9% |
| Physical Therapist Aides | High school diploma or equivalent | None | Short-term | 70.9% |
| Physical Therapist Assistants | Associate degree | None | None | 70.9% |
| Psychiatric Technicians | Postsecondary nondegree award | Less than 5 years | Short-term | 56.4% |
| Massage Therapists | Postsecondary nondegree award | None | None | 54% |
| Medical Equipment Preparers | High school diploma or equivalent | None | Moderate-term | 38.1% |
| Surgical Technologists | Postsecondary nondegree award | None | None | 56.4% |
| Diagnostic Medical Sonographers | Associate degree | None | None | 66.1% |

Community College Supply

Exhibit 80 shows annual job openings and corresponding program titles with student completion data.

Exhibit 80: Health care community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|--|---------------------------|--|------------------------------------|---|
| Registered Nurses (29-1141) | 481 | Nursing - 123000 | - | - |
| | | Registered Nursing - 123010 | 262 | 1 |
| Nursing Assistants (31-1014) | 313 | Health Occupations, General - 120100 | 31 | - |
| | | School Health Clerk - 122400 | - | - |
| | | Nursing - 123000 | - | - |
| | | Certified Nurse Assistant - 123030 | - | 98 |
| Home Health Aides (31-1011) | 200 | Health Occupations, General - 120100 | 31 | - |
| | | Nursing - 123000 | - | - |
| | | Home Health Aide - 123080 | - | - |
| | | Gerontology - 130900 | - | 2 |
| Medical Assistants (31-9092) | 178 | Medical Assisting - 120800 | 209 | 329 |
| | | Clinical Medical Assisting - 120810 | - | - |
| Licensed Practical and Licensed Vocational Nurses (29-2061) | 163 | Nursing - 123000 | - | - |
| | | Licensed Vocational Nursing - 123020 | 15 | 76 |
| Medical Secretaries (43-6013) | 90 | Medical Office Technology - 051420 | 55 | 125 |
| | | Administrative Medical Assisting - 120820 | - | - |
| Dental Assistants (31-9091) | 88 | Dental Occupations - 124000 | - | - |
| | | Dental Assistant - 124010 | 51 | 136 |
| Pharmacy Technicians (29-2052) | 40 | Pharmacy Technology - 122100 | 49 | 10 |
| Dental Hygienists (29-2021) | 34 | Dental Occupations - 124000 | - | - |
| | | Dental Hygienist - 124020 | - | - |
| Medical Records and Health Information Technicians (29-2071) | 32 | Health Information Technology - 122300 | - | - |
| | | Health Information Coding - 122310 | - | 0 |
| Phlebotomists (31-9097) | 28 | Phlebotomy - 120510 | - | - |
| Medical and Clinical Laboratory Technicians (29-2012) | 24 | Biotechnology and Biomedical Technology - 043000 | 2 | 0 |
| | | Laboratory Science Technology - 095500 | 0 | - |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|---|---------------------------|--|------------------------------------|---|
| | | Medical Laboratory Technology - 120500 | - | - |
| Radiologic Technologists (29-2034) | 21 | Radiologic Technology - 122500 | 23 | 14 |
| Opticians, Dispensing (29-2081) | 20 | No corresponding programs | | |
| Medical and Clinical Laboratory Technologists (29-2011) | 18 | Electron Microscopy - 093470 | - | 19 |
| Healthcare Support Workers, All Other (31-9099) | 18 | Health Facility Unit Coordinator - 120830 | - | - |
| | | Speech/Language Pathology and Audiology - 122000 | 16 | 1 |
| Respiratory Therapists (29-1126) | 17 | Respiratory Care/Therapy - 121000 | 73 | - |
| Physical Therapist Aides (31-2022) | 17 | No corresponding programs | | |
| Physical Therapist Assistants (31-2021) | 16 | Physical Therapist Assistant - 122200 | - | - |
| Psychiatric Technicians (29-2053) | 15 | Psychiatric Technician - 123900 | 25 | 63 |
| Massage Therapists (31-9011) | 15 | Massage Therapy - 126200 | - | 48 |
| Medical Equipment Preparers (31-9093) | 13 | Hospital Central Service Technician - 120900 | - | - |
| Surgical Technologists (29-2055) | 12 | Surgical Technician - 121700 | - | - |
| Diagnostic Medical Sonographers (29-2032) | 10 | Diagnostic Medical Sonography - 122700 | - | 3 |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



MANUFACTURING

Current & Projected Employment

With the manufacturing industry projected to generate approximately 2,000 new jobs by 2021 in the subregion, beverage manufacturing will account for a significant portion of the industry's job creation.

Beverage manufacturing will grow by 11%, adding 755 jobs (Exhibit 81). Converted paper product manufacturing is projected to add 381 jobs, growing by 18%.

Other business types that will each create more than 200 new jobs over the next five years in the subregion include: dairy product manufacturing; household and institutional furniture and kitchen cabinet manufacturing; and agriculture, construction and mining machinery manufacturing.

Business types that are expected to contract in the subregion include animal slaughtering and processing (the loss of 100 jobs), glass and glass product manufacturing (the loss of 135 jobs), and plastics product manufacturing (the loss of 99 jobs).

Exhibit 81: Manufacturing current and projected employment

| Description (NAICS) | 2016 Jobs | 2021 Jobs | 5-Year Change | 5-Year % Change | # of Firms |
|---|--------------|--------------|------------------|--------------------|---------------|
| Beverage Manufacturing (3121) | 6,672 | 7,427 | 755 | 11% | 134 |
| Dairy Product Manufacturing (3115) | 3,443 | 3,697 | 254 | 7% | 28 |
| Other Food Manufacturing (3119) | 2,578 | 2,605 | 27 | 1% | 23 |
| Architectural and Structural Metals Manufacturing (3323) | 2,147 | 2,282 | 135 | 6% | 71 |
| Converted Paper Product Manufacturing (3222) | 2,140 | 2,521 | 381 | 18% | 18 |
| Cement and Concrete Product Manufacturing (3273) | 1,352 | 1,488 | 136 | 10% | 36 |
| Household and Institutional Furniture and Kitchen Cabinet Manufacturing (3371) | 1,246 | 1,451 | 205 | 16% | 56 |
| Animal Food Manufacturing (3111) | 1,245 | 1,254 | 9 | 1% | 42 |
| Machine Shops; Turned Product; and Screw, Nut and Bolt Manufacturing (3327) | 968 | 1,054 | 86 | 9% | 88 |
| Agriculture, Construction, and Mining Machinery Manufacturing (3331) | 955 | 1,234 | 279 | 29% | 20 |

Industry Staffing Patterns

The staffing patterns data for the manufacturing industry that indicated an addition of 10 or more jobs in the next five years are shown in Exhibit 82.

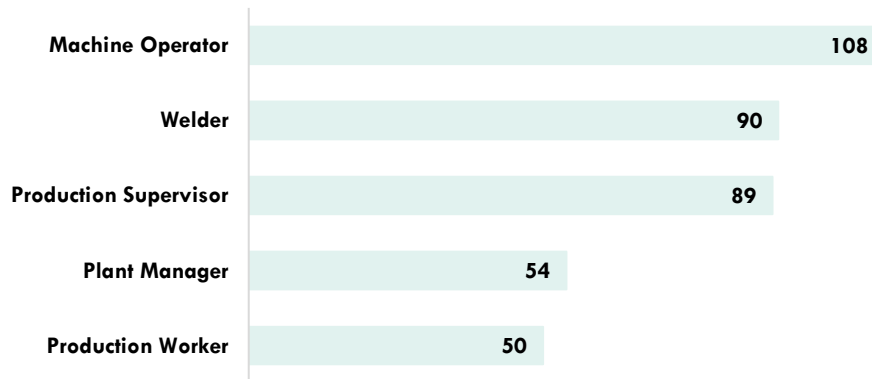
Exhibit 82: Manufacturing staffing patterns

| SOC | Description | Employment | | 5-Year Change | 5-Year % Change |
|---------|---|------------|-------|---------------|-----------------|
| | | 2016 | 2021 | | |
| 49-9041 | Industrial Machinery Mechanics | 1,106 | 1,257 | 151 | 14% |
| 51-9111 | Packaging and Filling Machine Operators and Tenders | 4,070 | 4,184 | 114 | 3% |
| 51-9196 | Paper Goods Machine Setters, Operators and Tenders | 695 | 792 | 97 | 14% |
| 51-9012 | Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders | 930 | 1,007 | 77 | 8% |
| 51-1011 | First-Line Supervisors of Production and Operating Workers | 1,864 | 1,930 | 66 | 4% |
| 51-4041 | Machinists | 674 | 732 | 58 | 9% |
| 51-4121 | Welders, Cutters, Solderers and Brazers | 969 | 1,021 | 52 | 5% |
| 51-2092 | Team Assemblers | 1,629 | 1,678 | 49 | 3% |
| 51-9061 | Inspectors, Testers, Sorters, Samplers and Weighers | 1,366 | 1,403 | 37 | 3% |
| 49-9071 | Maintenance and Repair Workers, General | 838 | 874 | 36 | 4% |
| 51-3092 | Food Batchmakers | 1,023 | 1,057 | 34 | 3% |
| 51-4011 | Computer-Controlled Machine Tool Operators, Metal and Plastic | 227 | 261 | 34 | 15% |
| 49-9043 | Maintenance Workers, Machinery | 377 | 404 | 27 | 7% |
| 51-9023 | Mixing and Blending Machine Setters, Operators and Tenders | 844 | 871 | 27 | 3% |
| 11-3051 | Industrial Production Managers | 653 | 677 | 24 | 4% |
| 51-2041 | Structural Metal Fabricators and Fitters | 336 | 357 | 21 | 6% |
| 51-9121 | Coating, Painting and Spraying Machine Setters, Operators and Tenders | 236 | 256 | 20 | 8% |
| 51-9199 | Production Workers, All Other | 481 | 495 | 14 | 3% |
| 43-5061 | Production, Planning and Expediting Clerks | 338 | 350 | 12 | 4% |
| 51-2099 | Assemblers and Fabricators, All Other | 148 | 160 | 12 | 8% |
| 51-9191 | Adhesive Bonding Machine Operators and Tenders | 150 | 162 | 12 | 8% |
| 51-4081 | Multiple Machine Tool Setters, Operators and Tenders, Metal and Plastic | 82 | 93 | 11 | 13% |
| 47-2211 | Sheet Metal Workers | 135 | 145 | 10 | 7% |
| 49-1011 | First-Line Supervisors of Mechanics, Installers and Repairers | 211 | 221 | 10 | 5% |

Job Postings

An analysis of job posting data for the 24 staffing pattern occupations shows the positions employers most sought to fill in the last 12 months. Exhibit 83 details the top five occupations requiring less than a bachelor's degree advertised by employers.

Exhibit 83: Manufacturing job postings



Skills

Physical demand, communication skills and writing are the most commonly listed baseline skills across both perspectives (Exhibit 84). The remaining two of the top five occupational baseline skills include troubleshooting and maintenance, whereas, English and mathematics are dominant in the industry perspective.

Exhibit 84: Manufacturing baseline skills

| Occupational Cluster | | Industry: Production | |
|------------------------|--------------|----------------------|--------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Physical Demand | 563 | Communication Skills | 339 |
| Communication Skills | 558 | Physical Demand | 314 |
| Troubleshooting | 544 | English | 265 |
| Preventive Maintenance | 509 | Writing | 219 |
| Writing | 434 | Mathematics | 202 |

Repair, inspection, scheduling and supervisory skills are the most commonly listed specialized skills by the subregion's employers (Exhibit 85).

Exhibit 85: Manufacturing specialized skills

| Occupational Cluster | | Industry: Production | |
|----------------------|--------------|----------------------|--------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Repair | 1029 | Inspection | 285 |
| Inspection | 483 | Scheduling | 248 |
| Scheduling | 482 | Supervisory Skills | 234 |
| Supervisory Skills | 465 | Repair | 199 |
| Machinery | 373 | Packaging | 183 |

The top five software skills for jobs related to manufacturing are shown in Exhibit 86. The skills listed in each table are identical. Once again, the Microsoft suite of tools dominates, along with SAP.

Exhibit 86: Manufacturing software skills

| Occupational Cluster | | Industry: Production | |
|----------------------|--------------|----------------------|--------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Excel | 288 | Microsoft Excel | 134 |
| Microsoft Office | 272 | Microsoft Office | 108 |
| Microsoft Word | 137 | Microsoft Word | 67 |
| SAP | 93 | SAP | 42 |
| Microsoft PowerPoint | 80 | Microsoft PowerPoint | 35 |

Occupational Demand Projections

The largest occupation is packaging and filling machine operators and tenders, which has the greatest projected gain, 267 new jobs by 2021 with 256 annual openings (Exhibit 87). The second largest occupation is industrial machinery mechanics, 282 new jobs with 109 annual openings, followed by team assemblers, 169 new jobs and 87 annual openings.

Exhibit 87: Manufacturing occupational projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|---|-------------|-------------|------------------------|--------------------------|----------------------------|
| Packaging and Filling Machine Operators and Tenders | 5,482 | 5,749 | 267 | 5% | 256 |
| Industrial Machinery Mechanics | 1,826 | 2,108 | 282 | 15% | 109 |
| Team Assemblers | 2328 | 2497 | 169 | 7% | 87 |
| Inspectors, Testers, Sorters, Samplers and Weighers | 2159 | 2283 | 124 | 6% | 82 |
| First-Line Supervisors of Production and Operating Workers | 2631 | 2748 | 117 | 4% | 67 |
| First-Line Supervisors of Mechanics, Installers and Repairers | 1653 | 1800 | 147 | 9% | 64 |
| Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders | 1032 | 1116 | 84 | 8% | 52 |
| Production, Planning and Expediting Clerks | 915 | 1002 | 87 | 10% | 44 |
| Production Workers, All Other | 1089 | 1172 | 83 | 8% | 41 |
| Food Batchmakers | 1134 | 1174 | 40 | 4% | 33 |
| Paper Goods Machine Setters, Operators and Tenders | 748 | 848 | 100 | 13% | 32 |
| Industrial Production Managers | 824 | 858 | 34 | 4% | 31 |
| Mixing and Blending Machine Setters, Operators and Tenders | 945 | 982 | 37 | 4% | 29 |
| Assemblers and Fabricators, All Other | 394 | 453 | 59 | 15% | 21 |
| Maintenance Workers, Machinery | 590 | 643 | 53 | 9% | 21 |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | 235 | 272 | 37 | 16% | 15 |
| Food Processing Workers, All Other | 424 | 443 | 19 | 4% | 13 |
| Molders, Shapers and Casters, Except Metal and Plastic | 261 | 271 | 10 | 4% | 12 |
| Coating, Painting and Spraying Machine Setters, Operators and Tenders | 269 | 293 | 24 | 9% | 10 |

Wages

The highest hourly wages are earned by industrial production managers and first-line supervisors of mechanics, installers and repairers (Exhibit 88). One-third of the occupations, however, have entry-level wages below the subregion's average living wage for a single adult.

Exhibit 88: Manufacturing wages

| Occupation | Pct. 10 Hourly Wages | Median Hourly Wages |
|---|-------------------------|------------------------|
| Industrial Production Managers | \$26.40 | \$40.83 |
| First-Line Supervisors of Mechanics, Installers and Repairers | \$19.53 | \$31.49 |
| Industrial Machinery Mechanics | \$18.30 | \$26.01 |
| First-Line Supervisors of Production and Operating Workers | \$15.15 | \$25.22 |
| Production, Planning and Expediting Clerks | \$14.57 | \$22.97 |
| Maintenance Workers, Machinery | \$12.70 | \$18.67 |
| Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders | \$12.27 | \$18.45 |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | \$11.48 | \$19.33 |
| Molders, Shapers and Casters, Except Metal and Plastic | \$11.43 | \$13.91 |
| Coating, Painting and Spraying Machine Setters, Operators and Tenders | \$11.24 | \$16.13 |
| Inspectors, Testers, Sorters, Samplers and Weighers | \$11.14 | \$17.80 |
| Assemblers and Fabricators, All Other | \$10.37 | \$12.87 |
| Food Batchmakers | \$10.00 | \$15.40 |
| Food Processing Workers, All Other | \$9.99 | \$12.03 |
| Mixing and Blending Machine Setters, Operators and Tenders | \$9.94 | \$14.77 |
| Production Workers, All Other | \$9.91 | \$11.76 |
| Team Assemblers | \$9.71 | \$13.38 |
| Packaging and Filling Machine Operators and Tenders | \$9.66 | \$14.65 |
| Paper Goods Machine Setters, Operators and Tenders | \$9.35 | \$12.03 |

Education Level

Exhibit 89 shows education levels required for occupations that fall within the manufacturing industry. The typical entry-level education of industrial production managers is a bachelor's degree, and this occupation falls only minutely short of meeting the 33% CPS threshold. The remaining occupations have education requirements below the community college level. However, nearly three-quarters of them have moderate-term to long-term on-the-job training requirements or upskilling needs that are addressed by many local community college programs.

Exhibit 89: Manufacturing education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|--------------------------------------|---------------------------------|------------------------------------|------------|
| Packaging and Filling Machine Operators and Tenders | High school diploma or equivalent | None | Moderate-term | 18.6% |
| Industrial Machinery Mechanics | High school diploma or equivalent | None | Long-term | 41.7% |
| Team Assemblers | High school diploma or equivalent | None | Moderate-term | 29.2% |
| Inspectors, Testers, Sorters, Samplers and Weighers | High school diploma or equivalent | None | Moderate-term | 37.7% |
| First-Line Supervisors of Production and Operating Workers | High school diploma or equivalent | Less than 5 years | None | 35.3% |
| First-Line Supervisors of Mechanics, Installers and Repairers | High school diploma or equivalent | Less than 5 years | None | 42.9% |
| Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders | High school diploma or equivalent | None | Moderate-term | 41.0% |
| Production, Planning and Expediting Clerks | High school diploma or equivalent | None | Moderate-term | 40.1% |
| Production Workers, All Other | High school diploma or equivalent | None | Moderate-term | 26.7% |
| Food Batchmakers | High school diploma or equivalent | None | Moderate-term | 27.0% |
| Paper Goods Machine Setters, Operators and Tenders | High school diploma or equivalent | None | Moderate-term | 30.4% |
| Industrial Production Managers | Bachelor's degree | 5 years or more | None | 32.7% |
| Mixing and Blending Machine Setters, Operators and Tenders | High school diploma or equivalent | None | Moderate-term | 26.8% |
| Assemblers and Fabricators, All Other | High school diploma or equivalent | None | Moderate-term | 29.2% |
| Maintenance Workers, Machinery | High school diploma or equivalent | None | Moderate-term | 34.5% |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | High school diploma or equivalent | None | Moderate-term | 43.6% |
| Food Processing Workers, All Other | No formal educational credential | None | Moderate-term | 18.7% |
| Molders, Shapers and Casters, Except Metal and Plastic | High school diploma or equivalent | None | Long-term | 24.4% |
| Coating, Painting and Spraying Machine Setters, Operators and Tenders | High school diploma or equivalent | None | Moderate-term | 27.1% |

Community College Supply

Exhibit 90 shows annual job openings and corresponding program titles with student completion data.

Exhibit 90: Manufacturing community college supply

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|---|---------------------------|--|------------------------------------|---|
| Packaging and Filling Machine Operators and Tenders (51-9111) | 256 | No corresponding programs | | |
| Industrial Machinery Mechanics (49-9041) | 109 | No corresponding programs | | |
| Team Assemblers (51-2092) | 87 | No corresponding programs | | |
| Inspectors, Testers, Sorters, Samplers and Weighers (51-9061) | 82 | Biotechnology and Biomedical Technology - 043000 | 2 | 0 |
| | | Laboratory Science Technology - 095500 | 0 | - |
| | | Manufacturing and Industrial Technology - 095600 | - | - |
| | | Industrial Quality Control - 095680 | - | - |
| First-Line Supervisors of Production and Operating Workers (51-1011) | 67 | No corresponding programs | | |
| First-Line Supervisors of Mechanics, Installers and Repairers (49-1011) | 64 | Electrical Systems and Power Transmission - 093440 | - | - |
| | | Recreational Vehicle Service - 094850 | - | - |
| Separating, Filtering, Clarifying, Precipitating and Still Machine Setters, Operators and Tenders (51-9012) | 52 | No corresponding programs | | |
| Production, Planning and Expediting Clerks (43-5061) | 44 | Logistics and Materials Transportation - 051000 | 0 | 1 |
| Production Workers, All Other (51-9199) | 41 | No corresponding programs | | |
| Food Batchmakers (51-3092) | 33 | No corresponding programs | | |
| Paper Goods Machine Setters, Operators and Tenders (51-9196) | 32 | No corresponding programs | | |
| Industrial Production Managers (11-3051) | 31 | Business and Commerce, General - 050100 | 243 | 4 |
| | | Business Administration - 050500 | 255 | - |
| | | Business Management - 050600 | 16 | 6 |

| Occupation | Annual Openings (2016-21) | Program - TOP6 | Total Annual Avg Degrees (2013-16) | Total Annual Avg Certificates (2013-16) |
|---|---------------------------|--|------------------------------------|---|
| Mixing and Blending Machine Setters, Operators and Tenders (51-9023) | 29 | No corresponding programs | | |
| Assemblers and Fabricators, All Other (51-2099) | 21 | No corresponding programs | | |
| Maintenance Workers, Machinery (49-9043) | 21 | No corresponding programs | | |
| Computer-Controlled Machine Tool Operators, Metal and Plastic (51-4011) | 15 | Manufacturing and Industrial Technology - 095600 | - | - |
| | | Machining and Machine Tools - 095630 | 1 | 15 |
| Food Processing Workers, All Other (51-3099) | 13 | No corresponding programs | | |
| Molders, Shapers and Casters, Except Metal and Plastic (51-9195) | 12 | No corresponding programs | | |
| Coating, Painting and Spraying Machine Setters, Operators and Tenders (51-9121) | 10 | No corresponding programs | | |

Source: EMSI, MIS, Data Mart, Center of Excellence TOP-CIP-SOC



CONCLUSION & RECOMMENDATIONS

The North Central Valley/Northern Mother Lode's population currently totals more than 1.7 million residents and is projected to add more than 54,000 new residents by 2022.

This study focused on eight industries: agriculture, water and environmental technologies; energy, construction and utilities; global trade and logistics; retail and hospitality; protective services; ICT/digital media; health care; and manufacturing.

Collectively, these industries employ approximately 454,000 workers and are projected to offer 35,098 new jobs by 2021 in the North Central Valley/Northern Mother Lode Subregion.

Of the eight industries analyzed, the health care industry accounts for 39% of projected job growth by 2021 in the subregion. Community colleges are strongly encouraged to take into consideration the rapid expansion that the health care industry will undergo over the next five years. Other industries where substantial job growth is expected to occur are retail, hospitality and tourism, and global trade and logistics.

Retail, hospitality and tourism will generate more than 5,800 new jobs while global trade and logistics will create 6,646 new jobs. ICT/digital media represents the smallest industry analyzed by the study and is projected to offer only 388 new jobs in the subregion by 2021.

Across all industries, software skills most highly in demand revolve around Microsoft Office, with employers frequently seeking workers who are skilled in Microsoft Word, Excel and PowerPoint.

Key findings and recommendations:

- **AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES**—Community college programs focusing on agriculture and the life sciences may want to tailor programs toward business types in the subregion that will be adding the most jobs over the next five years: support activities for crop production (1,900 jobs), crop production (550 jobs), and commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance (219 jobs). The animal production and aquaculture business type is expected to lose nearly 400 jobs.
- **ENERGY, CONSTRUCTION & UTILITIES**—The building equipment contractors business type is projected to add 654 jobs in the North Central Valley/Northern Mother Lode Subregion by 2021. Meanwhile, utility system construction will expand rapidly by 32%, adding 413 jobs. Community college programs may want to focus on preparing students to enter these business types. In addition, the industry's top job postings in the region revolve around the skilled trades. Job postings for electricians (including journeyman electricians and electrician foremen) are the most common job ads related to this industry.
- **GLOBAL TRADE & LOGISTICS**—Global trade and logistics will be a major driver of employment in the subregion over the next five years. Warehousing and storage is expected to add more than 3,400 jobs, and general freight trucking will add 811 jobs. Community college programs may want to consider expanding or revising programs to incorporate these areas, and should work with employers now to start building pipelines to jobs in these business types. The top five job postings (nearly 5,000) related to global trade and logistics are for a variety of drivers. Colleges may to prepare for a decline in employment related to offices of real estate agents and brokers (NAICS 5312), which is expected to shed 252 jobs in the subregion.

- **RETAIL, HOSPITALITY & TOURISM**—The greatest number of new jobs related to this industry will be created by restaurants and other eating places, which have a growth rate of 9%, representing the addition of 3,393 jobs. Job postings in the subregion are most commonly for sales associates, sales consultants and sales representatives.
- **PROTECTIVE SERVICES**—Job postings in the subregion most frequently sought security officers in the last 12 months. While protective services occupations associated with the federal government are expected to shrink by 2021, with a projected loss of 800 jobs, state government (excluding education and hospitals) and local government (excluding education and hospitals) are projected to rapidly expand, adding more than 3,500 jobs by 2021. Students majoring in programs related to protective services should have strong job outlooks.
- **ICT/DIGITAL MEDIA**—While ICT/digital media is the smallest of the eight industries studied, this industry contains one business type that will grow by a third over the next five years. Wired telecommunications is projected to create 412 new positions by 2021. Community colleges may want to evaluate whether current programs sufficiently address the projected need for workers in this business type.
- **HEALTH CARE**—Of all the industries analyzed, the health care industry is expected to offer the most employment opportunities, more than 13,500 new jobs, in the North Central Valley/Northern Mother Lode Subregion over the next five years. Business types with the most projected growth include: individual and family services, 5,887 new jobs; outpatient care centers, 2,000 new jobs; home health care services 1,410 new jobs; and offices of physicians and nursing care facilities (skilled nursing facilities), 1,100 new jobs. The most common job posting is for registered nurses. In the last 12 months, there were 3,631 job postings for this occupation in the subregion.
- **MANUFACTURING**—Two business types within the manufacturing industry are projected to be significant job generators over the next five years in the North Central Valley/Northern Mother Lode Subregion. Beverage manufacturing will grow by 11%, adding 755 jobs, and converted paper product manufacturing will grow by 18%, adding 381 jobs. CTE programs at the community colleges in the subregion may want to partner with firms in these business types to connect students with jobs, and may want to tailor or update programs to incorporate curriculum or work experience opportunities related to these business types. The most common job posting related to manufacturing in last 12 months was for machine operators (more than 100 job postings). Repair, inspection and scheduling are in-demand specialized skills in the subregion.

APPENDIX A: METHODOLOGY & DATA SOURCES

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

| Data Type | Source |
|--|---|
| Labor Market Information/Population Estimates and Projections/Educational Attainment | Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com . |
| Living Wage | A living wage calculator that estimates the cost of living in a specific community or subregion: livingwage.mit.edu . |
| Typical Education Level and On-the-job Training | Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: www.bls.gov/emp/ep_education_tech.htm . |
| Labor Force, Employment and Unemployment Estimates | California Employment Development Department, Labor Market Information Division, labormarketinfo.edd.ca.gov |
| Job Posting and Skills Data | Burning Glass, http://www.burning-glass.com/ |
| Additional Education Requirements/Employer Preferences | The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledges, work activities and interests associated with specific occupations: www.onetonline.org |

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or subregion for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.

Wages Family Compositions: The living wage calculator estimates the living wage needed to support families. For single adult families, the adult is assumed to be employed full time. For two adult families where both adults are in the labor force, both adults are assumed to be employed full time. For two adult families where one adult is not in the labor force, one of the adults is assumed to be employed full time while the other non-wage-earning adult provides full-time child care for the family's children. Full-time work is assumed to be year-round, 40 hours per week for 52 weeks, per adult. Families with one child are assumed to have a 'young child' (4 years old). Families with two children are assumed to have a 'young child' and a 'child' (9 years old). Families with three children are assumed to have a 'young child,' a 'child,' and a 'teenager' (15 years old).

APPENDIX B: BUSINESS OCCUPATIONAL DATA

Exhibit 1B: Business occupational demand projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|---|-------|-------|-------------|---------------|-----------------|
| Customer Service Representatives | 5,353 | 5,840 | 487 | 9% | 237 |
| Secretaries and Administrative Assistants, Except Legal, Medical, and Executive | 8,159 | 8,762 | 603 | 7% | 213 |
| First-Line Supervisors of Office and Administrative Support Workers | 5,437 | 5,898 | 461 | 8% | 180 |
| Billing and Posting Clerks | 2,284 | 2,510 | 226 | 10% | 96 |
| Office and Administrative Support Workers, All Other | 1,835 | 1,995 | 160 | 9% | 85 |
| Insurance Sales Agents | 1,699 | 1,846 | 147 | 9% | 79 |
| Bookkeeping, Accounting, and Auditing Clerks | 6,111 | 6,148 | 37 | 1% | 77 |
| Business Operations Specialists, All Other | 2,002 | 2,166 | 164 | 8% | 58 |
| Cost Estimators | 965 | 1,020 | 55 | 6% | 40 |
| Executive Secretaries and Executive Administrative Assistants | 1,877 | 1,942 | 65 | 3% | 35 |
| Payroll and Timekeeping Clerks | 980 | 1,014 | 34 | 3% | 34 |
| Administrative Services Managers | 854 | 933 | 79 | 9% | 33 |
| Purchasing Agents, Except Wholesale, Retail, and Farm Products | 711 | 753 | 42 | 6% | 29 |
| First-Line Supervisors of Housekeeping and Janitorial Workers | 877 | 945 | 68 | 8% | 28 |
| Interviewers, Except Eligibility and Loan | 699 | 740 | 41 | 6% | 25 |
| Eligibility Interviewers, Government Programs | 623 | 708 | 85 | 14% | 25 |
| First-Line Supervisors of Non-Retail Sales Workers | 1,210 | 1,247 | 37 | 3% | 23 |
| Data Entry Keyers | 838 | 861 | 23 | 3% | 16 |
| Human Resources Assistants, Except Payroll and Timekeeping | 495 | 529 | 34 | 7% | 13 |
| Court, Municipal, and License Clerks | 468 | 508 | 40 | 9% | 11 |

Exhibit 2B: Business and financial job postings

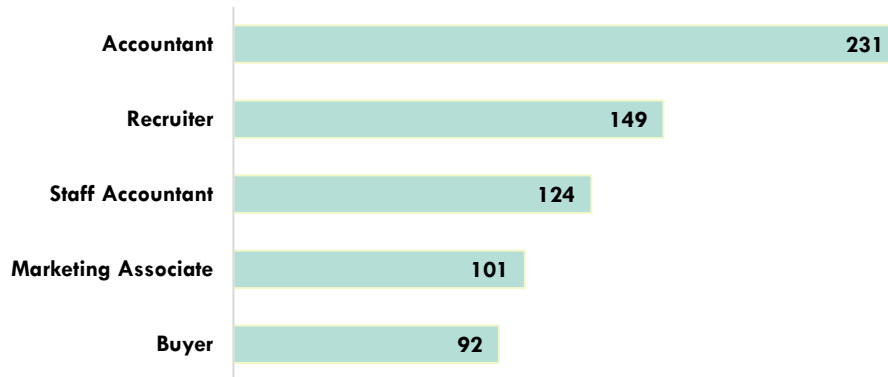


Exhibit 3B: Office and administrative support job postings

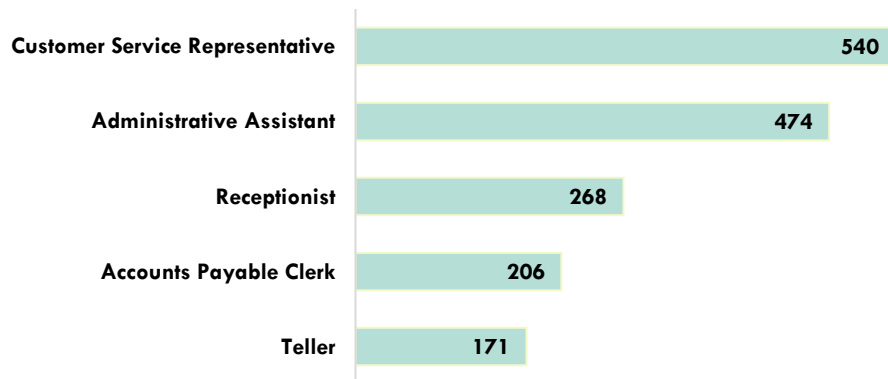


Exhibit 4B: Business industry baseline skills

| Business & Financial | | Office Administration & Support | |
|---------------------------------|---------------------|--|---------------------|
| Baseline Skills | Job Postings | Baseline Skills | Job Postings |
| Communication Skills | 780 | Communication Skills | 2,180 |
| Writing | 611 | Organizational Skills | 1,329 |
| Organizational Skills | 491 | Detail-Oriented | 1,327 |
| Planning | 357 | Writing | 1,290 |
| Research | 322 | Typing | 1,248 |

Exhibit 5B: Business industry specialized skills

| Business & Financial | | Office Administration & Support | |
|---------------------------------|---------------------|--|---------------------|
| Specialized Skills | Job Postings | Specialized Skills | Job Postings |
| Microsoft Excel | 785 | Customer Service | 2,040 |
| Accounting | 658 | Microsoft Excel | 1,878 |
| Budgeting | 386 | Data Entry | 1,304 |
| Microsoft Office | 386 | Scheduling | 1,177 |
| Customer Service | 361 | Administrative Support | 1,126 |

Exhibit 6B: Business industry software skills

| Business & Financial | | Office Administration & Support | |
|---------------------------------|---------------------|--|---------------------|
| Software Skills | Job Postings | Software Skills | Job Postings |
| Microsoft Excel | 785 | Microsoft Excel | 1,878 |
| Microsoft Office | 386 | Microsoft Office | 897 |
| Microsoft Word | 325 | Microsoft Word | 886 |
| Microsoft PowerPoint | 237 | Microsoft PowerPoint | 286 |
| Microsoft Access | 96 | Word Processing | 286 |

Exhibit 7B: Business occupational wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Customer Service Representatives | \$11.14 | \$16.63 |
| Secretaries and Administrative Assistants, Except Legal, Medical and Executive | \$10.69 | \$17.07 |
| First-Line Supervisors of Office and Administrative Support Workers | \$15.90 | \$24.76 |
| Billing and Posting Clerks | \$10.95 | \$15.38 |
| Office and Administrative Support Workers, All Other | \$9.98 | \$12.98 |
| Insurance Sales Agents | \$15.60 | \$23.46 |
| Bookkeeping, Accounting and Auditing Clerks | \$11.17 | \$17.86 |
| Business Operations Specialists, All Other | \$16.58 | \$31.10 |
| Cost Estimators | \$15.61 | \$27.00 |
| Executive Secretaries and Executive Administrative Assistants | \$16.94 | \$24.99 |
| Payroll and Timekeeping Clerks | \$14.06 | \$19.89 |
| Administrative Services Managers | \$22.97 | \$40.87 |
| Purchasing Agents, Except Wholesale, Retail, and Farm Products | \$18.49 | \$28.54 |
| First-Line Supervisors of Housekeeping and Janitorial Workers | \$12.31 | \$18.02 |
| Interviewers, Except Eligibility and Loan | \$10.61 | \$16.96 |
| Eligibility Interviewers, Government Programs | \$17.27 | \$23.81 |
| First-Line Supervisors of Non-Retail Sales Workers | \$14.96 | \$22.99 |
| Data Entry Keyers | \$10.97 | \$14.97 |
| Human Resources Assistants, Except Payroll and Timekeeping | \$11.11 | \$19.54 |
| Court, Municipal and License Clerks | \$15.29 | \$19.54 |

Exhibit 8B: Business education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|--------------------------------------|---------------------------------|------------------------------------|------------|
| Customer Service Representatives | High school diploma or equivalent | None | Short-term | 43.7% |
| Secretaries and Administrative Assistants, Except Legal, Medical, and Executive | High school diploma or equivalent | None | Short-term | 47.5% |
| First-Line Supervisors of Office and Administrative Support Workers | High school diploma or equivalent | Less than 5 years | None | 40.8% |
| Billing and Posting Clerks | High school diploma or equivalent | None | Moderate-term | 49.6% |
| Office and Administrative Support Workers, All Other | High school diploma or equivalent | None | Short-term | 42.7% |
| Insurance Sales Agents | High school diploma or equivalent | None | Moderate-term | 35.6% |
| Bookkeeping, Accounting, and Auditing Clerks | Some college, no degree | None | Moderate-term | 48.8% |
| Business Operations Specialists, All Other | Bachelor's degree | None | None | 27.9% |
| Cost Estimators | Bachelor's degree | None | None | 40.8% |
| Executive Secretaries and Executive Administrative Assistants | High school diploma or equivalent | Less than 5 years | None | 47.5% |
| Payroll and Timekeeping Clerks | High school diploma or equivalent | None | Moderate-term | 51.3% |
| Administrative Services Managers | Bachelor's degree | Less than 5 years | None | 42% |
| Purchasing Agents, Except Wholesale, Retail, and Farm Products | Bachelor's degree | None | Long-term | 36.5% |
| First-Line Supervisors of Housekeeping and Janitorial Workers | High school diploma or equivalent | Less than 5 years | None | 35.2% |
| Interviewers, Except Eligibility and Loan | High school diploma or equivalent | None | Short-term | 49.5% |
| Eligibility Interviewers, Government Programs | High school diploma or equivalent | None | Moderate-term | 38.4% |
| First-Line Supervisors of Non-Retail Sales Workers | High school diploma or equivalent | Less than 5 years | None | 32.2% |
| Data Entry Keyers | High school diploma or equivalent | None | Moderate-term | 46.3% |
| Human Resources Assistants, Except Payroll and Timekeeping | Associate degree | None | None | 46.7% |

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|--|---|--|------------|
| Court, Municipal, and License Clerks | High school diploma or equivalent | None | Moderate- term | 47.5% |
| Tax Examiners and Collectors, and Revenue Agents | Bachelor's degree | None | Moderate- term | 35% |
| Compensation, Benefits, and Job Analysis Specialists | Bachelor's degree | Less than 5 years | None | 33% |

APPENDIX C: MULTI-SECTOR OCCUPATIONAL DATA

Exhibit 1C: Multi-sector occupational demand projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|--|-------|-------|-------------|---------------|-----------------|
| Bus and Truck Mechanics and Diesel Engine Specialists | 1,409 | 1,564 | 155 | 11% | 57 |
| Installation, Maintenance and Repair Workers, All Other | 892 | 937 | 45 | 5% | 23 |
| Mobile Heavy Equipment Mechanics, Except Engines | 577 | 609 | 32 | 6% | 21 |
| Security and Fire Alarm Systems Installers | 200 | 231 | 31 | 16% | 12 |
| Structural Metal Fabricators and Fitters | 416 | 438 | 22 | 5% | 12 |
| Aircraft Mechanics and Service Technicians | 146 | 159 | 13 | 9% | 6 |
| Control and Valve Installers and Repairers, Except Mechanical Door | 92 | 101 | 9 | 10% | 6 |
| Welders, Cutters, Solderers and Brazers | 1,730 | 1,814 | 84 | 5% | 71 |
| Machinists | 924 | 1,021 | 97 | 10% | 49 |
| Sheet Metal Workers | 535 | 570 | 35 | 7% | 19 |
| Telecommunications Line Installers and Repairers | 279 | 336 | 57 | 20% | 17 |
| Wind Turbine Service Technicians | 125 | 156 | 31 | 25% | 9 |
| Crane and Tower Operators | 142 | 158 | 16 | 11% | 9 |

Exhibit 2C: Multi-sector occupational wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Bus and Truck Mechanics and Diesel Engine Specialists | \$15.80 | \$21.55 |
| Installation, Maintenance and Repair Workers, All Other | \$11.17 | \$16.05 |
| Mobile Heavy Equipment Mechanics, Except Engines | \$16.02 | \$24.25 |
| Security and Fire Alarm Systems Installers | \$13.37 | \$19.32 |
| Structural Metal Fabricators and Fitters | \$14.80 | \$20.91 |
| Aircraft Mechanics and Service Technicians | \$15.87 | \$25.30 |
| Control and Valve Installers and Repairers, Except Mechanical Door | \$18.54 | \$30.56 |
| Welders, Cutters, Solderers and Brazers | \$13.07 | \$18.74 |
| Machinists | \$11.98 | \$18.89 |
| Sheet Metal Workers | \$13.43 | \$20.24 |
| Telecommunications Line Installers and Repairers | \$19.71 | \$31.02 |
| Wind Turbine Service Technicians | \$16.37 | \$22.14 |
| Crane and Tower Operators | \$17.88 | \$34.76 |

Exhibit 2C: Multi-sector education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|--------------------------------------|---------------------------------|------------------------------------|------------|
| Bus and Truck Mechanics and Diesel Engine Specialists | High school diploma or equivalent | None | Long-term | 34.8% |
| Installation, Maintenance and Repair Workers, All Other | High school diploma or equivalent | None | Moderate-term | 35% |
| Mobile Heavy Equipment Mechanics, Except Engines | High school diploma or equivalent | None | Long-term | 37% |
| Security and Fire Alarm Systems Installers | High school diploma or equivalent | None | Moderate-term | 47.2% |
| Structural Metal Fabricators and Fitters | High school diploma or equivalent | None | Moderate-term | 34.7% |
| Aircraft Mechanics and Service Technicians | Postsecondary nondegree award | None | None | 60% |
| Control and Valve Installers and Repairers, Except Mechanical Door | High school diploma or equivalent | None | Moderate-term | 49.1% |
| Medical Equipment Repairers | Associate degree | None | Moderate-term | 54.4% |
| Electrical and Electronics Repairers, Commercial and Industrial Equipment | Postsecondary nondegree award | None | Long-term | 56.8% |
| Welders, Cutters, Solderers and Brazers | High school diploma or equivalent | None | Moderate-term | 28.2% |
| Machinists | High school diploma or equivalent | None | Long-term | 38.8% |
| Sheet Metal Workers | High school diploma or equivalent | None | Apprenticeship | 34.4% |
| Telecommunications Line Installers and Repairers | High school diploma or equivalent | None | Long-term | 47.2% |
| Wind Turbine Service Technicians | Some college, no degree | None | Long-term | 35% |
| Crane and Tower Operators | High school diploma or equivalent | Less than 5 years | Moderate-term | 26.6% |
| Electrical and Electronics Engineering Technicians | Associate degree | None | None | 55.1% |
| Chemical Technicians | Associate degree | None | Moderate-term | 35.8% |
| Millwrights | High school diploma or equivalent | None | Apprenticeship | 42.3% |

APPENDIX D: ALL OTHER OCCUPATIONAL DATA

Exhibit 1D: All other occupational demand projections

| Occupation | 2016 | 2021 | 5-Yr Change | 5-Yr % Change | Annual Openings |
|---|-------|-------|-------------|---------------|-----------------|
| Teacher Assistants | 6,997 | 7,598 | 601 | 9% | 301 |
| Automotive Service Technicians and Mechanics | 2,770 | 2,904 | 134 | 5% | 105 |
| Bus Drivers, School or Special Client | 1,685 | 1,952 | 267 | 16% | 78 |
| Kindergarten Teachers, Except Special Education | 1,191 | 1,273 | 82 | 7% | 53 |
| Dispatchers, Except Police, Fire and Ambulance | 1,050 | 1,148 | 98 | 9% | 48 |
| Bus Drivers, Transit and Intercity | 681 | 787 | 106 | 16% | 31 |
| Weighers, Measurers, Checkers and Samplers, Recordkeeping | 736 | 775 | 39 | 5% | 31 |
| Automotive Body and Related Repairers | 761 | 809 | 48 | 6% | 29 |
| Library Technicians | 424 | 460 | 36 | 8% | 29 |
| Training and Development Specialists | 555 | 622 | 67 | 12% | 28 |
| Paralegals and Legal Assistants | 1,053 | 1,074 | 21 | 2% | 28 |
| Library Assistants, Clerical | 404 | 438 | 34 | 8% | 20 |
| Photographers | 334 | 345 | 11 | 3% | 13 |
| Painters, Transportation Equipment | 307 | 325 | 18 | 6% | 10 |
| Career/Technical Education Teachers, Secondary School | 160 | 185 | 25 | 16% | 9 |

Exhibit 2D: All other occupational wages

| Occupation | Entry-level Wages | Median Hourly Wages |
|--|-------------------|---------------------|
| Automotive Service Technicians and Mechanics | \$10.31 | \$17.06 |
| Teacher Assistants | \$10.96 | \$15.26 |
| Bus Drivers, School or Special Client | \$11.28 | \$16.44 |
| Kindergarten Teachers, Except Special Education | \$21.82 | \$32.14 |
| Dispatchers, Except Police, Fire, and Ambulance | \$12.21 | \$19.90 |
| Bus Drivers, Transit and Intercity | \$11.16 | \$19.60 |
| Weighers, Measurers, Checkers, and Samplers, Recordkeeping | \$9.52 | \$13.07 |
| Automotive Body and Related Repairers | \$12.60 | \$18.60 |
| Library Technicians | \$14.35 | \$17.22 |
| Training and Development Specialists | \$14.80 | \$23.06 |
| Paralegals and Legal Assistants | \$18.30 | \$25.13 |
| Library Assistants, Clerical | \$10.17 | \$14.20 |
| Photographers | \$12.31 | \$16.04 |
| Painters, Transportation Equipment | \$15.50 | \$20.45 |
| Career/Technical Education Teachers, Secondary School | \$22.17 | \$30.71 |

Exhibit 3D: All other education levels

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|-----------------------------------|--------------------------|-----------------------------|-------|
| Teacher Assistants | Some college, no degree | None | None | 43.7% |
| Automotive Service Technicians and Mechanics | Postsecondary nondegree award | None | Short-term | 33.4% |
| Bus Drivers, School or Special Client | High school diploma or equivalent | None | Short-term | 36.1% |
| Kindergarten Teachers, Except Special Education | Bachelor's degree | None | Internship/residency | 37.8% |
| Dispatchers, Except Police, Fire and Ambulance | High school diploma or equivalent | None | Moderate-term | 47.6% |
| Bus Drivers, Transit and Intercity | High school diploma or equivalent | None | Moderate-term | 36.1% |
| Weighers, Measurers, Checkers and Samplers, Recordkeeping | High school diploma or equivalent | None | Short-term | 33.9% |

| Occupation | Typical Entry-Level Education | Work Experience Required | Typical On-The-Job Training | CPS |
|---|--------------------------------------|---------------------------------|------------------------------------|------------|
| Automotive Body and Related Repairers | High school diploma or equivalent | None | Long-term | 26.1% |
| Library Technicians | Postsecondary nondegree award | None | None | 26.1% |
| Training and Development Specialists | Bachelor's degree | Less than 5 years | None | 33.7% |
| Paralegals and Legal Assistants | Associate degree | None | None | 42.6% |
| Library Assistants, Clerical | High school diploma or equivalent | None | Short-term | 37.6% |
| Photographers | High school diploma or equivalent | None | Long-term | 33% |
| Painters, Transportation Equipment | High school diploma or equivalent | None | Moderate-term | 27.1% |
| Career/Technical Education Teachers, Secondary School | Bachelor's degree | Less than 5 years | Internship/residency | 4.8% |
| Civil Engineering Technicians | Associate degree | None | None | 55.1% |
| Electrical and Electronic Equipment Assemblers | High school diploma or equivalent | None | Moderate-term | 30.1% |
| Special Education Teachers, Preschool | Bachelor's degree | None | Internship/residency | 9.7% |
| Bicycle Repairers | High school diploma or equivalent | None | Moderate-term | 21.8% |