



2023 OVERVIEW:

CENTRAL VALLEY/ MOTHER LODE REGION

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TABLE OF CONTENTS

Central Valley/Mother Lode College Area3

Executive Summary4

Introduction.....5

Methodology5

Regional Overview6

K-12 Enrollment and Demographics 12

CE Enrollment and Demographics 15

Sector Composition 18

Middle-Skill Jobs Composition 19

Advanced Manufacturing 23

Advanced Transportation & Logistics 28

Agriculture, Water & Environmental Technologies 33

Business & Entrepreneurship 38

Education 43

Energy, Construction & Utilities 48

Health 53

ICT/Digital Media..... 58

Public Safety 63

Retail, Hospitality & Tourism 68

Conclusion 73

Appendix A: Methodology & Data Sources 76

Appendix B: Postsecondary Supply for Each Sector 78

Appendix C: Educational Attainment for the Top Occupations in Each Sector 100



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CENTRAL VALLEY/MOTHER LODGE COLLEGE AREA

Exhibit 1. Map of community colleges in the Central Valley/Mother Lode region



EXECUTIVE SUMMARY

Having completed an extensive analysis of postsecondary supply and workforce demand, the Central Valley/Mother Lode Center of Excellence (COE) has released its 2023 annual report on the 10 sectors/occupational groupings critical to the Central Valley/Mother Lode (CVML) region's economic vitality.¹ This report examines where future job growth is expected to occur in the region's labor market and estimates workforce gaps, i.e., potential shortages of workers to fill middle-skill jobs in each sector. The report includes current occupational demand, wages, and educational supply for the 10 sectors and summarizes a variety of metrics related to population demographics and community college career education (CE) programs and enrollment in the region.

Within the region, the 10 sectors detailed in this study are projected to offer over 102,500 annual openings each year in middle-skill occupations, those requiring more education and training than a high school diploma, but less than a bachelor's degree. By comparison, postsecondary institutions in the region are conferring 22,252 awards on average each year, a slight decrease from the previous year's analysis which shows a total of 22,264 average annual awards. A comparison between workforce demand and the number of awards being earned in the region shows an undersupply of 80,297 workers in the region.

The three sectors with the greatest number of annual openings also have the largest gaps in workforce supply in the region:

- **Health**, a shortage of 15,664 workers
- **Business and entrepreneurship**, a shortage of 15,161 workers
- **Energy, construction, and utilities**, a shortage of 11,034 workers

Sectors with the smallest gaps in workforce supply include public safety (a shortage of only 1,853 workers) and advanced manufacturing (a shortage of 4,157 workers). On average each year, the greatest number of awards are being conferred by programs in the health sector (7,949 awards), business and entrepreneurship sector (2,911 awards), and education sector (2,340 awards). The fewest awards are being conferred in ICT/digital media (955 awards) and advanced manufacturing (1,080 awards).

Other findings:

- Regionally, the health sector leads all other sectors in terms of the number of anticipated job openings, accounting for nearly 23% of projected workforce demand in the region.
- Several sectors with programs that have a low number of awards also have proportionally large undersupplies: advanced manufacturing (1,080 average awards and an undersupply of 4,157 workers, translating to 4 times as much demand as supply); advanced transportation and logistics (1,222 awards and an undersupply of 9,410, about 8 times as much demand as supply); and ICT/digital media (955 awards and an undersupply of 5,660, 6 times as much demand as supply). While these potential workforce shortages are smaller in terms of overall number than the business and entrepreneurship sector, and the health sector, these sectors still play a critical role in powering the regional economy and intersect with other fields of work of regional importance, such as business and agriculture.
- This analysis identifies 15 occupations with the most annual openings across all 10 sectors in the region. Some sectors contain more than one of these occupations due to strong projected growth projections or large employment size. (See the Conclusion section for the list of 15 occupations.)

¹ Referred to henceforth as sectors in this report, the 10 sectors analyzed by the COE adhere to the sector title designations from the California Community Colleges Chancellor's Office: <https://www.cccco.edu/About-Us/Chancellors-Office/Divisions/Workforce-and-Economic-Development/Strong-Workforce-Program/SWP-Archive/Events/K12-SWP-Industry-Sector-Crosswalk>.

INTRODUCTION

The Center of Excellence has conducted an extensive labor market analysis focusing on the Central Valley/Mother Lode region. The community colleges in the region are shown in Exhibit 1. In total, 10 sectors were analyzed for this report, and their workforce demand was compared with postsecondary supply. A sector represents a cluster or grouping of primary occupations, comprising a segment of one or multiple industries. For each sector, the report details current employment numbers, projected occupational demand, wages, common skills in job postings, race/ethnicity, age, and gender composition of the workforce, and a three-year average supply of awards (degrees and certificates) from two-year higher education institutions. Each sector section contains a gap analysis, i.e., a comparison of workforce demand (annual openings) and educational supply (awards), to illustrate potential shortages of workers. This report is organized by the 10 sectors in the region.



METHODOLOGY

Labor market data, particularly secondary data related to workforce demand 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. The average living wage for a single adult in the Central Valley/Mother Lode region is \$12.31/hour.² The criteria for occupations included in this report were determined by the Central Valley/Mother Lode Center of Excellence based on COE leadership and CVML consortium discussions and recommendations. The occupational demand data includes only community college relevant (middle-skill) jobs that are directly related to a sector having 25 or more annual openings. Occupational projections include annual openings. Replacements can be determined by subtracting annual openings from overall job change. If the change is negative, then all the annual openings are replacements. (For more information on the data sources employed by this study, please refer to Appendix A.) Each sector section of the report contains an analysis of postsecondary supply which counts awards by TOP6 codes for programs listed in the Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP). Appendix B contains educational attainment for the top occupations in each sector. Appendix C details educational attainment typically required for the top occupations in each sector.

A note on race/ethnicity data: The 2023 Central Valley/Mother Lode Overview contains some metrics not included in past reports. The race/ethnicity composition of the top occupations in each sector are summarized.³ It is important to note that the race/ethnicity demographics for residents in the region show that Hispanic or Latino residents account for the majority of the population. However, the race/ethnicity demographic data for workers in most of the 10 sectors reveal that white workers comprise the largest demographic group, with Hispanic or Latino workers comprising the second largest share of the workforce. This suggests underrepresentation of Hispanic or Latino workers in middle-skill jobs in the overall regional workforce. The data analysis of race/ethnicity demographics involved calculating percentages of the total for workers within a sector and comparing those percentages with the composition of workers across all sectors. For example, if 46% of workers are white in a sector, but across all sectors 30% of all workers are white, then there is overrepresentation of that demographic.

² The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

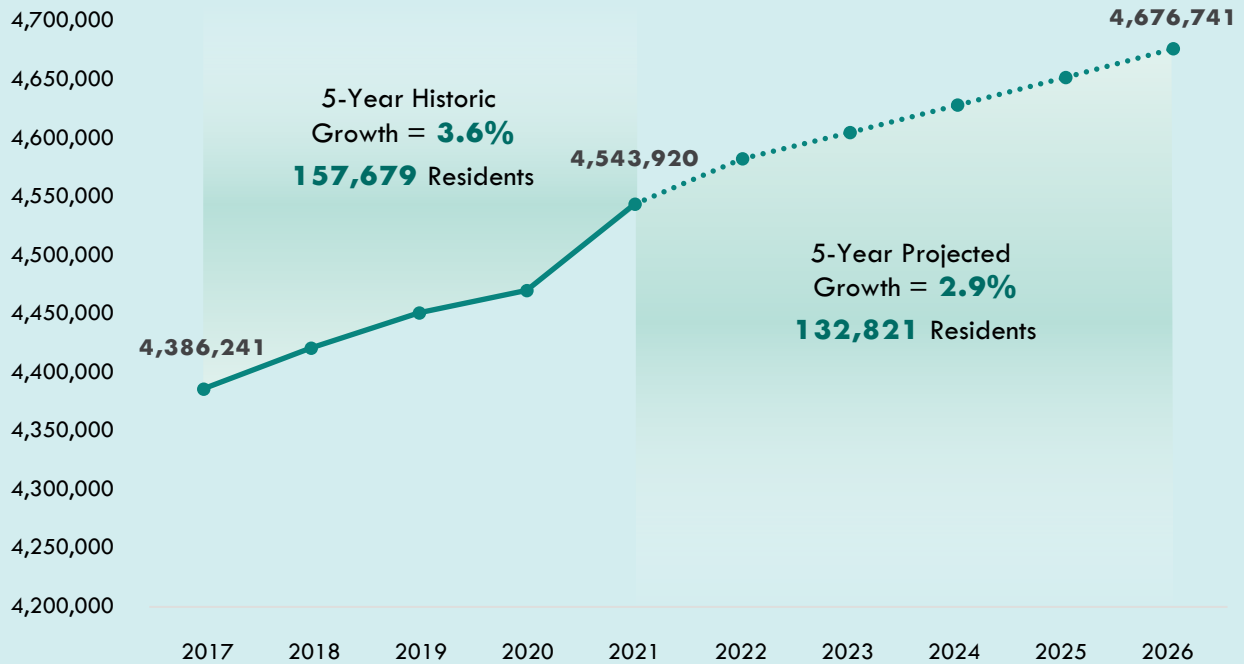
³ Please note: This report uses race and ethnicity data from Lightcast collected by the U.S. Census Bureau through the American Community Survey. In the sector sections, this report uses the term Asian American instead of Asian. The race/ethnicity terms in this document, including white, Hispanic, and Black, adhere to the terms and definitions the Census Bureau uses in collecting its data. For definitions, refer to: <https://www.census.gov/topics/population/race/about.html>. Please refer to Appendix A for additional information on definitions.

REGIONAL OVERVIEW

Residential Population

According to the latest U.S. Census data, the CVML region was home to approximately 4.54 million residents in 2021 (Exhibit 2). Between 2017 and 2021, the region added more than 157,600 residents. Between 2021 and 2026, the region is projected to add 132,821 new residents, totaling nearly 4.68 million residents.

Exhibit 2. Population estimates and projections in the CVML region



Source: Lightcast 2022.4

Demographics

The CVML region's gender composition is equivalent to the state. The population is equally divided between men and women. Exhibit 3 shows projected changes in the CVML region's race/ethnicity demographics by 2026. The largest group in the region by race/ethnicity is white, Hispanic, totaling more than 2.28 million residents in 2021. The number of individuals identifying as white, non-Hispanic, the second largest demographic group in the region, is expected to decline by 100,258 residents over the next five years. Rapid growth rates are projected for residents identifying as two or more races, Hispanic, 15% growth; two or more races, non-Hispanic, 13%; and Native Hawaiian or Pacific Islander, Hispanic, 12% (Exhibit 3a).

The most substantial population growth by number of residents is projected for:

- White, Hispanic residents, an increase of 146,730, representing 7% growth;
- Asian, non-Hispanic residents, an increase of 39,345, 11% growth; and
- Two or more races, non-Hispanic, an increase of 13,525, 13% growth.

Exhibit 3a. Projected change in race/ethnicity in the CVML region

Race/Ethnicity	2021	2026	5-Year Change	5-Year % Change
White, Hispanic	2,131,199	2,277,929	146,730	7%
White, Non-Hispanic	1,433,802	1,333,544	(100,258)	(7%)
Asian, Non-Hispanic	366,947	406,292	39,345	11%
Black, Non-Hispanic	199,096	203,317	4,221	2%
Two or More Races, Non-Hispanic	106,679	120,204	13,525	13%
American Indian or Alaskan Native, Hispanic	96,828	104,510	7,682	8%
Two or More Races, Hispanic	67,689	77,544	9,855	15%
Black, Hispanic	49,441	54,873	5,432	11%
Asian, Hispanic	40,650	44,661	4,011	10%
American Indian or Alaskan Native, Non-Hispanic	29,660	29,390	(270)	(1%)
Native Hawaiian or Pacific Islander, Non-Hispanic	13,863	15,416	1,553	11%
Native Hawaiian or Pacific Islander, Hispanic	8,066	9,061	995	12%
TOTAL	4,543,920	4,676,741	132,821	3%

Source: Lightcast 2022.4

Applying an equity lens to the data by examining cohort percentage reveals that residents identifying as Hispanic represented 55% of the total population in 2021, a four-percentage-point increase from 2019. The Black population's overall percentage representation of 4% has remained stable and is projected to do so through 2026. However, evaluation of the anticipated growth rate of this group has declined by 100% over the last two years (Exhibit 3b).

Exhibit 3b. Projected change in Hispanic vs. non-Hispanic races/ethnicities in the CVML region, 2021–2026

Race/Ethnicity	Population		Change		% of Cohort
	2021	2026	Number	Percent	2026
African American or Black	199,096	203,317	4,221	2%	4%
American Indian or Alaskan Native	29,660	29,390	(270)	(1%)	1%
Asian	366,947	406,292	39,345	11%	9%
Hawaiian or Pacific Islander Native	13,863	15,416	1,553	11%	0%
Hispanic	2,393,873	2,568,579	174,706	7%	55%
Two or More Races	106,679	120,204	13,525	13%	3%
White	1,433,802	1,333,544	(100,258)	(7%)	29%
TOTAL	4,543,920	4,676,741	132,821	3%	100%

Source: Lightcast 2022.4

When the population data and occupational data are evaluated, a key finding is that the majority of middle-skill workers are white in the region. This finding may indicate an equity issue in two ways, for which further examination may be warranted:

- The data finding raises the possibility that Hispanic students and workers may lack access to higher paying jobs and may be entering lower-paid occupations that do not offer economic mobility.
- Additionally, disparities may be exacerbated if Hispanic students and workers are entering career pathways that lead to “dead-end” above-middle-skill or academic occupations.

Changes in age cohorts in the region may indicate future demand for educational services. Of relevance for community college planning in the region is the 15-to-19 age group, which is projected to add more than 21,767 residents over the next five years, while younger cohorts will decrease in size (Exhibit 4). The 20-to-24 age cohort also is expected to grow by 5%, representing an increase of more than 15,665 residents.

Exhibit 4. Projected change in age cohorts in the CVML region, 2021–2026

Age Cohort	2021	2026	Change	% Change	2021 % of Cohort
Under 5 years	313,196	308,557	(4,639)	(1%)	7%
5 to 9 years	349,808	333,854	(15,954)	(5%)	8%
10 to 14 years	373,320	353,606	(19,714)	(5%)	8%
15 to 19 years	345,483	367,250	21,767	6%	8%
20 to 24 years	308,493	324,158	15,665	5%	7%
25 to 29 years	326,769	317,778	(8,991)	(3%)	7%
30 to 34 years	334,078	327,484	(6,594)	(2%)	7%
35 to 39 years	315,676	341,338	25,662	8%	7%
40 to 44 years	289,500	316,315	26,815	9%	6%
45 to 49 years	257,237	282,681	25,444	10%	6%
50 to 54 years	252,991	248,841	(4,150)	(2%)	6%
55 to 59 years	249,438	240,011	(9,427)	(4%)	5%
60 to 64 years	238,357	233,148	(5,209)	(2%)	5%
65 to 69 years	199,594	218,809	19,215	10%	4%
70 to 74 years	160,395	177,433	17,038	11%	3%
75 to 79 years	104,249	136,077	31,828	31%	2%
80 to 84 years	65,559	80,982	15,423	24%	1%
85 years and over	59,777	68,419	8,642	14%	1%
TOTAL	4,543,920	4,676,741	132,821	3%	100%

Source: Lightcast 2022.4

When the age of residents and the projected change in two separate age groups – the 20-to-54 age cohort and 55+ age cohort – are considered, the analysis shows that both cohorts will add residents over the next five years. The 55+ age cohort will increase at a faster rate, 7%, however, adding more residents proportionally than the 20-to-54 age cohort, 4% (Exhibit 5a).

Exhibit 5a. Projected change in two age cohorts in the CVML region, 2021–2026

Age Cohort	2021	2026	Change	% Change
20 to 54 years	2,084,744	2,158,595	73,851	4%
55+ years	1,077,369	1,154,879	77,510	7%

Source: Lightcast 2022.4

In evaluating the age-cohort data to gauge the future education and hiring needs of the region’s labor market, the analysis incorporated the traditional lens of workers retiring out of the labor force at age 55. This renders a projection picture of nearly one-quarter of the population leaving the workforce by 2026. However, many workers are opting to work up until 64 or 65 years of age. If this consideration is factored into projections, the overall workforce is projected to contract by roughly 10% (Exhibit 5b).

Exhibit 5b. Projected change in age cohorts, grouped by young children, school age, working age, or retiring in the CVML region, 2021–2026

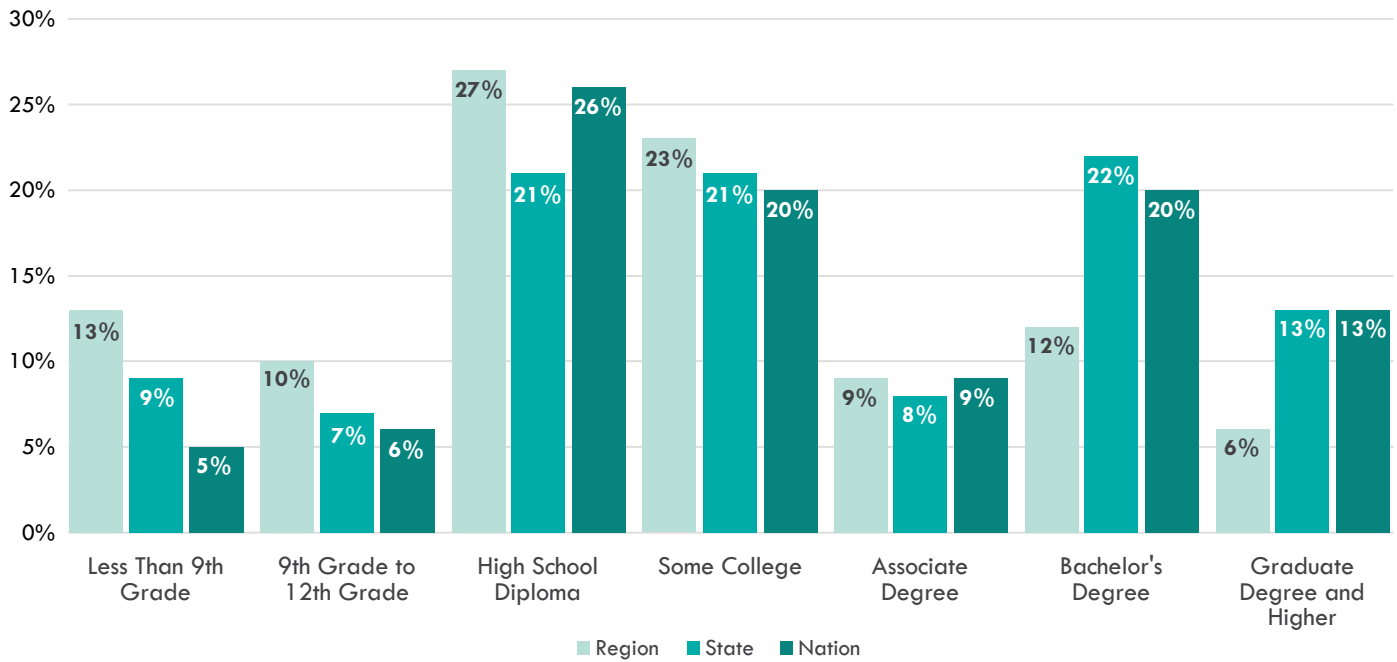
Category	Age Cohort	2021 Population	2026 Population	Change	% Change	2021 % of Cohort	2026 % of Cohort
Young Children	Under 5 years	313,196	308,557	(4,639)	(1%)	6.9%	6.6%
School Age	5 to 24 years	1,377,104	1,378,868	1,764	0%	30.3%	29.5%
Working Age	25 to 54 years	1,776,251	1,834,438	58,187	3%	39.1%	39.2%
Retiring	55 Plus	1,077,369	1,154,878	77,509	7%	23.7%	24.7%
TOTAL		4,543,920	4,676,741	132,821	3%	100%	100%
Still Working	55 to 64	487,795	473,159	(14,636)	(3%)	10.7%	10.1%
Retiring	65 Plus	589,574	681,719	92,145	16%	13.0%	14.6%

Source: Lightcast 2022.4

Educational Attainment

Exhibit 6 summarizes educational attainment data for the population’s residents who are 25 years of age and older. The CVML region continues to trail the state in bachelor’s degree attainment, with 12% of the adult population holding a bachelor’s degree, compared to 22% in the state. Regarding associate degree attainment, the region and the state are similar, 9% and 8% respectively. The region has a higher percentage of residents with a high school education, 27% compared to 21% in the state. A slightly greater proportion of the region has completed some college, 23%, compared to 21% in the state. Compared to the state, the region has larger shares of residents with less than a 9th grade education and less than a 12th grade education, which indicates a greater regional need for adult education. In the region, 13% percent of residents have less than a 9th grade education, compared to 9% in the state.

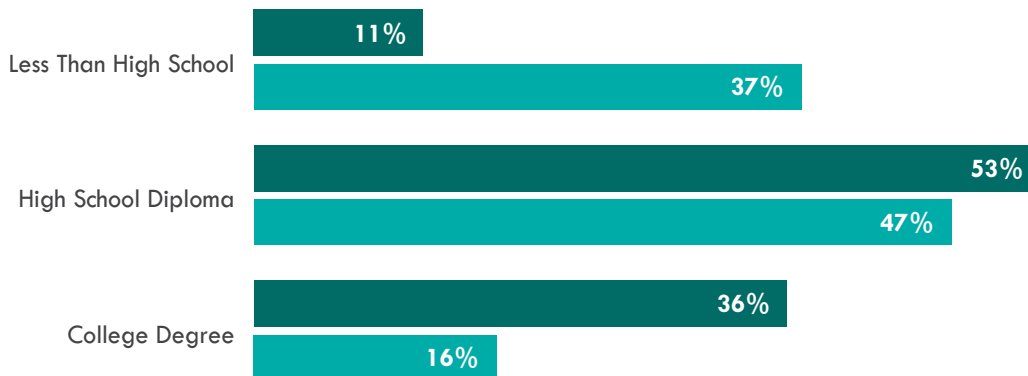
Exhibit 6. Educational attainment comparison of the CVML region, state, and nation, 2021



Source: Lightcast 2022.4

In the region, 36% of the non-Hispanic adult population has a college degree, compared to 16% of the Hispanic population (Exhibit 7). A comparison of this data to the 2020 CVML Overview, revealed a 3-percentage-point increase for both groups. Comparison with 2020 data shows that within the Hispanic population, the number of high school diploma holders increased by 3 percentage points; whereas, non-Hispanic residents have experienced a 1-percentage-point decline. As observed in the 2020 CVML Overview, a greater proportion of Hispanic residents have completed less than a high school education, 37%, compared to non-Hispanic residents, 11%. However, both groups have undergone improvements: a 6-percentage-point improvement for the Hispanic population and a 2-percentage-point increase for non-Hispanics.

Exhibit 7. Hispanic/non-Hispanic educational attainment in the region, 2021



Source: Lightcast 2022.4

Labor Force & Employment

The size and characteristics of a region’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.) The labor force in the CVML region increased by 1,110 workers over the last five years (Exhibit 8). Employment declined by 15,150 workers, from 1.75 million workers in 2017 to 1.74 million workers in 2021. Unemployment rose from 8% in 2017 to 9% in 2021.

Exhibit 8. Labor force size, employment, and unemployment in the CVML region, 2017–2021

Metric	2017	2021	5-Year Change
Labor Force	1,913,870	1,914,980	1,110
Employment	1,752,230	1,737,080	(15,150)
Unemployment	161,340	177,840	16,500
Unemployment Rate	8%	9%	1%

EDD: Employment Development Department, State of California

Over the last five years, the state’s labor force has lost 262,200 workers, declining from 19.19 million in 2017 to 18.92 million in 2021 (Exhibit 9). More than 700,000 workers in California were lost from the employment pool between 2017 and 2021. Employment declined from 18.26 million workers in 2017 to 17.55 million workers in 2021 statewide. Unemployment slightly increased from 5% in 2017 to 7% in 2021.

Exhibit 9. Labor force size, employment, and unemployment in California, 2017–2021

Metric	2017	2021	5-Year Change
Labor Force	19,185,400	18,923,200	(262,200)
Employment	18,258,100	17,541,900	(716,200)
Unemployment	927,300	1,381,200	453,900
Unemployment Rate	5%	7%	2%

EDD: Employment Development Department, State of California

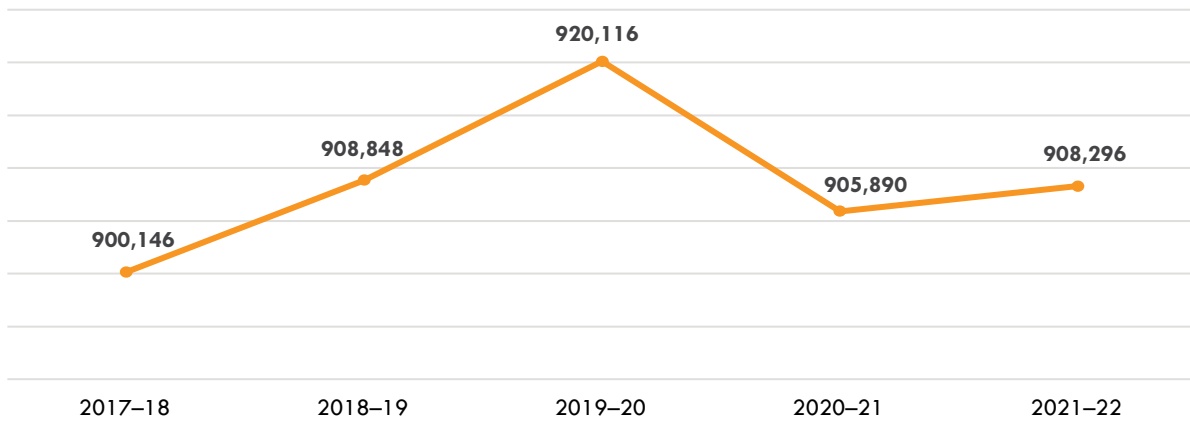


K-12 ENROLLMENT AND DEMOGRAPHICS

Regional K-12 Enrollment

Up until the 2019–20 academic year, K-12 enrollment had steadily increased from 900,146 students in 2017–18 to 920,116 students in 2019–20 in the region (Exhibit 10). Enrollment increased by the greatest amount between the 2018–19 and 2019–20 academic years, with the addition of 11,268 students. During the COVID-19 pandemic, enrollment dropped by the greatest amount between the 2019–20 and 2020–21 academic years, a decrease of 14,226 students. Between the 2020–21 and 2021–22 academic years, K-12 enrollment rebounded slightly, increasing by 2,406 students. Between 2017–18 and 2021–22, the entire five-year timeframe shown in Exhibit 10, the region’s net enrollment grew by 8,150 students.

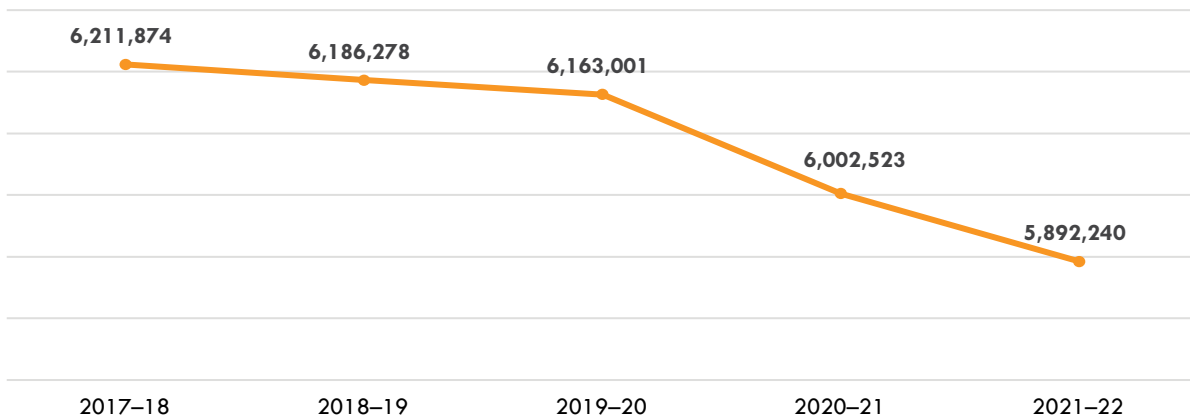
Exhibit 10. Total enrollment for grades K-12 in the region, academic years 2017–18 to 2021–22



Data Quest, California Department of Education

By comparison, K-12 enrollment has been steadily declining in the state since 2017–18. Consistent with enrollment trends in the region, a substantial drop in enrollment occurred during the COVID-19 pandemic in the 2020–21 academic year. Statewide, K-12 enrollment decreased by 160,478 students, a 3% decline (Exhibit 11). In the last five years, enrollment declined by more than 319,634 students, and another decline of 209,351 students is projected over the next five years.

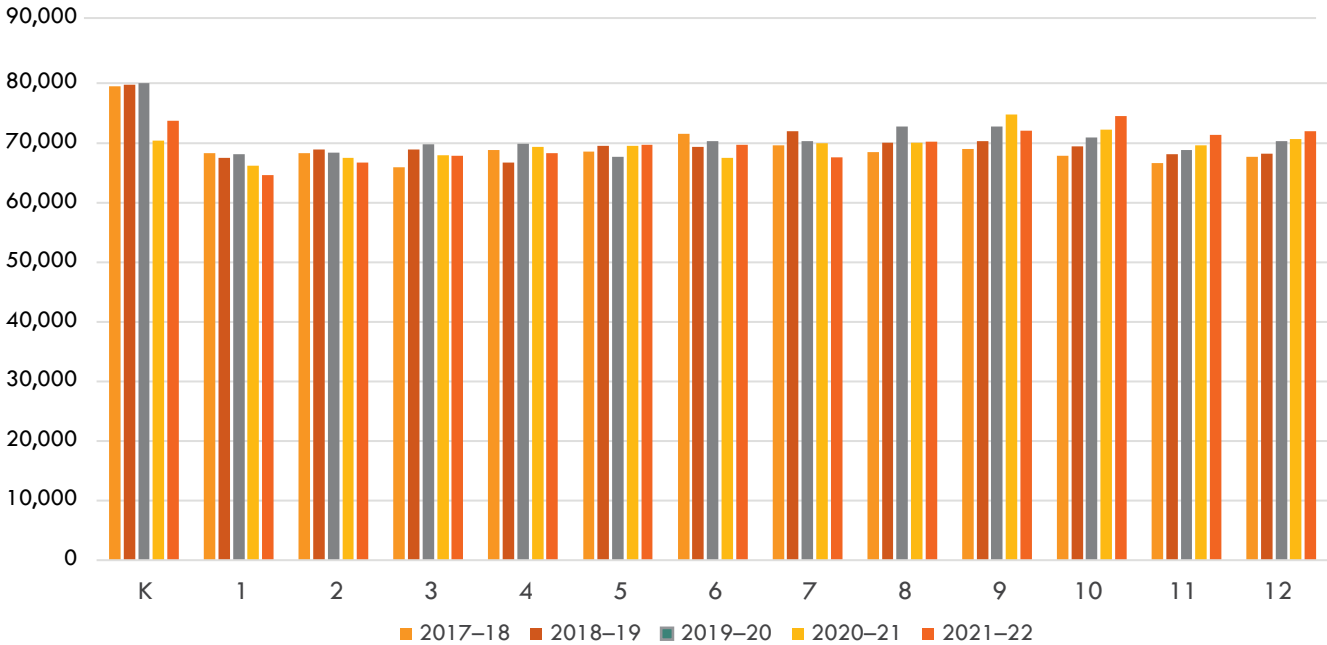
Exhibit 11. Total enrollment for grades K-12 in California, academic years 2017–18 to 2021–22



Data Quest, California Department of Education

Exhibits 12 and 13 show how enrollment has fluctuated by grade level over the past five years in the region. Within some of the grade levels, there has been substantial growth in student enrollment. Enrollment in 10th through 12th grade has consistently increased year over year. However, for grades K through 8, enrollment has largely declined in the last three years for every grade, except grade 5. (Despite fluctuations, enrollment increased in the most recent academic year for grades 5 and 6). Kindergarten enrollment was gravely impacted by the COVID-19 pandemic, suggesting that parents may have been waiting for the pandemic to end before enrolling their children in school. Kindergarten enrollment declined by the greatest amount between 2019–20 and 2020–21, representing the loss of over 9,000 students during the pandemic. Kindergarten enrollment rebounded somewhat in 2021–22 but has not recovered to pre-pandemic levels.

Exhibit 12. Enrollment by grade level in the region, academic years 2017–18 to 2021–22⁴



Data Quest, California Department of Education

Exhibit 13. Enrollment by grade level in the region, academic years 2017–18 to 2021–22

Year	K	1	2	3	4	5	6	7	8	9	10	11	12
2017–18	79,489	68,295	68,292	65,924	68,799	68,547	71,577	69,604	68,449	68,975	67,883	66,627	67,685
2018–19	79,758	67,544	68,888	68,907	66,717	69,552	69,336	71,978	70,038	70,290	69,471	68,122	68,247
2019–20	80,063	68,147	68,395	69,815	69,860	67,667	70,323	70,282	72,783	72,786	70,897	68,818	70,280
2020–21	70,397	66,197	67,522	67,969	69,353	69,564	67,493	69,985	70,023	74,800	72,281	69,612	70,694
2021–22	73,715	64,579	66,724	67,814	68,299	69,689	69,666	67,601	70,222	72,086	74,548	71,370	71,983

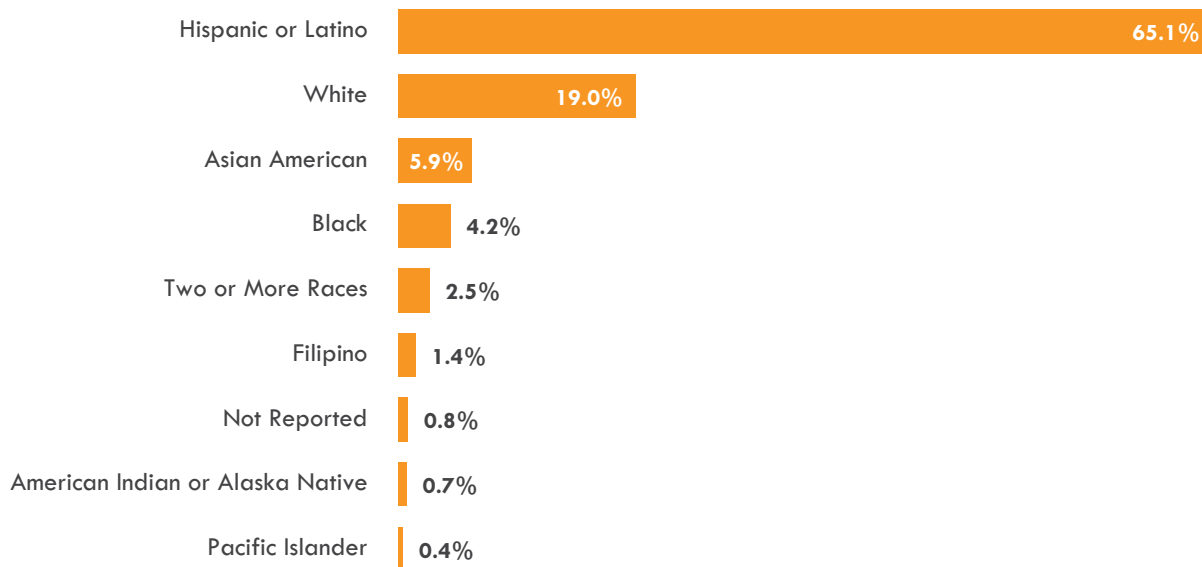
Data Quest, California Department of Education

⁴ The ungraded/non-grade assigned students are excluded.

High School Graduation Demographics

Students who identify as Hispanic or Latino comprise the largest share of students graduating high school in the region, totaling approximately 590,000 in the 2019–20 academic year (Exhibit 14). The second largest group is white students, a total of 172,507, followed by Asian American students, 53,654. Students who identify as American Indian or Alaska Native, and those who identify as Pacific Islander, comprise the smallest groups in terms of race/ethnicity data reporting.

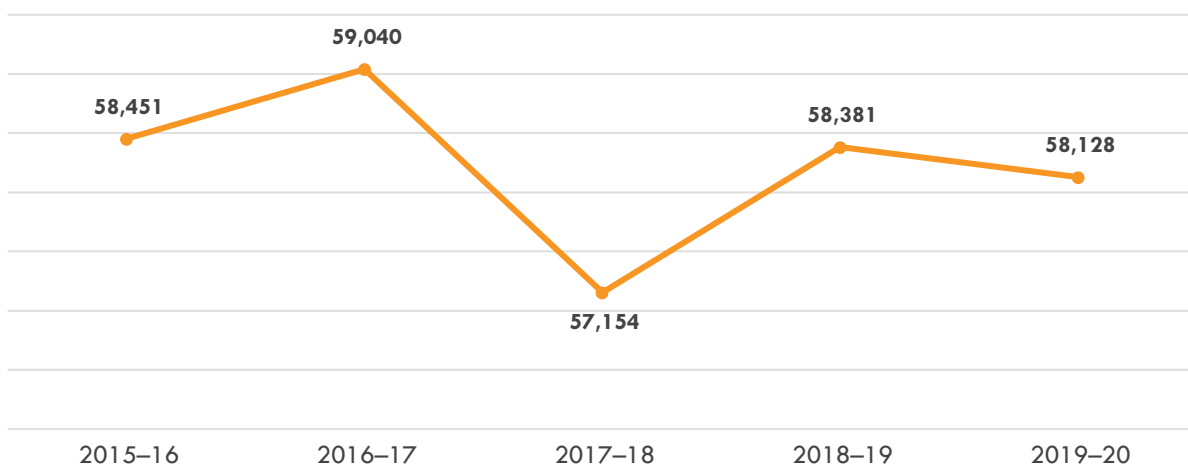
Exhibit 14. High school graduates by race/ethnicity in the region, 2019–20 academic year



Data Quest, California Department of Education

The graduation trend in the region has somewhat stabilized (Exhibit 15). Between the 2016–17 and 2017–18 academic years, graduation numbers decreased by about 2,000 students. However, between 2017–18 and 2018–19, the number of graduating students increased by 1,227 students. Nearly the same number of students graduated in 2019–20 compared to the previous academic year, a difference of only 253 students.

Exhibit 15. High school graduation trend in the region, academic years 2015–16 to 2019–20

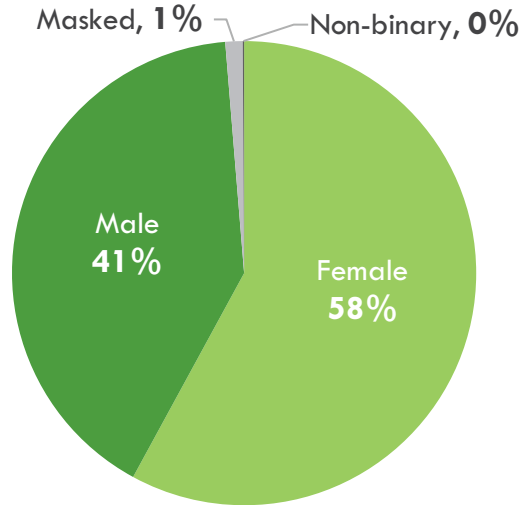


Data Quest, California Department of Education

CE ENROLLMENT AND DEMOGRAPHICS

Female students comprise a larger percentage of students enrolled in career education (CE) than male students in the region (Exhibit 16). Women account for 58% of CE students, while men total 41%. Gender is masked for about 1% of students.

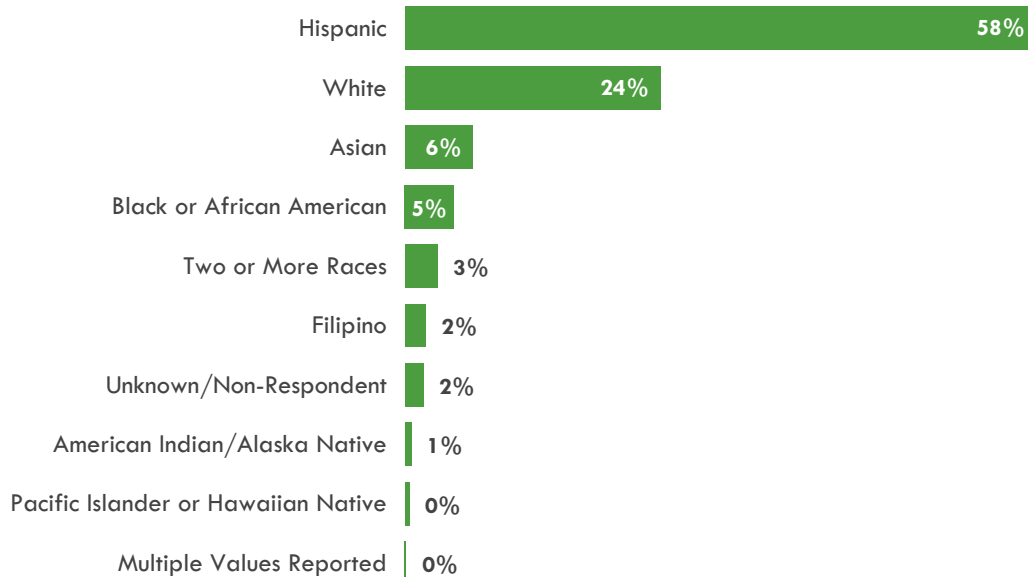
Exhibit 16. CE student gender comparison, CVML region



California Community Colleges Chancellor's LaunchBoard

More than half, 58% of CE students, identify as Hispanic (Exhibit 17). About 24% identify as white, just over 6% identify as Asian American, and nearly 5% identify as Black. Approximately 3% of students identify as two or more races.

Exhibit 17. Race/ethnicity of CE students, CVML region



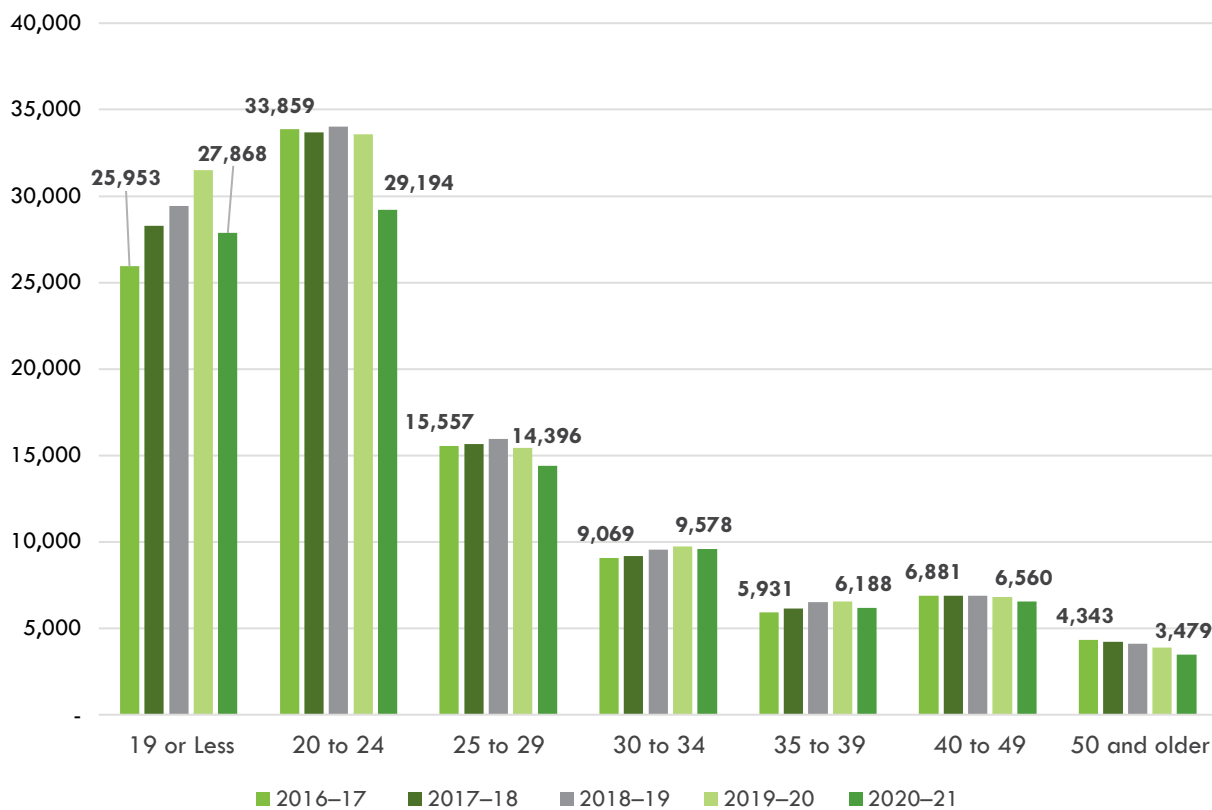
California Community Colleges Chancellor's LaunchBoard

In the region, CE enrollment over the last five years has decreased by more than 4,300 students and totaled 97,263 in the 2020–21 academic year (Exhibit 18a). For the most part, overall CE enrollment across all age groups increased steadily for four years, before dropping in the 2020–21 academic year.

An analysis of student age shows that CE enrollment has grown the most in the 19-or-less age group over the last five years, an increase of 1,915 students. This age group’s enrollment reached a high of 31,491 students in the 2019–20 academic year. Enrollment decreased by 4,665 for students for the 20-to-24 age group, and by 1,161 for the 25-to-29 age group, in the 2020–21 academic year.

Enrollment numbers have consistently been highest for the 20-to-24 age group during the five-year period. This age group slightly declined in 2018–19 by 463 students in 2019–20. It contracted significantly, by nearly 4,000 students, to 29,194 in the 2020–21 academic year. This is interpreted as another major impact of the COVID-19 pandemic.

Exhibit 18a. CE enrollment by age group in the region, academic years 2016–17 to 2020–21



California Community Colleges Chancellor’s LaunchBoard

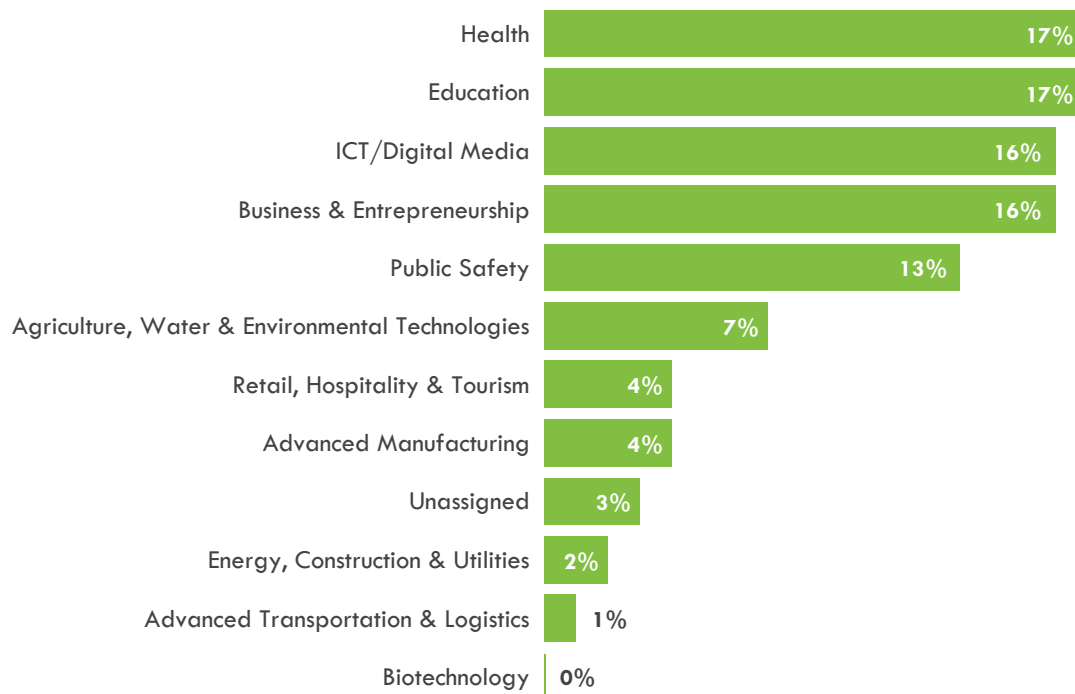
In the 2020–21 academic year, career education program areas with the largest enrollment in the CVML region were health, education, ICT/Digital media, and business (Exhibit 18b).

Exhibit 18b. Number of CE enrollments by sector in the region, 2020–21 academic year

Sector	Enrollment	Percent
Health	21,214	17%
Education	20,943	17%
ICT/Digital Media	20,681	16%
Business & Entrepreneurship	19,447	16%
Public Safety	15,735	13%
Agriculture, Water & Environmental Technologies	8,196	7%
Retail, Hospitality & Tourism	5,105	4%
Advanced Manufacturing	5,064	4%
Unassigned	4,212	3%
Energy, Construction & Utilities	2,897	2%
Advanced Transportation & Logistics	1,802	1%
Biotechnology	81	0%
TOTAL	125,377	100%

California Community Colleges Chancellor's LaunchBoard

Exhibit 18c. Percentage of CE enrollment by sector in the region, 2020–21 academic year



California Community Colleges Chancellor's LaunchBoard

SECTOR COMPOSITION

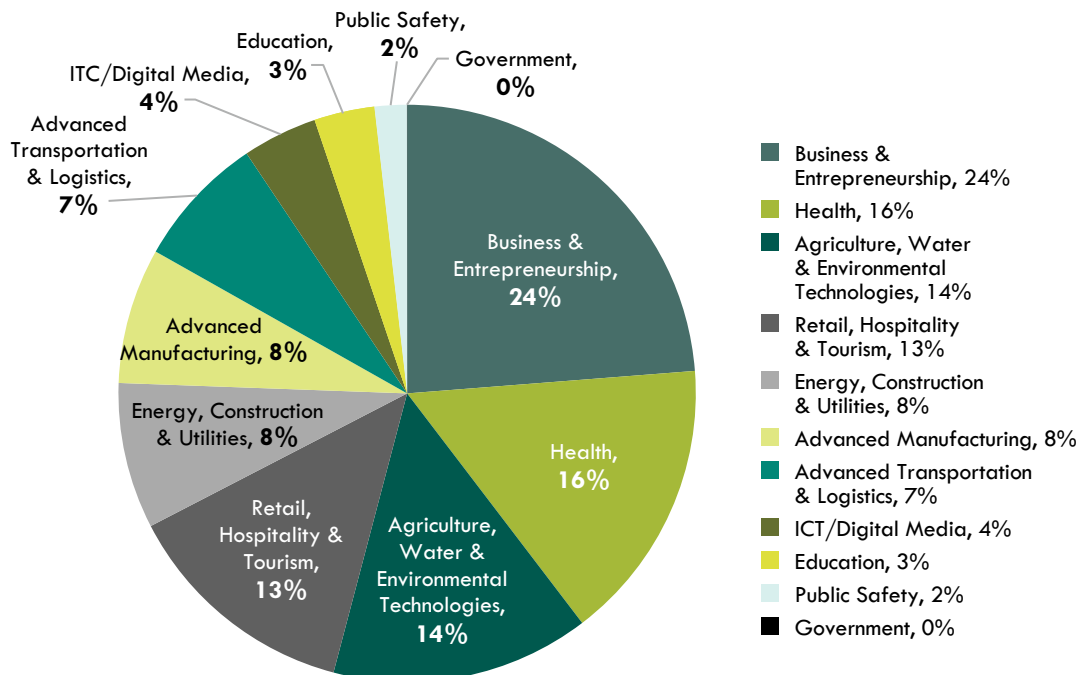
Across all sectors, there were more than 1.5 million jobs in the region in 2021. When below-middle-skill, middle-skill, and above-middle-skill jobs are all accounted for, the business and entrepreneurship sector contained the greatest number of jobs in 2021 with more than 360,000 in the CVML region. This was followed by the health sector, which had over 240,000 jobs (Exhibit 19). Together, several sectors comprise the majority of employment in the region: business and entrepreneurship; health; agriculture, water, and environmental technologies; and retail, hospitality, and tourism (Exhibit 20).

Exhibit 19. Number of jobs by sector in the region, 2021

Sector	2021 Jobs
Business & Entrepreneurship	362,920
Health	242,454
Agriculture, Water & Environmental Technologies	221,138
Retail, Hospitality & Tourism	203,115
Energy, Construction & Utilities	124,888
Advanced Manufacturing	116,063
Advanced Transportation & Logistics	113,613
ICT/Digital Media	64,107
Education	51,635
Public Safety	27,531
Government	137
TOTAL	1,527,601

Source: Lightcast 2022.4

Exhibit 20. Sector percentages by number of jobs in the region, 2021



Source: Lightcast 2022.4

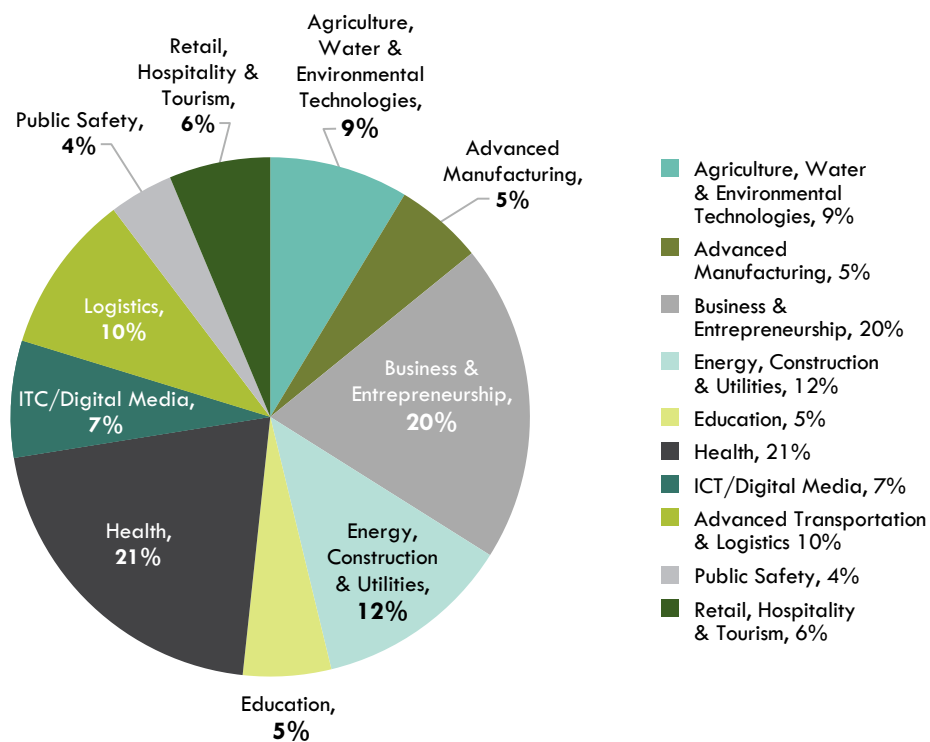
MIDDLE-SKILL JOBS COMPOSITION

Of the more than 1.5 million jobs in the region, 839,575 jobs are middle skill, requiring more education or training than a high school diploma but less than a bachelor's degree. The largest sectors by number of middle-skill jobs are health (174,450 jobs), business and entrepreneurship (166,163 jobs), and energy, construction, and utilities (103,096 jobs).

These sectors lead all others with the most annual job openings. Sectors with the smallest employment in terms of total jobs are advanced manufacturing (46,094 jobs), education (46,053 jobs), and public safety (33,569 jobs). Exhibit 21 shows the percentages that the sectors comprise in terms of overall middle-skill employment in the region.

Regarding projected occupational demand by sector, advanced manufacturing, education, and public safety, which are the smallest sectors in terms of total middle-skill employment, are expected to offer a much smaller share of annual openings compared to health, business and entrepreneurship, and energy, construction, and utilities.

Exhibit 21. 2021 CVML middle-skill employment



Source: Lightcast 2022.4



Gap Analysis Summary

Nearly 102,550 annual openings are projected for the 10 sectors. Overall, there is a supply gap of nearly 80,300 workers in the CVML region. The sectors with the largest supply gaps are health (a shortage of 15,664 workers), business and entrepreneurship (15,161), and energy, construction, and utilities (11,034) (Exhibit 22a). Sectors with the smallest gaps are advanced manufacturing, education, and public safety.

Exhibit 22a. Projected middle-skill annual job openings, average annual awards, and undersupply of workers (gap)

Sector	Demand (Annual Openings)	Gap	Supply (Average Annual Awards)
Health	23,613	15,664	7,949
Business & Entrepreneurship	18,072	15,161	2,911
Energy, Construction & Utilities	12,105	11,034	1,071
Advanced Transportation & Logistics	10,632	9,410	1,222
Retail, Hospitality & Tourism	8,496	6,853	1,643
Agriculture, Water & Environmental Technologies	8,394	7,271	1,123
ICT/Digital Media	6,615	5,660	955
Education	5,574	3,234	2,340
Advanced Manufacturing	5,237	4,157	1,080
Public Safety	3,811	1,853	1,958
TOTAL	102,549	80,297	22,252

Source: Lightcast 2022.4 and Integrated Postsecondary Education Data System (IPEDS)

In comparing middle-skill job projections, annual job openings increased from 92,688 in 2019 to 102,549 in 2020, an increase of roughly 10,000 jobs. Evaluation of the occupational data reveals this is a result of changes in how the Bureau of Labor Statistics (BLS) calculates projections combined with a general increase in middle-skill annual workforce demand. Exhibit 22b visually depicts the supply gap for 2021 projected job openings with the undersupply of workers shown in green.

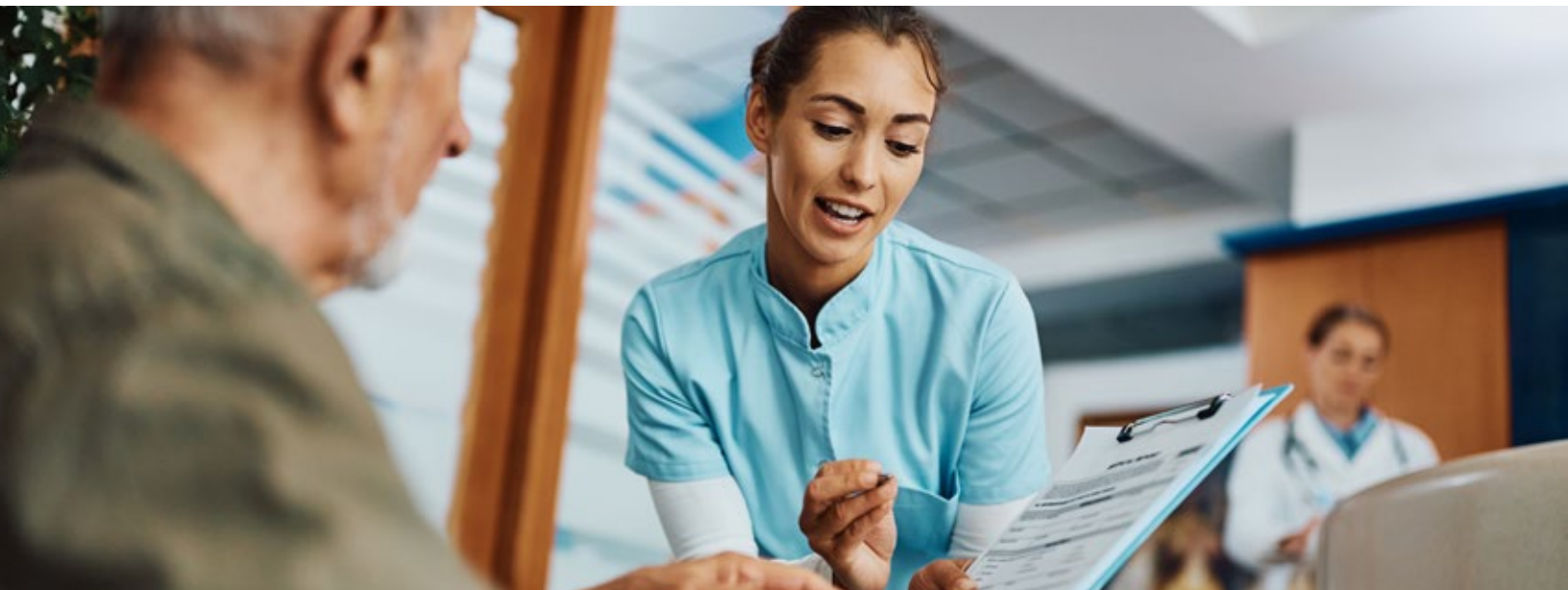
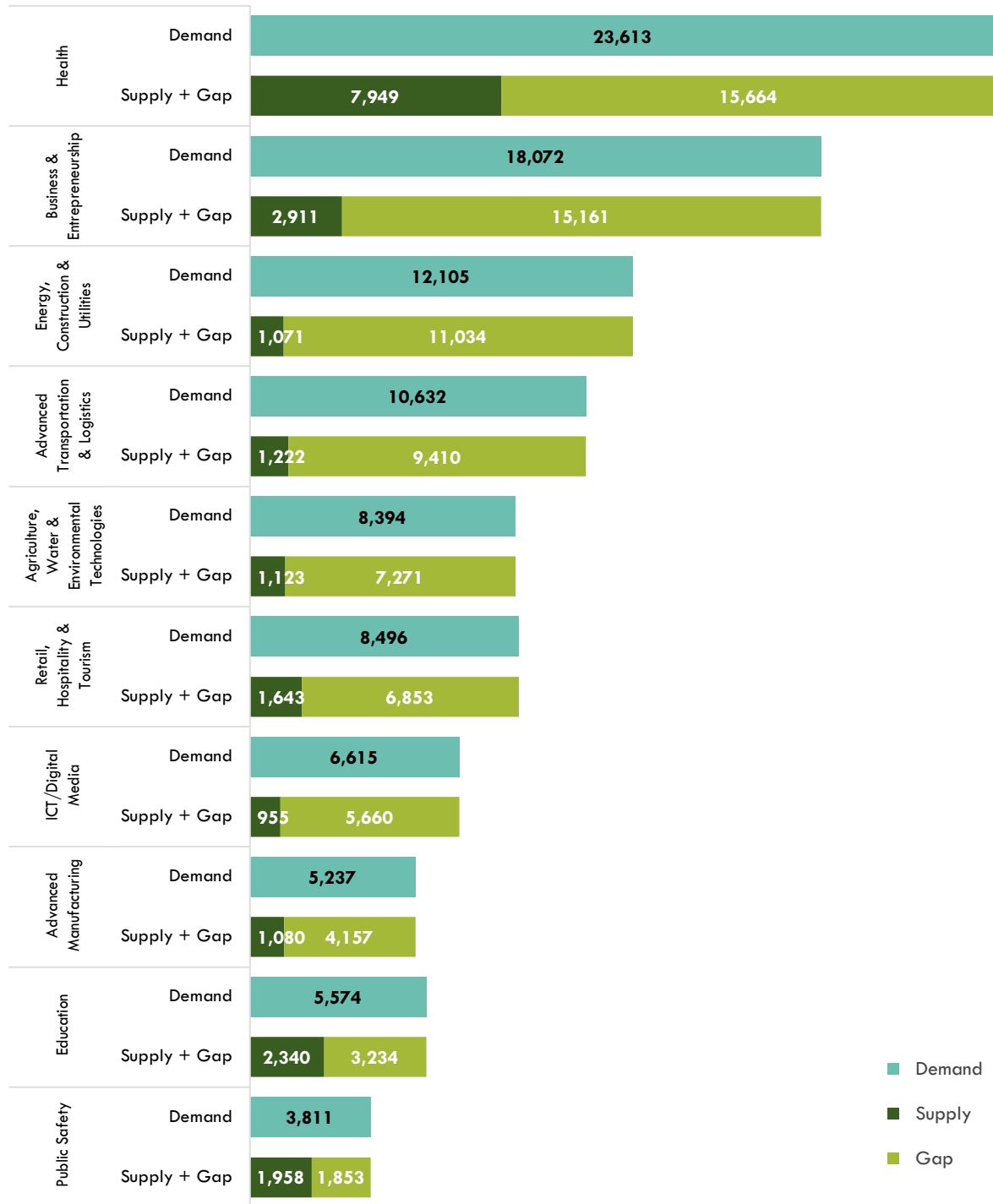


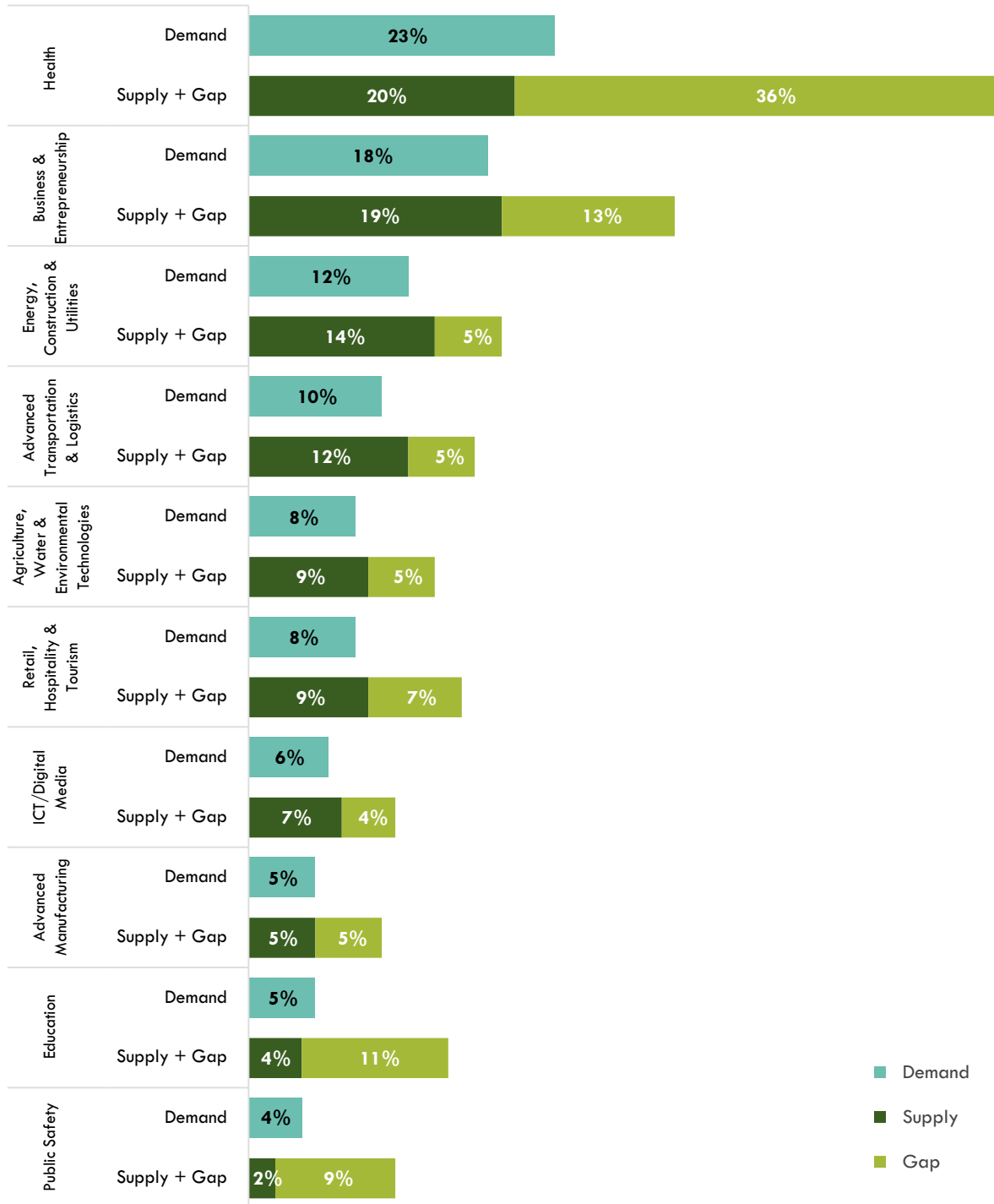
Exhibit 22b. Projected middle-skill annual job openings (demand), average annual awards (supply), and undersupply of workers (gap), 2021



Source: Lightcast 2022.4 and Integrated Postsecondary Education Data System (IPEDS)

Exhibit 22c displays 2021 results in percent change for projected demand, postsecondary supply, and the gap or undersupply of workers to fill positions. The greatest changes in middle-skill workforce demand and undersupply of workers occurred in health. (This number reflects a small change in how the BLS categorizes health occupations.) As a percentage of overall demand, health demand projections increased by 10 percentage points. Subsequently, the gap increased by 14 percentage points even though supply changed by only one percentage point.

Exhibit 22c. Middle-skill employment projections or annual openings, average annual awards and undersupply of workers or gap, 2021



Source: Lightcast 2022.4 and Integrated Postsecondary Education Data System (IPEDS)

ADVANCED MANUFACTURING

Summary

- » **Gender and race/ethnicity:** Comprising 28% of the workforce, women are underrepresented in this sector. Analysis shows overrepresentation of Hispanic or Latino workers. The largest age group is 25–44 years of age (Exhibits 23, 24, and 25).
- » **Employment and projected demand:** The largest middle-skill occupation is packaging and filling machine operators and tenders, which has 930 annual openings (Exhibit 26).
- » **Wages:** The highest paid occupation is industrial production managers, with an entry-level wage of \$38.50/hour (Exhibits 27a and 27b).
- » **Specialized skills:** The top skill is quality assurance and control, and the top certification is OSHA Forklift Certification (Exhibit 28).

Top Job Titles

- Production Supervisor
- Welder
- Maintenance Mechanic

Exhibit 23. Gender composition of the top occupations in the advanced manufacturing workforce

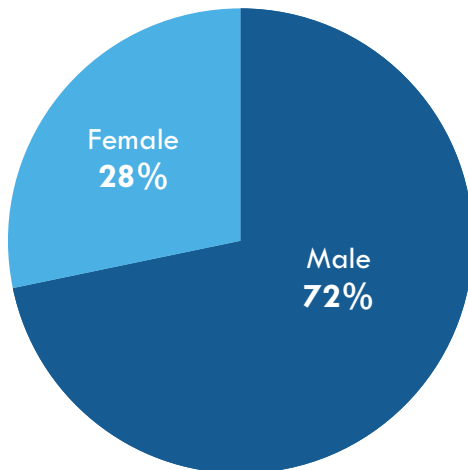


Exhibit 24. Race/ethnicity composition of the top occupations in the advanced manufacturing workforce

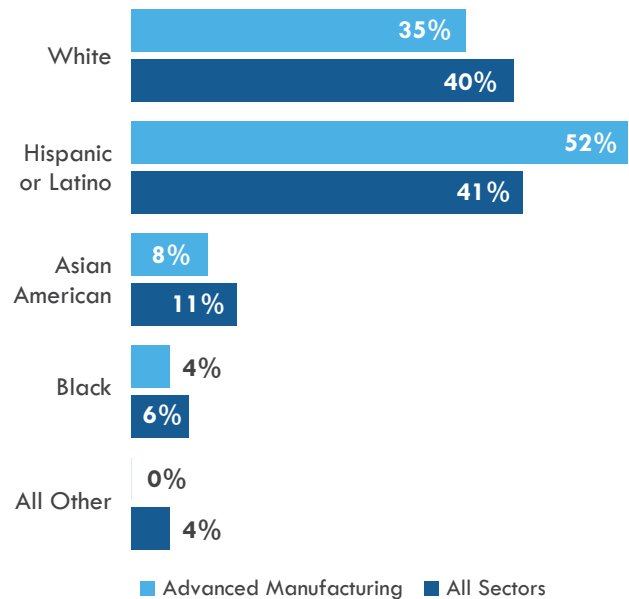


Exhibit 25. Advanced manufacturing age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	136	658	425	40
Computer Numerically Controlled Tool Operators	43	352	275	27
Cutting and Slicing Machine Setters, Operators, and Tenders	49	306	272	43
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	54	317	321	46
First-Line Supervisors of Production and Operating Workers	126	2,326	2,662	288
Industrial Machinery Mechanics	157	1,768	2,102	273
Industrial Production Managers	19	713	920	106
Inspectors, Testers, Sorters, Samplers, and Weighers	474	2,426	2,363	437
Machinists	92	658	773	133
Mixing and Blending Machine Setters, Operators, and Tenders	105	705	582	61
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	51	374	356	42
Packaging and Filling Machine Operators and Tenders	644	3,513	3,761	480
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	83	1,001	630	70
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	133	536	485	112
Welders, Cutters, Solderers, and Brazers	402	2,182	1,480	172



Exhibit 26. Advanced manufacturing employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Packaging and Filling Machine Operators and Tenders	8,400	8,343	(57)	(1%)	930
Inspectors, Testers, Sorters, Samplers, and Weighers	5,699	5,599	(100)	(2%)	680
First-Line Supervisors of Production and Operating Workers	5,405	5,690	285	5%	596
Welders, Cutters, Solderers, and Brazers	4,237	4,414	177	4%	495
Industrial Machinery Mechanics	4,309	4,725	416	10%	465
Machinists	1,662	1,777	115	7%	199
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	1,790	1,821	31	2%	190
Mixing and Blending Machine Setters, Operators, and Tenders	1,460	1,510	50	3%	174
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	1,259	1,370	111	9%	152
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	1,273	1,396	123	10%	151
Industrial Production Managers	1,756	1,810	54	3%	133
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	827	881	54	7%	97
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	743	778	35	5%	85
Cutting and Slicing Machine Setters, Operators, and Tenders	674	674	(0)	(0%)	85
Computer Numerically Controlled Tool Operators	697	719	22	3%	83

Exhibit 27a. Advanced manufacturing hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Industrial Production Managers	\$38.50	\$49.75	\$63.10
Industrial Machinery Mechanics	\$22.55	\$28.80	\$35.03
First-Line Supervisors of Production and Operating Workers	\$22.50	\$29.25	\$37.69
Welders, Cutters, Solderers, and Brazers	\$18.24	\$22.35	\$25.63
Computer Numerically Controlled Tool Operators	\$17.87	\$22.01	\$25.42
Machinists	\$17.60	\$21.73	\$26.56
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	\$17.20	\$22.73	\$28.91
Mixing and Blending Machine Setters, Operators, and Tenders	\$16.72	\$18.74	\$22.18
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	\$16.55	\$20.70	\$24.98
Cutting and Slicing Machine Setters, Operators, and Tenders	\$16.06	\$17.83	\$20.03
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	\$15.50	\$17.72	\$21.84
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	\$15.29	\$18.66	\$22.44
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	\$14.94	\$18.13	\$22.04
Inspectors, Testers, Sorters, Samplers, and Weighers	\$14.45	\$16.58	\$22.20
Packaging and Filling Machine Operators and Tenders	\$14.35	\$15.97	\$21.88

Exhibit 27b. Advanced manufacturing average hourly wages in the region

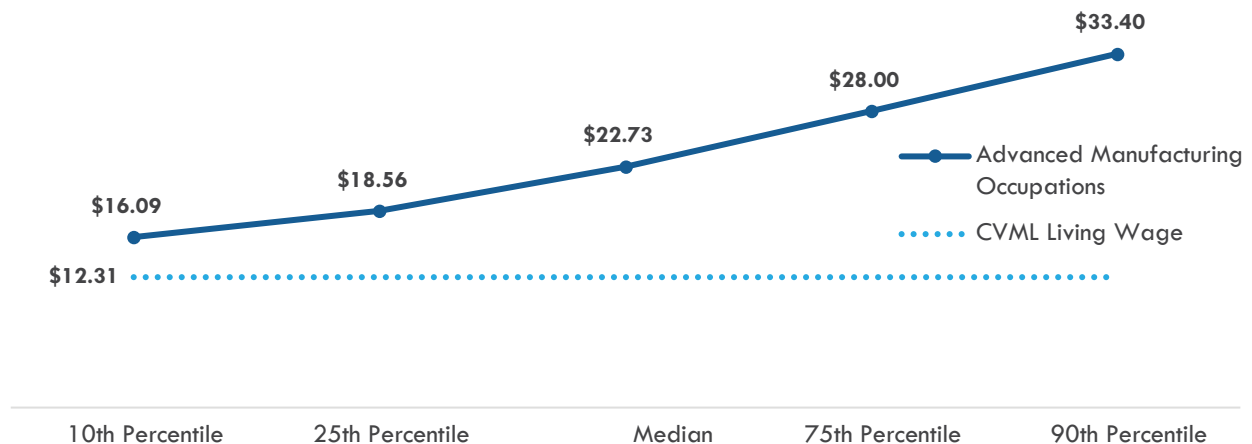
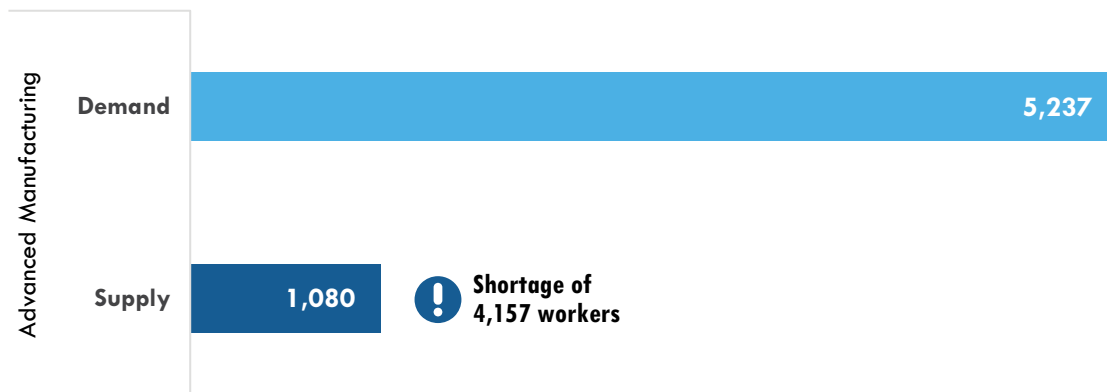


Exhibit 28. Top 10 certifications, specialized skills, and software skills in job postings for advanced manufacturing occupations

Certifications	Specialized Skills	Software Skills
OSHA Forklift Certification	Quality Assurance and Control	Microsoft Excel
Welding Certification	Repair	SAP
Global Food Safety Initiative (GFSI)	Welding	Enterprise Resource Planning (ERP)
American Society for Quality (ASQ) Certification	Quality Management	AutoCAD
Hazard Analysis and Critical Control Point (HACCP) Certification	Food Safety	Oracle
Six Sigma Black Belt Certification	Machinery	Lockout / Tagout (LOTO)
Six Sigma Green Belt Certification	Good Manufacturing Practices (GMP)	Microsoft SharePoint
Certified Quality Engineer (CQE)	Forklift Operation	Microsoft Visio
Six Sigma Certification	Hazard Analysis Critical Control Point (HACCP)	Computer Aided Drafting/Design (CAD)
AWS D1.1	Production Management	Revit

Exhibit 29. Advanced manufacturing workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



ADVANCED TRANSPORTATION & LOGISTICS

Summary

- » **Gender and race/ethnicity:** Comprising 11% of the workforce, women are significantly underrepresented in this sector. Analysis shows overrepresentation of Hispanic or Latino workers. The largest age group is 25–44 years of age (Exhibits 30, 31, and 32).
- » **Employment and projected demand:** The largest middle-skill occupation is heavy and tractor-trailer truck drivers, which has 5,519 annual openings (Exhibit 33).
- » **Wages:** The highest paid occupation is airline pilots, copilots, and flight engineers, with an entry-level wage of \$70.83/hour (Exhibits 34a and 34b).
- » **Specialized skills:** The top skill is repair, and the top certification is Automotive Service Excellence (ASE) Certification (Exhibit 35).

Top Job Titles

- Driver
- Warehouse Supervisor
- Maintenance Supervisor

Exhibit 30. Gender composition of the top occupations in the advanced transportation and logistics workforce

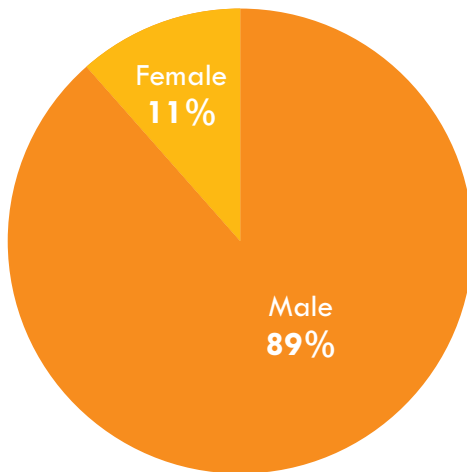


Exhibit 31. Race/ethnicity composition of the top occupations in the advanced transportation and logistics workforce

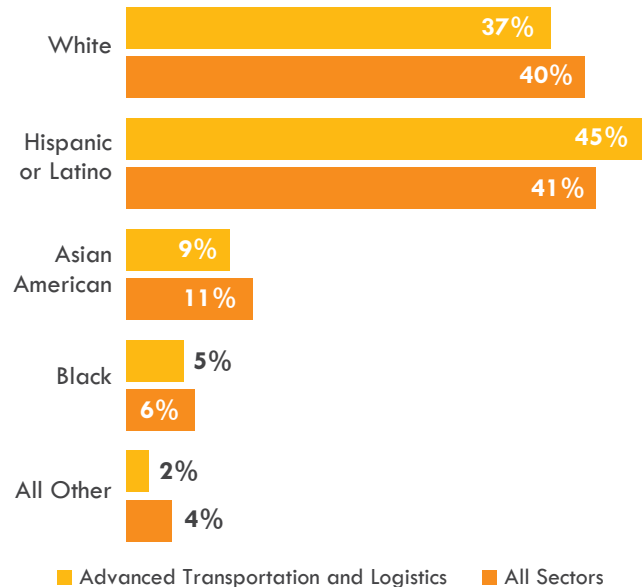


Exhibit 32. Advanced transportation and logistics age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Air Traffic Controllers	58	311	150	<10
Aircraft Mechanics and Service Technicians	307	846	484	49
Airline Pilots, Copilots, and Flight Engineers	36	345	85	<10
Automotive Body and Related Repairers	147	517	416	54
Automotive Service Technicians and Mechanics	989	3,588	2,107	233
Bus and Truck Mechanics and Diesel Engine Specialists	339	1,641	1,441	138
Bus Drivers, Transit and Intercity	13	459	884	237
Cargo and Freight Agents	34	169	148	19
Commercial Pilots	25	332	285	77
First-Line Supervisors of Mechanics, Installers, and Repairers	111	2,104	2,714	346
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Super-visors	311	3,112	2,652	458
Heavy and Tractor-Trailer Truck Drivers	1,690	15,192	18,184	3,106
Logisticians	120	1,029	561	66
Shipping, Receiving, and Inventory Clerks	1,214	4,381	3,034	404
Transportation, Storage, and Distribution Managers	101	1,067	927	118



Exhibit 33. Advanced transportation and logistics employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Heavy and Tractor-Trailer Truck Drivers	38,173	43,541	5,368	14%	5,519
Shipping, Receiving, and Inventory Clerks	9,034	9,283	249	3%	942
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	6,540	7,275	735	11%	881
Automotive Service Technicians and Mechanics	6,916	7,221	305	4%	753
First-Line Supervisors of Mechanics, Installers, and Repairers	5,279	5,614	335	6%	546
Bus and Truck Mechanics and Diesel Engine Specialists	3,560	3,908	348	10%	408
Bus Drivers, Transit and Intercity	1,600	1,785	185	12%	232
Logisticians	1,779	2,045	266	15%	217
Transportation, Storage, and Distribution Managers	2,214	2,424	210	9%	214
Aircraft Mechanics and Service Technicians	1,692	1,748	56	3%	165
Automotive Body and Related Repairers	1,133	1,284	151	13%	139
Commercial Pilots	724	772	48	7%	90
Airline Pilots, Copilots, and Flight Engineers	477	502	25	5%	58
Air Traffic Controllers	529	537	8	2%	53
Cargo and Freight Agents	372	437	65	17%	53



Exhibit 34a. Advanced transportation and logistics hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Airline Pilots, Copilots, and Flight Engineers	\$70.83	\$106.50	\$151.94
Air Traffic Controllers	\$49.21	\$69.49	\$83.38
Transportation, Storage, and Distribution Managers	\$35.74	\$44.75	\$54.09
Commercial Pilots	\$34.62	\$56.29	\$81.24
Aircraft Mechanics and Service Technicians	\$29.49	\$35.07	\$36.95
Logisticians	\$29.28	\$38.03	\$47.59
First-Line Supervisors of Mechanics, Installers, and Repairers	\$27.73	\$36.06	\$45.47
Automotive Body and Related Repairers	\$21.58	\$26.71	\$28.81
Bus and Truck Mechanics and Diesel Engine Specialists	\$20.80	\$27.59	\$29.61
Bus Drivers, Transit and Intercity	\$20.71	\$25.64	\$29.79
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	\$20.26	\$27.92	\$34.33
Cargo and Freight Agents	\$17.68	\$22.14	\$28.21
Automotive Service Technicians and Mechanics	\$17.49	\$22.75	\$28.47
Heavy and Tractor-Trailer Truck Drivers	\$17.42	\$22.80	\$28.36
Shipping, Receiving, and Inventory Clerks	\$14.78	\$17.65	\$20.99

Exhibit 34b. Advanced transportation and logistics average hourly wages in the region

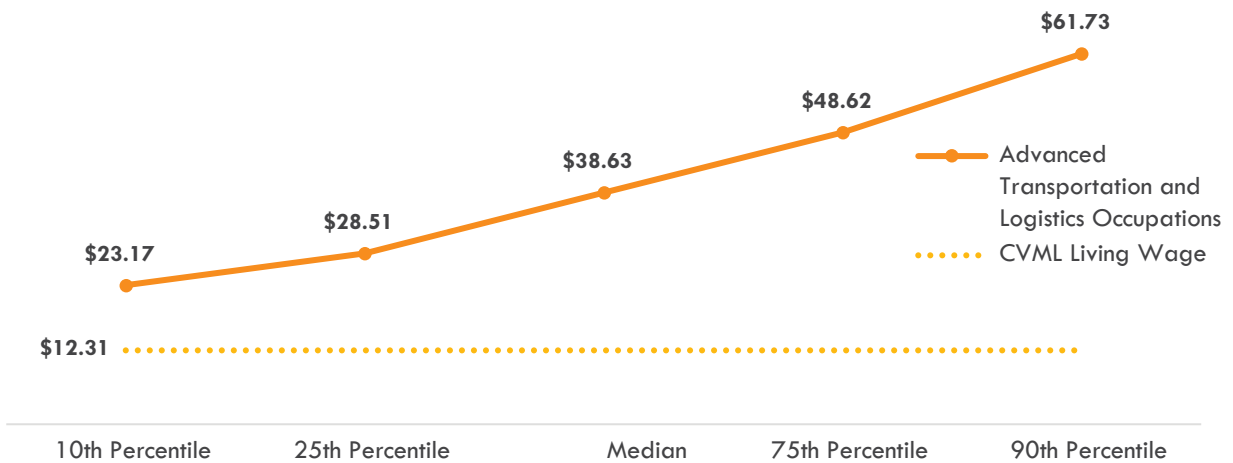
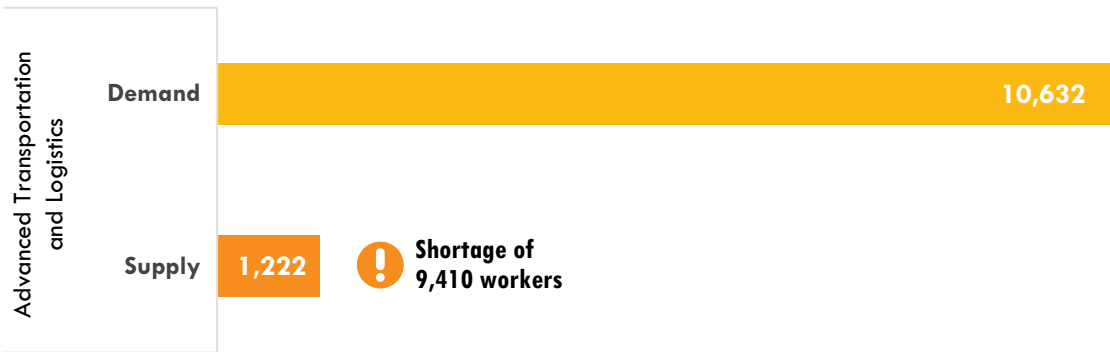


Exhibit 35. Top 10 certifications, specialized skills, and software skills in job postings for advanced transportation and logistics occupations

Certifications	Specialized Skills	Software Skills
Automotive Service Excellence (ASE) Certification	Repair	Microsoft Excel
Security Clearance	Scheduling	SAP
OSHA Forklift Certification	Commercial Driving	Enterprise Resource Planning (ERP)
Air Brake Certified	Forklift Operation	Oracle
Airframe and Powerplant (A and P) Certification	Predictive / Preventative Maintenance	Microsoft Access
EPA 609	Auto Repair	Microsoft Project
Project Management Certification	HAZMAT	QuickBooks
Hazardous Materials Certification	Machinery	Linux
Department of Transportation (DOT) Medical Certification	Logistics	AutoCAD
Certified Fraud Examiner (CFE)	Occupational Health and Safety	Salesforce

Exhibit 36. Advanced transportation and logistics workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES

Summary

- » **Gender and race/ethnicity:** Comprising 28% of the workforce, women are underrepresented in this sector. Analysis shows overrepresentation of white workers. The largest age group is 45–64 years of age (Exhibits 37, 38, and 39).
- » **Employment and projected demand:** The largest middle-skill occupation is farmers, ranchers, and other agricultural managers, which has 2,742 annual openings (Exhibit 40).
- » **Wages:** The highest paid occupation is cost estimators, with an entry-level wage of \$26.09/hour (Exhibits 41a and 41b).
- » **Specialized skills:** The top skill is sales, and the top certification is certified pest control (Exhibit 42).

Top Job Titles

- Sales Representative
- Outside Sales Representative
- Account Executive

Exhibit 37. Gender composition of the top occupations in the agriculture, water, and environmental technologies workforce

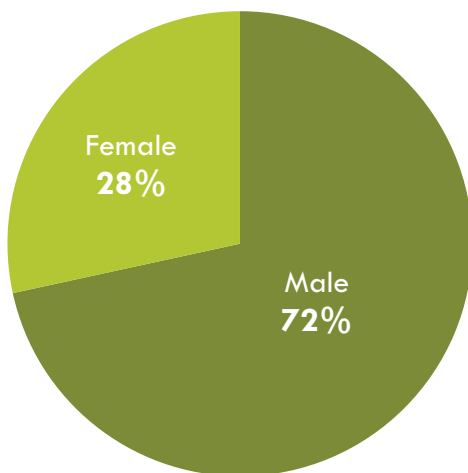


Exhibit 38. Race/ethnicity composition of the top occupations in the agriculture, water, and environmental technologies workforce

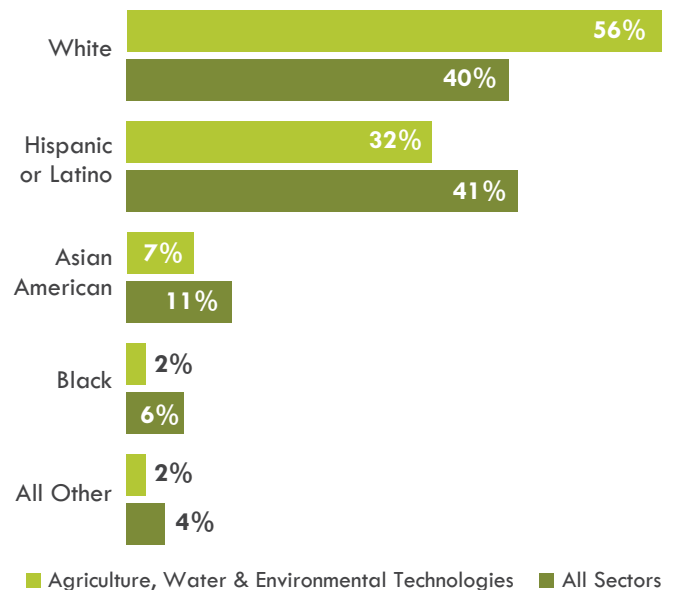


Exhibit 39. Agriculture, water, and environmental technologies age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Agricultural Equipment Operators	682	2,372	1,910	590
Animal Trainers	87	506	453	79
Buyers and Purchasing Agents	115	1,224	1,326	245
Compliance Officers	52	1,127	1,213	177
Cost Estimators	74	827	970	346
Farm Equipment Mechanics and Service Technicians	94	732	677	109
Farmers, Ranchers, and Other Agricultural Managers	1,067	6,875	12,597	7,100
First-Line Supervisors of Farming, Fishing, and Forestry Workers	176	1,904	2,909	915
Food Science Technicians	37	329	342	46
Forest and Conservation Technicians	268	499	330	50
Forest and Conservation Workers	116	285	211	61
Mobile Heavy Equipment Mechanics, Except Engines	132	933	916	122
Pest Control Workers	150	608	459	92
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	406	4,642	4,666	1,019
Veterinary Assistants and Laboratory Animal Care-takers	240	535	172	28



Exhibit 40. Agriculture, water, and environmental technologies employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Farmers, Ranchers, and Other Agricultural Managers	27,640	27,426	(214)	(1%)	2,742
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	10,731	11,115	384	4%	1,137
Agricultural Equipment Operators	5,554	5,758	204	4%	933
First-Line Supervisors of Farming, Fishing, and Forestry Workers	5,905	5,978	73	1%	875
Buyers and Purchasing Agents	2,914	2,914	(0)	(0%)	294
Mobile Heavy Equipment Mechanics, Except Engines	2,111	2,188	77	4%	230
Compliance Officers	2,571	2,690	119	5%	227
Cost Estimators	2,222	2,318	96	4%	224
Pest Control Workers	1,309	1,356	47	4%	187
Farm Equipment Mechanics and Service Technicians	1,617	1,662	45	3%	177
Veterinary Assistants and Laboratory Animal Caretakers	974	1,047	73	8%	176
Animal Trainers	1,135	1,213	78	7%	157
Forest and Conservation Technicians	1,148	1,111	(37)	(3%)	140
Forest and Conservation Workers	674	691	17	2%	113
Food Science Technicians	764	761	(3)	(0%)	99



Exhibit 41a. Agriculture, water, and environmental technologies hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Cost Estimators	\$26.09	\$34.94	\$46.94
Compliance Officers	\$25.75	\$33.68	\$44.60
Mobile Heavy Equipment Mechanics, Except Engines	\$23.00	\$28.62	\$34.76
Buyers and Purchasing Agents	\$22.96	\$29.26	\$38.04
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	\$22.01	\$29.65	\$44.49
Farm Equipment Mechanics and Service Technicians	\$18.13	\$22.18	\$28.23
Food Science Technicians	\$17.44	\$20.67	\$25.68
Forest and Conservation Technicians	\$15.86	\$17.72	\$24.05
First-Line Supervisors of Farming, Fishing, and Forestry Workers	\$14.71	\$19.86	\$25.42
Pest Control Workers	\$14.59	\$18.19	\$22.66
Forest and Conservation Workers	\$14.21	\$17.41	\$19.29
Agricultural Equipment Operators	\$14.01	\$14.39	\$17.60
Veterinary Assistants and Laboratory Animal Caretakers	\$14.01	\$15.76	\$17.27
Farmers, Ranchers, and Other Agricultural Managers	\$14.00	\$16.80	\$29.98
Animal Trainers	\$9.38	\$14.32	\$22.36

Exhibit 41b. Agriculture, water, and environmental technologies average hourly wages in the region

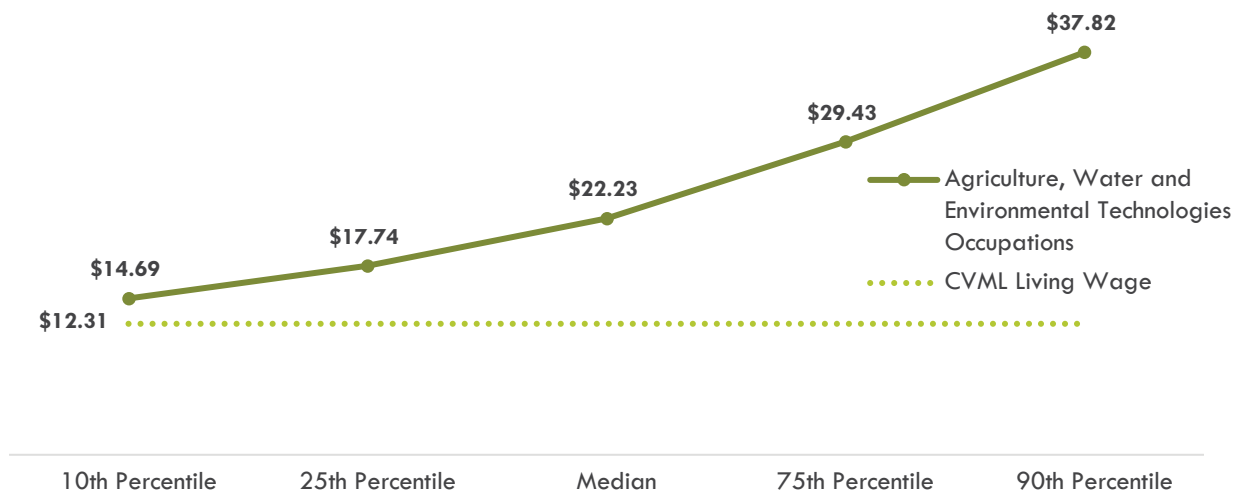


Exhibit 42. Top 10 certifications, specialized skills, and software skills in job postings for agriculture, water, and environmental technologies occupations

Certifications	Specialized Skills	Software Skills
Certified Pest Control	Sales	Microsoft Office
Certified Veterinary Technician	Customer Service	Microsoft Excel
Property and Casualty License	Repair	Salesforce
Life Insurance License	Quality Assurance and Control	Customer Relationship Management (CRM)
Insurance Agent Certification	Budgeting	SAP
OSHA Forklift Certification	Product Knowledge	Enterprise Resource Planning (ERP)
Applicators License	Data Entry	CRM software
Real Estate Certification	Business Development	Software as a Service (SaaS)
Life and Health Insurance License	Sales Management	Tableau
Food Service Certification	Retail Industry Knowledge	AutoCAD

Exhibit 43. Agriculture, water, and environmental technologies workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



BUSINESS & ENTREPRENEURSHIP

Summary

- » **Gender and race/ethnicity:** Comprising 35% of the workforce, men are underrepresented in this sector. Analysis shows overrepresentation of white workers. The largest age group is 25–44 years of age (Exhibits 44, 45, and 46).
- » **Employment and projected demand:** The largest middle-skill occupation is general and operations managers, which has 2,183 annual openings (Exhibit 47).
- » **Wages:** The highest paid occupation is general and operations managers, with an entry-level wage of \$29.81/hour (Exhibits 48a and 48b).
- » **Specialized skills:** The top skill is customer service, and the top certification is Real Estate Certification (Exhibit 49).

Top Job Titles

- Customer Service Representative
- Receptionist
- Bookkeeper

Exhibit 44. Gender composition of the top occupations in the business and entrepreneurship workforce

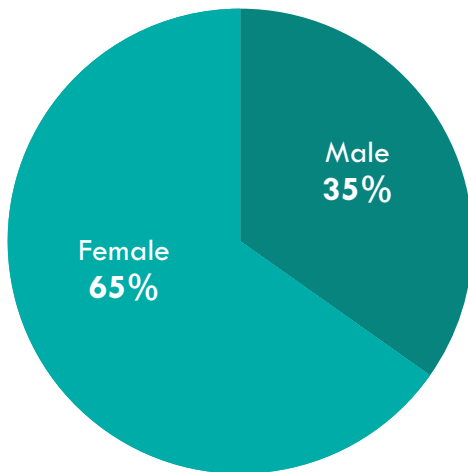


Exhibit 45. Race/ethnicity composition of the top occupations in the business and entrepreneurship workforce

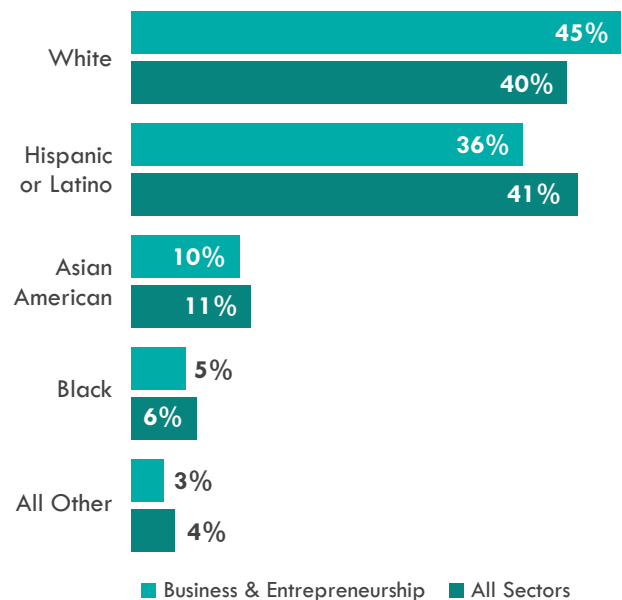


Exhibit 46. Business and entrepreneurship age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Billing and Posting Clerks	250	2,205	1,699	296
Bookkeeping, Accounting, and Auditing Clerks	610	5,184	7,429	2,735
Business Operations Specialists, All Other	643	5,522	4,665	816
Customer Service Representatives	2,282	7,313	4,455	821
Eligibility Interviewers, Government Programs	75	1,575	1,645	207
First-Line Supervisors of Office and Administrative Support Workers	451	6,054	6,032	956
General and Operations Managers	385	10,259	9,363	1,279
Human Resources Specialists	298	2,790	1,658	261
Information and Record Clerks, All Other	272	1,160	1,226	371
Insurance Sales Agents	220	2,158	2,039	560
Office and Administrative Support Workers, All Other	203	1,278	1,117	216
Production, Planning, and Expediting Clerks	245	1,577	1,384	168
Receptionists and Information Clerks	1,377	3,028	2,069	734
Sales and Related Workers, All Other	305	1,032	956	553
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	629	2,955	2,221	492



Exhibit 47. Business and entrepreneurship employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
General and Operations Managers	21,295	23,132	1,837	9%	2,183
Customer Service Representatives	14,874	15,260	386	3%	1,990
Bookkeeping, Accounting, and Auditing Clerks	15,958	15,972	14	0%	1,782
First-Line Supervisors of Office and Administrative Support Workers	13,493	13,788	295	2%	1,403
Receptionists and Information Clerks	7,208	7,575	367	5%	999
Business Operations Specialists, All Other	11,646	12,060	414	4%	937
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	6,296	6,705	409	6%	814
Human Resources Specialists	5,012	5,417	405	8%	570
Insurance Sales Agents	4,983	5,347	364	7%	542
Billing and Posting Clerks	4,452	4,559	107	2%	483
Production, Planning, and Expediting Clerks	3,374	3,629	255	8%	405
Sales and Related Workers, All Other	2,845	2,921	76	3%	384
Eligibility Interviewers, Government Programs	3,504	3,649	145	4%	347
Information and Record Clerks, All Other	3,030	3,096	66	2%	343
Office and Administrative Support Workers, All Other	2,813	2,881	68	2%	327



Exhibit 48a. Business and entrepreneurship hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
General and Operations Managers	\$29.81	\$44.07	\$61.98
Human Resources Specialists	\$23.65	\$29.75	\$38.12
First-Line Supervisors of Office and Administrative Support Workers	\$23.29	\$28.72	\$35.18
Business Operations Specialists, All Other	\$20.72	\$30.57	\$41.48
Eligibility Interviewers, Government Programs	\$20.07	\$22.95	\$27.65
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	\$18.97	\$25.00	\$38.34
Production, Planning, and Expediting Clerks	\$18.31	\$22.81	\$28.68
Information and Record Clerks, All Other	\$17.81	\$21.36	\$23.43
Insurance Sales Agents	\$17.76	\$23.58	\$36.45
Bookkeeping, Accounting, and Auditing Clerks	\$17.68	\$22.01	\$25.44
Billing and Posting Clerks	\$17.48	\$20.79	\$22.79
Customer Service Representatives	\$14.54	\$17.63	\$22.38
Sales and Related Workers, All Other	\$14.37	\$16.91	\$21.58
Office and Administrative Support Workers, All Other	\$14.13	\$15.75	\$21.95
Receptionists and Information Clerks	\$14.05	\$15.10	\$17.54

Exhibit 48b. Business and entrepreneurship average hourly wages in the region

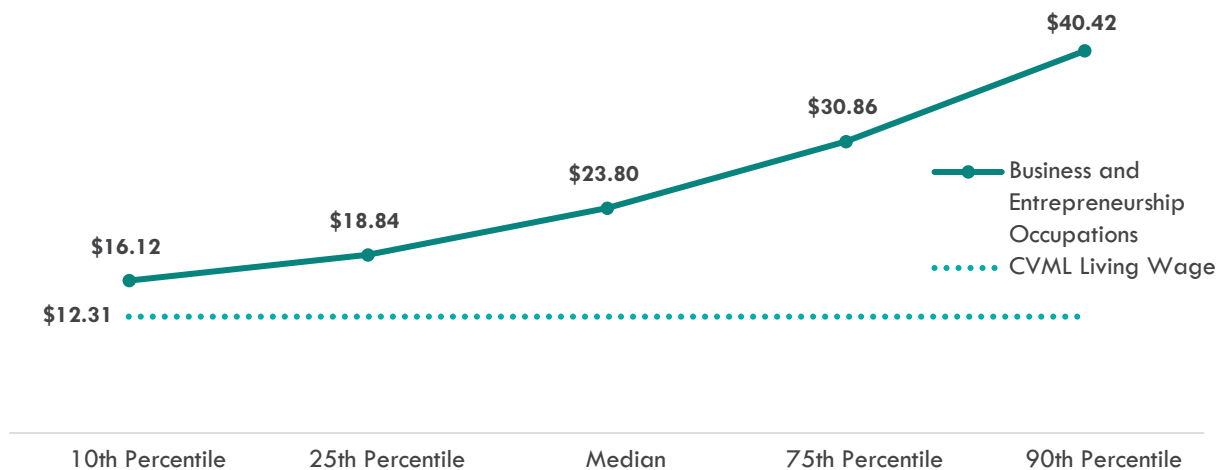


Exhibit 49. Top 10 certifications, specialized skills, and software skills in job postings for business and entrepreneurship occupations

Certifications	Specialized Skills	Software Skills
Real Estate Certification	Customer Service	Microsoft Excel
Insurance Agent Certification	Scheduling	QuickBooks
Insurance License	Data Entry	Customer Relationship Management (CRM)
Property and Casualty License	Accounting	Word Processing
Mortgage License	Customer Contact	Enterprise Resource Planning (ERP)
Life and Health Insurance License	Budgeting	Accounting Software
Certified Public Accountant (CPA)	Administrative Support	SAP
Security Clearance	Customer Billing	Salesforce
SHRM Certified Professional (SHRM-CP)	Staff Management	Public administration
Paralegal Certification	Retail Industry Knowledge	Yardi Software

Exhibit 50. Business and entrepreneurship workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



EDUCATION

Summary

- » **Gender and race/ethnicity:** Comprising 15% of the workforce, men are underrepresented in this sector. Analysis shows overrepresentation of Hispanic or Latino workers. The largest age group is 25–44 years of age (Exhibits 51, 52, and 53).
- » **Employment and projected demand:** The largest middle-skill occupation is teaching assistants, except postsecondary, which has 2,136 annual openings (Exhibit 54).
- » **Wages:** The highest paid occupation is special education teachers, preschool, with an entry-level wage of \$21.90/hour (Exhibits 55a and 55b).
- » **Specialized skills:** The top skill is teaching, and the top certification is First Aid CPR AED (Exhibit 56).

Top Job Titles

- Pre-School Teacher
- Activities Assistant
- Special Education Paraprofessional

Exhibit 51. Gender composition of the top occupations in the education workforce

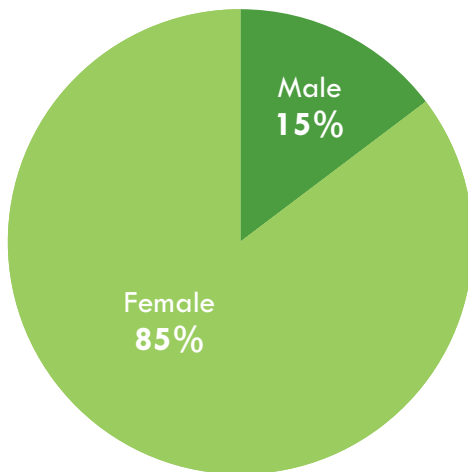


Exhibit 52. Race/ethnicity composition of the top occupations in the education workforce

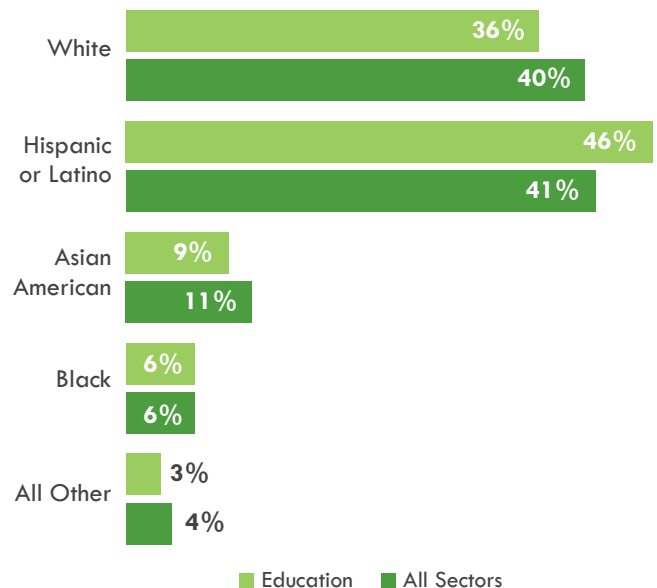


Exhibit 53. Education age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Childcare Workers	1,549	2,537	2,286	601
Education and Childcare Administrators, Preschool and Daycare	14	302	292	44
Interpreters and Translators	60	315	210	46
Library Assistants, Clerical	77	205	332	103
Library Technicians	143	218	355	112
Preschool Teachers, Except Special Education	501	2,594	1,516	165
Recreation Workers	744	1,161	878	210
Special Education Teachers, Preschool	0	135	114	10
Substitute Teachers, Short-Term	1,148	2,655	2,380	556
Teaching Assistants, Except Postsecondary	1,650	8,287	9,661	1,190
Teaching Assistants, Postsecondary	147	261	171	25



Exhibit 54. Education employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Teaching Assistants, Except Postsecondary	20,788	21,796	1,008	5%	2,136
Childcare Workers	6,973	6,813	(160)	(2%)	1,000
Substitute Teachers, Short-Term	6,740	7,208	468	7%	877
Preschool Teachers, Except Special Education	4,776	5,114	338	7%	577
Recreation Workers	2,994	3,263	269	9%	528
Library Technicians	828	827	(1)	(0%)	121
Library Assistants, Clerical	726	724	(2)	(0%)	113
Interpreters and Translators	633	686	53	8%	72
Teaching Assistants, Postsecondary	613	585	(28)	(4%)	60
Education and Childcare Administrators, Preschool and Daycare	656	680	24	4%	59
Special Education Teachers, Preschool	270	293	23	8%	25



Exhibit 55a. Education hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Special Education Teachers, Preschool	\$21.90	\$34.96	\$43.05
Interpreters and Translators	\$21.26	\$24.88	\$33.06
Education and Childcare Administrators, Preschool and Daycare	\$20.72	\$23.92	\$28.46
Library Technicians	\$17.88	\$21.65	\$23.10
Substitute Teachers, Short-Term	\$16.77	\$17.94	\$21.06
Teaching Assistants, Postsecondary	\$15.39	\$19.82	\$24.04
Teaching Assistants, Except Postsecondary	\$14.56	\$17.64	\$19.18
Library Assistants, Clerical	\$14.53	\$17.77	\$21.57
Preschool Teachers, Except Special Education	\$14.22	\$17.15	\$21.55
Recreation Workers	\$14.06	\$14.39	\$15.81
Childcare Workers	\$14.02	\$14.48	\$17.28

Exhibit 55b. Education average hourly wages in the region

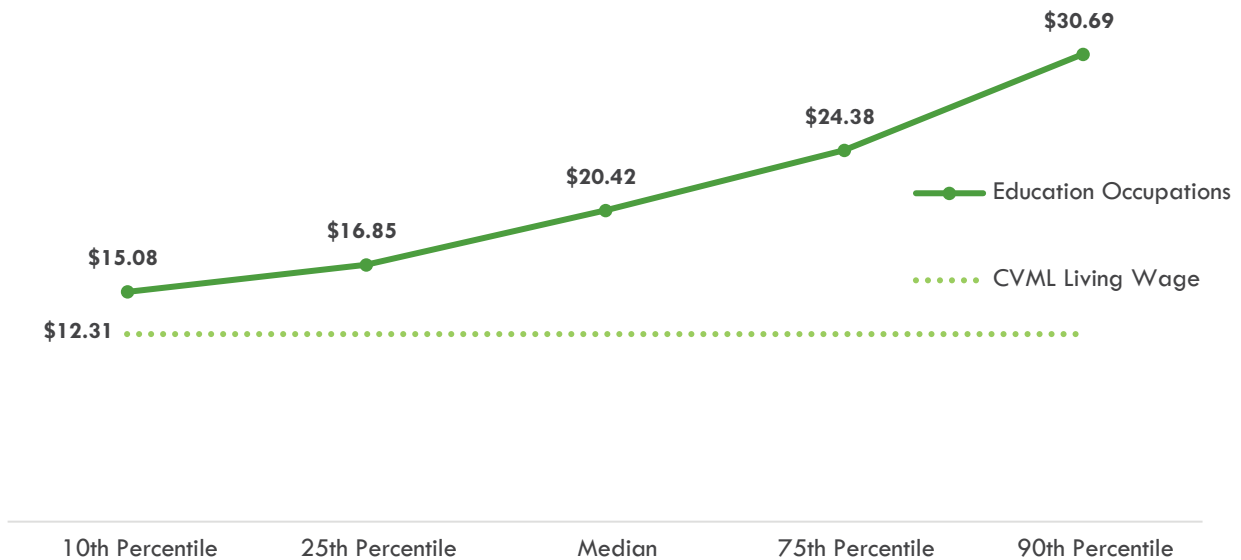
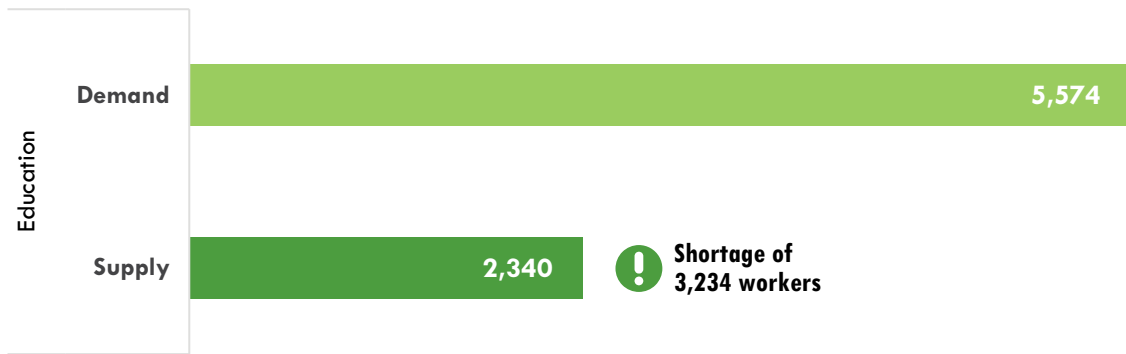


Exhibit 56. Top 10 certifications, specialized skills, and software skills in job postings for education occupations

Certifications	Specialized Skills	Software Skills
First Aid CPR AED	Teaching	Microsoft Excel
Child Development Associate (CDA)	Child Development	Microsoft Word
Certified Career Development Facilitator	Child Care	Microsoft PowerPoint
Registered Behavior Technician	Cardiopulmonary Resuscitation (CPR)	Microsoft Windows
Basic Life Saving (BLS)	Early Childhood Education	Database Software
Certified Interpreter for the Deaf	Scheduling	Speech Recognition
Certified Teacher	Lesson Planning	Peoplesoft
Home Care Certificate	Special Education	Public Administration
Business License	Child Care Facility	Adobe Acrobat
Board Certified Behavior Analyst (BCBA)	Toileting	Apache Zookeeper

Exhibit 57. Education workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



ENERGY, CONSTRUCTION & UTILITIES

Summary

- » **Gender and race/ethnicity:** Comprising 6% of the workforce, women are underrepresented in this sector. Analysis shows overrepresentation of Hispanic or Latino workers. The largest age group is 25–44 years of age (Exhibits 58, 59, and 60).
- » **Employment and projected demand:** The largest middle-skill occupation is industrial truck and tractor operators, which has 2,979 annual openings (Exhibit 61).
- » **Wages:** The highest paid occupation is first-line supervisors of construction trades and extraction workers, with an entry-level wage of \$28.15/hour (Exhibits 62a and 62b).
- » **Specialized skills:** The top skill is repair, and the top certification is OSHA Forklift Certification (Exhibit 63).

Top Job Titles

- Forklift Operator
- Maintenance Technician
- Field Service Technician

Exhibit 58. Gender composition of the top occupations in the energy, construction, and utilities workforce

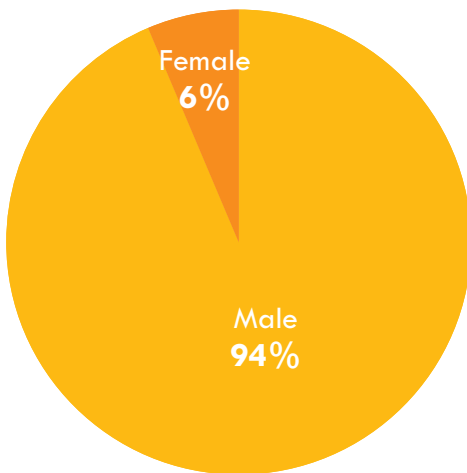


Exhibit 59. Race/ethnicity composition of the top occupations in the energy, construction, and utilities workforce

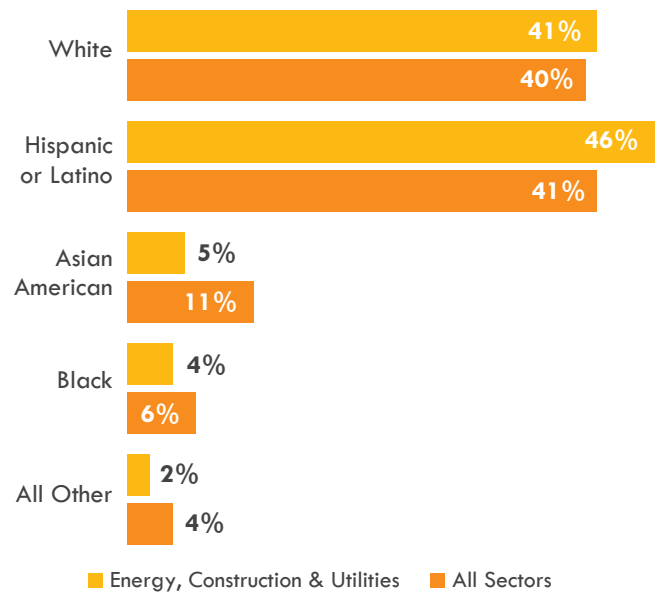


Exhibit 60. Energy, construction, and utilities age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Carpenters	842	4,926	4,658	725
Construction Managers	75	1,821	2,356	434
Electricians	578	3,285	2,229	308
First-Line Supervisors of Construction Trades and Extraction Workers	141	2,779	3,159	583
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	309	1,916	1,267	167
Industrial Truck and Tractor Operators	2,617	11,479	7,102	678
Installation, Maintenance, and Repair Workers, All Other	311	1,346	1,030	194
Maintenance and Repair Workers, General	756	5,584	7,202	1,285
Operating Engineers and Other Construction Equipment Operators	197	1,673	1,830	277
Plumbers, Pipefitters, and Steamfitters	342	2,296	1,580	208
Security and Fire Alarm Systems Installers	115	466	200	31
Sheet Metal Workers	100	594	430	54
Solar Photovoltaic Installers	122	500	214	25
Telecommunications Equipment Installers and Repairers, Except Line Installers	98	595	519	59
Water and Wastewater Treatment Plant and System Operators	56	682	812	78



Exhibit 61. Energy, construction, and utilities employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Industrial Truck and Tractor Operators	21,876	24,333	2,456	11%	2,979
Maintenance and Repair Workers, General	14,826	15,826	999	7%	1,640
Carpenters	11,150	11,528	378	3%	1,135
Electricians	6,398	7,141	743	12%	842
First-Line Supervisors of Construction Trades and Extraction Workers	6,668	6,977	310	5%	726
Plumbers, Pipefitters, and Steam-fitters	4,426	4,901	475	11%	566
Operating Engineers and Other Construction Equipment Operators	3,986	4,177	191	5%	475
Construction Managers	4,687	5,149	462	10%	440
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	3,659	4,038	379	10%	438
Installation, Maintenance, and Repair Workers, All Other	2,880	2,971	90	3%	319
Solar Photovoltaic Installers	870	1,094	224	26%	156
Water and Wastewater Treatment Plant and System Operators	1,629	1,628	(1)	(0%)	152
Telecommunications Equipment Installers and Repairers, Except Line Installers	1,277	1,266	(11)	(1%)	145
Sheet Metal Workers	1,185	1,265	79	7%	129
Security and Fire Alarm Systems Installers	816	963	147	18%	118



Exhibit 62a. Energy, construction, and utilities hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
First-Line Supervisors of Construction Trades and Extraction Workers	\$28.15	\$35.65	\$45.67
Operating Engineers and Other Construction Equipment Operators	\$24.64	\$30.45	\$42.96
Water and Wastewater Treatment Plant and System Operators	\$23.74	\$29.86	\$36.60
Telecommunications Equipment Installers and Repairers, Except Line Installers	\$23.12	\$29.15	\$36.25
Construction Managers	\$22.38	\$37.98	\$56.47
Electricians	\$21.82	\$28.94	\$37.39
Solar Photovoltaic Installers	\$21.59	\$22.81	\$26.49
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	\$21.27	\$24.24	\$30.60
Plumbers, Pipefitters, and Steamfitters	\$21.10	\$28.37	\$37.77
Sheet Metal Workers	\$21.06	\$27.99	\$35.95
Carpenters	\$18.11	\$25.48	\$34.35
Industrial Truck and Tractor Operators	\$17.78	\$20.87	\$22.80
Security and Fire Alarm Systems Installers	\$17.55	\$23.31	\$26.92
Maintenance and Repair Workers, General	\$17.45	\$22.07	\$27.85
Installation, Maintenance, and Repair Workers, All Other	\$16.40	\$19.21	\$23.78

Exhibit 62b. Energy, construction, and utilities average hourly wages in the region

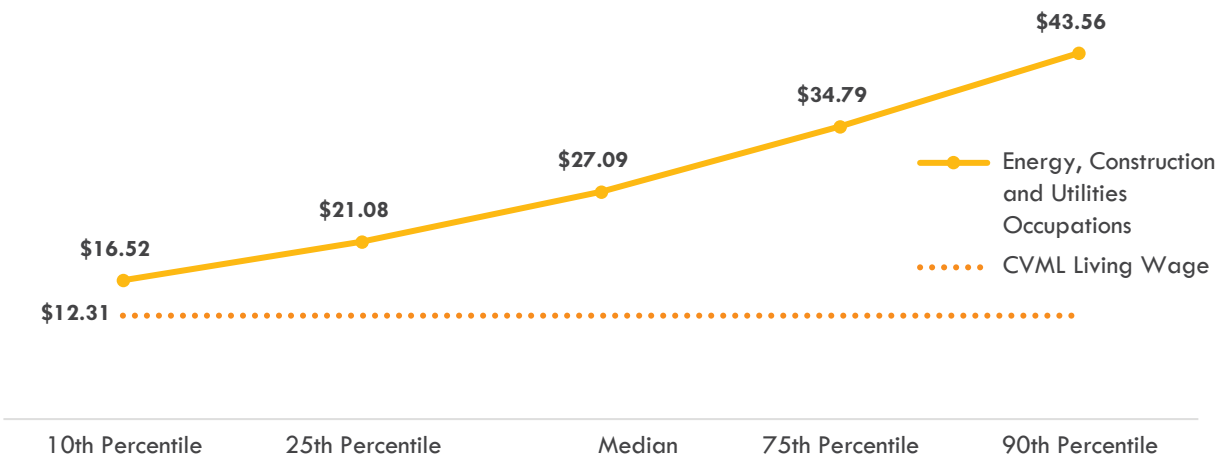
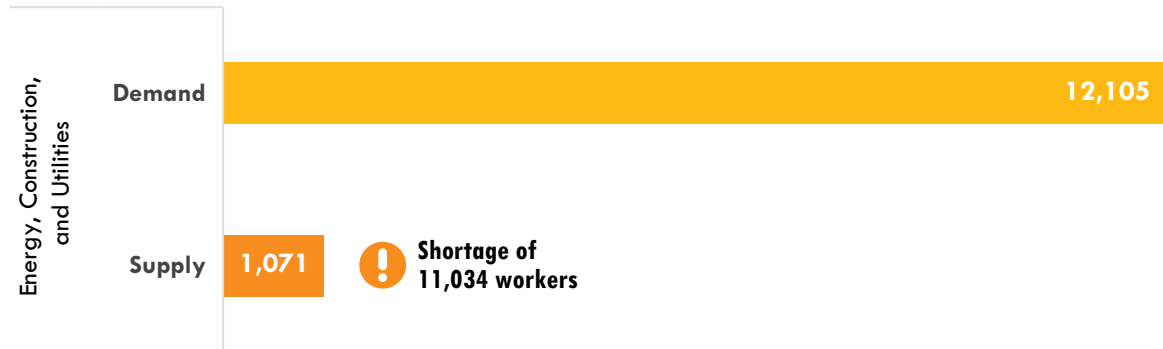


Exhibit 63. Top 10 certifications, specialized skills, and software skills in job postings for energy, construction, and utilities occupations

Certifications	Specialized Skills	Software Skills
OSHA Forklift Certification	Repair	Microsoft Office
Environmental Protection Agency Certification	Forklift Operation	Microsoft Excel
Electrician Certification	Plumbing	SAP
Occupational Safety and Health Administration Certification	Scheduling	AutoCAD
Certified Safety Professional	HVAC	SCADA
Project Management Certification	Occupational Health and Safety	Primavera
Security Clearance	Predictive / Preventative Maintenance	Active Server Pages (ASP)
Wastewater Treatment Plant Operator	Hand Tools	Database Software
OSHA Safety 30 Hour	Carpentry	Solaris
Certified Pool/Spa Operator	Project Management	Lockout / Tagout (LOTO)

Exhibit 64. Energy, construction, and utilities workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



HEALTH

Summary

- » **Gender and race/ethnicity:** Comprising 17% of the workforce, men are underrepresented in this sector. Analysis shows underrepresentation of white workers and overrepresentation of Asian American workers. The largest age group is 25–44 years of age (Exhibits 65, 66 and 67).
- » **Employment and projected demand:** The largest middle-skill occupation is home health and personal care aides, which has 11,965 annual openings (Exhibit 68).
- » **Wages:** The highest paid occupation is registered nurses, with an entry-level wage of \$45.16/hour (Exhibits 69a and 69b).
- » **Specialized skills:** The top skill is patient care, and the top certification is registered nurse (Exhibit 70).

Top Job Titles

- Registered Nurse
- Medical Assistant
- Licensed Vocational Nurse

Exhibit 65. Gender composition of the top occupations in the health workforce

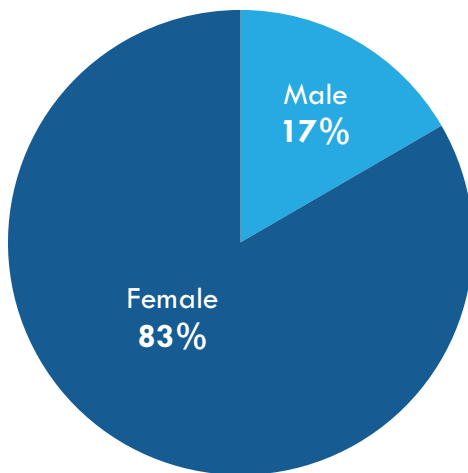


Exhibit 66. Race/ethnicity composition of the top occupations in the health workforce

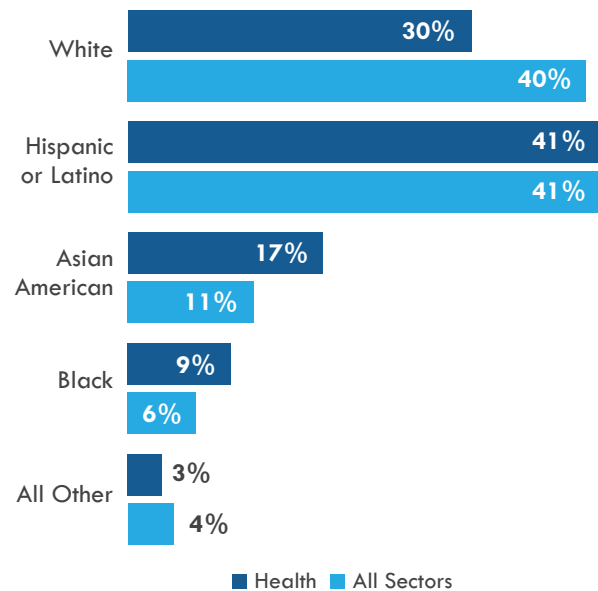


Exhibit 67. Health age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Dental Assistants	743	2,901	1,185	108
Dental Hygienists	77	1,038	667	72
Health Technologists and Technicians, All Other	126	1,106	622	69
Healthcare Support Workers, All Other	137	531	385	56
Home Health and Personal Care Aides	5,531	26,759	26,987	6,228
Licensed Practical and Licensed Vocational Nurses	407	3,343	2,585	371
Medical Assistants	1,505	6,640	2,256	212
Medical Records Specialists	126	943	889	149
Medical Secretaries and Administrative Assistants	543	3,742	3,601	726
Nursing Assistants	1,304	4,965	3,246	468
Pharmacy Technicians	586	2,242	930	91
Phlebotomists	116	677	304	32
Radiologic Technologists and Technicians	71	1,049	640	73
Registered Nurses	766	15,454	12,719	1,534
Social and Human Service Assistants	335	2,423	1,811	306



Exhibit 68. Health employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Home Health and Personal Care Aides	65,503	81,181	15,678	24%	11,965
Registered Nurses	30,475	32,903	2,428	8%	2,138
Nursing Assistants	9,984	11,158	1,174	12%	1,507
Medical Assistants	10,615	11,653	1,038	10%	1,495
Medical Secretaries and Administrative Assistants	8,611	9,209	598	7%	1,073
Social and Human Service Assistants	4,875	5,502	627	13%	719
Dental Assistants	4,936	5,305	369	7%	668
Licensed Practical and Licensed Vocational Nurses	6,714	7,365	651	10%	657
Pharmacy Technicians	3,849	4,017	168	4%	311
Health Technologists and Technicians, All Other	1,924	2,202	278	14%	200
Medical Records Specialists	2,107	2,194	87	4%	168
Radiologic Technologists and Technicians	1,834	1,991	157	9%	166
Phlebotomists	1,129	1,248	119	10%	161
Healthcare Support Workers, All Other	1,108	1,199	91	8%	157
Dental Hygienists	1,856	2,035	179	10%	155



Exhibit 69a. Health hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Registered Nurses	\$45.16	\$54.27	\$62.66
Dental Hygienists	\$40.48	\$47.13	\$49.33
Radiologic Technologists and Technicians	\$35.90	\$39.86	\$48.73
Licensed Practical and Licensed Vocational Nurses	\$23.66	\$28.87	\$32.94
Phlebotomists	\$17.92	\$21.67	\$23.68
Pharmacy Technicians	\$17.79	\$21.56	\$25.99
Health Technologists and Technicians, All Other	\$17.74	\$21.52	\$27.62
Medical Records Specialists	\$17.70	\$22.47	\$29.97
Social and Human Service Assistants	\$17.49	\$18.89	\$22.71
Medical Secretaries and Administrative Assistants	\$16.79	\$18.04	\$22.19
Dental Assistants	\$16.31	\$19.25	\$22.96
Healthcare Support Workers, All Other	\$16.17	\$18.88	\$22.73
Medical Assistants	\$15.02	\$17.89	\$20.86
Nursing Assistants	\$14.53	\$17.11	\$18.44
Home Health and Personal Care Aides	\$14.26	\$14.28	\$14.34

Exhibit 69b. Health average hourly wages in the region

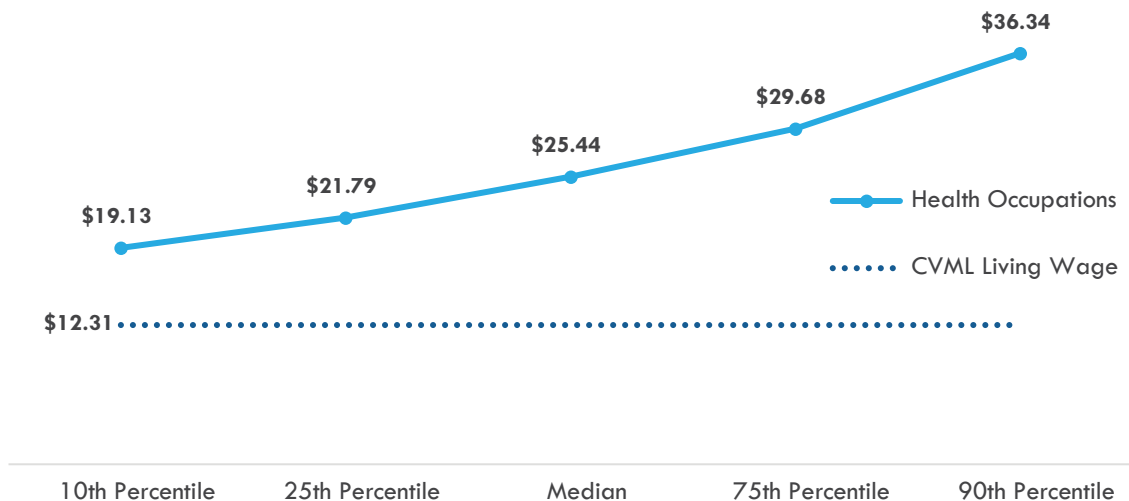
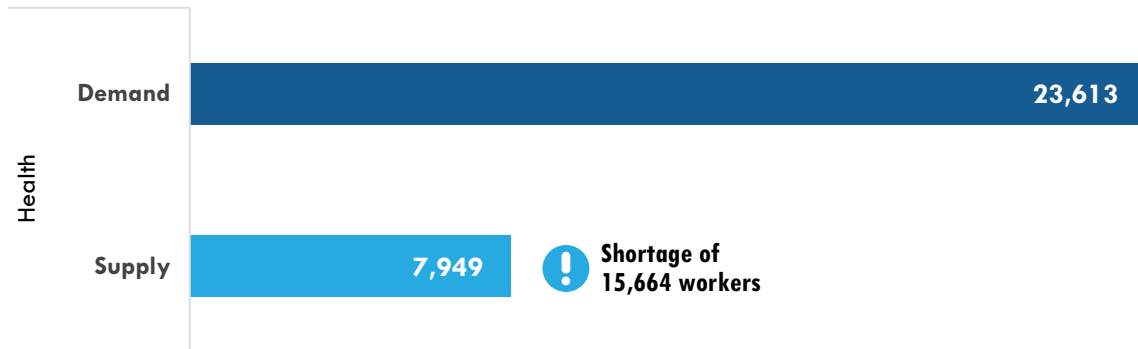


Exhibit 70. Top 10 certifications, specialized skills, and software skills in job postings for health occupations

Certifications	Specialized Skills	Software Skills
Registered Nurse	Patient Care	Dentrix
Basic Life Saving (BLS)	Advanced Cardiac Life Support (ACLS)	ICD-10
Advanced Cardiac Life Support (ACLS) Certification	Cardiopulmonary Resuscitation (CPR)	Meditech
Basic Cardiac Life Support Certification	Life Support	Really Simple Syndication (RSS)
First Aid CPR AED	Treatment Planning	Medical Software
Licensed Vocational Nurse (LVN)	Acute Care	PointClickCare
American Heart Association Certification	Vaccination	Prognosis
Licensed Practical Nurse (LPN)	Scheduling	Adobe Acrobat
Certified Nursing Assistant	Vital Signs Measurement	ICD-9-CM Coding
Certified Medical Assistant	Surgery	ActiveX

Exhibit 71. Health workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



ICT/DIGITAL MEDIA

Summary

- » **Gender and race/ethnicity:** Comprising 22% of the workforce, men are underrepresented in this sector. Analysis shows overrepresentation of white workers and underrepresentation of Hispanic or Latino workers. The largest age group is 45–54 years of age (Exhibits 72, 73 and 74).
- » **Employment and projected demand:** The largest middle-skill occupation is office clerks, general, which has 3,282 annual openings (Exhibit 75).
- » **Wages:** The highest paid occupation is network and computer systems administrators, with an entry-level wage of \$32.23/hour (Exhibits 76a and 76b).
- » **Specialized skills:** The top skill is administrative support, and the top certification is security clearance (Exhibit 77).

Top Job Titles

- Administrative Assistant
- Office Assistant
- Executive Assistant

Exhibit 72. Gender composition of the top occupations in the ICT/digital media workforce

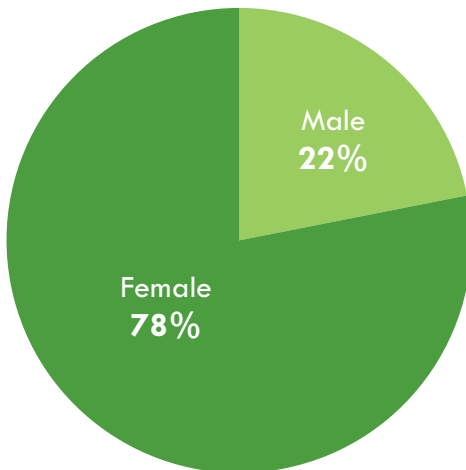


Exhibit 73. Race/ethnicity composition of the top occupations in the ICT/digital media workforce

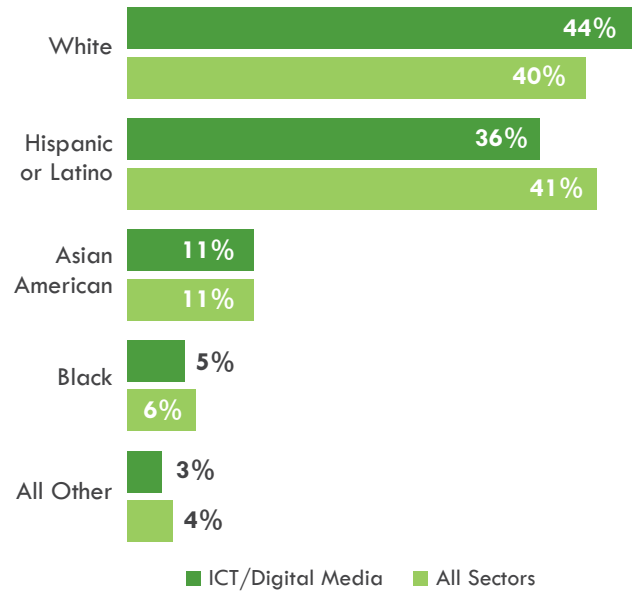


Exhibit 74. ICT/digital media age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Audio and Video Technicians	43	192	116	15
Audiovisual Equipment Installers and Repairers	36	172	77	12
Broadcast Technicians	12	133	110	18
Computer Network Architects	12	319	183	11
Computer Network Support Specialists	72	538	340	29
Computer Occupations, All Other	269	1,643	1,117	120
Computer User Support Specialists	233	1,576	932	93
Executive Secretaries and Executive Administrative Assistants	164	1,062	1,530	343
Graphic Designers	72	539	307	52
Network and Computer Systems Administrators	63	844	508	40
Office Clerks, General	3,424	10,275	10,466	3,464
Procurement Clerks	15	253	314	37
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	922	5,526	7,730	2,056
Surveying and Mapping Technicians	29	138	106	19
Switchboard Operators, Including Answering Service	72	309	368	156

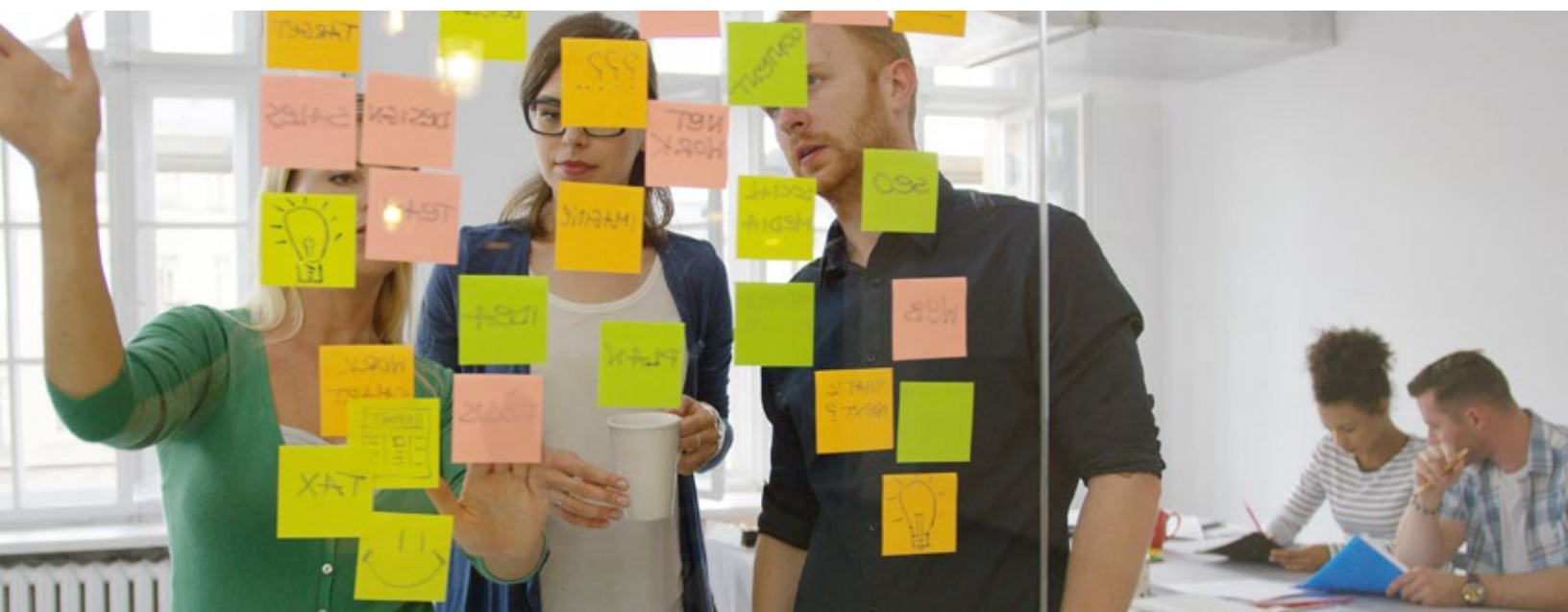


Exhibit 75. ICT/digital media employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Office Clerks, General	27,629	28,093	464	2%	3,282
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	16,235	16,166	(69)	(0%)	1,760
Executive Secretaries and Executive Administrative Assistants	3,100	2,888	(212)	(7%)	324
Computer Occupations, All Other	3,148	3,296	148	5%	262
Computer User Support Specialists	2,834	2,980	146	5%	239
Network and Computer Systems Administrators	1,458	1,512	54	4%	107
Switchboard Operators, Including Answering Service	913	800	(113)	(12%)	95
Graphic Designers	973	979	6	1%	94
Computer Network Support Specialists	983	1,015	32	3%	79
Procurement Clerks	624	612	(12)	(2%)	57
Audio and Video Technicians	374	402	28	8%	44
Surveying and Mapping Technicians	294	313	19	6%	41
Computer Network Architects	535	549	14	3%	35
Audiovisual Equipment Installers and Repairers	298	289	(9)	(3%)	32
Broadcast Technicians	280	287	7	3%	30



Exhibit 76a. ICT/digital media hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
Network and Computer Systems Administrators	\$32.23	\$40.67	\$47.88
Computer Network Architects	\$32.16	\$40.04	\$54.53
Computer Occupations, All Other	\$27.21	\$37.72	\$51.64
Computer Network Support Specialists	\$24.60	\$30.10	\$37.63
Executive Secretaries and Executive Administrative Assistants	\$23.66	\$29.59	\$36.36
Surveying and Mapping Technicians	\$22.32	\$30.44	\$42.05
Computer User Support Specialists	\$21.52	\$27.45	\$34.08
Audio and Video Technicians	\$20.40	\$22.66	\$29.79
Audiovisual Equipment Installers and Repairers	\$19.73	\$24.38	\$27.78
Graphic Designers	\$18.13	\$24.00	\$30.87
Procurement Clerks	\$17.92	\$21.61	\$25.57
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	\$17.32	\$21.54	\$23.31
Switchboard Operators, Including Answering Service	\$14.76	\$17.47	\$21.51
Office Clerks, General	\$14.46	\$17.77	\$22.19
Broadcast Technicians	\$14.06	\$17.73	\$30.88

Exhibit 76b. ICT/digital media average hourly wages in the region

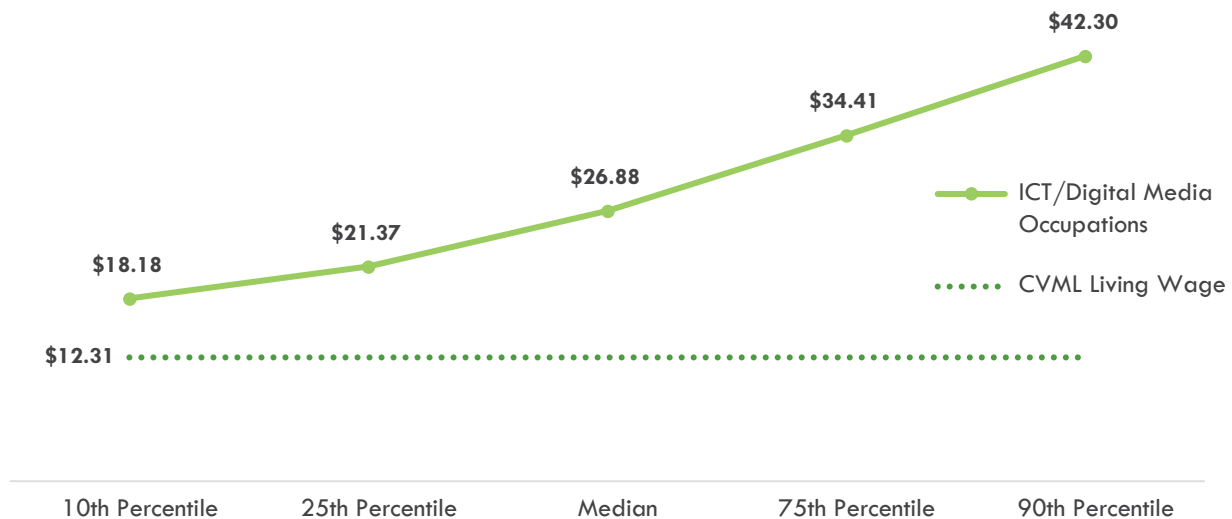
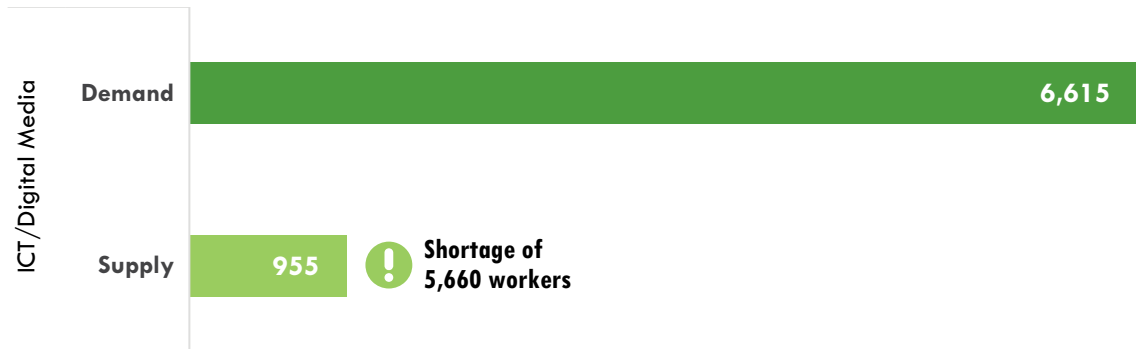


Exhibit 77. Top 10 certifications, specialized skills, and software skills in job postings for ICT/digital media occupations

Certifications	Specialized Skills	Software Skills
Security Clearance	Administrative Support	Microsoft Excel
Certified A+ Technician	Customer Service	Word Processing
Cisco Certified Network Associate (CCNA)	Scheduling	SQL
CompTIA Security+	Data Entry	QuickBooks
Project Management Certification	Technical Support	Python
IT Infrastructure Library (ITIL) Certification	Repair	SAP
CompTIA Network+	Appointment Setting	Linux
Microsoft Certified Solutions Associate (MCSA)	Budgeting	Enterprise Resource Planning (ERP)
Project Management Professional (PMP)	Spreadsheets	Adobe Acrobat
Certified Information Systems Security Professional (CISSP)	Project Management	VMware

Exhibit 78. ICT/digital media workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



PUBLIC SAFETY

Summary

- » **Gender and race/ethnicity:** Comprising 33% of the workforce, women are underrepresented in this sector. Analysis shows overrepresentation of Black workers. The largest age group is 25–44 years of age (Exhibits 79, 80, and 81).
- » **Employment and projected demand:** The largest middle-skill occupation is protective service workers, all other, which has 1,121 annual openings (Exhibit 82).
- » **Wages:** The highest paid occupation is first-line supervisors of correctional officers, with an entry-level wage of \$49.21/hour (Exhibits 83a and 83b).
- » **Specialized skills:** The top skill is surveillance, and the top certification is First Aid CPR AED (Exhibit 84).

Top Job Titles

- Marine Interdiction Agent
- Border Patrol Agent
- Asset Protection Specialist

Exhibit 79. Gender composition of the top occupations in the public safety workforce

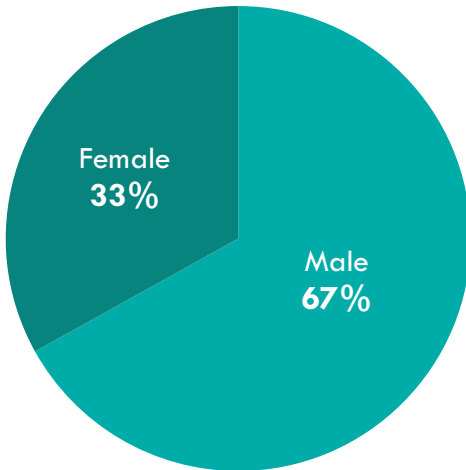


Exhibit 80. Race/ethnicity composition of the top occupations in the public safety workforce

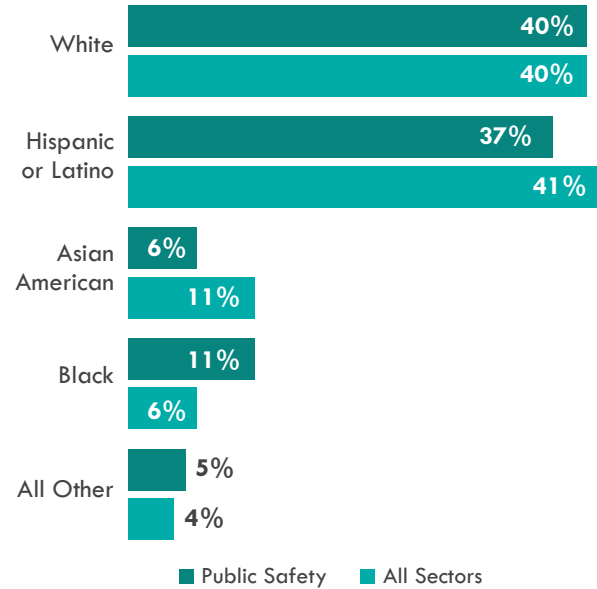


Exhibit 81. Public safety age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Correctional Officers and Jailers	731	5,906	3,871	313
Detectives and Criminal Investigators	10	474	315	25
Fire Inspectors and Investigators	0	100	140	19
Firefighters	189	2,224	936	25
First-Line Supervisors of Correctional Officers	15	512	613	43
First-Line Supervisors of Firefighting and Prevention Workers	0	263	422	17
First-Line Supervisors of Police and Detectives	10	349	375	18
First-Line Supervisors of Security Workers	11	239	214	33
Forensic Science Technicians	33	90	66	11
Gambling Surveillance Officers and Gambling Investigators	18	155	133	40
Police and Sheriff's Patrol Officers	383	4,506	1,990	128
Private Detectives and Investigators	14	226	151	23
Protective Service Workers, All Other	2,103	963	870	322
Public Safety Telecommunicators	65	548	323	27
Transportation Security Screeners	91	442	302	52



Exhibit 82. Public safety employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Protective Service Workers, All Other	4,257	4,450	193	5%	1,121
Correctional Officers and Jailers	10,820	10,699	(121)	(1%)	1,008
Police and Sheriff's Patrol Officers	7,014	7,359	345	5%	615
Firefighters	3,380	3,544	164	5%	290
First-Line Supervisors of Correctional Officers	1,186	1,210	24	2%	101
Public Safety Telecommunicators	965	1,012	47	5%	99
Transportation Security Screeners	889	897	9	1%	80
Detectives and Criminal Investigators	829	870	41	5%	70
First-Line Supervisors of Police and Detectives	759	811	52	7%	60
First-Line Supervisors of Security Workers	501	539	38	8%	58
First-Line Supervisors of Firefighting and Prevention Workers	704	735	31	4%	53
Gambling Surveillance Officers and Gambling Investigators	357	362	5	1%	48
Private Detectives and Investigators	417	442	25	6%	42
Fire Inspectors and Investigators	266	279	13	5%	30
Forensic Science Technicians	202	223	21	11%	30



Exhibit 83a. Public safety hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
First-Line Supervisors of Correctional Officers	\$49.21	\$51.21	\$55.45
First-Line Supervisors of Police and Detectives	\$47.76	\$61.08	\$77.76
First-Line Supervisors of Firefighting and Prevention Workers	\$37.16	\$41.57	\$51.65
Detectives and Criminal Investigators	\$37.16	\$47.11	\$51.23
Police and Sheriff's Patrol Officers	\$33.90	\$39.59	\$49.06
Correctional Officers and Jailers	\$33.15	\$41.77	\$45.38
Forensic Science Technicians	\$27.17	\$32.28	\$40.29
Firefighters	\$24.56	\$30.96	\$36.58
Private Detectives and Investigators	\$24.33	\$39.19	\$51.26
Public Safety Telecommunicators	\$22.58	\$28.02	\$30.05
Transportation Security Screeners	\$21.71	\$24.37	\$33.79
Fire Inspectors and Investigators	\$21.44	\$35.80	\$46.86
First-Line Supervisors of Security Workers	\$17.76	\$23.81	\$35.07
Gambling Surveillance Officers and Gambling Investigators	\$17.11	\$23.85	\$27.64
Protective Service Workers, All Other	\$14.48	\$15.46	\$18.65

Exhibit 83b. Public safety average hourly wages in the region

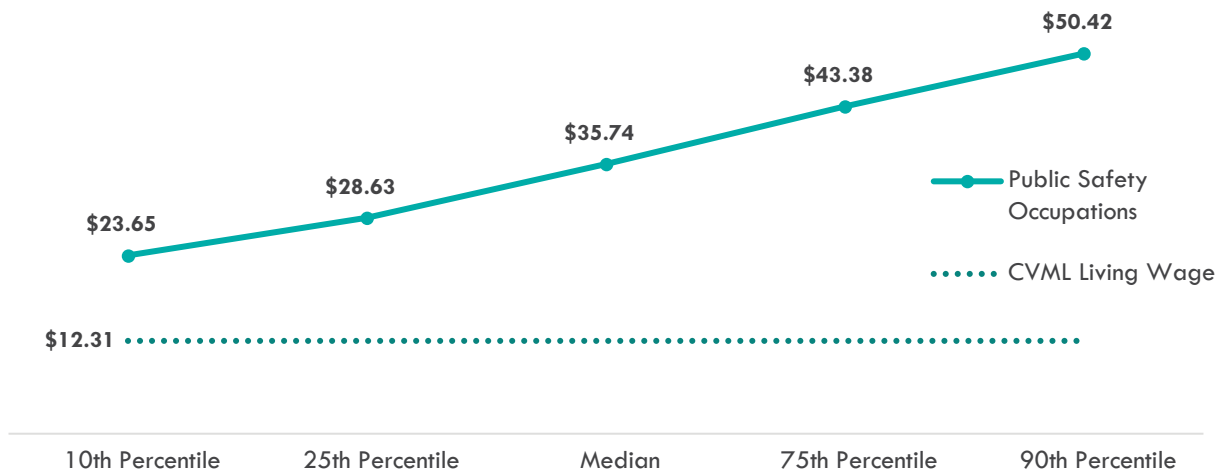
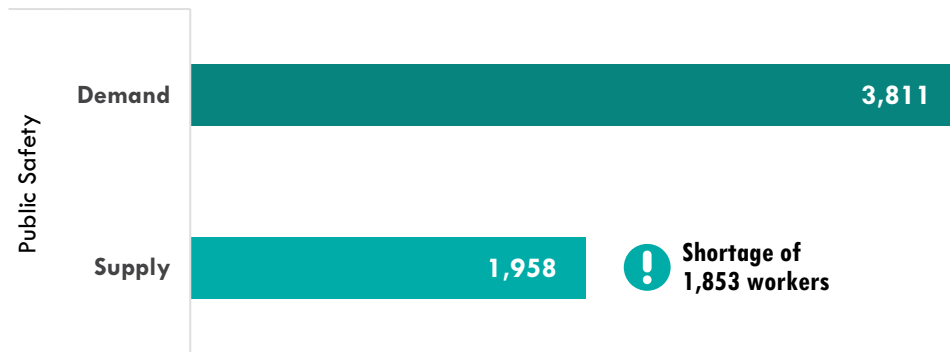


Exhibit 84. Top 10 certifications, specialized skills, and software skills in job postings for public safety occupations

Certifications	Specialized Skills	Software Skills
First Aid CPR AED	Surveillance	Microsoft Excel
Private Investigation	Loss Control / Prevention	Public administration
Police Officer	Criminal Justice	SQL
Security Guard Certification	Law Enforcement or Criminal Justice Experience	MySQL
Security Clearance	Asset Protection	Peoplesoft
Emergency Medical Technician (EMT)	Prevention of Criminal Activity	Microsoft Operating Systems
Fire Fighter I	Public Health and Safety	Linux
Basic Post Certificate	Cardiopulmonary Resuscitation (CPR)	UNIX
Pilot Certification	Litigation	Debugging
Certified Correctional Officer	Rehabilitation	Database Software

Exhibit 85. Public safety workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



RETAIL, HOSPITALITY & TOURISM

Summary

- » **Gender and race/ethnicity:** Men and women are equally represented in this sector. Analysis shows overrepresentation of Hispanic or Latino workers. The largest age group is 25–44 years of age (Exhibits 86, 87, and 88).
- » **Employment and projected demand:** The largest middle-skill occupation is first-line supervisors of food preparation and serving workers, which has 2,089 annual openings (Exhibit 89).
- » **Wages:** The highest paid occupation is first-line supervisors of landscaping, lawn service, and groundskeeping workers, with an entry-level wage of \$20.88/hour (Exhibits 90a and 90b).
- » **Specialized skills:** The top skill is retail industry knowledge, and the top certification is ServSafe (Exhibit 91).

Top Job Titles

- Assistant Store Manager
- General Manager
- Shift Leader

Exhibit 86. Gender composition of the top occupations in the retail, hospitality, and tourism workforce

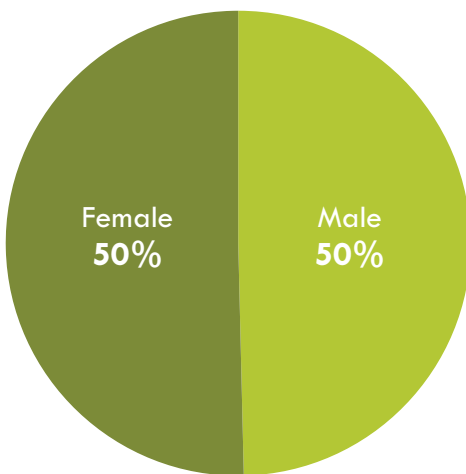


Exhibit 87. Race/ethnicity composition of the top occupations in the retail, hospitality, and tourism workforce

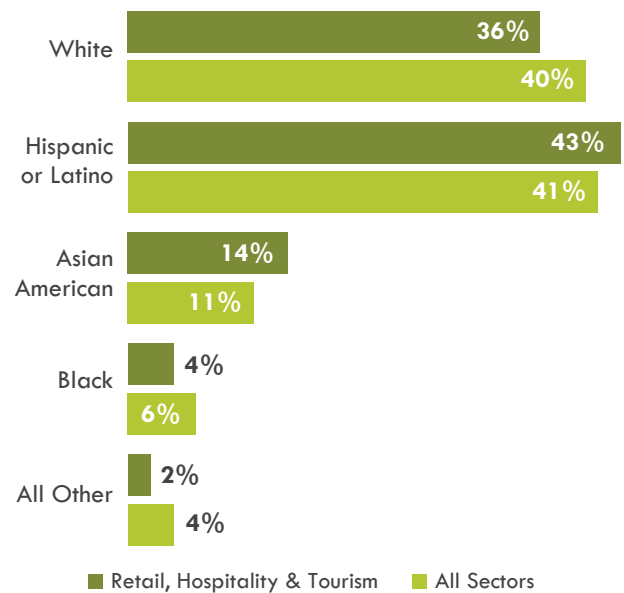


Exhibit 88. Retail, hospitality, and tourism age groups

Occupation	2021 Age Groups			
	14–24	25–44	45–64	65+
Chefs and Head Cooks	147	913	612	75
Cooks, All Other	98	208	143	26
Cooks, Institution and Cafeteria	289	1,101	1,003	173
Cooks, Restaurant	2,508	3,789	2,132	455
Exercise Trainers and Group Fitness Instructors	402	765	393	89
First-Line Supervisors of Food Preparation and Serving Workers	2,183	5,050	2,768	544
First-Line Supervisors of Housekeeping and Janitorial Workers	25	422	551	78
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	35	444	429	88
First-Line Supervisors of Personal Service Workers	54	320	234	33
First-Line Supervisors of Retail Sales Workers	1,001	6,256	3,933	533
Food Service Managers	341	1,415	919	215
Hairdressers, Hairstylists, and Cosmetologists	163	686	423	62
Manicurists and Pedicurists	144	994	687	36
Musicians and Singers	55	192	197	183
Self-Enrichment Teachers	480	975	643	217



Exhibit 89. Retail, hospitality, and tourism employment and occupational projections

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
First-Line Supervisors of Food Preparation and Serving Workers	10,544	12,590	2,046	19%	2,089
Cooks, Restaurant	8,884	11,092	2,208	25%	1,843
First-Line Supervisors of Retail Sales Workers	11,724	12,180	456	4%	1,349
Cooks, Institution and Cafeteria	2,566	2,898	332	13%	457
Food Service Managers	2,890	3,334	444	15%	427
Self-Enrichment Teachers	2,316	2,492	176	8%	305
Exercise Trainers and Group Fitness Instructors	1,650	1,684	34	2%	283
Chefs and Head Cooks	1,748	1,965	217	12%	278
Manicurists and Pedicurists	1,861	2,153	292	16%	265
Hairdressers, Hairstylists, and Cosmetologists	1,338	1,589	251	19%	208
First-Line Supervisors of Housekeeping and Janitorial Workers	1,080	1,225	145	13%	159
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	998	1,111	113	11%	131
First-Line Supervisors of Personal Service Workers	644	766	122	19%	98
Cooks, All Other	475	520	45	9%	81
Musicians and Singers	634	657	23	4%	79



Exhibit 90a. Retail, hospitality, and tourism hourly wages in the region

Occupation	Hourly Wages		
	25th Percentile	Median	75th Percentile
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	\$20.88	\$27.99	\$35.30
Musicians and Singers	\$19.28	\$34.89	\$55.06
Food Service Managers	\$19.08	\$25.95	\$32.23
First-Line Supervisors of Housekeeping and Janitorial Workers	\$17.47	\$21.22	\$27.83
Chefs and Head Cooks	\$17.25	\$21.52	\$29.01
First-Line Supervisors of Retail Sales Workers	\$17.08	\$18.30	\$23.07
First-Line Supervisors of Personal Service Workers	\$15.98	\$19.91	\$24.33
First-Line Supervisors of Food Preparation and Serving Workers	\$14.86	\$17.32	\$21.17
Exercise Trainers and Group Fitness Instructors	\$14.84	\$22.61	\$27.87
Self-Enrichment Teachers	\$14.74	\$19.47	\$29.51
Cooks, Institution and Cafeteria	\$14.65	\$17.34	\$20.24
Cooks, Restaurant	\$14.39	\$16.70	\$17.44
Cooks, All Other	\$14.32	\$16.90	\$19.81
Hairdressers, Hairstylists, and Cosmetologists	\$14.00	\$14.39	\$17.90
Manicurists and Pedicurists	\$14.00	\$14.01	\$15.02

Exhibit 90b. Retail, hospitality, and tourism average hourly wages in the region

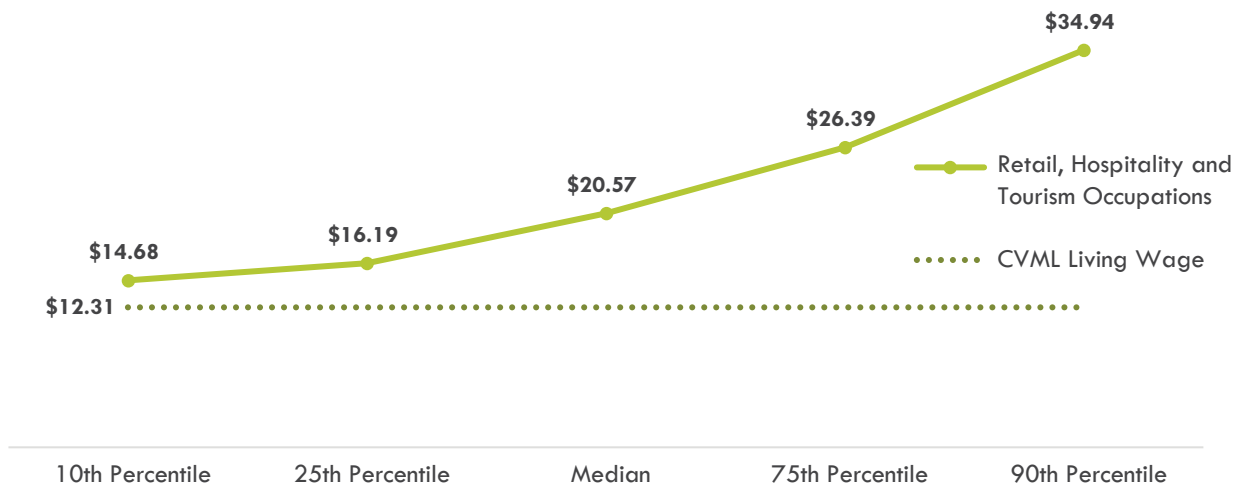
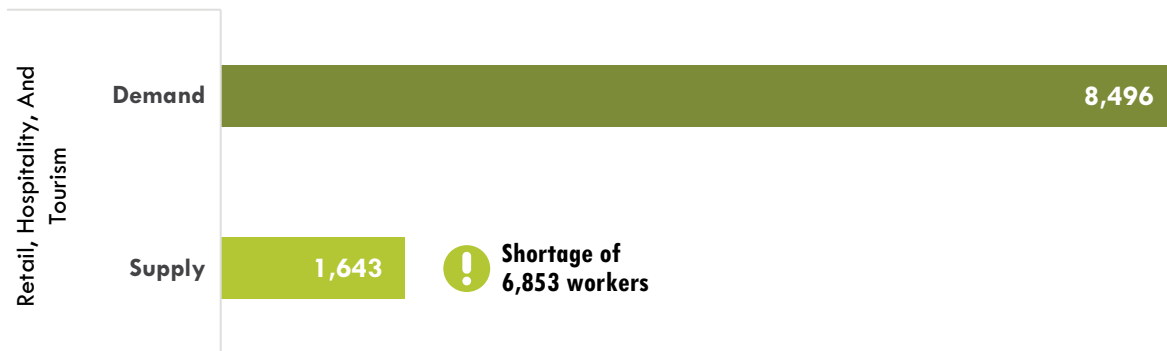


Exhibit 91. Top 10 certifications, specialized skills, and software skills in job postings for retail, hospitality, and tourism occupations

Certifications	Specialized Skills	Software Skills
ServSafe	Retail Industry Knowledge	Lotus Domino
Licensed Barber	Scheduling	Microsoft Access
Food Handler Certification	Customer Service	SAP
Food Service Certification	Store Management	Apache Groovy
Certified Hair Stylist	Store Operations	Salesforce
Pharmacy Technician Certification Board (PTCB)	Merchandising	Adobe Photoshop
Training for Intervention Procedures (TIPS) Certification	Cash Handling	Adobe Acrobat
Automotive Service Excellence (ASE) Certification	Sales	Oracle
Cosmetology License	Budgeting	Enterprise Resource Planning (ERP)
Food Safety Manager Certification	Guest Services	JavaScript

Exhibit 92. Retail, hospitality, and tourism workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill the gap in the region



CONCLUSION

In the CVML region, the 10 sectors detailed in this study are projected to offer 102,549 annual openings each year for middle-skill occupations, those requiring more education and training than a high school diploma, but less than a bachelor’s degree. By comparison, postsecondary institutions in the region are conferring 22,252 awards, on average. A comparison between workforce demand and the number of awards being earned in the region shows a potential undersupply of 80,297 workers in the region.⁵ Exhibit 93 shows how the health sector, the business and entrepreneurship sector, and the energy, construction, and utilities sector have the greatest workforce demand in terms of annual job openings.

Exhibit 93. Comparison between workforce demand (annual job openings) and postsecondary supply of students (awards) for each sector, showing gaps in the number of workers to fill openings

Sector	Demand (Annual Openings)	Supply (Average Annual Awards)	Gap
Health	23,613	7,949	15,664
Business & Entrepreneurship	18,072	2,911	15,161
Energy, Construction & Utilities	12,105	1,071	11,034
Advanced Transportation & Logistics	10,632	1,222	9,410
Retail, Hospitality & Tourism	8,496	1,643	6,853
Agriculture, Water & Environmental Technologies	8,394	1,123	7,271
ICT/Digital Media	6,615	955	5,660
Education	5,574	2,340	3,234
Advanced Manufacturing	5,237	1,080	4,157
Public Safety	3,811	1,958	1,853
TOTAL	102,549	22,252	80,297

The three sectors with the greatest number of annual openings also have the largest potential gaps in workforce supply in the region:

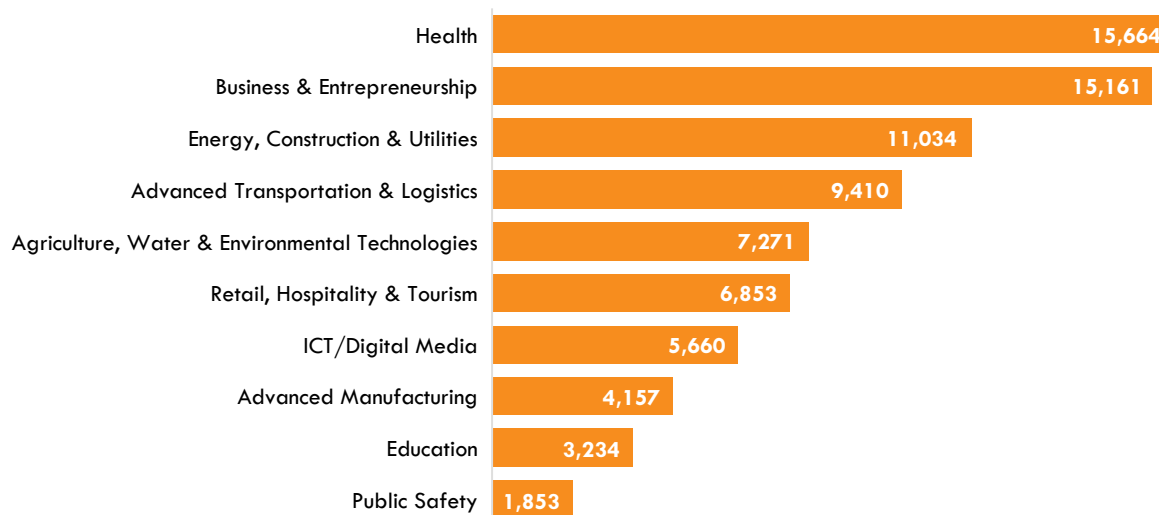
- **Health**, a shortage of 15,664 workers
- **Business and entrepreneurship**, a shortage of 15,161 workers
- **Energy, construction, and utilities**, a shortage of 11,034 workers

Several sectors with programs that have a low number of awards also have proportionally large undersupplies: advanced manufacturing (1,080 average awards and an undersupply of 4,157 workers, translating to 4 times as much demand as supply); advanced transportation and logistics (1,222 awards and an undersupply of 9,410, about 8 times as much demand as supply); and ICT/digital media (955 awards and an undersupply of 5,660, 6 times as much demand as supply). While these potential workforce shortages are smaller in terms of overall number compared to the business and entrepreneurship sector and the health sector, these sectors still play a critical role in fueling the regional economy and intersect with other fields of work of regional importance, such as business and agriculture.

⁵ While the retail, hospitality, and tourism sector appears to be another area of need, it is important to keep in mind that many occupations in this sector have been hard hit by the economic fallout from Covid-19 and impacts resulting from inflation, and many jobs have been transformed as a result.

On average each year, the greatest number of awards are being conferred by programs in the health sector (7,949 awards), business and entrepreneurship sector (2,911 awards), and education sector (2,340 awards). The fewest awards are being conferred in ICT/digital media (955 awards) and energy, construction & utilities (1,071 awards). Based on this comparison, the community colleges may want to consider expanded program offerings in areas in which supply is comparatively low: ICT/digital media, energy, construction & utilities, advanced manufacturing, and agriculture, water & environmental technologies.

Exhibit 94. Sectors with the largest gaps between workforce demand (annual job openings) and postsecondary supply of students (awards)



Regionally, the health sector leads all other sectors in terms of number of anticipated job openings.⁶ Health occupations expected to be in high demand are:

- **Registered nurses**, 2,138 annual openings
- **Nursing assistants**, 1,507 annual openings
- **Medical assistants**, 1,495 annual openings

The business sector contains several occupations that are projected to have the greatest number of annual openings across all sectors in the region. Business occupations expected to be in high demand are:

- **General and operations managers**, 2,183 annual openings
- **Customer service representatives**, 1,990 annual openings
- **Bookkeeping, accounting, and auditing clerks**, 1,782 annual openings

One sector that particularly warrants attention due to its substantial supply gap is energy, construction, and utilities. This sector is expected to offer 12,105 annual openings, but postsecondary institutions in the region confer only 1,071 awards on average each year. Energy, construction, and utilities occupations projected to be in high demand are:

- **Industrial truck and tractor operators**, 2,979 annual openings
- **Maintenance and repair workers, general**, 1,640 annual openings
- **Carpenters**, 1,135 annual openings

⁶ While nearly 12,000 annual job openings are projected for home health and personal care aides, this occupation's entry-level wage of \$14.26 is the lowest in the sector, just barely above the region's living wage.

Future planning efforts by community colleges should take into consideration the 15 occupations with the most annual openings in the region across all sectors. Some sectors contain more than one of these occupations due to strong projected growth or large employment size for these occupations. These occupations are highlighted to bring attention to the fact that there are certain sectors with more job opportunities than others. To demonstrate this, each occupation with the most annual openings is listed along with the respective sector. For example, the health sector contains three of these occupations, as does the business and entrepreneurship sector.

1. **Health:** Home Health and Personal Care Aides, 11,965 annual openings
2. **Advanced Transportation and Logistics:** Heavy and Tractor-Trailer Truck Drivers, 5,519 annual openings
3. **ICT/Digital Media:** Office Clerks, General, 3,282 annual openings
4. **Energy, Construction & Utilities:** Industrial Truck and Tractor Operators, 2,979 annual openings
5. **Agriculture, Water & Environmental Technologies:** Farmers, Ranchers, and Other Agricultural Managers, 2,742 annual openings
6. **Business & Entrepreneurship:** General and Operations Managers, 2,183 annual openings
7. **Health:** Registered Nurses, 2,138 annual openings
8. **Education:** Teaching Assistants, Except Postsecondary, 2,136 annual openings
9. **Retail, Hospitality & Tourism:** First-Line Supervisors of Food Preparation and Serving Workers, 2,089 annual openings
10. **Business & Entrepreneurship:** Customer Service Representatives, 1,990 annual openings
11. **Retail, Hospitality & Tourism:** Cooks, Restaurant, 1,843 annual openings
12. **Business & Entrepreneurship:** Bookkeeping, Accounting, and Auditing Clerks, 1,782 annual openings
13. **ICT/Digital Media:** Secretaries and Administrative Assistants, Except Legal, Medical, and Executive, 1,760 annual openings
14. **Energy, Construction & Utilities:** Maintenance and Repair Workers, General, 1,640 annual openings
15. **Health:** Nursing Assistants, 1,507 annual openings

Finally, in previous years, the CVML Center of Excellence has highlighted supervisory positions as a training area of need in the region. There appears to be continued strong projected demand for many types of supervisory positions. Many of these positions typically pay higher wages than other type of jobs and can help improve students' standards of living.

Supervisory positions with the highest entry-level wages are in the public safety sector; energy, construction, and utilities sector; advanced manufacturing sector; and advanced transportation and logistics sector. Occupations to note include:

- **First-line supervisors of correctional officers**, with an entry-level wage above \$49/hour and 101 annual openings
- **First-line supervisors of construction trades and extraction workers**, with an entry-level wage above \$28/hour and 726 annual openings
- **First-line supervisors of mechanics, installers, and repairers**, with an entry-level wage above \$27/hour and 546 annual openings

APPENDIX A: METHODOLOGY & DATA SOURCES

Data Sources

Labor market and educational supply data compiled in this report are derived from a variety of sources. Data were drawn from external sources, including Lightcast, 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	Lightcast. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast 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 Lightcast earnings by industry: https://lightcast.io .
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: 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	Lightcast, https://lightcast.io .
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: ononline.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 Lightcast 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.

Race and Ethnicity: The federal government tracks several racial categories (white, Black or African American, Asian, etc.) but only two ethnic categories, Hispanic and Non-Hispanic. There may be some overlap between race and ethnicity unless the two characteristics are clearly separated, e.g., "white non-Hispanic," "white Hispanic," and "Non-white Hispanic."

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 childcare 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: POSTSECONDARY SUPPLY FOR EACH SECTOR

Exhibit B1. Postsecondary supply for the advanced manufacturing workforce

TOP/CIP Code - Title	College	Associate Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Noncredit Award 192 < 288 Hours	Noncredit Award 480 < 960 Hours	Subtotal
092400 - Engineering Technology, General (requires Trigonometry)	Bakersfield	1						0						1
	Merced	0												0
093400 - Electronics and Electric Technology	Bakersfield	14						9	50					73
	Fresno City	15			4	1	12							32
	Merced	1						2						3
	San Joaquin Delta							7						7
093410 - Computer Electronics	Sequoias					1			1					2
	Merced	7						14						22
093420 - Industrial Electronics	Modesto Junior	3						0						3
	Fresno City				16	1								17
093500 - Electro-Mechanical Technology	Merced	0												0
	Modesto Junior	7						6	3					15
093600 - Printing and Lithography	Bakersfield	11				1	2							14
	San Joaquin Delta	2				0	1							3
094300 - Instrumentation Technology	Fresno City	3						3						6
094500 - Industrial Systems Technology and Maintenance	Merced	1						1						3
	Clovis	0				0	0							1
	Fresno City					8						31		39
	Merced	1						1						1
	San Joaquin Delta					1	1	1						3
	Sequoias	7				6		51			17			81
095600 - Manufacturing and Industrial Technology	West Hills Lemoore					1								1
	Bakersfield	7						1						7
	Cerro Coso	1						1						2
	Fresno City	2						7					22	31
	Modesto Junior					1	3			0				4
	Porterville					3	11		18					32
095650 - Welding Technology	Reedley College	1				37	53	1						91
	Bakersfield	8						8	50					67
	Cerro Coso	6				3	14	10						33
	Columbia									1				1
	Fresno City	7			11	6		5						29
	Merced	4				2	5		41					53
	Modesto Junior	4							11					15
	Porterville								10					10
	Reedley College	4				12	1	14						30
	San Joaquin Delta					2	15	9						26
	Sequoias	8				2	13							23
099900 - Other Engineering and Related Industrial Technologies	Taft	1			3				2	1				7
	West Hills Coalinga					1	5							6
47.0104 - Computer Installation and Repair Technology/ Technician	Taft							3		2				6
	UEI College-Bakersfield					20								20
	UEI College-Fresno					24								24
	United Education Institute-UEI College Stockton	12												12

Continued

TOP/CIP Code - Title	College	Associate Degree	Award < 1	Award 1 < 2	Award 2 < 4	Certificate 12 < 18	Certificate 16 < 30	Certificate 18 < 30	Certificate 30 < 60	Certificate 6 < 18	Certificate 8 < 16	Credit Award, < 6	Noncredit Award 192 < 288	Noncredit Award 480 < 960	Subtotal
			Academic Year	Academic Years	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Hours	
47.0303 - Industrial Mechanics and Maintenance Technology	San Joaquin Valley College-Visalia	15		117											132
48.0508 - Welding Technology/Welder	Advanced Career Institute		89												89
	Institute of Technology			3											3
TOTAL		143	89	176	30	91	128	163	188	2	17	31	22	1,080	

Exhibit B2. Postsecondary supply for the advanced transportation and logistics workforce

TOP/CIP Code - Title	College	Associate Degree	Award < 1	Award 1 < 2	Award 2 < 4	Certificate 12 < 18	Certificate 16 < 30	Certificate 18 < 30	Certificate 30 < 60	Certificate 6 < 18	Certificate 60+	Certificate 8 < 16	Noncredit award 192 < 288	Noncredit award 480 < 960	Noncredit award 960+	Subtotal
			Academic Year	Academic Years	Academic Years	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Semester Units	Hours	
051000 - Logistics and Materials Transportation	Fresno City												17			17
	Modesto Junior	0				1		1		0						2
	San Joaquin Delta	1						2								3
094700 - Diesel Technology	San Joaquin Delta	2			2			11								15
094720 - Heavy Equipment Maintenance	San Joaquin Delta	25			1		6	11								43
094730 - Heavy Equipment Operation	West Hills Coalinga				4											4
094750 - Truck and Bus Driving	West Hills Coalinga				1											1
094800 - Automotive Technology	Bakersfield	10				19		61	20	0						110
	Columbia	2			6			3	3	7		1				22
	Fresno City	12									1				6	19
	Merced	8				9		29	32							78
	Modesto Junior	7			5	2	4	8				2				28
	Reedley College	9							43							52
	San Joaquin Delta	10				7		18	30							65
Sequoias	6							1	37						44	
094900 - Automotive Collision Repair	Fresno City	2							6					12		20
	Merced							1								1
	Modesto Junior	3				8		6		15		1				33
	San Joaquin Delta				0		18	7								25
095000 - Aeronautical and Aviation Technology	Reedley College	5									10					15
095340 - Mechanical Drafting	Merced	5				3		4	5							17
	San Joaquin Delta	4				0			3							7
	Sequoias	0			3							0				3
130720 - Lodging Management	Columbia	1				0		3								4
	West Hills Lemoore							1		2						2
15.0406 - Automation Engineer Technology/Technician	Institute of Technology	10														10
47.0604 - Automobile/Automotive Mechanics Technology/Technician	UEI College-Bakersfield		55													55

Continued

TOP/CIP Code - Title	College	Associate Degree	Award < 1 Year	Award 1 < 2 Years	Award 2 < 4 Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Noncredit award 192 < 288 Hours	Noncredit award 480 < 960 Hours	Noncredit award 960+ Hours	Subtotal
47.0607 - Airframe Mechanics and Aircraft Maintenance Technology/Technician	San Joaquin Valley College-Visalia	33		1	3											38
49.0205 - Truck and Bus Driver/Commercial Vehicle Operator and Instructor	Advanced Career Institute	489														489
TOTAL		157	489	56	3	13	57	155	179	61	11	4	17	12	6	1,222

Exhibit B3. Postsecondary supply for the agriculture, water, and environmental technologies workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Subtotal
010100 - Agriculture Technology and Sciences, General	Merced	9									9
	Modesto Junior	6								0	6
	Porterville	9									9
	Reedley College	1						1			2
010200 - Animal Science	West Hills Coalinga	2						1		1	4
	Bakersfield	14	6							2	22
	Merced	9								1	10
	Modesto Junior	20	7								27
	Reedley College	1	11		4	5					21
010210 - Veterinary Technician (Licensed)	Sequoias	5	10					3			18
	Modesto Junior	10			22						43
010220 - Artificial Inseminator (Licensed)	Sequoias							0			0
	Modesto Junior					1	2				3
010230 - Dairy Science	Modesto Junior	3									3
	Sequoias	0								3	3
010240 - Equine Science	Modesto Junior	1			4						5
	Reedley College					3	2				5
	Sequoias					1	2				3
010300 - Plant Science	Bakersfield	8	2							1	11
	Merced	3						1			4
	Modesto Junior	16	1								17
	Reedley College	1	26		10	9	15	3			64
	San Joaquin Delta										1
	Sequoias	2	8					1		2	13
010310 - Agricultural Pest Control Adviser and Operator (Licensed)	West Hills Coalinga										34
	Sequoias					0	1	0			2
010400 - Viticulture, Enology, and Wine Business	West Hills Coalinga					1	2				3
	Reedley College					1					1
010900 - Horticulture	Bakersfield	1								1	2
	Merced	4								0	4
	Modesto Junior	3									3
	San Joaquin Delta	2				1					3
	Sequoias	1						2			3
010910 - Landscape Design and Maintenance	San Joaquin Delta					1	2	1			3
	Sequoias	1						2		3	5
010930 - Nursery Technology	Modesto Junior							0			0
	San Joaquin Delta					1		1			2
010940 - Turfgrass Technology	San Joaquin Delta								0		0

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Subtotal
011200 - Agriculture Business, Sales and Service	Bakersfield	10	43						1			53
	Merced	16	18						4			38
	Modesto Junior	23	9									32
	Porterville		3									3
	Reedley College	0	18			1					5	24
	San Joaquin Delta	1	1									2
	Sequoias	3	5				3	7				18
011300 - Food Processing and Related Technologies	Clovis							4				4
011400 - Forestry	Bakersfield	19							2			21
	Columbia	11							4	2		17
	Reedley College	10					5	9				24
011500 - Natural Resources	Columbia	12							6	1		19
	Fresno City					0	0					0
	Reedley College	5					5	13				23
011510 - Parks and Outdoor Recreation	Reedley College					1	2				3	
011600 - Agricultural Power Equipment Technology	Bakersfield	4							1			5
	Merced	5					3	8	46			62
	Modesto Junior	7				19	3	3			4	36
	Reedley College	18					92	81	27			218
	San Joaquin Delta							4	1			5
	Sequoias	1						0		0		1
019900 - Other Agriculture and Natural Resources	Modesto Junior	9										9
51.0808 - Veterinary/Animal Health Technology/Technician and Veterinary Assistant	Carrington College-Stockton	34										34
	San Joaquin Valley College-Visalia	88			14							102
TOTAL		408	203	14	60	136	168	102	12	20		1,123

Exhibit B4. Postsecondary supply for the business and entrepreneurship workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
050100 - Business and Commerce, General	Bakersfield										21			21
	Cerro Coso		7											7
	Columbia	5												5
	Merced	22								3				25
	Porterville	4												4
	Reedley College	0						141	6					147
	San Joaquin Delta	142							33	8				183
	Sequoias	10								2				12
	Taft	18												18
050200 - Accounting	Bakersfield	25								17				42
	Columbia	4				0	1	2						7
	Fresno City	12				19	1	1	14			7		54
	Merced	17							5					21
	Modesto Junior	24				1	0	3		0	0			29
	Porterville							1			0			1
	Reedley College	7						2	6					15
	San Joaquin Delta	67						3	3	10				82
	Sequoias	12								3				15
	Taft	3							1					4
	West Hills Coalinga	3							0	4				7
West Hills Lemoore	3							2	7				12	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
050210 - Tax Studies	Columbia							1	1					1
	San Joaquin Delta									3				3
050400 - Banking and Finance	Sequoias							0	1					1
050500 - Business Administration	Bakersfield	7	155											162
	Cerro Coso	9	20							7				36
	Clovis	4	115											118
	Columbia	1	11											12
	Fresno City	9	234											243
	Merced	0	118											118
	Modesto Junior	33	108											142
	Porterville		44					0	1					45
	Reedley College	6	96											102
	San Joaquin Delta		46											46
	Sequoias		101					1	2					105
	Taft	8	26											34
	West Hills Coalinga	1	12											12
West Hills Lemoore	20	49											69	
050600 - Business Management	Cerro Coso	2								2				4
	Clovis	1							1					2
	Columbia						1			1	8		5	15
	Fresno City	6						6	48					60
	Modesto Junior	17									0			18
	Porterville	2												2
	Reedley College	3						0	1					4
	Sequoias	0												0
	West Hills Coalinga	2								1				3
	West Hills Lemoore	3						1	1	2				7
050630 - Management Development and Supervision	Merced	2								1			39	42
	Modesto Junior	4							1					5
	Porterville										0			0
	San Joaquin Delta								6	1				7
	Taft	2						1	1		9			12
050640 - Small Business and Entrepreneurship	Clovis	0												0
	Columbia	2								1	3	1		7
	Merced	3								2				5
	Reedley College	1						0	1					2
050800 - International Business and Trade	Modesto Junior						1					1		1
050900 - Marketing and Distribution	Bakersfield	0												0
	Fresno City	4												4
	Merced	3								2				5
	Modesto Junior	5							1					6
	San Joaquin Delta								1	1				1
051100 - Real Estate	Merced	0									3			4
	Modesto Junior	4						1	4		50			58
051410 - Legal Office Technology	San Joaquin Delta	4						0	2	1				7
	Fresno City	1						1		1				2
051430 - Court Reporting	Sequoias										1			1
	Taft	2								2				3
051440 - Office Management	Bakersfield	6												6
	San Joaquin Delta	5								3				8

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
051800 - Customer Service	Porterville										3			3
059900 - Other Business and Management	San Joaquin Delta							0						0
130730 - Resort and Club Management	West Hills Lemoore	3												3
140200 - Paralegal	Cerro Coso	4								6				10
	Fresno City	23								31				54
	Sequoias	13								4				17
22.0301 - Legal Administrative Assistant/Secretary	MTI Business College Inc				2								2	
22.0302 - Legal Assistant/Paralegal	Humphreys University-Stockton and Modesto Junior Campuses					3								3
	Santa Barbara Business College-Bakersfield	10			0									10
22.0303 - Court Reporting/Court Reporter	Humphreys University-Stockton and Modesto Junior Campuses	1												1
52.0201 - Business Administration and Management, General	Advanced College-Stockton	0												0
	Humphreys University-Stockton and Modesto Junior Campuses	6												6
52.0301 - Accounting	Advanced College-Stockton			0										0
	Humphreys University-Stockton and Modesto Junior Campuses	5												5
52.0302 - Accounting Technology/Technician and Bookkeeping	Advanced College-Stockton				0									0
	Institute of Technology	7												7
	Santa Barbara Business College-Bakersfield	25			0									25
	Stellar Career College			30										30
52.0399 - Accounting and Related Services, Other	Milan Institute-Visalia			10										10
52.0401 - Administrative Assistant and Secretarial Science, General	Clovis Adult Education			18										18
	Institute of Technology				1									1
	Milan Institute-Visalia			15										15
	Stellar Career College			24										24
52.0407 - Business/Office Automation/Technology/Data Entry	MTI Business College Inc				1								1	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
52.0408 - General Office Occupations and Clerical Services	MTI Business College Inc				6									6
	San Joaquin Valley College-Visalia	111			100									211
	Stellar Career College			3										3
	UEI College-Bakersfield				40									40
	UEI College-Fresno				62									62
	United Education Institute-UEI College Stockton				24									24
52.1001 - Human Resources Management/ Personnel Administration, General	Institute of Technology	17			1									18
	San Joaquin Valley College-Visalia	16			24									40
TOTAL		801	1,143	99	260	3	23	165	135	131	100	9	44	2,911



Exhibit B5. Postsecondary supply for the education workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Subtotal
080200 - Educational Aide (Teacher Assistant)	Fresno City	1				1					2
080900 - Special Education	Fresno City						3				3
	Taft	2		1	2						5
083520 - Fitness Trainer	San Joaquin Delta					3	2				5
083610 - Recreation Assistant	San Joaquin Delta					1					1
085010 - Sign Language Interpreting	Bakersfield						1				1
	Fresno City			2	2						4
086000 - Educational Technology	Columbia							1			1
13.1210 - Early Childhood Education and Teaching	Humphreys University-Stockton and Modesto Junior Campuses	9									9
130100 - Family and Consumer Sciences, General	San Joaquin Delta	14									14
130500 - Child Development/Early Care and Education	Bakersfield	30	89				38	272			429
	Cerro Coso	1	11		16	24	18				70
	Clovis	5	18		4	10					37
	Columbia	6	2	4	2	1				2	17
	Fresno City	16	44	10	15	71				5	161
	Merced	25	34				10				69
	Modesto Junior	47	36	104	13	23	16			46	285
	Porterville	31	12				22				65
	Reedley College	24	38	36	52	71				8	229
	San Joaquin Delta		4		0	41	12				57
	Sequoias	38	52		18	39		292			439
	Taft	21	17	21	8	8	1	20		11	107
	West Hills Coalinga	5	4			4		71			84
West Hills Lemoore	19	9		2	10		95			135	
130520 - Children with Special Needs	Fresno City	2					3				5
	Modesto Junior				2	6	0				8
	Reedley College			1	1						2
	Sequoias					5					5
	Taft				0	0					0
130540 - Preschool Age Children	San Joaquin Delta	37									37
130550 - The School Age Child	Clovis				4	6					10
	Reedley College				1	9					9
130570 - Foster and Kinship Care	Fresno City			1						1	2
130580 - Child Development Administration and Management	Cerro Coso						3				3
	Modesto Junior						6				6
	San Joaquin Delta				0				1		1
130590 - Infants and Toddlers	Fresno City			6	2						8
160200 - Library Technician (Aide)	Fresno City	4			2	8					14
TOTAL		337	370	182	145	346	135	751	1	73	2,340

Exhibit B6. Postsecondary supply for the energy, construction, and utilities workforce

TOP/CIP Code - Title	College	Associate Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Subtotal
020100 - Architecture and Architectural Technology	Bakersfield	9							4			13
	Fresno City	7						5				12
	San Joaquin Delta	1										1
	Sequoias	3			9	0		3	10		1	26
093470 - Electron Microscopy	San Joaquin Delta	14				1		4				19
094600 - Environmental Control Technology	Bakersfield	1						3				4
	Fresno City	7			34			11		1	1	54
	Merced	2						2				4
	San Joaquin Delta	1				3		8				12
	Sequoias	2						24	2			28
	West Hills Coalinga					2						2
095200 - Construction Crafts Technology	Bakersfield	1						2				3
	Fresno City	1						1				2
	Sequoias	2						3	4			9
095220 - Electrical	Bakersfield	2						22				24
	Merced	4						20				24
	Modesto Junior							2				2
	San Joaquin Delta	9				8		8				25
	Sequoias				16	1					2	19
095230 - Plumbing, Pipefitting and Steamfitting	Bakersfield							7				7
095250 - Mill and Cabinet Work	Bakersfield	0							1			1
095300 - Drafting Technology	Bakersfield	14						2	39			55
	Fresno City	4						6				10
	Merced	0										0
	San Joaquin Delta	8					6					14
095310 - Architectural Drafting	Merced					0						0
095500 - Laboratory Science Technology	Fresno City					0	2					2
095630 - Machining and Machine Tools	Bakersfield								31			31
	Modesto Junior	1			2	0		1	1			5
	Reedley College	3				8	5	7				23
	San Joaquin Delta	1					2	0				3
095640 - Sheet Metal and Structural Metal	Bakersfield							2				2
	Modesto Junior								4			4
095700 - Civil and Construction Management Technology	San Joaquin Delta					0						0
095720 - Construction Inspection	Sequoias	1				1	1	1				4
095800 - Water and Wastewater Technology	Clovis					1	3					4
	Columbia	4						0	1			5
	Sequoias								2			2
15.0613 - Manufacturing Engineering Technology/Technician	Milan Institute-Bakersfield West	1		0								1
15.0903 - Petroleum Technology/Technician	Milan Institute-Bakersfield West			6								6
46.0302 - Electrician	Milan Institute-Bakersfield West			33								33
	San Joaquin Valley College-Visalia	7		64								71

Continued

TOP/CIP Code - Title	College	Associate Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Subtotal
47.0201 - Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician	DeHart Technical School		32	9								41
	Institute of Technology			105								105
	San Joaquin Valley College-Visalia	54		157								211
	Santa Barbara Business College-Bakersfield			19								19
	UEI College-Bakersfield			33								33
	UEI College-Fresno			29								29
	United Education Institute-UEI College Stockton			25								25
52.2001 - Construction Management	San Joaquin Valley College-Visalia	40										40
TOTAL		204	32	488	61	25	18	144	99	1	3	1,071

Exhibit B7. Postsecondary supply for the health workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
043000 - Biotechnology and Biomedical Technology	Merced	0					0	0						1
051420 - Medical Office Technology	Columbia	2							1					3
	Fresno City	8						5	6	8				27
	Merced	16						8		13				37
	Reedley College	16						5	15					36
	San Joaquin Delta								10	6				17
095670 - Industrial and Occupational Safety and Health	Bakersfield	1												1
	Taft	3						0	2					6
120100 - Health Occupations, General	Bakersfield		6											6
	Clovis							0						0
	Columbia	40	2											42
	Fresno City		7					1						8
	Modesto Junior		8											8
	San Joaquin Delta	74												74
	Taft	50												50
120510 - Phlebotomy	Bakersfield										6			6
120800 - Medical Assisting	Cerro Coso	3												3
	Modesto Junior	28								55				83
120810 - Clinical Medical Assisting	Cerro Coso									9				9
	Fresno City	23						14	55					93
120820 - Administrative Medical Assisting	Cerro Coso									7				7
121000 - Respiratory Care/Therapy	Fresno City	18												18
	Modesto Junior	23												23
122000 - Speech/ Language Pathology and Audiology	Reedley College						0							0
122100 - Pharmacy Technology	San Joaquin Delta	16							2	3				21
	Sequoias										14			14

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
122200 - Physical Therapist Assistant	Sequoias	24												24
122300 - Health Information Technology	Bakersfield	1												1
	Fresno City	11												11
122310 - Health Information Coding	Fresno City						2	5						7
122500 - Radiologic Technology	Bakersfield	21									6			27
	Fresno City	20												20
	Merced	16										15		31
	San Joaquin Delta	1					0							1
122700 - Diagnostic Medical Sonography	Merced									5				5
122800 - Athletic Training and Sports Medicine	Modesto Junior	9												9
	Sequoias	7												7
123010 - Registered Nursing	Bakersfield	118												118
	Fresno City	197								34				231
	Merced	56												56
	Modesto Junior	110												110
	Porterville	19												19
	Reedley College	11							4					15
	San Joaquin Delta	103												103
	Sequoias	85												85
123020 - Licensed Vocational Nursing	West Hills Lemoore	31												31
	Bakersfield										20			20
	Cerro Coso	11									16			27
	Merced	21									23			44
123030 - Certified Nurse Assistant	Reedley College	9									17			26
	Bakersfield										35			35
	Merced											62		62
	Modesto Junior										164			164
	Reedley College						1	0						1
123900 - Psychiatric Technician	Sequoias										70			70
	Porterville									31				31
	San Joaquin Delta	34						13		25				72
124010 - Dental Assistant	West Hills Coalinga	27									53			80
	Reedley College	5									16			21
124020 - Dental Hygienist	Fresno City	19									0			19
	Taft	18												18
125000 - Emergency Medical Services	Bakersfield										129			129
	Cerro Coso										15			15
	Columbia	0						0			1	1		3
	Merced										28			28
	Modesto Junior										33			33
	Porterville										63			63
125100 - Paramedic	Sequoias										42	20		62
	Bakersfield	2									5			7
	Fresno City										1			1
130620 - Dietetic Services and Management	West Hills Lemoore	3					3	8						14
	Bakersfield	1									2			4
	Fresno City								2					2
130620 - Dietetic Services and Management	Merced						2	2			0			4

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
130630 - Culinary Arts	Bakersfield	17								7				24
	Columbia	6						1	3	5	0			15
	Merced	5						2	4					11
	Modesto Junior	1												1
	San Joaquin Delta	26							17	9				51
	Sequoias							1	2		5			7
130900 - Gerontology	Fresno City							4						4
	Modesto Junior											1		1
210400 - Human Services	Bakersfield	31									16			47
	Cerro Coso	11								9				20
	Columbia	2					1	2						5
	Fresno City	59								62				121
	Merced	8								2				10
	Modesto Junior	17					1	3		12				33
	Reedley College							0						0
	San Joaquin Delta							1		1				2
	Sequoias	12								6				18
	West Hills Lemoore										1			1
210440 - Alcohol and Controlled Substances	Fresno City	16								25				42
	Merced	1								1				2
	Modesto Junior	5								4				9
	Porterville									2				2
	San Joaquin Delta									10				10
51.0000 - Health Services/Allied Health/Health Sciences, General	Clovis Adult Education			129										129
51.0601 - Dental Assisting/Assistant	Carrington College-Stockton	0			33									33
	Milan Institute-Merced			22										22
	Milan Institute-Visalia			38										38
	San Joaquin Valley College-Visalia				155									155
	UEI College-Bakersfield				80									80
	UEI College-Fresno				64									64
	United Education Institute-UEI College Stockton				55									55
51.0602 - Dental Hygiene/Hygienist	San Joaquin Valley College-Visalia	65												65
51.0701 - Health/Health Care Administration/Management	Advanced College-Stockton	0		0										0
51.0702 - Hospital and Health Care Facilities Administration/Management	Advanced College-Stockton	0												0
51.0705 - Medical Office Management/Administration	MTI Business College Inc				3									3
51.0706 - Health Information/Medical Records Administration/Administrator	Institute of Technology				57									57

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
51.0707 - Health Information/Medical Records Technology/Technician	Santa Barbara Business College-Bakersfield	0												0
51.0710 - Medical Office Assistant/Specialist	Clovis Adult Education			25										25
	San Joaquin Valley College-Visalia	64			152									216
	Santa Barbara Business College-Bakersfield				6									6
	United Education Institute-UEI College Stockton				34									34
51.0713 - Medical Insurance Coding Specialist/Coder	San Joaquin Valley College-Visalia	22			47									69
	UEI College-Bakersfield				75									75
	UEI College-Fresno				56									56
51.0714 - Medical Insurance Specialist/Medical Biller	Advanced College-Stockton				1									1
	Carrington College-Stockton	0			10									10
	Santa Barbara Business College-Bakersfield	13												13
51.0716 - Medical Administrative/Executive Assistant and Medical Secretary	Carrington College-Stockton				16									16
	Milan Institute-Merced			27										27
	Milan Institute-Visalia			44										44
	MTI Business College Inc				3									3
	Stellar Career College			39										39
51.0801 - Medical/Clinical Assistant	California Institute of Medical Science			0										0
	Carrington College-Stockton	0			85									85
	Clovis Adult Education			26										26
	Institute of Technology				140									140
	Milan Institute-Bakersfield			11										11
	Milan Institute-Fresno			24										24
	Milan Institute-Merced			88										88
	Milan Institute-Visalia			117										117
	MTI Business College Inc				14									14
	San Joaquin Valley College-Visalia	339			846									1185
	Santa Barbara Business College-Bakersfield	22			7									28
	UEI College-Bakersfield				202									202
	UEI College-Fresno				199									199
United Education Institute-UEI College Stockton				167									167	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
51.0802 - Clinical/Medical Laboratory Assistant	California Institute of Medical Science			17										17
	Carrington College-Stockton	9			24									33
	Institute of Technology				13									13
51.0805 - Pharmacy Technician/Assistant	San Joaquin Valley College-Visalia	113			83									196
	Santa Barbara Business College-Bakersfield	0												0
	UEI College-Bakersfield				52									52
	UEI College-Fresno				59									59
51.0806 - Physical Therapy Technician/Assistant	United Education Institute-UEI College Stockton				0									0
	Advanced College-Stockton			0	0									0
51.0908 - Respiratory Care Therapy/Therapist	Institute of Technology	10												10
	San Joaquin Valley College-Visalia	229												229
51.0909 - Surgical Technology/Technologist	Advanced College-Stockton	0			0									0
	San Joaquin Valley College-Visalia	41												41
51.0910 - Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	San Joaquin Valley College-Visalia	17												17
51.1009 - Phlebotomy Technician/Phlebotomist	Advanced College-Stockton			3										3
	California Institute of Medical Science			6										6
51.3501 - Massage Therapy/Therapeutic Massage	Advanced College-Stockton			0	0									0
	Carrington College-Stockton				11									11
	Milan Institute-Bakersfield			21										21
	Milan Institute-Fresno			22										22
51.3801 - Registered Nursing/Registered Nurse	Milan Institute-Visalia			15										15
	San Joaquin Valley College-Visalia	104												104
51.3901 - Licensed Practical/Vocational Nurse Training	Clovis Adult Education				54									54
	San Joaquin Valley College-Visalia	37												37
	Santa Barbara Business College-Bakersfield			41										41
	Xavier College School of Nursing			64										64
51.3902 - Nursing Assistant/Aide and Patient Care Assistant/Aide	Clovis Adult Education			83										83
	Institute of Technology			2										2
	Milan Institute-Visalia			40										40

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Award 2 < 4 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Credit Award, < 6 Semester Units	Subtotal
51.3999 - Practical Nursing, Vocational Nursing and Nursing Assistants, Other	Advanced College-Stockton				0									0
	Institute of Technology				37	122								160
TOTAL		2,618	23	797	2,947	122	0	64	144	493	642	15	83	7,949

Exhibit B8. Postsecondary supply for the ICT/digital media workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Noncredit Award 480-960 Hours	Subtotal
051400 - Office Technology/Office Computer Applications	Bakersfield	5						8	10				23
	Cerro Coso	4				7	13	12					36
	Columbia								1				1
	Fresno City	16				6	19	4				8	53
	Merced	22						36	20				78
	Modesto Junior	8			2	1	1	2		5			19
	Reedley College	11			16	17	25			12			81
	San Joaquin Delta					0	5	9					14
	Sequoias	0					1						1
	Taft	4					0		0	0			4
	West Hills Coalinga	3					0	1					4
West Hills Lemoore	0											0	
060200 - Journalism	Bakersfield		11										11
	Fresno City		16										16
	San Joaquin Delta		3										3
	Sequoias		4										4
	Taft	0											0
060400 - Radio and Television	San Joaquin Delta	10											10
060410 - Radio	San Joaquin Delta							1					1
060420 - Television (including combined TV/Film/Video)	Modesto Junior									0			0
	San Joaquin Delta					0		2					2
061400 - Digital Media	Columbia	2				0	0						2
	Merced	0											0
	Sequoias									0			0
061410 - Multimedia	Bakersfield							6					6
061430 - Website Design and Development	Bakersfield	1											1
	Cerro Coso	3						7					10
	Clovis	1											1
	Fresno City				1					0			1
061460 - Computer Graphics and Digital Imagery	Modesto Junior	22				2	4						28
	Modesto Junior	2											2
070100 - Information Technology, General	Porterville	2								4			6
	Sequoias									0			0

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Noncredit Award 480-960 Hours	Subtotal
070200 - Computer Information Systems	Bakersfield	1											1
	Cerro Coso	16				7	18	15					56
	Clovis					0	1						1
	Columbia	1											1
	Fresno City	7				1							8
	Merced	2											2
	Porterville	11						1					12
	Reedley College				10	15	7						32
	San Joaquin Delta	15											15
	Sequoias	5						2					7
070210 - Software Applications	Taft								2				2
	Modesto Junior					1	3						4
	Taft								8				8
	West Hills Coalinga	4					4						8
070710 - Computer Programming	West Hills Lemoore	17							15				32
	Columbia	1											1
	Modesto Junior				7					0			7
	Reedley College	1				4	0						5
	San Joaquin Delta						0	0					0
070800 - Computer Infrastructure and Support	West Hills Lemoore						2						2
	Bakersfield							5					5
	Fresno City				3	1							4
070810 - Computer Networking	Sequoias								2				2
	Cerro Coso	9						10					19
	Clovis	2					1						3
	Fresno City	22						22					44
	Modesto Junior				7					1			8
	Reedley College	4				9	7						20
	San Joaquin Delta	15					18	3					36
	Sequoias	1							5				6
070820 - Computer Support	West Hills Lemoore					0	1						1
	Clovis	0				0							0
070900 - World Wide Web Administration	Reedley College	4					4						8
	Fresno City	2				1	1						3
093430 - Telecommunications Technology	San Joaquin Delta							0					0
	Fresno City				18	1		5					24
101100 - Photography	Columbia	1											1
	Merced	1											1
	Modesto Junior	7											7
	San Joaquin Delta	4											4
101300 - Commercial Art	Porterville	4											4
	Sequoias							1					1
103000 - Graphic Art and Design	Bakersfield	4						11					15
	Fresno City	5						5					10
	San Joaquin Delta	13				1		2					16
	Sequoias	2			2				9	1			14
11.0101 - Computer and Information Sciences, General	Milan Institute-Visalia			6									6
	Santa Barbara Business College-Bakersfield	5											5
11.0103 - Information Technology	San Joaquin Valley College-Visalia	12		19									31

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Noncredit Award 480-960 Hours	Subtotal
11.0901 - Computer Systems Networking and Telecommunications	Institute of Technology			13									13
11.1006 - Computer Support Specialist	San Joaquin Valley College-Visalia	7											7
	Santa Barbara Business College-Bakersfield	0											0
11.9999 - Computer and Information Sciences and Support Services, Other	MTI Business College Inc			2									2
220610 - Geographic Information Systems	Columbia	2				0	0		8		2		12
TOTAL		323	34	40	66	74	138	169	84	19	2	8	955

Exhibit B9. Postsecondary supply for the public safety workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Subtotal
210500 - Administration of Justice	Bakersfield	54	116							170
	Cerro Coso		14							14
	Clovis	1	34		0	1				36
	Fresno City	13	133		2	1	23			172
	Merced	24	78				3			105
	Modesto Junior	25	75					0		100
	Porterville	1	46				12			59
	Reedley College	6	66		10	19				101
	San Joaquin Delta	34	59				2		7	102
	Sequoias	11	86							97
	Taft	19	22							41
	West Hills Coalinga	2	19							21
	West Hills Lemoore	23	43							66
210510 - Corrections	Bakersfield	2								2
	Fresno City	3					5			8
	Merced	0								0
	Reedley College	5			3	10				18
	San Joaquin Delta	4			0	2	1			7
	Sequoias	3								3
	Taft	0				1				1
	West Hills Coalinga	5								5
West Hills Lemoore	10						3		13	
210540 - Forensics, Evidence, and Investigation	Fresno City	2					3			5
210550 - Police Academy	Fresno City				0	28				28
	San Joaquin Delta	7			14	58				79
	Sequoias							96		96
213300 - Fire Technology	Bakersfield	25						8		33
	Columbia	15			5	25				43
	Fresno City	9						1		10
	Merced	7						2		9
	Modesto Junior	18						8		26
	Porterville							4		4
	Sequoias	8						1		9
213310 - Wildland Fire Technology	Bakersfield	3						0		3
	Porterville							18		18

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award 1 < 2 Academic Years	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Subtotal
213350 - Fire Academy	Fresno City				7	16				23
	Modesto Junior							17		17
	Sequoias							42		42
219900 - Other Public and Protective Services	Porterville	10								10
43.0102 - Corrections	San Joaquin Valley College-Visalia	181		1						182
43.0103 - Criminal Justice/Law Enforcement Administration	Humphreys University-Stockton and Modesto Junior Campuses	10								10
43.0107 - Criminal Justice/Police Science	Institute of Technology	44								44
43.0109 - Security and Loss Prevention Services	Carrington College-Stockton	4		12						16
	Santa Barbara Business College-Bakersfield	22								22
	UEI College-Bakersfield			23						23
	UEI College-Fresno			63						63
	United Education Institute-UEI College Stockton			0						0
TOTAL		611	792	99	42	165	167	78	7	1,958

Exhibit B10. Postsecondary supply for the retail, hospitality, and tourism workforce

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
050650 - Retail Store Operations and Management	Columbia					0							0
	Fresno City	3							22				25
	Modesto Junior						1	1					2
	San Joaquin Delta	10											10
	West Hills Coalinga	1						1					2
	West Hills Lemoore	0					0	4		5			10
100500 - Commercial Music	Bakersfield								10				10
	Fresno City	2				3			3				8
	Modesto Junior									5			5
	Sequoias									4			4
100600 - Technical Theater	Fresno City	2											2
	Modesto Junior									1			1
	San Joaquin Delta	2						1					3
101200 - Applied Photography	Bakersfield								6				6
	Fresno City	6				12	1		6		6		30
	Merced						0	0					1
	San Joaquin Delta							1	0				2

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
12.0401 - Cosmetology/ Cosmetologist, General	Adrian's College of Beauty Turlock				45								45
	California Beauty School				20								20
	California College of Barbering and Cosmetology				9								9
	Estes Institute of Cosmetology Arts and Science				26								26
	Institute of Technology				0								0
	Lawrence & Company College of Cosmetology				43								43
	Lyle's College of Beauty				19								19
	Lyle's College of Beauty				20								20
	Milan Institute of Cosmetology-Visalia (CLOSED)				75								75
	Milan Institute-Bakersfield				97								97
	Milan Institute-Fresno				56								56
	Milan Institute-Merced				27								27
	Milan Institute-Visalia				0								0
	North Adrian's College of Beauty Inc				52								52
	Paul Mitchell the School-Fresno				122								122
	Paul Mitchell the School-Modesto Junior				96								96
	Princess Institute of Beauty				7								7
Sierra College of Beauty				31								31	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
12.0402 - Barbering/Barber	California College of Barbering and Cosmetology				12								12
	Institute of Technology				0								0
	Lawrence & Company College of Cosmetology				1								1
	Milan Institute-Bakersfield				4								4
	Milan Institute-Fresno				23								23
	Milan Institute-Merced				7								7
	North Adrian's College of Beauty Inc			8	6								14
	Paul Mitchell the School-Fresno				6								6
	Paul Mitchell the School-Modesto Junior				29								29
	Sierra College of Beauty				11								11
12.0409 - Aesthetician/ Esthetician and Skin Care Specialist	Adrian's College of Beauty Turlock			5									5
	California Beauty School			25									25
	California College of Barbering and Cosmetology			16									16
	Lawrence & Company College of Cosmetology			7									7
	Lyle's College of Beauty			0									0
	Lyle's College of Beauty			8									8
	Milan Institute-Bakersfield			53									53
	Milan Institute-Fresno			98									98
	North Adrian's College of Beauty Inc			17									17
	Paul Mitchell the School-Modesto Junior			59									59
	Princess Institute of Beauty			1									1
Sierra College of Beauty			9									9	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal	
12.0410 - Nail Technician/Specialist and Manicurist	Adrian's College of Beauty Turlock			10									10	
	California Beauty School			11									11	
	California College of Barbering and Cosmetology			13									13	
	Estes Institute of Cosmetology Arts and Science			18									18	
	Lawrence & Company College of Cosmetology			6									6	
	Lyle's College of Beauty			14									14	
	Lyle's College of Beauty			25									25	
	North Adrian's College of Beauty Inc			0									0	
	Paul Mitchell the School- Modesto Junior			21										21
	Princess Institute of Beauty			1										1
Sierra College of Beauty			4										4	
12.0413 - Cosmetology, Barber/Styling, and Nail Instructor	Adrian's College of Beauty Turlock			0									0	
	California College of Barbering and Cosmetology			2									2	
	Lyle's College of Beauty			0									0	
	Lyle's College of Beauty			0									0	
	North Adrian's College of Beauty Inc			0									0	
12.0499 - Cosmetology and Related Personal Grooming Arts, Other	Lyle's College of Beauty			0									0	
12.0501 - Baking and Pastry Arts/ Baker/Pastry Chef	Institute of Technology				43								43	
12.0503 - Culinary Arts/ Chef Training	Institute of Technology	49		13	9								71	
12.9999 - Personal and Culinary Services, Other	Institute of Technology				28								28	
130200 - Interior Design and Merchandising	San Joaquin Delta	6						0					6	
130300 - Fashion	Sequoias									0			0	

Continued

TOP/CIP Code - Title	College	Associate Degree	Associate for Transfer Degree	Award < 1 Academic Year	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Credit Award, < 6 Semester Units	Subtotal
130310 - Fashion Design	San Joaquin Delta	5							2				7
	Sequoias	5					0	1		0			7
130320 - Fashion Merchandising	Fresno City	3							2				5
	San Joaquin Delta	2							1				3
130330 - Fashion Production	Sequoias	4					0	1		1			5
	San Joaquin Delta							1					1
130600 - Nutrition, Foods, and Culinary Arts	Bakersfield	4											4
	Fresno City	1	3						0				5
	Merced		2										2
130700 - Hospitality	Columbia									1			1
130710 - Restaurant and Food Services and Management	Bakersfield	0											0
	Columbia	2							2	9		8	20
	Fresno City	2							2				4
	West Hills Lemoore						2	6		26			34
300700 - Cosmetology and Barbering	Sequoias						0	0					1
TOTAL		108	5	444	925	15	5	19	58	51	6	8	1,643



APPENDIX C: EDUCATIONAL ATTAINMENT FOR THE TOP OCCUPATIONS IN EACH SECTOR

Exhibit C1. Advanced manufacturing educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Industrial Production Managers	Bachelor's degree	5 years or more	None	29.2%
Packaging and Filling Machine Operators and Tenders	High school diploma or equivalent	None	Moderate-term	21.1%
Inspectors, Testers, Sorters, Samplers, and Weighers	High school diploma or equivalent	None	Moderate-term	38.0%
First-Line Supervisors of Production and Operating Workers	High school diploma or equivalent	Less than 5 years	None	35.2%
Welders, Cutters, Solderers, and Brazers	High school diploma or equivalent	None	Moderate-term	32.2%
Industrial Machinery Mechanics	High school diploma or equivalent	None	Long-term	40.9%
Machinists	High school diploma or equivalent	None	Long-term	41.2%
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	34.5%
Mixing and Blending Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	28.5%
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	28.6%
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	High school diploma or equivalent	None	Short-term	35.9%
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	High school diploma or equivalent	None	Moderate-term	37.0%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	High school diploma or equivalent	None	Moderate-term	27.8%
Cutting and Slicing Machine Setters, Operators, and Tenders	High school diploma or equivalent	None	Moderate-term	20.9%
Computer Numerically Controlled Tool Operators	High school diploma or equivalent	None	Moderate-term	42.5%

Exhibit C2. Advanced transportation and logistics educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Air Traffic Controllers	Associate degree	None	Long-term	45.9%
Logisticians	Bachelor's degree	None	None	35.9%
Airline Pilots, Copilots, and Flight Engineers	Bachelor's degree	Less than 5 years	Moderate-term on-the-job training	22.0%
Shipping, Receiving, and Inventory Clerks	High school diploma or equivalent	None	Short-term on-the-job training	33.8%
First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	High school diploma or equivalent	Less than 5 years	None	39.4%
First-Line Supervisors of Mechanics, Installers, and Repairers	High school diploma or equivalent	Less than 5 years	None	41.7%
Bus and Truck Mechanics and Diesel Engine Specialists	High school diploma or equivalent	None	Long-term on-the-job training	36.4%
Bus Drivers, Transit and Intercity	High school diploma or equivalent	None	Moderate-term on-the-job training	39.5%
Transportation, Storage, and Distribution Managers	High school diploma or equivalent	5 years or more	None	34.7%
Automotive Body and Related Repairers	High school diploma or equivalent	None	Long-term on-the-job training	26.2%
Commercial Pilots	High school diploma or equivalent	None	Moderate-term on-the-job training	22.0%
Cargo and Freight Agents	High school diploma or equivalent	None	Short-term on-the-job training	40.7%
Heavy and Tractor-Trailer Truck Drivers	Postsecondary nondegree award	None	Short-term on-the-job training	29.8%
Automotive Service Technicians and Mechanics	Postsecondary nondegree award	None	Short-term on-the-job training	35.7%
Aircraft Mechanics and Service Technicians	Postsecondary nondegree award	None	None	58.4%

Exhibit C3. Agriculture, water, and environmental technologies educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Forest and Conservation Technicians	Associate degree	None	None	37.1%
Food Science Technicians	Associate degree	None	Moderate-term on-the-job training	40.5%
Buyers and Purchasing Agents	Bachelor's degree	None	Moderate-term on-the-job training	33.6%
Compliance Officers	Bachelor's degree	None	Moderate-term on-the-job training	25.5%
Cost Estimators	Bachelor's degree	None	Moderate-term on-the-job training	37.4%
Farmers, Ranchers, and Other Agricultural Managers	High school diploma or equivalent	5 years or more	None	30.2%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	None	Moderate-term on-the-job training	32.1%
First-Line Supervisors of Farming, Fishing, and Forestry Workers	High school diploma or equivalent	Less than 5 years	None	21.9%
Mobile Heavy Equipment Mechanics, Except Engines	High school diploma or equivalent	None	Long-term on-the-job training	35.2%
Pest Control Workers	High school diploma or equivalent	None	Moderate-term on-the-job training	35.9%
Farm Equipment Mechanics and Service Technicians	High school diploma or equivalent	None	Long-term on-the-job training	35.2%
Veterinary Assistants and Laboratory Animal Caretakers	High school diploma or equivalent	None	Short-term on-the-job training	44.0%
Animal Trainers	High school diploma or equivalent	None	Moderate-term on-the-job training	32.0%
Forest and Conservation Workers	High school diploma or equivalent	None	Moderate-term on-the-job training	24.4%
Agricultural Equipment Operators	No formal educational credential	None	Moderate-term on-the-job training	14.9%

Exhibit C4. Business and entrepreneurship educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
General and Operations Managers	Bachelor's degree	5 years or more	None	34.3%
Business Operations Specialists, All Other	Bachelor's degree	None	None	22.2%
Human Resources Specialists	Bachelor's degree	None	None	24.6%
Customer Service Representatives	High school diploma or equivalent	None	Short-term on-the-job training	41.8%
First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	Less than 5 years	None	41.4%
Receptionists and Information Clerks	High school diploma or equivalent	None	Short-term on-the-job training	45.8%
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	High school diploma or equivalent	None	Moderate-term on-the-job training	29.2%
Insurance Sales Agents	High school diploma or equivalent	None	Moderate-term on-the-job training	36.5%
Billing and Posting Clerks	High school diploma or equivalent	None	Moderate-term on-the-job training	49.1%
Production, Planning, and Expediting Clerks	High school diploma or equivalent	None	Moderate-term on-the-job training	39.8%
Sales and Related Workers, All Other	High school diploma or equivalent	None	None	28.1%
Eligibility Interviewers, Government Programs	High school diploma or equivalent	None	Moderate-term on-the-job training	40.2%
Information and Record Clerks, All Other	High school diploma or equivalent	None	Short-term on-the-job training	44.1%
Office and Administrative Support Workers, All Other	High school diploma or equivalent	None	Short-term on-the-job training	40.7%
Bookkeeping, Accounting, and Auditing Clerks	Some college, no degree	None	Moderate-term on-the-job training	50.1%

Exhibit C5. Energy, construction, and utilities educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Construction Managers	Bachelor's degree	None	Moderate-term on-the-job training	31.5%
Maintenance and Repair Workers, General	High school diploma or equivalent	None	Moderate-term on-the-job training	37.6%
Carpenters	High school diploma or equivalent	None	Apprenticeship	25.1%
Electricians	High school diploma or equivalent	None	Apprenticeship	45.8%
First-Line Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	5 years or more	None	29.2%
Plumbers, Pipefitters, and Steamfitters	High school diploma or equivalent	None	Apprenticeship	32.9%
Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	None	Moderate-term on-the-job training	24.5%
Installation, Maintenance, and Repair Workers, All Other	High school diploma or equivalent	None	Moderate-term on-the-job training	36.8%
Solar Photovoltaic Installers	High school diploma or equivalent	None	Moderate-term on-the-job training	51.6%
Water and Wastewater Treatment Plant and System Operators	High school diploma or equivalent	None	Long-term on-the-job training	47.0%
Sheet Metal Workers	High school diploma or equivalent	None	Apprenticeship	32.3%
Security and Fire Alarm Systems Installers	High school diploma or equivalent	None	Moderate-term on-the-job training	49.2%
Industrial Truck and Tractor Operators	No formal educational credential	None	Short-term on-the-job training	26.4%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Postsecondary nondegree award	None	Long-term on-the-job training	44.0%
Telecommunications Equipment Installers and Repairers, Except Line Installers	Postsecondary nondegree award	None	Moderate-term on-the-job training	53.0%

Exhibit C6. Education sector's educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Preschool Teachers, Except Special Education	Associate degree	None	None	31.6%
Substitute Teachers, Short-Term	Bachelor's degree	None	None	25.4%
Interpreters and Translators	Bachelor's degree	None	None	35.5%
Teaching Assistants, Postsecondary	Bachelor's degree	None	None	38.6%
Education and Childcare Administrators, Preschool and Daycare	Bachelor's degree	Less than 5 years	None	11.4%
Special Education Teachers, Preschool	Bachelor's degree	None	None	7.2%
Childcare Workers	High school diploma or equivalent	None	Short-term on-the-job training	35.1%
Recreation Workers	High school diploma or equivalent	None	Short-term on-the-job training	35.7%
Library Assistants, Clerical	High school diploma or equivalent	None	Short-term on-the-job training	37.0%
Library Technicians	Postsecondary nondegree award	None	None	25.9%
Teaching Assistants, Except Postsecondary	Some college, no degree	None	None	38.6%



Exhibit C7. Health educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Radiologic Technologists and Technicians	Associate degree	None	None	66.6%
Dental Hygienists	Associate degree	None	None	60.1%
Registered Nurses	Bachelor's degree	None	None	33.3%
Home Health and Personal Care Aides	High school diploma or equivalent	None	Short-term on-the-job training	34.9%
Medical Secretaries and Administrative Assistants	High school diploma or equivalent	None	Moderate-term on-the-job training	53.6%
Social and Human Service Assistants	High school diploma or equivalent	None	Short-term on-the-job training	34.4%
Pharmacy Technicians	High school diploma or equivalent	None	Moderate-term on-the-job training	53.7%
Healthcare Support Workers, All Other	High school diploma or equivalent	None	None	43.2%
Nursing Assistants	Postsecondary nondegree award	None	None	44.7%
Medical Assistants	Postsecondary nondegree award	None	None	63.4%
Dental Assistants	Postsecondary nondegree award	None	None	55.9%
Licensed Practical and Licensed Vocational Nurses	Postsecondary nondegree award	None	None	73.3%
Health Technologists and Technicians, All Other	Postsecondary nondegree award	None	None	46.8%
Medical Records Specialists	Postsecondary nondegree award	None	None	46.8%
Phlebotomists	Postsecondary nondegree award	None	None	59.7%

Exhibit C8. ICT/digital media educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Computer Network Support Specialists	Associate degree	None	None	39.2%
Broadcast Technicians	Associate degree	None	Short-term on-the-job training	36.2%
Computer Occupations, All Other	Bachelor's degree	None	None	27.2%
Network and Computer Systems Administrators	Bachelor's degree	None	None	37.4%
Graphic Designers	Bachelor's degree	None	None	26.5%
Computer Network Architects	Bachelor's degree	5 years or more	None	37.7%
Office Clerks, General	High school diploma or equivalent	None	Short-term on-the-job training	45.2%
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	High school diploma or equivalent	None	Short-term on-the-job training	45.9%
Executive Secretaries and Executive Administrative Assistants	High school diploma or equivalent	Less than 5 years	None	41.0%
Switchboard Operators, Including Answering Service	High school diploma or equivalent	None	Short-term on-the-job training	49.0%
Procurement Clerks	High school diploma or equivalent	None	Moderate-term on-the-job training	38.5%
Surveying and Mapping Technicians	High school diploma or equivalent	None	Moderate-term on-the-job training	57.7%
Audio and Video Technicians	Postsecondary nondegree award	None	Short-term on-the-job training	36.9%
Audiovisual Equipment Installers and Repairers	Postsecondary nondegree award	None	Short-term on-the-job training	45.8%
Computer User Support Specialists	Some college, no degree	None	None	39.2%

Exhibit C9. Public safety educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
Forensic Science Technicians	Bachelor's degree	None	Moderate-term	37.1%
Protective Service Workers, All Other	High school diploma or equivalent	None	Short-term	36.8%
Correctional Officers and Jailers	High school diploma or equivalent	None	Moderate-term	49.3%
Police and Sheriff's Patrol Officers	High school diploma or equivalent	None	Moderate-term	46.8%
First-Line Supervisors of Correctional Officers	High school diploma or equivalent	Less than 5 years	None	42.4%
Public Safety Telecommunicators	High school diploma or equivalent	None	Moderate-term	54.0%
Transportation Security Screeners	High school diploma or equivalent	None	Short-term	46.7%
Detectives and Criminal Investigators	High school diploma or equivalent	Less than 5 years	Moderate-term	32.0%
First-Line Supervisors of Police and Detectives	High school diploma or equivalent	Less than 5 years	Moderate-term	41.0%
First-Line Supervisors of Security Workers	High school diploma or equivalent	Less than 5 years	None	37.8%
Gambling Surveillance Officers and Gambling Investigators	High school diploma or equivalent	Less than 5 years	Moderate-term	41.9%
Private Detectives and Investigators	High school diploma or equivalent	Less than 5 years	Moderate-term	32.7%
Firefighters	Postsecondary nondegree award	None	Long-term	59.4%
First-Line Supervisors of Firefighting and Prevention Workers	Postsecondary nondegree award	Less than 5 years	Moderate-term	55.2%
Fire Inspectors and Investigators	Postsecondary nondegree award	5 years or more	Moderate-term	44.1%

Exhibit C10. Retail, hospitality, and tourism educational attainment

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	Current Population Survey (CPS)
First-Line Supervisors of Food Preparation and Serving Workers	High school diploma or equivalent	Less than 5 years	None	36.7%
First-Line Supervisors of Retail Sales Workers	High school diploma or equivalent	Less than 5 years	None	38.8%
Food Service Managers	High school diploma or equivalent	Less than 5 years	None	35.8%
Self-Enrichment Teachers	High school diploma or equivalent	Less than 5 years	None	25.4%
Exercise Trainers and Group Fitness Instructors	High school diploma or equivalent	None	Short-term	28.6%
Chefs and Head Cooks	High school diploma or equivalent	5 years or more	None	35.8%
First-Line Supervisors of Housekeeping and Janitorial Workers	High school diploma or equivalent	Less than 5 years	None	31.0%
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	High school diploma or equivalent	Less than 5 years	None	31.0%
First-Line Supervisors of Personal Service Workers	High school diploma or equivalent	Less than 5 years	None	37.8%
Cooks, Restaurant	No formal educational credential	Less than 5 years	Moderate-term	24.3%
Cooks, Institution and Cafeteria	No formal educational credential	None	Short-term	24.3%
Cooks, All Other	No formal educational credential	None	Moderate-term	24.3%
Musicians and Singers	No formal educational credential	None	Long-term	27.6%
Manicurists and Pedicurists	Postsecondary nondegree award	None	None	23.5%
Hairdressers, Hairstylists, and Cosmetologists	Postsecondary nondegree award	None	None	43.0%

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