

July 2018

# LABOR MARKET ANALYSIS

## Food Safety Occupations



# TABLE OF CONTENTS

- Summary ..... 3
- Introduction..... 4
- Occupational Demand ..... 6
- Wages ..... 6
- Job Postings ..... 7
- Education, Work Experience and Training..... 10
- Supply ..... 10
- Conclusion..... 11
- Recommendation ..... 12
- Appendix A: Methodology & Data Sources ..... 12

# SUMMARY

This study examines labor market demand, wages, skills and community college supply for occupations related to food safety for Bakersfield College. Two occupations were identified: food scientists and technologists (SOC 19-1012) and agricultural and food science technicians (SOC 19-4011).

## KEY FINDINGS:

- **Occupational demand** — The top food safety occupation is agricultural and food science technicians with 518 workers in 2017 and 57 annual openings, followed by food scientists and technologists with 280 workers and 30 annual openings.
- **Wages** — The highest paid occupation is food scientists and technologists. Entry-level wages for food safety occupations exceed the average self-sufficiency wage at the regional and subregional levels, but the entry-level wage of agricultural and food science technicians falls short of the average living wage for a single adult at both levels.
- **Employers** — Top employers in the region include Campbell Soup Company, Nestle USA Incorporated, and Lyons Magnus.
- **Job titles** — The most common job titles were food technologist, research and development food scientist, and food scientist.
- **Skills and certifications** — The top baseline skill requirement is communication skills, and the top specialized skill is food science. The top certifications are Global Food Safety Initiative and a driver's license.
- **Education** — Employers of agricultural and food science technicians typically require an associate degree, while a bachelor's degree is typically required for entry-level positions for food scientists and technologists.
- **Supply** — Analysis of community college completions in the region shows that on average, nine certificates and 25 degrees are conferred each year related to the two occupations in this study.

Based on a comparison of occupational demand and community college supply, there is an undersupply of 67 trained workers in the subregion and 109 trained workers in the region. As a result, the Center of Excellence recommends that the community colleges work with the agriculture deputy sector navigator, department advisory boards and local industry in the expansion of a food safety program.

# INTRODUCTION

The Central Valley/Mother Lode Center of Excellence was asked by Bakersfield College to provide labor market information for Taxonomy of Programs (TOP) codes 010100-Agriculture Technology and Sciences, General; 010400-Viticulture, Enology, and Wine Business; and 011300-Food Processing and Related Technologies.

This analysis focuses on the South Central Valley/Southern Mother Lode (SCV/SML) subregion. Occupational demand, supply and wage data for the region are also included for broader applicability and use. Analysis of the program and occupational data related to food safety resulted in the identification of two applicable occupations.

The occupational titles and their Standard Occupational Classification (SOC) System codes are:

- Food scientists and technologists (SOC 19-1012) and
- Agricultural and food science technicians (SOC 19-4011).

The SOC codes, occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O\*NET OnLine are shown in Exhibit 1.

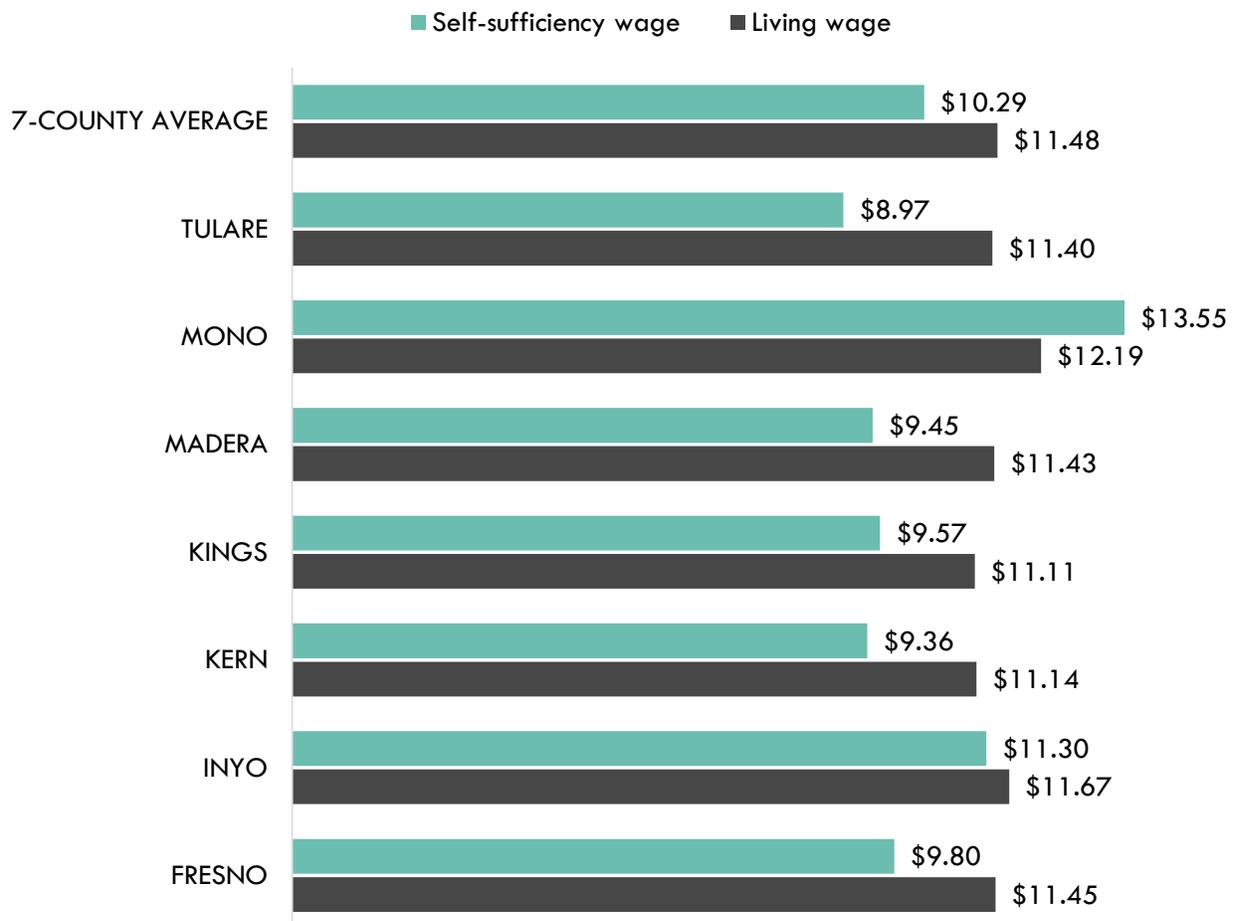
**EXHIBIT 1. Food safety-related SOC titles, job descriptions, sample job titles, and knowledge and skills**

SOC TITLE (SOC CODE)	DESCRIPTION	SAMPLE JOB TITLES	KNOWLEDGE AND SKILLS
<b>Food Scientists and Technologists</b> (19-1012)	Use chemistry, microbiology, engineering and other sciences to study the principles underlying the processing and deterioration of foods; analyze food content to determine levels of vitamins, fat, sugar and protein; discover new food sources; research ways to make processed foods safe, palatable and healthful; and apply food science knowledge to determine best ways to process, package, preserve, store and distribute food.	Food Scientist, Food Technologist, Product Development Manager, Product Development Scientist, Professor, Quality Assurance Manager (QA Manager), Research and Development Director (R & D Director), Research and Development Manager (R & D Manager), Research Scientist	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Production and processing</li> <li>• Chemistry</li> <li>• Food production</li> <li>• Biology</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• Active listening</li> <li>• Reading comprehension</li> <li>• Writing</li> <li>• Active learning</li> <li>• Critical thinking</li> </ul>
<b>Agricultural and Food Science Technicians</b> (19-4011)	Set up or maintain laboratory equipment and collect samples from crops or animals. Prepare specimens or record data to assist scientists in biology or related life science experiments.	Agricultural Research Technician, Agricultural Research Technologist, Agricultural Technician, Laboratory Technician, Research Assistant, Research Associate, Research Specialist, Research Technician, Seed Analyst, Agricultural Assistant,	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Mathematics</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Administration and management</li> <li>• Production and processing</li> </ul>

SOC TITLE (SOC CODE)	DESCRIPTION	SAMPLE JOB TITLES	KNOWLEDGE AND SKILLS
	Perform standardized qualitative and quantitative tests to determine physical or chemical properties of food or beverage products.	Central Lab Technician, Food Science Technician, Lab Tech, Lab Assistant, Operations Technician, Quality Assurance Analyst, Quality Control Technician, Quality Technician, Technical Services Analyst	<b>Skills</b> <ul style="list-style-type: none"> <li>• Reading comprehension</li> <li>• Active listening</li> <li>• Complex problem solving</li> <li>• Critical thinking</li> <li>• Writing</li> </ul>

The 2014 average self-sufficiency wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is \$10.29/hour, and the current average living wage for a single adult is \$11.48/hour. Self-sufficiency and living wage data by county and the overall seven-county average are shown in Exhibit 2. In the wages sections of this report, Pct.10 hourly denotes entry-level wages, and median represents experienced wages.

**EXHIBIT 2. Self-sufficiency and living wages in the SCV/SML subregion**



# OCCUPATIONAL DEMAND

The subregion employed 798 food safety workers in 2017 in the South Central Valley/Southern Mother Lode subregion (Exhibit 3). The largest occupation is agricultural and food science technicians with 518 workers in 2017. The occupation is expected to grow by 4% over the next five years and will have 57 projected annual job openings. The next largest occupation is food scientists and technologists. This occupation had only 280 jobs in 2017, and is also projected to grow by 4%, with 30 projected annual job openings.

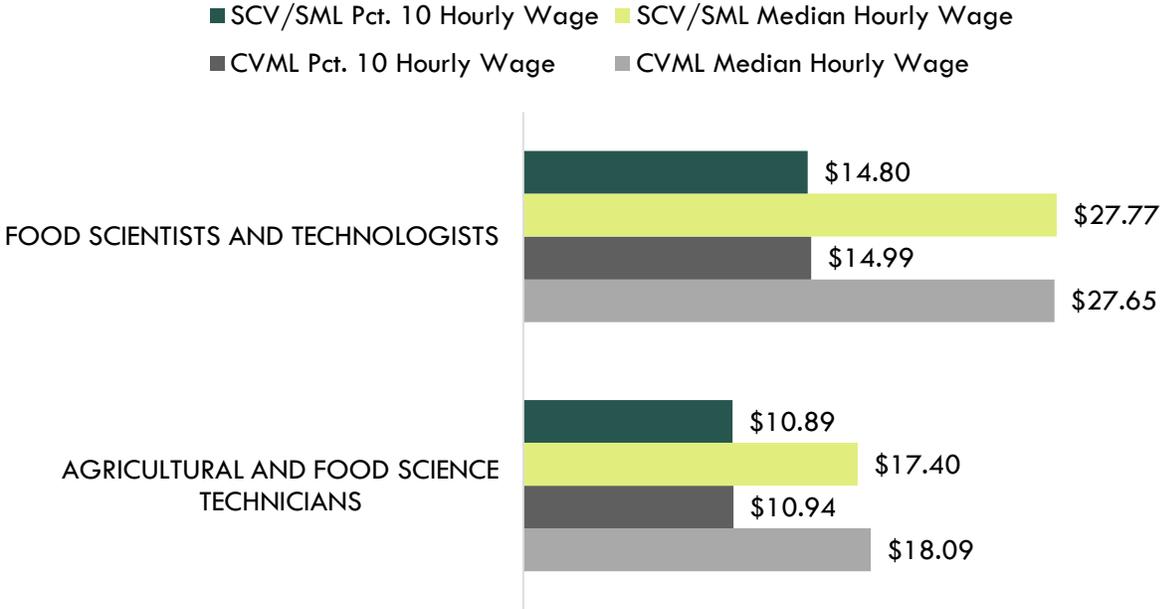
**EXHIBIT 3. Food safety employment and occupational demand projections in the SCV/SML subregion**

OCCUPATION	2017 JOBS	5-YEAR CHANGE	5-YEAR % CHANGE	ANNUAL OPENINGS
Agricultural and food science technicians	518	21	4%	57
Food scientists and technologists	280	10	4%	30
<b>TOTAL</b>	<b>798</b>	<b>31</b>	<b>4%</b>	<b>87</b>

# WAGES

Exhibit 4 compares the entry-level and experienced wages of the two food safety occupations. The entry-level wages for both occupations exceed the average self-sufficiency wage for a single adult in the seven-county subregion, \$10.28/hour. However, the entry-level wages for agricultural and food science technicians falls below the average living wage for a single adult, \$11.48/hour, in the subregion.

**EXHIBIT 4. Entry-level and experienced wage comparison in the region and subregion**



# JOB POSTINGS

There were 50 job postings for the two food safety occupations in the seven counties of the South Central Valley/Southern Mother Lode subregion from June 2017 through May 2018. The top seven employers advertising for the 50 jobs are listed in Exhibit 5.

## EXHIBIT 5. Top food safety employers by number of job postings

EMPLOYER	JOB POSTINGS
Campbell Soup Company	5
Nestle USA Incorporated	3
Lyons Magnus	3
Grimway Farms	2
Ruiz Foods	2
UI LLC	2
Western Milling	2

Exhibit 6 shows the job postings for the two targeted food safety occupations in the subregion were distributed evenly between the two occupations, with food scientists and technologists having only eight more postings than agricultural and food service technicians.

## EXHIBIT 6. Occupational titles related to food safety in job postings

OCCUPATION	JOB POSTINGS
Food scientists and technologists	29
Agricultural and food service technicians	21

## JOB TITLES

Analysis of the 50 advertised job titles for the targeted occupations reveals that the top 10 job titles are related to food safety. Exhibit 7 shows the top nine job titles among the job postings.

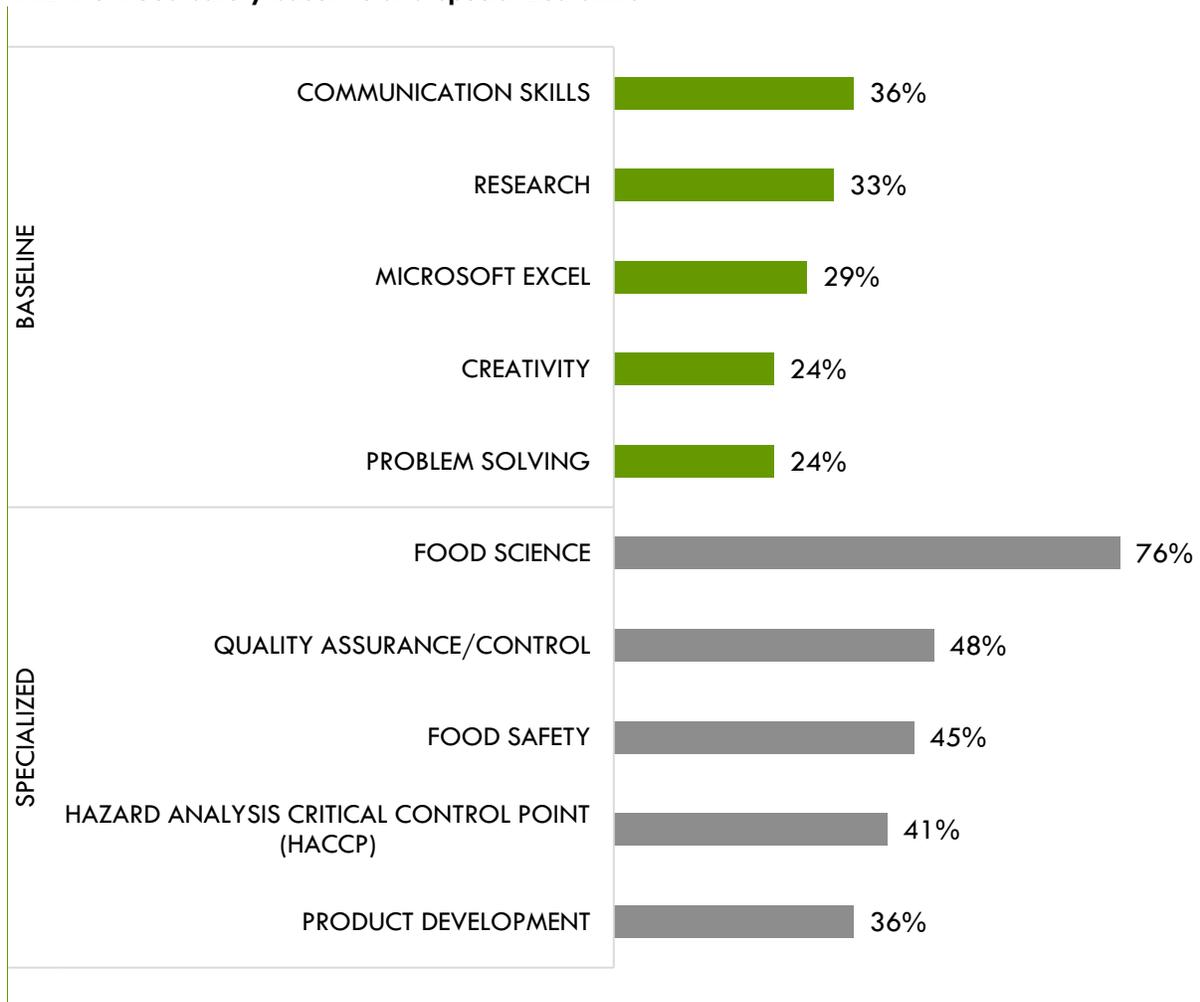
## EXHIBIT 7. Top food safety job titles by number of job postings

TITLE	JOB POSTINGS
Food technologist	9
Research and development food scientist	6
Food scientist	3
Agricultural technician	2
Director, quality assurance, food	2
Food safety technician	2
Supply quality assurance technologist	2
Technician	2
Technologist	2

## SKILLS

Exhibit 8 depicts the top baseline and specialized skills for the two food safety occupations. Most of the job postings contain skills data. Of the 42 job postings that contain skills data, the three most important baseline skills are communication skills, 36% of job postings, research, 33%, and Microsoft Excel, 29%. The top three specialized skills are food science, 76% of job postings, quality assurance/quality control, 48%, and food safety, 45%.

**EXHIBIT 8. Food safety baseline and specialized skills**



## SKILL CLUSTER PROJECTIONS

Nearly 40 job postings contained skill cluster projections data. Analysis of this information reveals that each of these postings have more than one skill cluster indicator. An evaluation of the top skill clusters that will have the greatest gains in level of importance shows that the top area is personal care and services: food and beverage service, 55%.

Other clusters with large gain projections include business: business process and analysis (24%), and business: quality assurance and control (53%). Additionally, health care: nutrition and diet is a slower growing cluster, but is indicated in 87% of job postings (Exhibit 9).

**EXHIBIT 9. Skill cluster projections for food safety occupations**



**CERTIFICATIONS**

The top certifications required by employers is Global Food Safety Initiative and a driver’s license (Exhibit 10).

**EXHIBIT 10. Food safety certifications requested in job postings**



# EDUCATION, WORK EXPERIENCE AND TRAINING

The typical entry-level education for food scientists and technologists is a bachelor’s degree, an occupation that is only relevant to transfer-focused community college students. The typical entry-level education for agricultural and food science technicians is an associate degree.

**EXHIBIT 11. Education, work experience, training and Current Population Survey results<sup>1</sup>**

OCCUPATION	TYPICAL ENTRY-LEVEL EDUCATION	WORK EXPERIENCE REQUIRED	TYPICAL ON-THE-JOB TRAINING	CPS
Food scientists and technologists	Bachelor’s degree	None	None	16.5%
Agricultural and food science technicians	Associate degree	None	Moderate-term	38.7%

## SUPPLY

Analysis of California Community Colleges Chancellor’s Office Curriculum Inventory (COCI) program data shows there are four community colleges in the SCV/SML region offering a total of seven programs (four associate degree programs and three certificate programs) contributing to workforce supply for the identified food safety occupations.

All programs are related to TOP code 010100-Agriculture Technology and Sciences, General. The other two related TOP codes—010400-Viticulture, Enology, and Wine Business, and 011300-Food Processing and Related Technologies—do not have programs in the Central Valley/Mother Lode region. In the subregion, there is one associate degree program at each of the following: Reedley College, Porterville College, College of the Sequoias, and West Hills College Coalinga. Additionally, Reedley, Sequoias, and West Hills College Coalinga all have certificate programs.

Analysis of the last three years of 010100-Agriculture Technology and Sciences, General shows that, on average, nine certificates and 25 degrees were conferred in the South Central Valley/Southern Mother Lode region each year (Exhibit 12).

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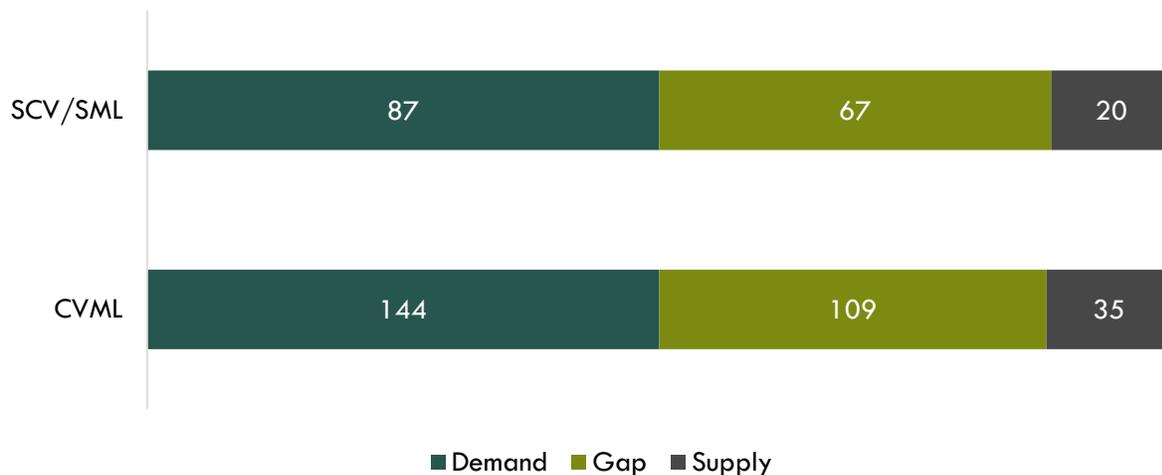
<sup>1</sup> “Labor Force Statistics from the Current Population Survey,” Bureau of Labor Statistics, <https://www.bls.gov/cps/>. Table 1.11 Educational attainment for workers 25 years and older by detailed occupation, 2015-16. Some college, no degree and Associate degree.

**EXHIBIT 12. Community college supply for the food safety occupations in the SCV/SML region**

TOP TITLE AND CODE	COLLEGE	3-YEAR AVERAGE	
		CERTIFICATES	DEGREES
010100-Agriculture Technology and Sciences, General	Merced		5
	Modesto Junior		9
	Porterville	0	6
	Reedley	2	2
	Sequoias	0	0
	West Hills Coalinga	7	2
<b>TOTAL</b>		<b>9</b>	<b>25</b>

A gap in supply appears to exist in the region and subregion. In the subregion, there is a shortage of 67 trained workers (Exhibit 13). In the region, there is a shortage of 109 trained workers.

**EXHIBIT 13. Food safety workforce annual demand and supply in the subregion and region**



# CONCLUSION

Entry-level wages for food safety occupations exceed the average self-sufficiency wage at the regional and subregional levels, but the entry-level wage of agricultural and food science technicians falls short of the average living wage for a single adult at both levels. There were 50 job postings for the two food safety occupations from June 2017 to May 2018 in the South Central Valley/Southern Mother Lode subregion.

Analysis of skills and certificate requirements in job postings indicates:

- The top baseline skill requirement is communication skills, and the top specialized skill is food science.
- The top certifications are Global Food Safety Initiative and a driver’s license.

There are four community colleges in the region offering a total of seven programs (three certificate programs and four degree programs) contributing to workforce supply for the identified food safety occupations, but there remains an undersupply of trained workers, a shortage of 109 in the region and 67 in the subregion.

## RECOMMENDATION

While the supply gap is not large, there does remain a shortage of food safety workers in the region and subregion. As a result, it is recommended that Bakersfield College work with the region's deputy sector navigator, the college's advisory board, and local industry in the addition of a food safety program.



# APPENDIX A: METHODOLOGY & DATA SOURCES

## Data Sources

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

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: <a href="http://economicmodeling.com">economicmodeling.com</a> .
Living Wage	A living wage calculator that estimates the cost of living in a specific community or region: <a href="http://livingwage.mit.edu">livingwage.mit.edu</a> .
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: <a href="http://www.bls.gov/emp/ep_education_tech.htm">www.bls.gov/emp/ep_education_tech.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division, <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a>
Job Posting and Skills Data	Burning Glass, <a href="http://www.burning-glass.com/">http://www.burning-glass.com/</a>
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: <a href="http://www.onetonline.org">www.onetonline.org</a>

## Key Terms and Concepts

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

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

**Employment Estimate:** The total number of workers currently employed.

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

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

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

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

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

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

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

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

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