Labor Market Analysis for Program Recommendation: 0430.00/Biotechnology and Biomedical Technology *(Biotechnology Technician)*

Orange County Center of Excellence, March 2025

FOR LABOR MARKET RESEARCH
ORANGE COUNTY

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met ☐	Endorsed: Some LMI Criteria Met ☒	Not LMI Endorsed ☐

Program LMI Endorsement Criteria		
Supply Gap:	Yes ☑	No ☐
	Comments: there is projected to be **3,891 annual job openings** throughout Los Angeles and Orange counties for these biotechnology and biomedical technology occupations, which **is more than the 252 awards conferred by educational institutions.**	
Self-Sufficiency Standard Living Wage[1]:	Yes ☐	No ☑
	Comments: **all annual job openings** for these biotechnology technician occupations **have entry-level hourly wages significantly below the OC living wage of $27.13.**	
Education:	Yes ☑	No ☐
	Comments: though the majority (66%) of annual job openings for these biotechnology technician occupations typically require a high school diploma, **between 33% and 38% of workers in the field have completed some college or an associate degree as their highest level of education.**	

Additional Considerations			
Emerging Occupation(s):	Yes ☐	Some ☑	No ☐
	Comments: This report focuses on three middle-skill occupations. The occupation, *life, physical, and social science technicians, all other* (19-4099) includes data for the emerging occupation, *quality control analyst* (19-4099.01). Data for the emerging occupation is developing and currently limited and, therefore, cannot be analyzed on its own.		
OC Resilient Job(s):	Yes ☐	Some ☑	No ☐
	Comments: See Resilient Jobs and US News & World Report Best Jobs		
U.S. News & World Report 2025 Best Jobs List[2]:	Yes ☐	Some ☑	No ☐
	Comments: See Resilient Jobs and US News & World Report Best Jobs		

[1] At the direction of the California Community College Chancellor's Office, the living wage endorsement criteria in this report uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard, which the COE refers to as a living wage, to determine Orange County's living wage of $27.13, last updated in March 2024.
[2] "100 Best Jobs," U.S. News & World Report, accessed January 28, 2025, https://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs.

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to three middle-skill occupations:

- *Life, Physical, and Social Science Technicians, All Other (19-4099)*
- *Clinical Laboratory Technologists and Technicians (29-2018)*
- *Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)*

Based on the available data, there appears to be a supply gap for these biotechnology technician occupations and typical education requirements for these occupations align with a community college education. However, all annual job openings have entry-level wages below the Self-Sufficiency Standard living wage. **Therefore, due to some of the regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Life, Physical, and Social Science Technicians, All Other (19-4099)	LA: 380 OC: 145 *TTL: 525*	*Accounted for Below*	OC: $23.98	Associate degree	33%
Clinical Laboratory Technologists and Technicians (29-2018)	LA: 553 OC: 262 *TTL: 815*	LA: 119 OC: 88 *TTL: 208*	OC: $23.63	Bachelor's degree	35%
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	LA: 1,681 OC: 870 *TTL: 2,550*	LA: 44 OC: 0 *TTL: 44*	OC: $18.88	High school diploma or equivalent	38%
Total	**3,891**	**252**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these biotechnology technician occupations is projected to increase by 1% through 2028, equating to 3,891 annual job openings.
- Hourly entry-level wages for these biotechnology technician occupations range from $18.88 to $23.93 in Orange County; all annual job openings have entry-level wages below the Self-Sufficiency Standard living wage.
- There were 10,882 online job postings for these biotechnology technician occupations over the past 12 months. The highest number of postings were for quality inspectors, quality control inspectors, and laboratory technicians.
- The typical entry-level education for these biotechnology technician occupations ranges from a high school diploma or equivalent to a bachelor's degree.
- Between 33% and 38% of workers in the field have completed some college or an associate degree as their highest level of educational attainment.

Supply:

- There was an average of 205 awards conferred by 13 community colleges in Los Angeles and Orange Counties from 2020 to 2023.
- Non-community college institutions conferred an average of 47 awards from 2019 to 2022.
- Orange County community college students that exited biotechnology and biomedical technology programs in the 2020-21 academic year had a median annual wage of $40,498 ($19.47 per hour) after exiting the program and 42% attained the regional living wage.
- Due to a low number of students, student outcome data is not available for students working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for these biotechnology technician occupations from 2018 through 2028. Though there was a 7% decline across all occupations in Los Angeles and Orange counties from 2019 to 2020 due to the COVID-19 pandemic, employment for these biotechnology occupations decreased by only 5% during the same period.

In the two years preceding the pandemic, employment for these occupations increased in Orange County, from 2018 through 2019. After a decrease in employment in 2020, employment increased through 2022 and decreased again in 2023. Employment for these occupations in Orange County is projected to grow through 2028, experiencing a similar rate relative to all occupations in Los Angeles and Orange counties.

Exhibit 2: Annual Percent Change in Jobs for Biotechnology Technician Occupations, 2018-2028

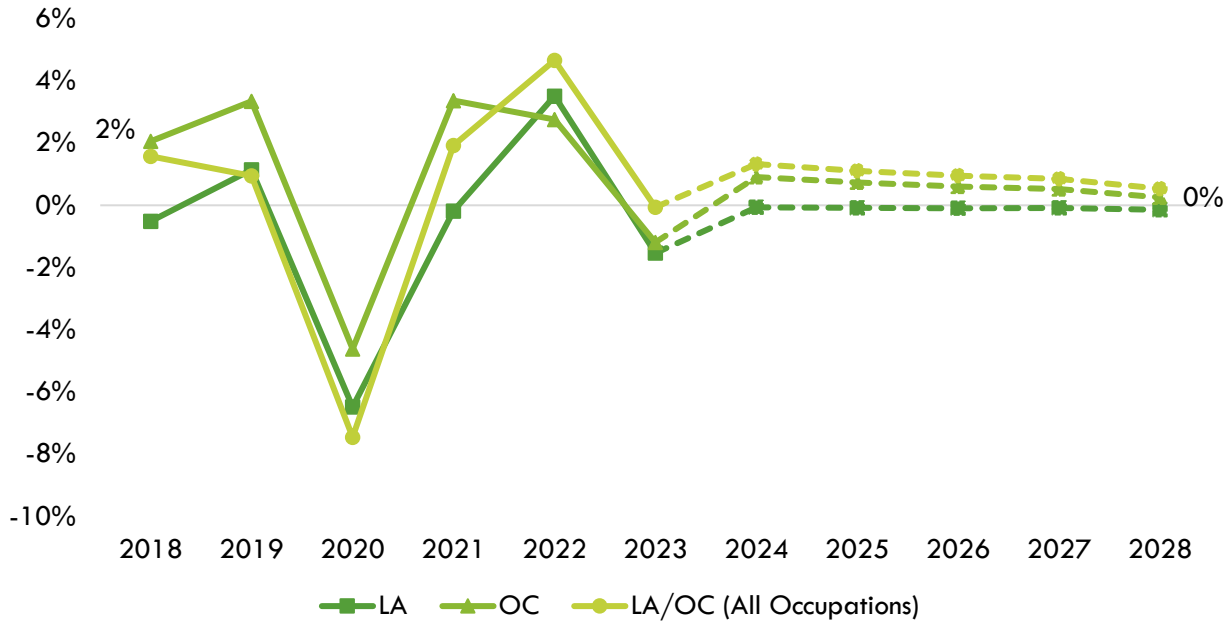


Exhibit 3 shows the five-year occupational demand projections for these biotechnology technician occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 1% through 2028. There is projected to be 3,891 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties[3]

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
Los Angeles	25,260	25,140	(120)	0%	2,614
Orange	11,754	12,114	359	3%	1,277
Total	**37,014**	**37,253**	**239**	**1%**	**3,891**

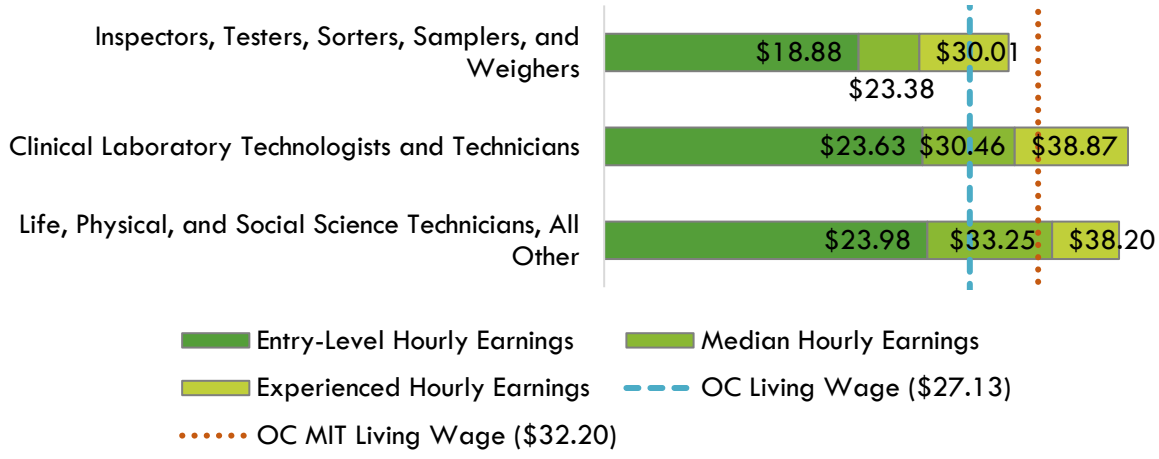
Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these biotechnology technician occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below to provide a complete analysis of the LA/OC region.

At the direction of the California Community College Chancellor's Office, the living wage endorsement criteria in this report uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard, which the COE refers to as a living wage, to determine Orange County's living wage of $27.13, last updated in March 2024. Additionally, data for the MIT Living Wage, updated on February 10, 2025, is provided as a reference. Currently, the MIT Living Wage in Orange County is $32.20. Both figures, which account for geographic-specific costs of necessities such as housing, food, health care, and transportation to assess the cost of living, are notated in the exhibits below.

All annual openings for these biotechnology technician occupations have entry-level wages below the Self-Sufficiency Standard living wage for one adult ($27.13 in Orange County). Typical entry-level hourly wages range between $18.88 and $23.98. Median hourly wages range between $23.38 and $33.46. Experienced hourly wages range between $30.01 and $38.20. Orange County's average wages of $29.43 are nearly identical to the average statewide wage of $30.29 for these occupations. Exhibit 4 shows the wage range for each of these biotechnology technician occupations in Orange County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

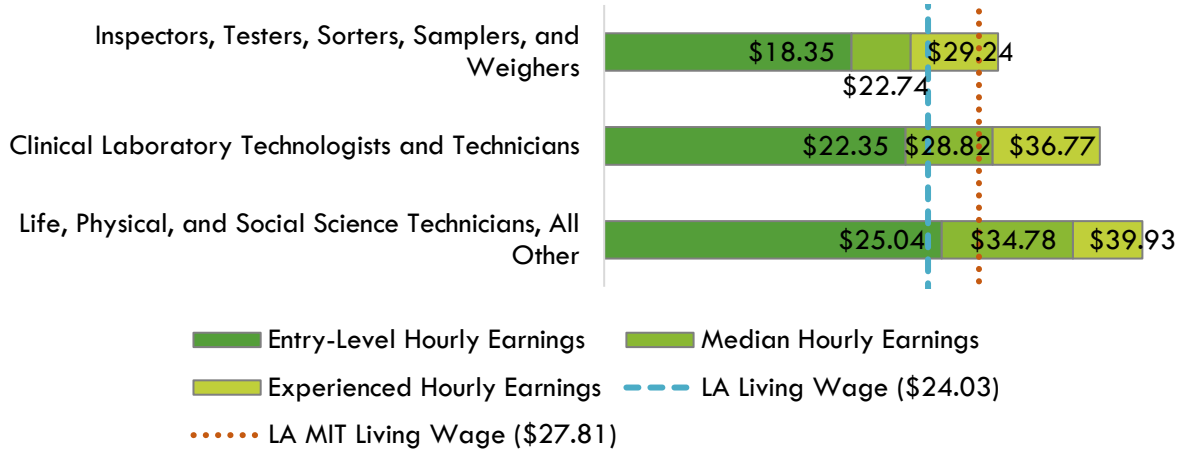
Exhibit 4: Wages by Occupation in Orange County



[3] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

The majority (85%) of annual openings for these biotechnology technician occupations have entry-level wages below the Self-Sufficiency Standard living wage for one adult ($24.03 in Los Angeles County). Typical entry-level hourly wages range between $18.35 and $25.04. Median hourly wages range between $22.74 and $34.78. Experienced hourly wages range between $29.24 and $39.93. Los Angeles County's average wages of $29.03 are slightly below the average statewide wage of $30.29 for these occupations. Exhibit 5 shows the wage range for each of these biotechnology technician occupations in Los Angeles County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Los Angeles County



Resilient Jobs and U.S. News & World Report Best Jobs:

Exhibit 6 shows if each occupation is considered an Orange County Great Recession-Resilient, COVID-19 Pandemic Recession-Resilient Job, or a 2025 U.S. News & World Report (USN&WR) Best Job. Only one occupation, *clinical laboratory technologies and technicians*, met the criteria to be considered a USN&WR Best Jobs. Only one occupation, *life, physical, and social science technicians, all other*, met the criteria to be considered a Great Recession-Resilient Jobs. *Inspectors, testers, sorters, samplers, and weighers*, did not meet the criteria of any of the three designations.

Exhibit 6: Resilient Jobs and USN&WR Best Jobs Designations

Occupation	Great Recession-Resilient Job	COVID-19 Pandemic Recession-Resilient Job	2025 USN&WR Best Job
Clinical Laboratory Technologists and Technicians	☐	☐	☑
Inspectors, Testers, Sorters, Samplers, and Weighers	☐	☐	☐
Life, Physical, and Social Science Technicians, All Other	☑	☐	☐

Job Postings:

Important Online Job Postings Data Note: *Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.*[4] *For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.*

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

Though occupational data for *quality control analysts* (19-4099.01) are still developing and currently limited, this section includes two job posting analyses to provide a comprehensive overview of regional demand for biotechnology technician occupations. The first analysis examines all job postings for the three occupations: *clinical laboratory technologies and technicians, inspectors, testers, sorters, samplers, and weighers,* and *life, physical, and social science technicians, all other*; the second focuses on *quality control analysts* (19-4099.01), an emerging occupation marked as a subset of *life, physical, and social science technicians, all other*. Please note, job postings do not equate to labor market demand, though they do provide insights for program development, such as which employers are hiring and the skills they look for from candidates.

Job Postings for Biotechnology Technician Occupations

There were 10,882 online job postings related to these biotechnology technician occupations listed in the past 12 months. Exhibit 7 shows the number of job postings by occupation. The majority (62%) of job postings were for *inspectors, testers, sorters, samplers, and weighers*, followed by *clinical laboratory technologies and technicians* (34%).

Exhibit 7: Number of Job Postings by Occupation (n=10,882)

Occupation	Job Postings	Percentage of Job Postings
Inspectors, Testers, Sorters, Samplers, and Weighers	6,750	62%
Clinical Laboratory Technologists and Technicians	3,712	34%
Life, Physical, and Social Science Technicians, All Other	420	4%
Total Postings	**10,882**	**100%**

[4] K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), https://link.springer.com/book/10.1007/978-81-322-3972-7.

The top employers in the region, by number of job postings, are shown in Exhibit 8.

Exhibit 8: Top Employers by Number of Job Postings (n=10,882)

Employer	Job Postings	Percentage of Job Postings
Aerotek	342	3%
Actalent	310	3%
University of California	200	2%
Volt	152	1%
Quest Diagnostics	141	1%
Kelly Services	113	1%
Express Employment Professionals	99	1%
Kaiser Permanente	65	1%
Ucla Health Systems	64	1%
Vetted Health	62	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 9.

Exhibit 9: Top Skills by Number of Job Postings (n=10,882)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Auditing (2,007)	Quality Control (3,741)	Microsoft Excel (1,557)
Calipers (1,694)	Communication (3,530)	Microsoft Office (1,185)
Micrometer (1,628)	Detail Oriented (2,836)	Microsoft Outlook (749)
Good Manufacturing Practices (1,258)	Quality Assurance (2,704)	Microsoft Word (683)
Quality Management (1,201)	Management (2,040)	Microsoft PowerPoint (564)
Laboratory Equipment (1,059)	Operations (1,785)	Laboratory Information Management Systems (220)
Quality Management Systems (1,051)	Microsoft Excel (1,557)	Spreadsheets (219)
Medical Laboratory (985)	Computer Literacy (1,470)	SAP Applications (174)
Biology (980)	Problem Solving (1,462)	Microsoft Access (118)
Coordinate Measuring Machine (CMM) (918)	Safety Assurance (1,339)	Operating Systems (64)

Job Postings for Quality Control Analysts (19-4099.01)

There were 297 online job postings related to *quality control analysts* listed in the past 12 months. Exhibit 10 shows the number of job postings by occupation.

Exhibit 10: Number of Job Postings for *Quality Control Analysts* by Occupation (n=297)

Job Titles	Job Postings	Median Advertised Salary	Percentage of Job Postings
Quality Control Analysts	297	$73,000 ($35.09)	100%

Exhibit 11 shows the top job titles for *quality control analysts* by number of job postings.

Exhibit 11: Top Job Tiles for *Quality Control Analysts* by Number of Job Postings (n=297)

Job Titles	Job Postings	Percentage of Job Postings
Quality Control Specialists	46	15%
Quality Control Analysts	43	14%
Quality Control Clerks	21	7%
Quality Improvement Analysts	13	4%
Quality Review Analysts	13	4%
Product Quality Analysts	8	3%
Quality Analysts	8	3%
Transaction Advisors	8	3%
IT Quality Analysts	7	2%
Laboratory Assistants	6	2%
Total Postings	**167**	**56%**

The top employers for *quality control analysts* in the region, by number of job postings, are shown in Exhibit 12.

Exhibit 12: Top Employers for *Quality Control Analysts* by Number of Job Postings (n=297)

Employer	Job Postings	Percentage of Job Postings
Actalent	8	3%
Alvarez & Marsal	8	3%
Northrop Grumman	8	3%
AbbVie	6	2%
Bio-Rad Laboratories	6	2%
Gilead Sciences	6	2%
Fladger Associates	5	2%
Heico Companies	5	2%
Quest Diagnostics	5	2%
Cedars-Sinai	4	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) for *quality control analysts* are shown in Exhibit 13.

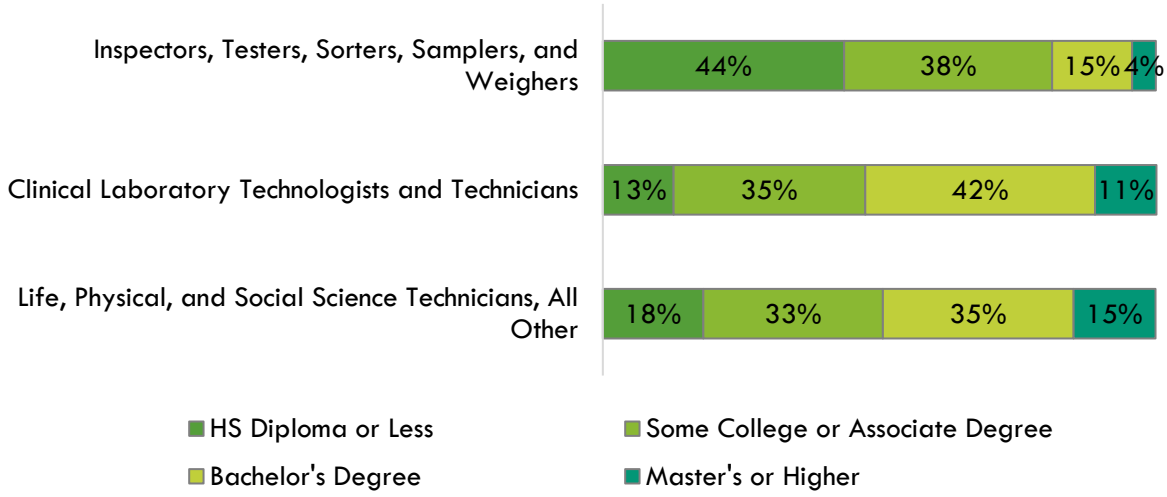
Exhibit 13: Top Skills for *Quality Control Analysts* by Number of Job Postings (n=297)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Auditing (90)	Quality Control (163)	Microsoft Excel (65)
Good Manufacturing Practices (59)	Detail Oriented (94)	Microsoft Office (47)
Chemistry (54)	Communication (86)	Microsoft PowerPoint (35)
Quality Management (40)	Management (83)	Microsoft Word (26)
Biology (38)	Investigation (65)	Microsoft Outlook (22)
Biochemical Assays (35)	Microsoft Excel (65)	Laboratory Information Management Systems (19)
Data Analysis (35)	Operations (61)	Microsoft Access (12)
Data Entry (35)	Problem Solving (52)	TrackWise (12)
Project Management (33)	Quality Assurance (48)	Reporting Tools (11)
Quality Management Systems (30)	Leadership (47)	Microsoft Visio (10)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *inspectors, testers, sorters, samplers, and weighers;* an associate degree for *life, physical, and social science technicians, all other* and a bachelor's degree for *clinical laboratory technologies and technicians*. However, the national-level educational attainment data indicates between 33% and 38% of workers in the field have completed some college or an associate degree as their highest level of education. Exhibit 14 shows the educational attainment for each occupation, sorted by highest community college educational attainment to lowest.

Exhibit 14: National-level Educational Attainment for Occupations



Of the 57% of the cumulative job postings for these biotechnology technician occupations that listed a minimum education requirement in Los Angeles/Orange County, 74% (4,608) requested a high school diploma or an associate degree and 24% (1,475) requested a bachelor's degree.

Of the 68% of the cumulative job postings for *quality control analysts* that listed a minimum education requirement in Los Angeles/Orange County, 56% (112) requested a bachelor's degree and 43% (87) requested a high school diploma or an associate degree.

Educational Supply

The following supply tables displays the total supply for these biotechnology technician occupations that align with these TOP/CIP codes and program needs.

Community College Supply:

Exhibit 15 shows the three-year average number of awards conferred by community colleges in the related TOP code:

- Biotechnology and Biomedical Technology (0430.00)
- Medical Laboratory Technology (1205.00)

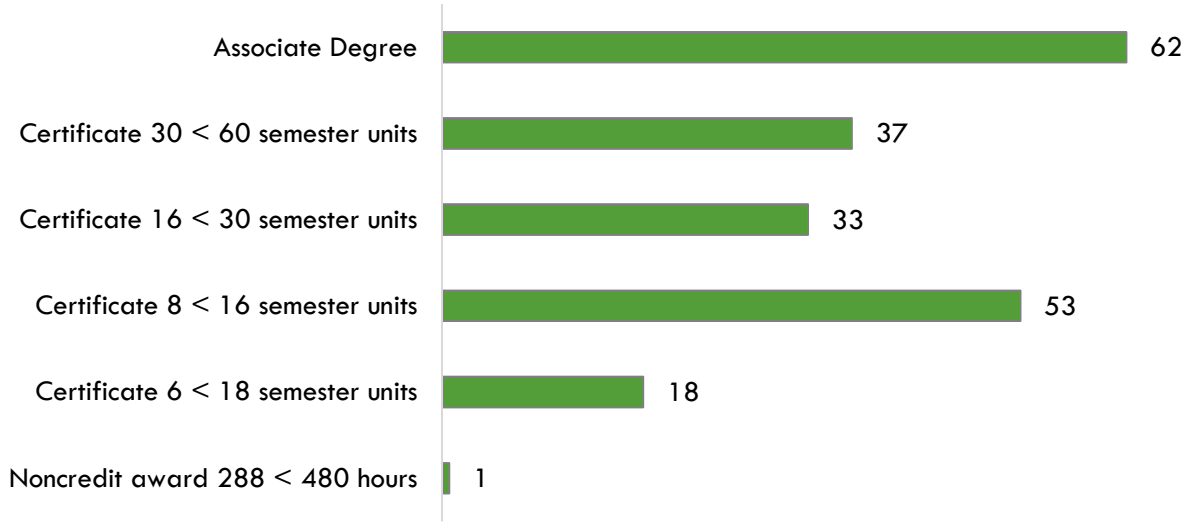
No awards were conferred under the related TOP code: Industrial Quality Control (0956.80). The colleges with the most completions in the region are LA Mission, Pasadena, and Santiago Canyon. Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Exhibit 15: Regional Community College Awards (Certificates and Degrees), 2020-2023

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
0430.00	Biotechnology and Biomedical Technology	Citrus	5	9	14	9
		East LA	7	4	0	4
		Glendale	0	0	12	4
		LA Mission	17	38	42	32
		LA Trade	6	13	3	7
		Pasadena	32	33	28	31
		West LA	0	0	7	2
		LA Subtotal	**67**	**97**	**106**	**90**
		Fullerton	13	3	12	9
		Irvine	14	23	11	16
		Santa Ana	5	13	20	13
		Santiago Canyon	9	16	57	27
		OC Subtotal	**41**	**55**	**100**	**65**
Supply Subtotal/Average			**108**	**152**	**206**	**155**
1205.00	Medical Laboratory Technology	Mt San Antonio	26	27	26	26
		LA Subtotal	**26**	**27**	**26**	**26**
		Saddleback	27	17	25	23
		OC Subtotal	**27**	**17**	**25**	**23**
Supply Subtotal/Average			**53**	**44**	**51**	**49**
Supply Total/Average			**161**	**196**	**257**	**205**

Exhibit 16 shows the annual average community college awards by type from 2020-21 to 2022-23. The plurality of the awards are for associate degrees, followed by certificates between 30 and less than 60 semester units and certificates between 16 and less than 30 semester units.

Exhibit 16: Annual Average Community College Awards by Type, 2020-2023



Community College Student Outcomes:

Exhibit 17 shows the Strong Workforce Program (SWP) metrics for biotechnology and biomedical technology programs in South Orange County Community College District (SOCCCD), the Orange County Region, and California. Of the 383 Orange County biotechnology and biomedical technology students in the 2021-22 academic year, 21% (80) attended an SOCCCD college.

Due to a low number of students, student outcome data for median salary is not available for median earnings and living wage at the district level. Orange County students that exited biotechnology and biomedical technology programs in the 2021-22 academic year had lower median annual earnings ($40,498 or $19.47 per hour) compared to all biotechnology and biomedical technology students in California ($47,148 or $22.67 per hour). A lower percentage of Orange County biotechnology and biomedical technology students attained the living wage (42%) when compared to all biotechnology and biomedical technology students in California (58%).

Exhibit 17: Biotechnology and Biomedical Technology (0430.00) Strong Workforce Program Metrics, 2021-22[5]

SWP Metric	SOCCCD	OC Region	California
SWP Students	80	383	2,499
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	16%	15%	21%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	Insufficient Data	73%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	10	24	343

[5] All SWP metrics are for 2021-22 unless otherwise noted.

SWP Metric	SOCCCD	OC Region	California
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	17	48	226
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	Insufficient Data	Insufficient Data	77%
Median Annual Earnings for SWP Exiting Students (2020-21)	Insufficient Data	$40,498 ($19.47)	$47,148 ($22.67)
Median Change in Earnings for SWP Exiting Students (2020-21)	Insufficient Data	51%	23%
SWP Exiting Students Who Attained the Living Wage (2020-21)	Insufficient Data	42%	58%

Non-Community College Supply:

To comprehensively analyze the regional supply, it is crucial to include data from other institutions offering biotechnology and biomedical technology training programs. Exhibit 18 displays the annual and three-year average awards granted by these institutions under the related Classification of Instructional Programs (CIP) code:

- Quality Control Technology/Technician (15.0702)
- Clinical/Medical Laboratory Technician (51.1004)

No awards were conferred under the related CIP codes:

- Science Technologies/Technicians, Other (41.9999)
- Clinical/Medical Laboratory Science and Allied Professions, Other (51.1099)

The available data covers 2019 to 2022. During this period, non-community college institutions in the region conferred an average of 47 awards annually in related programs.

Exhibit 18: Regional Non-Community College Awards, 2019-2022

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
15.0702	Quality Control Technology/ Technician	California Intercontinental University	0	0	0	0
		California State University-Dominguez Hills	51	40	41	44
		California State University-Northridge	0	0	0	0
		California Intercontinental University	0	0	0	0
		Supply Subtotal/Average	**51**	**40**	**41**	**44**
51.1004	Clinical/Medical Laboratory Technician	Regan Career Institute	0	1	8	3
		Supply Subtotal/Average	**0**	**1**	**8**	**3**
		Supply Total/Average	**51**	**41**	**49**	**47**

Regional Demographics

This section examines demographic data for Orange County community college students in biotechnology and biomedical technology programs compared to the OC population, along with occupational data, to identify potential diversity and equity issues addressable by community college programs.

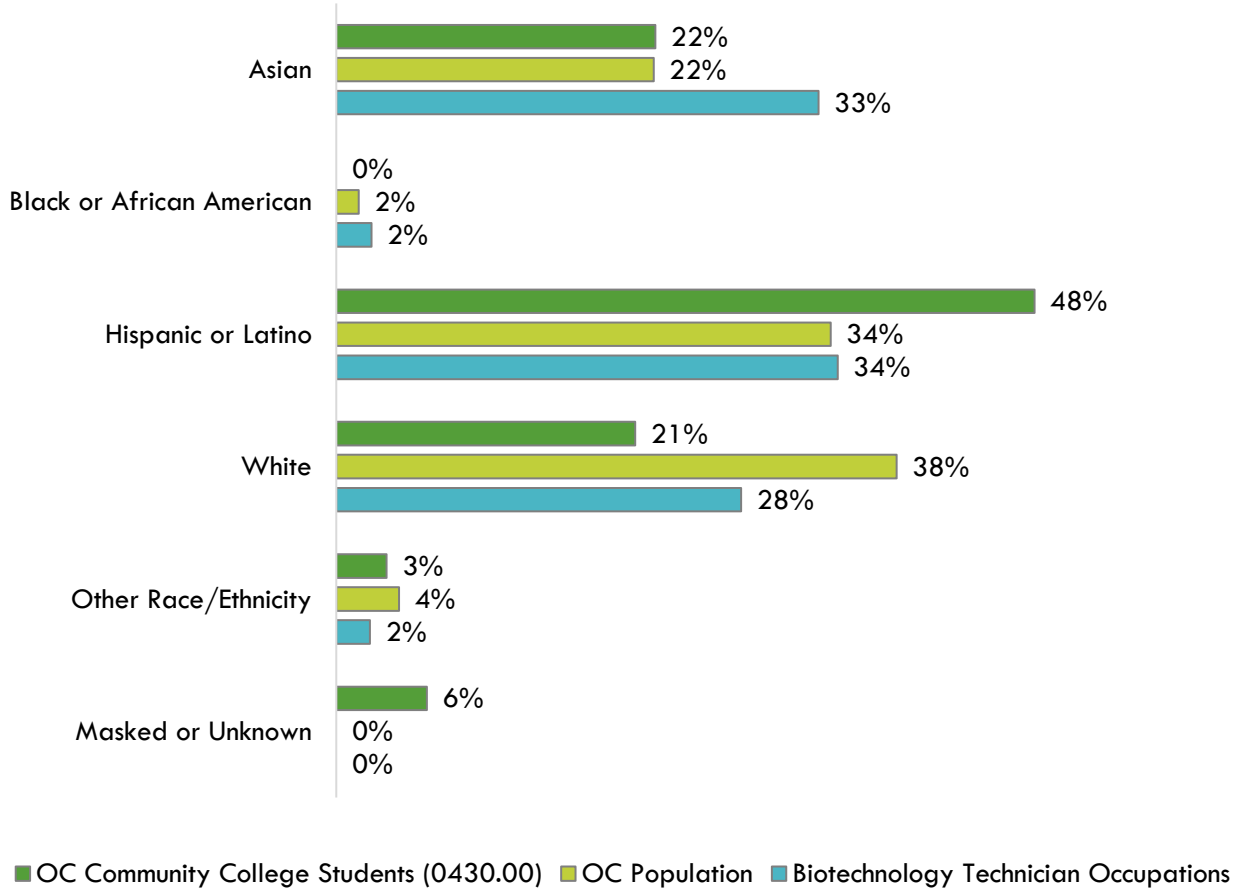
Ethnicity:

Exhibit 19 compares the ethnicity of Orange County community college students enrolled in biotechnology and biomedical technology programs, the overall Orange County population, and occupation-specific data for the three biotechnology technician occupations included in this report.

Notably, 34% of workers employed in these biotechnology technician occupations are Hispanic or Latino, which is the same as the population (34%) but lower than community college biotechnology and biomedical technology students (48%). Conversely, 33% of workers in the field are Asian, which is higher than the population (22%) and biomedical technology students (48%).

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of Hispanic or Latino workers is *inspectors, testers, sorters, samplers, and weighers* (40%), which has the lowest entry-level education and lowest wages of all three biotechnology technician occupations. *Clinical laboratory technologies and technicians* has the highest percentage of Asian workers (45%). This occupation also has the highest entry-level education requirements and the second highest entry-level wages of all three biotechnology technician occupations.

Exhibit 19: Program and County Demographics by Ethnicity



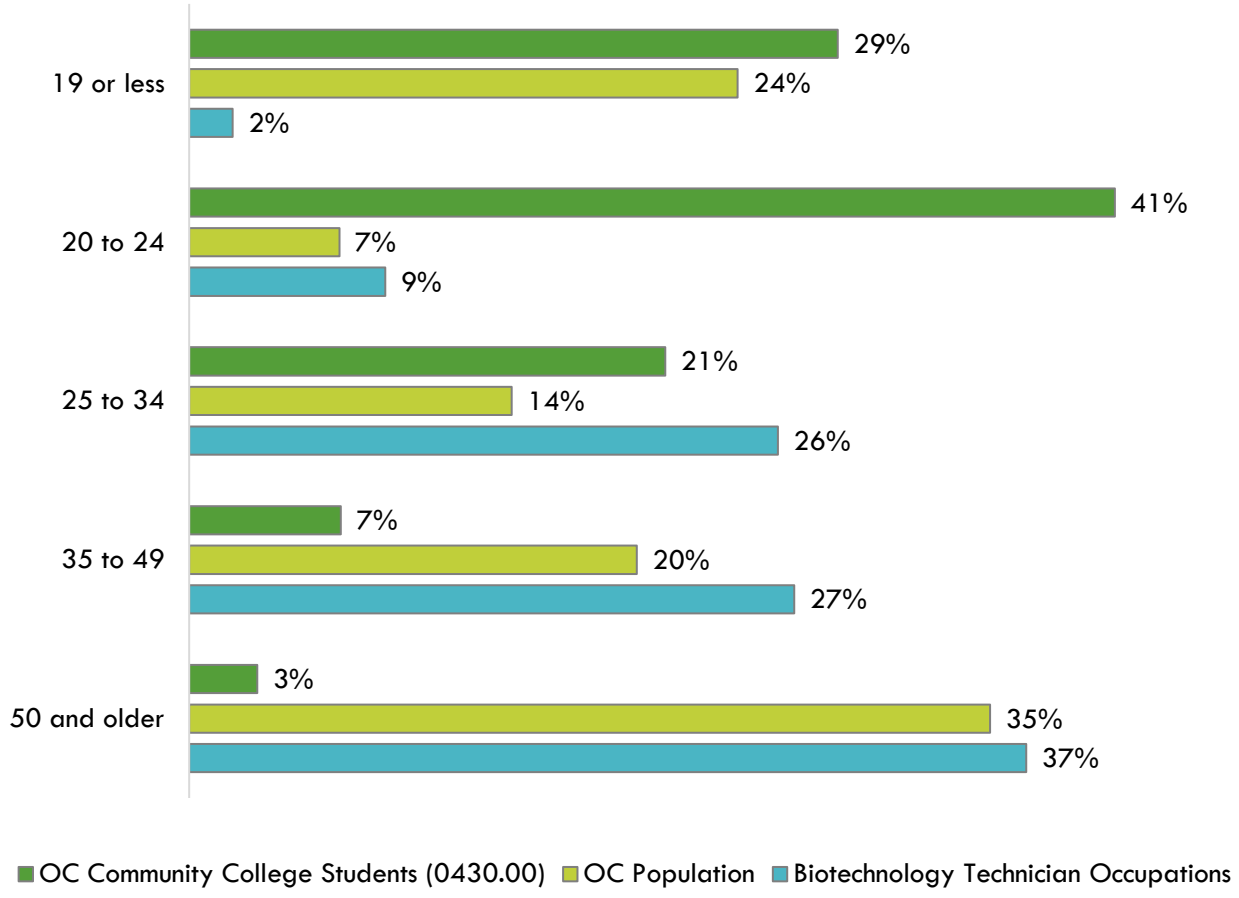
Age:

Exhibit 20 compares the age of Orange County community college students enrolled in biotechnology and biomedical technology programs, the overall Orange County population, and occupation-specific data for the four biotechnology technician occupations included in this report.

Nearly 64% of workers in these biotechnology technician occupations are aged 35 and older, which is higher than the population (55%) and significantly higher than community college biotechnology and biomedical technology students (10%). Conversely, 37% of workers in the field are aged 35 and younger, which is lower than the population (45%) and significantly lower than community college biotechnology and biomedical technology students (91%).

Examining disaggregated data for each occupation (not shown), the occupation with the highest percentage of workers aged 34 or younger is *life, physical, and social science technicians, all other* (64%), which has the highest entry-level wages of all three biotechnology technician occupations. Conversely, the occupation with the highest percentage of workers aged 35 and older is *inspectors, testers, sorters, samplers, and weighers* (69%). This occupation also has the lowest entry-level education and lowest wages of all three biotechnology technician occupations.

Exhibit 20: Program and County Demographics by Age



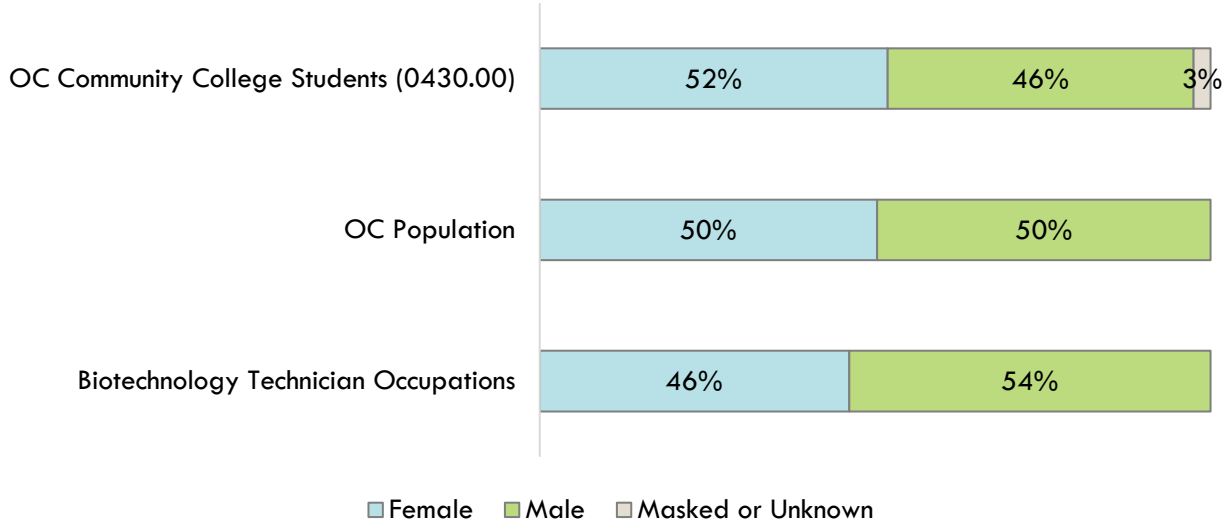
Sex:

Exhibit 21 compares the sex of Orange County community college students enrolled in biotechnology and biomedical technology programs, the overall Orange County population, and occupation-specific data for these biotechnology technician occupations.

Though the population is split evenly between women and men, women are slightly higher than the majority (52%) for community college biotechnology and biomedical technology students but slightly lower than the majority (46%) for workers in the field.

Examining disaggregated data for each occupation (not shown), only one occupation, *clinical laboratory technologies and technicians*, has a larger percentage of women (59%) than men (41%). This occupation has the highest entry-level education and second highest entry-level wages of all three biotechnology technician occupations.

Exhibit 21: Program and County Demographics by Sex



Appendix A: Methodology

The OC COE prepared this report by analyzing data from occupations and education programs. Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the OC COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The OC COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the OC COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	"Living Wage" measures the income necessary for an individual or family to afford basic expenses by assessing the costs such as housing, food, child care, health care, transportation, and taxes. Per the CCCCCO's this report's endorsement criteria uses the University of Washington's Center for Women's Welfare Self-Sufficiency Standard last updated in March 2024, which is $27.13 per hour ($56,451 annually) in Orange County. For more information, see: http://www.selfsufficiencystandard.org/California The MIT Living Wage, updated on February 10, 2025, is a nationally recognized living wage metric and is provided for reference. The current MIT Living Wage in Orange County is $32.20. For more information, see: https://livingwage.mit.edu/counties/06059
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml

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