

**Labor Market Analysis: 0430.00/Biotechnology and Biomedical Technology**  
**Biotechnology: Cell/Tissue Culture and Immunoassay Technology**  
**Cell and Gene Therapy Technician**

Certificate requiring 16 to fewer than 30 semester units; Certificate requiring 30 to fewer than 60 semester units; Associate of Science (A.S.) degree  
 Los Angeles Center of Excellence, June 2024

**Summary**

<b>Program Endorsement:</b>	<b>Endorsed: All Criteria Met</b> <input type="checkbox"/>	<b>Endorsed: Some Criteria Met</b> <input checked="" type="checkbox"/>	<b>Not Endorsed</b> <input type="checkbox"/>
<b>Program Endorsement Criteria</b>			
<b>Supply Gap:</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
<b>Living Wage: (Entry-Level, 25<sup>th</sup>)</b>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
<b>Education:</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
<b>Emerging Occupation(s)</b>			
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

The Los Angeles Center of Excellence for Labor Market Research (LA COE) prepared this report to provide regional labor market supply and demand data related to four middle-skill occupations:

- **Biological Technicians (19-4021)** Assist biological and medical scientists. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, collect data and samples, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.<sup>1</sup>
- **Chemical Technicians (19-4031)** Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.<sup>2</sup>
- **Clinical Laboratory Technologists and Technicians (29-2018)** This occupation includes the 2018 SOC occupations: Medical and Clinical Laboratory Technologists (29-2011) and Medical and Clinical Laboratory Technicians (29-2012).<sup>3</sup>
  - **Medical and Clinical Laboratory Technologists (29-2011)** Perform complex medical laboratory tests for diagnosis, treatment, and prevention of disease. May train or supervise staff.
  - **Medical and Clinical Laboratory Technicians (29-2012)** Perform routine medical laboratory tests for the diagnosis, treatment, and prevention of disease. May work under the supervision of a medical technologist.

<sup>1</sup> [Biological Technicians : U.S. Bureau of Labor Statistics \(bls.gov\)](https://www.bls.gov/occupations/19-4021)

<sup>2</sup> [Chemical Technicians : U.S. Bureau of Labor Statistics \(bls.gov\)](https://www.bls.gov/occupations/19-4031)

<sup>3</sup> [Clinical Laboratory Technologists and Technicians : U.S. Bureau of Labor Statistics \(bls.gov\)](https://www.bls.gov/occupations/29-2018)

- **Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)** Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.<sup>4</sup>

and one emerging occupation:

- **Quality Control Analysts (19-4099.01)** Conduct tests to determine quality of raw materials, bulk intermediate and finished products. May conduct stability sample tests.<sup>5</sup>

Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.<sup>6</sup> Although two of the occupations in this report (*biological technicians* and *medical and clinical laboratory technologists*) typically require a bachelor's degree, they are considered middle-skill because approximately one-third of workers in the field have completed some college or an associate degree. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Based on the available data, there appears to be a supply gap for these middle-skill biotechnology occupations in the region. While the majority of annual openings have entry-level wages are lower than the self-sufficiency standard wage in both Los Angeles and Orange counties, more than one-third of current workers in the field have completed some college or an associate degree. **Therefore, due to some of the criteria being met, the LA COE endorses this proposed program.** Detailed reasons include:

#### Demand:

- **Supply Gap Criteria** – Over the next five years, **4,959 jobs are projected to be available annually** in the region due to new job growth and replacements, **which is more than the three-year average of 363 awards conferred** by educational institutions in the region.
  - However, *inspectors, testers, sorters, samplers and weighers (51-9061)* are employed across various manufacturing and scientific industries, including biotechnology. Since the SOC code does not solely represent workers in biotechnology, the number of annual job openings is likely overstated.
  - Over the past 12 months, there were 276 online job postings related to the occupations in this report that also listed one of the following skills: biotechnology, gene therapy, cell therapy, tissue culture, cell culture,

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<sup>4</sup> [Quality Control Inspectors : U.S. Bureau of Labor Statistics \(bls.gov\)](https://www.bls.gov)

<sup>5</sup> [19-4099.01 - Quality Control Analysts \(onetonline.org\)](https://www.onetonline.org)

<sup>6</sup> The COE classifies middle-skill jobs as the following:

- 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.

immunoassay, and/or immunology. The highest number of job postings were for laboratory assistants, quality control associates, clinical laboratory scientists, medical laboratory technicians, and laboratory technicians.

- **Living Wage Criteria** – Within Los Angeles County, the majority (79%) of annual job openings for these middle-skill biotechnology occupations have **entry-level wages below the self-sufficiency standard hourly wage** (\$18.10/hour).<sup>7</sup>
- **Educational Criteria** – Within the greater LA/OC region, **66% of the annual job openings** for middle-skill occupations related to biotechnology **typically require a high school diploma or equivalent.**
  - However, the national-level educational attainment data indicates **between 34% and 40% of workers in the field have completed some college or an associate degree.**

**Supply:**

- There are **15 community colleges** in the greater LA/OC region that issue awards related to biotechnology, conferring an average of **262 awards annually** between 2018 and 2021.
- Between 2017 and 2020, there was an average of **101 awards conferred annually** in related training programs by non-community college institutions throughout the greater LA/OC region.

**Occupational Demand**

Exhibit 1 shows the five-year occupational demand projections for these middle-skill biotechnology occupations. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to increase by 5% through 2026. There will be nearly 5,000 job openings per year through 2026 due to job growth and replacements. It is important to note that the *inspectors, testers, sorters, samplers and weighers* (51-9061) occupation is employed across various manufacturing and scientific industries, including the emerging field of biotechnology. Therefore, the data in Exhibit 1 is likely overstated for biotechnology *inspectors, testers, sorters, samplers, and weighers*.

**Exhibit 1: Occupational demand in Los Angeles and Orange Counties<sup>8</sup>**

Geography	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Annual Openings
Los Angeles	27,490	28,433	942	3%	3,348
Orange	12,437	13,431	993	8%	1,611
<b>Total</b>	<b>39,928</b>	<b>41,863</b>	<b>1,936</b>	<b>5%</b>	<b>4,959</b>

<sup>7</sup> Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: <http://selfsufficiencystandard.org/california>.

<sup>8</sup> Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

## Wages

The labor market endorsement in this report considers the entry-level hourly wages for these middle-skill biotechnology occupations in Los Angeles County as they relate to the county's self-sufficiency standard wage. Orange County wages are included below in order to provide a complete analysis of the greater LA/OC region. Detailed wage information, by county, is included in Appendix A.

### Los Angeles County

The majority (79%) of annual openings for middle-skill biotechnology occupations have entry-level wages below the self-sufficiency standard wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between \$16.49 and \$22.19. One occupation in this report has entry-level wages above the county's self-sufficiency standard wage: *clinical laboratory technologists and technicians* (\$22.19). Experienced workers can expect to earn wages between \$27.74 and \$37.93, which are higher than the self-sufficiency standard.

**Exhibit 2: Earnings for Occupations in LA County**

Occupation	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)	Median Annual Earnings*
Biological Technicians (19-4021)	\$17.27	\$22.40	\$29.02	\$46,600
Chemical Technicians (19-4031)	\$17.96	\$22.82	\$28.59	\$47,500
Clinical Laboratory Technologists and Technicians (29-2018)	\$22.19	\$28.62	\$37.93	\$59,500
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	\$16.49	\$18.76	\$27.74	\$39,000

\*rounded to the nearest \$100

### Orange County

The majority (77%) of annual openings for these middle-skill biotechnology occupations have entry-level wages above the self-sufficiency standard wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages are in a range between \$16.90 and \$23.25. One occupation in this report has entry-level wages above the county's self-sufficiency standard wage: *clinical laboratory technologists and technicians* (\$23.25). Experienced workers can expect to earn wages between \$28.07 and \$39.39, which are higher than the self-sufficiency standard.

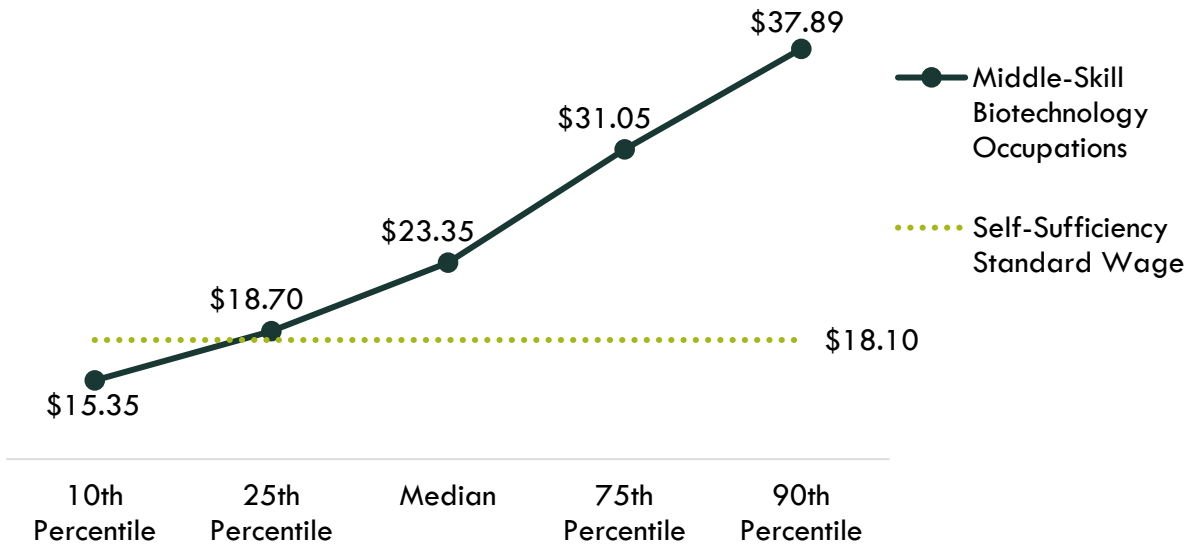
**Exhibit 3: Earnings for Occupations in Orange County**

Occupation	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)	Median Annual Earnings*
Biological Technicians (19-4021)	\$18.18	\$23.06	\$29.87	\$48,000
Chemical Technicians (19-4031)	\$18.34	\$23.29	\$29.18	\$48,400
Clinical Laboratory Technologists and Technicians (29-2018)	\$23.25	\$29.87	\$39.39	\$62,100
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	\$16.90	\$19.08	\$28.07	\$39,700

\*rounded to the nearest \$100

On average, the entry-level earnings for the occupations in this report are \$18.70; this is above the living wage for one single adult in Los Angeles County (\$18.10). Exhibit 4 shows the average wage for the occupations in this report, from entry-level to experienced workers.

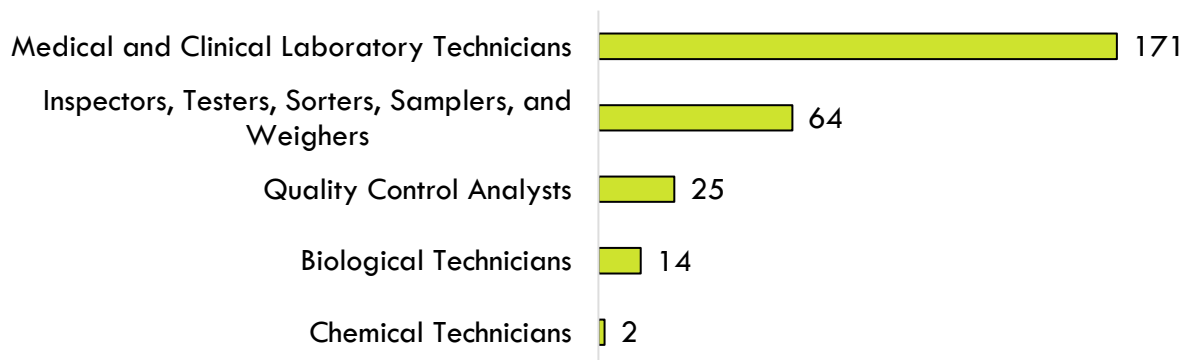
**Exhibit 4: Average Hourly Earnings for Middle-Skill Biotechnology Occupations in LA/OC**



### Job Postings

Over the past 12 months, there were 276 online job postings related to the occupations in this report that also listed one of the following skills: **biotechnology, gene therapy, cell therapy, tissue culture, cell culture, immunoassay, and/or immunology**. Exhibit 5 displays the number of job postings by occupation. The majority of job postings (62%) were for *medical and clinical laboratory technicians*, followed by *inspectors, testers, sorters, samplers, and weighers* (23%) and *quality control analysts* (9%). The highest number of job postings were for laboratory assistants, quality control associates, clinical laboratory scientists, medical laboratory technicians, and laboratory technicians. The top skills were biology, biotechnology, Good Manufacturing Practices (GMP), chemistry, pharmaceuticals, cell cultures, and immunology. The top three employers, by number of job postings, in the region were: University of California, Actalent (staffing company), and Fladger Associates (staffing company).

**Exhibit 5: Job postings by occupation (last 12 months)**



## Educational Attainment

The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

- **Bachelor's degree:** *Biological technicians; clinical laboratory technologists and technicians*
- **Associate degree:** *Chemical technicians*
- **High school diploma or equivalent:** *Inspectors, testers, sorters, samplers, and weighers*

In the greater LA/OC region, the majority of annual job openings (66%) typically require a high school diploma or equivalent. However, the national-level educational attainment data indicates between 34% and 40% of workers in the field have completed some college or an associate degree. Of the 87% of middle-skill biotechnology job postings listing a minimum education requirement in the greater Los Angeles/Orange County region, 28% (66) requested high school or vocational training, 9% (21) requested an associate degree, and 64% (152) requested a bachelor's degree.

## Educational Supply

### Community College Supply

Exhibit 6 shows the annual and three-year average number of awards conferred by community colleges in programs that have historically trained for the occupations of interest. The colleges with the most completions in the region are: Fullerton, Saddleback, Mt. San Antonio, and Santiago Canyon.

**Exhibit 6: Regional community college awards (certificates and degrees), 2018-2021**

TOP	Program	College	2018-19 Awards	2019-20 Awards	2020-21 Awards	3-Year Average
0430.00	Biotechnology and Biomedical Technology	Citrus	19	8	5	11
		East LA	-	5	7	4
		LA Mission	21	37	17	25
		LA Trade-Tech	2	7	6	5
		Pasadena	18	24	32	25
		<b>LA Subtotal</b>	<b>60</b>	<b>81</b>	<b>67</b>	<b>69</b>
		Fullerton	18	18	13	16
		Irvine	25	33	14	24
		Santa Ana	11	10	5	9
		Santiago Canyon	11	8	9	9
		<b>OC Subtotal</b>	<b>65</b>	<b>69</b>	<b>41</b>	<b>58</b>
<b>Supply Subtotal/Average</b>			<b>125</b>	<b>150</b>	<b>108</b>	<b>128</b>
0954.00	Chemical Technology	East LA	-	2	3	2
		LA Trade-Tech	8	2	3	4
		<b>LA Subtotal</b>	<b>8</b>	<b>4</b>	<b>6</b>	<b>6</b>

TOP	Program	College	2018-19 Awards	2019-20 Awards	2020-21 Awards	3-Year Average
<b>Supply Subtotal/Average</b>			<b>8</b>	<b>4</b>	<b>6</b>	<b>6</b>
0955.00	Laboratory Science Technology	Mt San Antonio	2	1	5	3
		<b>LA Subtotal</b>	<b>2</b>	<b>1</b>	<b>5</b>	<b>3</b>
<b>Supply Subtotal/Average</b>			<b>2</b>	<b>1</b>	<b>5</b>	<b>3</b>
0956.00	Manufacturing and Industrial Technology	Cerritos	2	-	1	1
		El Camino	2	-	-	1
		Glendale	-	2	-	1
		LA Trade-Tech	5	9	9	8
		LA Valley	3	9	7	6
		Mt San Antonio	13	14	4	10
		<b>LA Subtotal</b>	<b>25</b>	<b>34</b>	<b>21</b>	<b>27</b>
		Fullerton	9	38	20	22
		Irvine	3	-	4	2
		Saddleback	11	7	4	7
		Santa Ana	-	3	2	2
		Santiago Canyon	41	10	12	21
		<b>OC Subtotal</b>	<b>64</b>	<b>58</b>	<b>42</b>	<b>55</b>
<b>Supply Subtotal/Average</b>			<b>89</b>	<b>92</b>	<b>63</b>	<b>81</b>
0956.80	Industrial Quality Control	Santiago Canyon	2	-	-	1
		<b>LA Subtotal</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>1</b>
<b>Supply Subtotal/Average</b>			<b>2</b>	<b>-</b>	<b>-</b>	<b>1</b>
1205.00	Medical Laboratory Technology	Mt San Antonio	19	11	26	19
		<b>LA Subtotal</b>	<b>19</b>	<b>11</b>	<b>26</b>	<b>19</b>
		Saddleback	18	29	27	25
<b>OC Subtotal</b>			<b>18</b>	<b>29</b>	<b>27</b>	<b>25</b>
<b>Supply Subtotal/Average</b>			<b>37</b>	<b>40</b>	<b>53</b>	<b>43</b>
<b>Supply Total/Average</b>			<b>263</b>	<b>287</b>	<b>235</b>	<b>262</b>

### Non-Community College Supply

For a comprehensive regional supply analysis, it is important to consider the supply from other institutions in the region that provide training programs for biotechnology. Exhibit 7 shows the annual and three-year average number of awards conferred by these institutions in relevant programs. Due to different data collection periods, the most recent three-year period of available data is from 2017 to 2020. Between 2017 and 2020, non-community college institutions in the region conferred an average of 101 bachelor's degrees and sub-baccalaureate

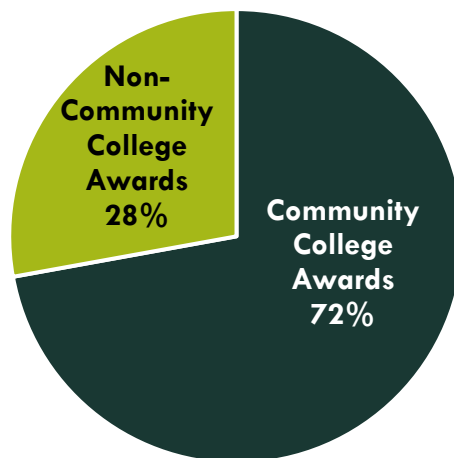
awards combined. Bachelor’s degrees are included since some of the occupations in this report typically require a bachelor’s degree. Sub-baccalaureate awards include associate degrees, postsecondary awards, and other academic awards that generally take fewer than four years to complete.

**Exhibit 7: Regional non-community college awards, 2017-2020**

CIP	Program	Institution	2017-18 Awards	2018-19 Awards	2019-20 Awards	3-Year Average
15.0401	Biomedical Technology/Technician	Southern California Institute of Technology	62	63	46	57
15.0702	Quality Control Technology/Technician	CSU-Dominguez Hills	5	3	1	3
26.1104	Computational Biology	University of Southern California	-	-	7	2
26.1201	Biotechnology	Cal. St. Poly. Univ.-Pomona	43	31	41	38
<b>Supply Total/Average</b>			<b>110</b>	<b>97</b>	<b>95</b>	<b>101</b>

Exhibit 8 shows the proportion of community college awards conferred in LA/OC compared to the number of non-community college awards for the programs in this report. Nearly three-quarters of awards conferred in these programs are awarded by community colleges in the LA/OC region.

**Exhibit 8: Community College Awards Compared to Non-Community College Awards in LA/OC Region, 3-Year Average**





Appendix A: Occupational demand and wage data by county

Exhibit 9. Los Angeles County

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Biological Technicians (19-4021)	1,160	1,363	203	18%	204	\$17.27	\$22.40	\$29.02
Chemical Technicians (19-4031)	1,774	1,850	76	4%	238	\$17.96	\$22.82	\$28.59
Clinical Laboratory Technologists and Technicians (29-2018)	7,564	8,338	774	10%	700	\$22.19	\$28.62	\$37.93
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	16,993	16,882	(111)	(1%)	2,206	\$16.49	\$18.76	\$27.74
<b>Total</b>	<b>27,490</b>	<b>28,433</b>	<b>942</b>	<b>3%</b>	<b>3,348</b>	<b>-</b>	<b>-</b>	<b>-</b>

Exhibit 10. Orange County

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 <sup>th</sup> Percentile)
Biological Technicians (19-4021)	407	470	63	16%	69	\$18.18	\$23.06	\$29.87
Chemical Technicians (19-4031)	824	865	42	5%	112	\$18.34	\$23.29	\$29.18
Clinical Laboratory Technologists and Technicians (29-2018)	3,170	3,846	676	21%	375	\$23.25	\$29.87	\$39.39
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	8,037	8,250	212	3%	1,055	\$16.90	\$19.08	\$28.07
<b>Total</b>	<b>12,437</b>	<b>13,431</b>	<b>993</b>	<b>8%</b>	<b>1,611</b>	<b>-</b>	<b>-</b>	<b>-</b>

**Exhibit 11. Los Angeles and Orange Counties**

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	% Age 55 and older*	Typical Entry-Level Education
Biological Technicians (19-4021)	1,566	1,833	266	17%	273	15%	Bachelor's degree
Chemical Technicians (19-4031)	2,597	2,715	118	5%	349	27%	Associate degree
Clinical Laboratory Technologists and Technicians (29-2018)	10,734	12,184	1,450	14%	1,075	22%	Bachelor's degree
Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)	25,030	25,131	102	0%	3,261	34%	High school diploma or equivalent
<b>Total</b>	<b>39,928</b>	<b>41,863</b>	<b>1,936</b>	<b>5%</b>	<b>4,959</b>	<b>-</b>	<b>-</b>

\*The average percentage of workers age 55 and older across all occupations in the greater LA/OC region is 27%. *Biological technicians* have a smaller share of older workers, which typically indicates fewer replacements needs to offset the amount of impending retirements. Conversely, *inspectors, testers, sorters, samplers, and weighers* has a larger share of older workers, typically indicating greater replacement needs.

**Appendix B: Sources**

- O\*NET Online
- Lightcast (formerly Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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