

Strong Workforce Program
Health & Life Science Regional Industry Advisory
Meeting Proceedings
Biotechnology Careers
December 2, 2022
Virtual - Zoom

Introduction

The Los Rios Community College District, in partnership with Valley Vision, and in collaboration with Sierra, Yuba and Lake Tahoe Community College Districts, invests Strong Workforce funding to organize and convene Regional Advisories. The objectives of the Regional Advisories are to build strong relationships between employers, educators, and workforce that:

- Provide timely information on skills gaps and workforce needs, informing partners on major industry trend information;
- Improve the efficiency of the advisory process for educators and employers;
- Reflect a regional view of workforce needs and assets
- Provide opportunities for more systemic, ongoing engagement that includes workforce partners in key industry sectors.

Regional Advisory meetings help inform decisions on needed investments and enhancements for Career Education (CE) programs to help fill the growing demand for middle-skill positions. This meeting proceedings report includes key findings, best practices, and minutes from the Fall 2022 Health & Life Science (HLS) Regional Industry Advisory meeting focused specifically on careers in biotechnology (biotech).

Valley Vision supports a robust talent pipeline through our multiple 21st Century Workforce initiatives. We prepare our regional workforce for the future by addressing skills gaps, advancing research, aligning efforts, and strengthening systems. Valley Vision's workforce efforts are supported by the Sacramento Employment and Training Agency (SETA), Golden Sierra Workforce Board, North Central Counties Consortium, Yolo County Workforce Investment Board, local community college districts, and others.

Key Findings

- The Greater Sacramento region has seen significant growth in the biotech industry, with a historically high average projected job growth rate of 21.2% between 2016 and 2021, on par with the state's average growth rate of 21.5% in the same time period. The industry is expected to continue growing at 10.3% in our region through 2026, exceeding the state projection of 8.6%.
- Most entry-level occupations require more than postsecondary education but less than a bachelor's degree. These jobs are in manufacturing and laboratory technology with an average wage range of \$19.31 to \$30.91 per hour and a median of \$25 an hour. Data shows that biotech and life-sciences pathway occupations requiring at least a bachelor's degree pay approximately \$20 more an hour than entry-level jobs. Additionally, the average annual number of job openings for these occupations is double that of entry-level positions in the Greater Sacramento region.
- The Research, Testing, & Medical Laboratories sub sector makes up around half of the biotech/life science jobs, supplying 53% of the 9,419 industry jobs in the region. This sub sector also offered the highest average earnings per job in 2021 (\$174K) compared to other industry subsectors.
- The panelists stated that there are employment opportunities at all skill levels from associate degree opportunities to positions that require advanced degrees. They stressed the importance of hands-on laboratory experience for entry-level positions noting this experience can be gained through laboratory coursework, internships, contract opportunities or part-time work in research laboratories.
- Prevalent skills required in the field include quality assurance and control, data entry, specimen processing/collection, vaccination, chemistry, and project management. Panelists also noted that competitive applicants have the following additional skills: computer literacy, communication, critical thinking, and integrity as it relates to following standard operating and documentation procedures.
- Research from the Centers of Excellence indicated that the projected number of job openings is currently higher than the number of biotech credentials awarded by the region's community colleges. One reason for the low number of credentials awarded is due to the COVID-19 pandemic negatively impacting enrollment in community college programs across the state, an issue that persists to this day. American River College incorporates biotech laboratory classes within other biology disciplines as a creative way to build awareness around these lucrative careers.
- A general lack of awareness among students about existing employment opportunities in biotech was emphasized. For example, students enrolled in the biotech academy at Sheldon High School are primarily interested in continuing their college education to gain admission into medical school, pharmacy school, or nursing programs.

Welcome and Overview

Yzabelle Dela Cruz, Project Manager at Valley Vision, welcomed participants to the advisory. She highlighted the objective of the advisory; to share and strengthen the Health and Life Sciences programs in the Greater Sacramento Region to prepare the region's workforce for growing biotech opportunities.

Labor Market Information Overview

Aaron Wilcher, Research Director of North/Far North Center of Excellence, provided labor and occupational information on the region's biotech and life science industry. This research detailed our seven-county region's industry composition, employment outlook, needed credentials, and opportunities to train and develop a talent pipeline that feeds into the biotechnology industry.

The biotech and life sciences industry is made up of five sub sectors, namely Agriculture Feedstock & Industrial Biosciences; Bioscience-Related Distribution; Drugs & Pharmaceuticals; Medical Devices & Equipment; and Research, Testing, & Medical Laboratories. Figure 1 shows the Research, Testing, & Medical Laboratories subsector is the largest in the Greater Sacramento region, with 53% of the 9,419 industry jobs. The Bioscience-Related Distribution sub sector accounts for 19% of total jobs, Medical Devices & Equipment makes up 14%, and the Drugs & Pharmaceuticals sub sector represents 10% of the total biotech jobs in the region. Although the relative percentage of positions in the Agricultural Feedstock & Industrial Biosciences subsector is the smallest at 4% of total jobs, it represents a higher portion of the biotech industry in the Greater Sacramento region compared to the rest of the state.

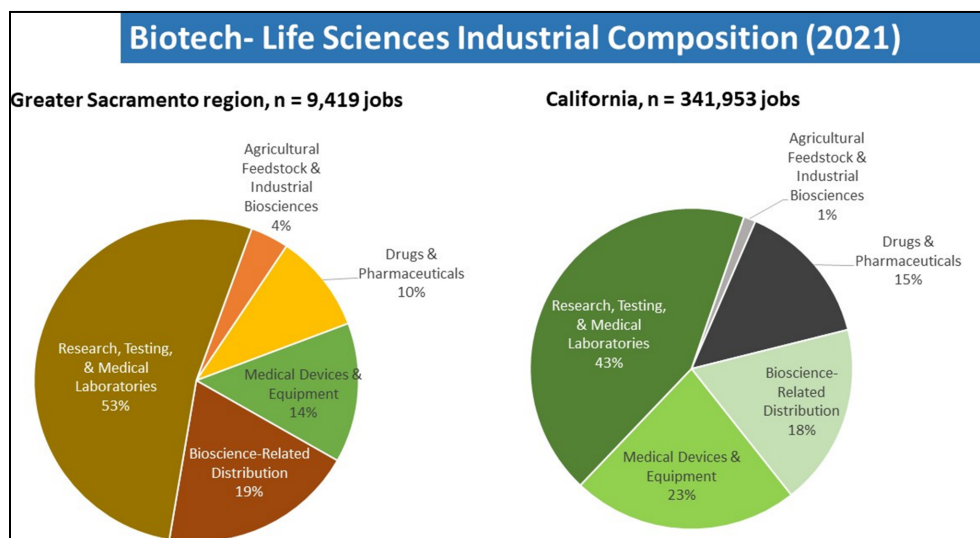


Figure 1: Biotech & Life Sciences Industry Subsectors (Greater Sacramento vs. California). Source: Centers of Excellence, Lightcast, QCEW, Non-QCEW, Self-employed, 2022.4

Figure 2, compares the most recent job growth trends in the Greater Sacramento region to the rest of the state. The region’s biotech and life sciences industry had a historically high average job growth rate of 21.2% between 2016 and 2021, on par with the state’s average growth rate of 21.5% in the same time period. In 2026, the Sacramento region is projected to grow an additional 10.3%, slightly greater than the 8.6 % projected growth rate of California. **In addition to being the largest subsector, jobs within Research, Testing, & Medical Laboratories offered the highest average earnings per job in 2021, in the region and across the state, compared to other industry subsectors.**

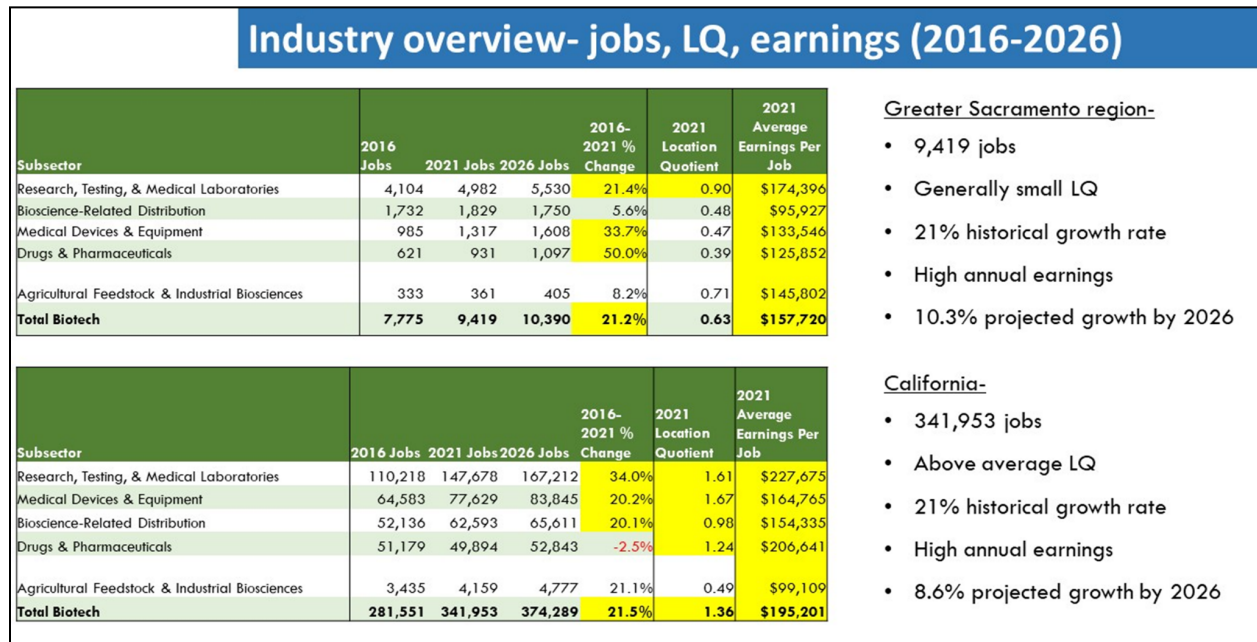


Figure 2: Biotech & Life Sciences Industry Overview, Job Posting Data and Average Earnings (2016-2026) Source: Centers of Excellence, Lightcast, QCEW, Non-QCEW, Self-employed, 2022.4 Industry Overview

Occupational Analysis

This occupational analysis took a look at seven key entry-level biotech occupations as detailed in a Center of Excellence 2021 statewide biotechnology report. This research focused on middle-skill occupations, specifically manufacturing and laboratory jobs, that can feed into biotech/life science career pathways. These positions include manufacturing production technicians, food science technicians, chemical technicians, quality control specialists, clinical laboratory technicians and technologists, inspectors, testers, sorters, samplers, and weighers. Due to the high technical skill needs of this industry, most entry-level jobs within this field require some education or training beyond a high school diploma.

Figure 3 shows the average projected growth rate from 2016-2022 is 4% for entry level employment into the biotech sector in the region. Inspectors, testers, sorters, samplers, and weighers have the highest average annual job openings, both regionally and across the state. In

total, there were 6,025 entry-level job postings in 2021 under all seven occupations and an average of 669 annual postings in the region. The average wage for the seven key entry-level occupations ranges from \$19-\$30 per hour.

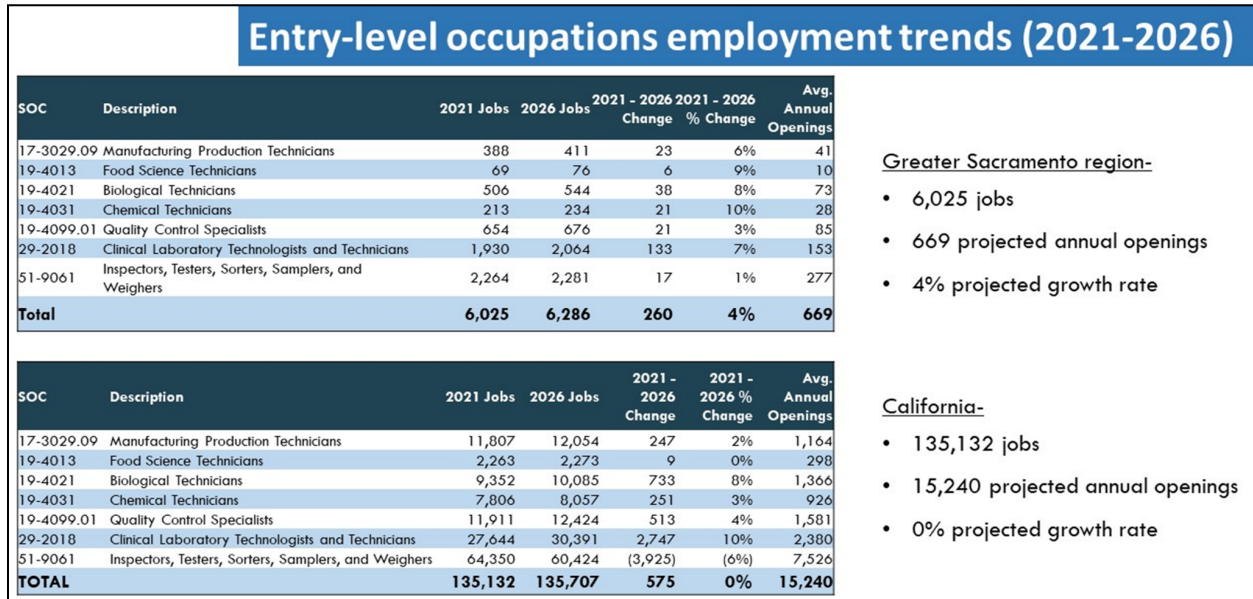


Figure 3: Entry-Level Occupational Employment Trends, Middle-Skill Manufacturing and Laboratory Focus, Greater Sacramento vs. California (2021-2026), Source: Centers of Excellence, Lightcast, QCEW, Non-QCEW, Self-employed, 2022.4

Note 1: Quality Control Analysts and Manufacturing Production Technicians are embedded in two broad occupation groups which include many other occupations. Therefore, the employment and projection may be overrated.

Note 2: Medical and Clinical Laboratory Technicians couldn't be found in EMSI and was replaced by Clinical Laboratory Technologists and Technicians.

Job Posting Analysis

Wilcher stated that there are more job openings in the biotech industry outside the seven key entry-level positions that don't include technical laboratory work. Figure 4 shows an expanded list of approximately 2,149 job postings in the region that has occupations ranging from sales representatives, managers, and analysts to maintenance and repair workers and various other positions. These positions are categorized as middle-skill occupations and are related to the seven skilled technical workforce occupations.

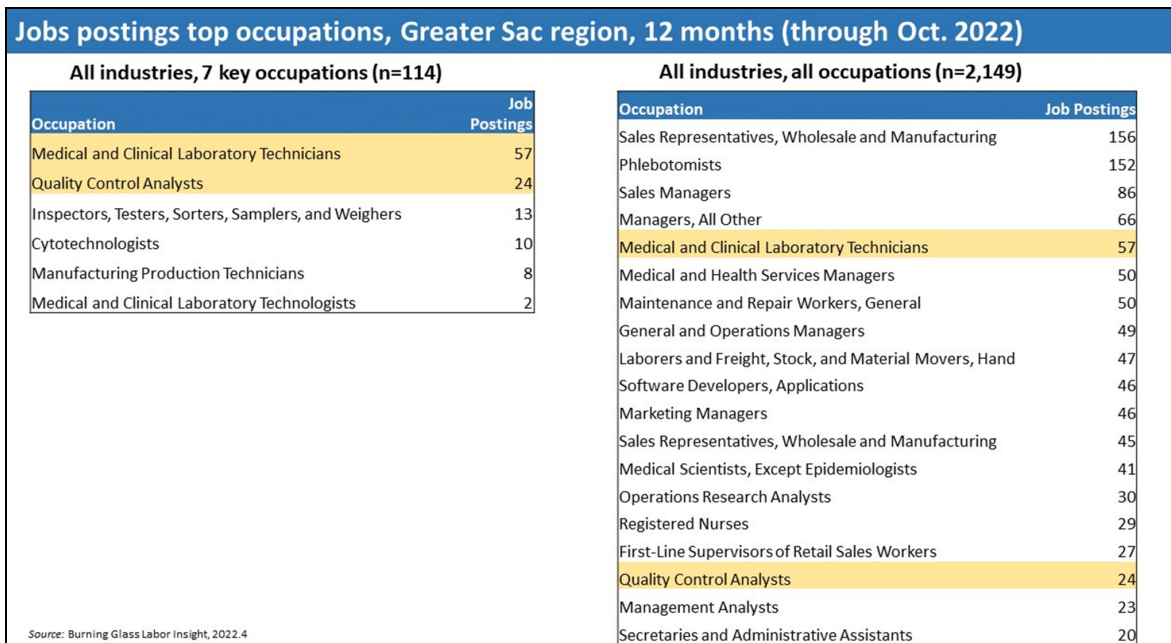


Figure 4: Top Occupations in Biotech/Life Science Job Postings, Greater Sacramento Region (October 2021 - October 2022), Source: Burning Glass Labor Insight, 2022.4

Top skills identified among the seven, key entry-level occupations and across related biotech/life science job postings can be found below in Figure 5. Prevalent skills required in the field include quality assurance and control; data entry; specimen processing/collection; vaccination; chemistry; and project management. Almost half of job postings among the seven, key entry-level occupations and related-job postings required a bachelor’s degree, 42% and 48% respectively.



Figure 4: Job Postings Top Skills, Greater Sacramento region (October 2021 - October 2022)

Source: Centers of Excellence, Burning Glass Labor Insight, 2022.4

Education and Training Program Analysis

In the Greater Sacramento region, our community college system offers 3 programs that help supply our biotech/life science workforce. These programs include Sacramento City College Chemical Technology (A.S. degree and certificate programs), American River College Biotechnology and Biomedical (A.S. degree and certificate programs), and Folsom Lake College Medical Laboratory Technology (A.S. degree and pre-clinical certificate programs). Currently, these programs supply an average of 24 associate degrees and 10 certificates annually (Centers of Excellence). With growing biotech/life science workforce needs, both locally and statewide, there are opportunities to expand or create new education and training programs to support this field.

Employer Panel Discussion

The panel discussion featured representatives from Miltenyi Biotec, BioConsortia Inc, Bayer Crop Science, Hygieia Biological Laboratories and UC Davis Health as follows:

- **Craig Bush**, Associate Director of Service Sales & Operations, Miltenyi Biotec
- **Damian Curtis**, Director of Synthetic Biology and Genomics, BioConsortia Inc.
- **Barry Kersting**, Director of Manufacturing, Hygieia Biological Laboratories
- **Lara Kramer**, Head of Global Pipeline Digital Operations, Bayer Crop Science
- **Laura Niznik Williams**, Director, Government and Community Relations, UC Davis Health



Miltenyi Biotec formed in 1989 and is a privately owned company headquartered in Germany. The company has proprietary technology on cell separation and employs 4,000 people globally. It has expanded its operations to include cell and gene therapy, biomanufacturing, biomedicine focused on cancer therapy, and treatment for neurodegenerative disorders. Their facility in Auburn is the headquarters for service operations, which includes customer support, finance, administrative support, service support engineers and instrument technicians. Craig Bush is the Associate Director of Service Sales & Operations at Miltenyi Biotec. His career began as a pipette calibration technician which is an entry-level position and transitioned to working as a field service engineer working eventually on more complex scientific equipment.

BioConsortia Inc. produces microbial products from nature which helps increase crop yields. The company focuses on developing biologicals and strain engineering in microbes and synthetic bio products such as food. The company is small and has open positions at multiple levels. In his role, Damian has mentored candidates in PhD and postdoc programs and currently leads a team in developing biologicals at BioConsortia.

Bayer Crop Science supports crop science pharmaceuticals and consumer health. Bayer's vision is health for all hunger for none and science for life. The company employs 100,000 people worldwide. Approximately 33,000 are in agriculture and crop science. Bayer also has multiple sites that support pharmaceutical production. Lara Kramer started her career as a technician in a medical biotech laboratory. Her interest in agriculture led her to pursue her PhD in the field which led her to her role as the Head of Global Pipeline and Digital Operations at Bayer Crop Science.

Hygieia Biological Laboratories is a Woodland, California based biotechnology company engaged in the research, development and manufacturing of veterinary and human vaccines and pharmaceuticals located in Woodland. They specialize in vaccines for dairy, poultry, cattle and small ruminants, with products in development for aquaculture. Hygieia employs 75 people, with approximately 35 people in manufacturing, a quarter in research science and a quarter in administrative roles. Barry Kersting is the Director of Manufacturing at Hygieia Biological Laboratories, he oversees four production laboratory teams as well as three operations departments and also serves on the Executive Team. He received his BS in Microbiology from UCD.

UC Davis (UCD) Health is a world-class designated magnet institution, employing between 13,000 to 15,000 employees within its medical center, and running clinics around the region. UC Davis has partnered with the City of Sacramento and Wexford Science and Technology to build Aggie Square, a research and innovation hub that will have 1.2 million square feet of laboratories, learning space and community space. In her role as Director of Government and Community Relations, at UC Davis Health, Laura Niznik Williams works with industry and university professionals and K-12 partners to introduce students to careers in the biosciences.

Essential skills vs trainable skills

Similar to the job posting data provided by Wilcher, panelists noted that educational requirements for various positions in the biotech field range from high school diploma or post secondary education to bachelor's or advanced degrees. The panelists stated that competitive applicants have the following skills: computer literacy and communication, critical thinking, and integrity as it relates to following standard operating and documentation procedures. Teamwork

was also highlighted as a necessary skill in the biotech field because the scope of work requires relying on a team to produce a specific product or output. Laura Niznik Williams from UCD Health stated that the most common foundational skills and soft skills to life science occupations include basic math, critical thinking, reading, and financial literacy. It was also mentioned that the ideal candidates exhibit self-awareness, initiative, and inquisitiveness about the responsibilities of the job and a desire to grow by learning new skills.

All of the industry panelists also emphasized that internships, part-time work, or other hands-on experience obtained from working in a laboratory, or laboratory coursework, can help candidates gain the technical skills that they look for in an ideal candidate. At Bayer, contracting opportunities and internship opportunities help give candidates a foot in the door in the company while gaining the desired skills needed for employment. Panelists also noted that they put less emphasis on educational requirements and highly consider candidates with tangible, transferable skills, willing to train individuals on the specific skills necessary for their roles. At Miltenyi Biotec, many of their positions require electrical mechanical skills and field-based customer service experience. Additionally, candidates need some level of scientific knowledge to interact with their core clients who typically have advanced scientific degrees, are researchers, and manufacturers in the field. The minimum skills required by the company include IT skills, digital skills, the ability to collaborate in small groups, and the ability to work independently.

The panelists stated that competitive applicants have the following skills; computer literacy and communication skills, critical thinking skills, and integrity as it relates to following standard operating and documentation procedures. Teamwork was also highlighted as a necessary skill in the biotech field because the scope of work requires relying on a team to produce a specific product or output. It was also mentioned that the ideal candidates exhibit self-awareness, initiative, and inquisitiveness about the responsibilities of the job and a desire to grow by learning new skills. Candidates with these skills are viewed as individuals who are trainable and can develop into their roles within specific companies.

Recruitment and Hiring/Training Opportunities

LinkedIn is a resource that some panelists have used to recruit candidates. They stated they are open to sharing their knowledge and experience with individuals who reach out, noting they are more than likely to be offered a position in the company should the opportunity open up, due to demonstrating commitment and interest by reaching out on a professional platform.

Hygieia Biological Laboratories is primarily a manufacturing facility for veterinary biologics and has entry level positions that are categorized as technician positions that consider candidates with high school diplomas or associate degrees with coursework in science or specialized biotech programs. Hyieia typically uses the UC Davis campus internship and career center to

field candidates while Miltenyi Biotec, based in Auburn, is known to recruit candidates from the mechatronics program at Sierra College to fill their manufacturing positions. Bayer shared that they source candidates for entry level contract technician positions from staffing companies like Aerotek and offer many internship opportunities posted on their website.

Many of the panelists noted that they are looking to hire and are interested in opportunities to partner and help build a strong biotech/life science workforce that can supply their companies.

Biotechnology Industry Outlook

The companies on the panel foresee growth in their respective companies with the expectation of adding additional staff in the next three to five years. Examples of growth opportunities in the industry include sustainability as it relates to farming, synthetic meat manufacturing, cell and gene therapy, data capture, and visualization. Artificial Intelligence, robotics, and automation will also play a significant role in the industry in the next five years. The projected growth in the biotech industry presents more opportunities to diversify the workforce and support career exploration programs for youth and young adults, through partnerships with industries and educational programs.

Education & Training Program Spotlights

American River College

The biotech program at American River College prepares students for entry-level positions in biotech and also prepares students to transfer to four-year institutions. Classes in the program include basic biology, molecular biology concepts, and capstone projects. The capstone project involves laboratory courses that cover broad-based laboratory skills such as lab safety, micro pipetting, DNA extraction, DNA synthesis, DNA sequencing, solution, and media preparation. Other skills taught include the aseptic technique, regulatory work space, Good Manufacturing Practice (GMP), proper documentation, data analysis, and the use of databases.

Students enrolled in the program gain exposure and experience to various aspects of the biotech field by attending biotech symposiums, research conferences, and visiting laboratories such as the United States Department of Agriculture (USDA) laboratory on the UC Davis campus. They also offer an on-campus biotech club that helps students build research skills by participating in workshops and ongoing lab projects outside the required coursework.

Sheldon High School

Sheldon is the third most diverse school in the state and has a sizable immigrant population. The school became a California Partnership Academy in 2008 which enabled them to get an annual grant from the state to run their Career Technical Education (CTE): Biotech Academy.

Students graduating from the program leave with hands-on experience through internships and research under the supervision of a UC Davis Ph.D. student through a Community Connected Learning program. Students enrolled in the biotech academy at Sheldon High School are primarily interested in continuing their college education to gain admission into medical school, pharmacy school, or nursing programs. However, the biotech program helps students understand the myriad of life science career opportunities, outside of just traditional medical career pathways, while preparing them for the field and/or higher education.

Conclusion

The data and information from this report are intended to support workforce and educational investments in the region's growing biotech/life sciences sector. Attendees were given the following contact information and were invited to reach out with networking requests to further support Biotech pipeline efforts. For more information about the report and the labor market data provided, please contact:

- Angelina Olweny, Project Associate, Valley Vision - angelina.olweny@valleyvision.org
- Yzabelle Dela Cruz, Project Manager, Work Valley Vision - yzabelle.delacruz@valleyvision.org
- Renee John, Director of Workforce Development - renee.john@valleyvision.org
- Aaron Wilcher, Director, North/Far North Centers of Excellence - WilcheA@losrios.edu