

2025

Life Science Economic Impact Report

The innovation and growth of the life science industry in California



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EXECUTIVE SUMMARY

The 2025 Biocom California Economic Impact Report provides data on the performance of the life science industry in California during 2024¹ and an overview of its economic impact in terms of jobs, labor income, and business output. The report includes a discussion of key trends that impacted the industry during 2024.²

Key findings, highlighted below, are further detailed in the body of this report:

Payroll employment in life science organizations in California experienced moderate contraction in 2024 while the number of establishments increased.

The life science industry in California employed 452,455 workers in 2024, down 3.1% from 466,888 in 2023.³ The nationwide drop in life science industry employment began three months after the Federal Reserve initiated interest rate hikes in March 2022, and has persisted for two years. In particular, the biotechnology industry is interest-rate sensitive due to challenges in financing projects with lengthy timelines and significant risk of failure. Despite payroll job contraction during the year, the number of life science establishments in California increased from 16,576 in 2023 to 17,220 in 2024.³ The life science industry nationally employed 3,150,785 workers in 2024, up 0.1% from 3,148,686 in 2023.³

Within the state, regional performance largely mirrored statewide life science contractionary trends, however each core region experienced pockets of job gains in various sub-sectors.

The contraction in life science employment is consistent across California with the Bay Area and San Diego markets accounting for 71.6% of job losses³ (see Appendix I for job loss/gain by sub-sector). Large Bay Area companies continued restructuring efforts, resulting in headcount reductions. However, certain sub-sectors have experienced job gains. The following sub-sectors each added more than 300 jobs³ in one of California's core regional markets: colleges and universities in the Bay Area; research and development (R&D) in biotechnology, colleges and universities, and surgical and medical instrument manufacturing in Los Angeles; surgical appliance and supplies manufacturing, and electromedical apparatus manufacturing in Orange County; and colleges and universities in San Diego (see Appendix I for job loss/gain by sub-sector).

452,455

workers employed by the life science industry in California in 2024

Manufacturing jobs made up 31.2% of California's life science payroll jobs in 2024.³ Approximately 50% of Orange County's life science payroll jobs were related to manufacturing; additionally, Orange County's manufacturing job sector grew 2.6% year over year.³ These metrics highlight the region's strong track record with med tech and medical device companies. Compared to its peer markets⁴, California continued to have the largest number of manufacturing-related life science jobs in the country, at just over 141,000.³ The proportion of California life science jobs that are related to manufacturing was greater than its peer markets, including Massachusetts, New York, Texas, and Pennsylvania. Nationally, manufacturing jobs made up 29.7% of the country's life science payroll jobs in 2024, down 0.2% from 29.9% in 2023.³



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¹ Due to availability of data at time of collection, the Report's reference to the year "2024" refers to the year starting Oct. 1, 2023, and ending Sept. 30, of 2024; the federal government's fiscal year also starts and ends on these dates

² The discussion of key trends in this Report is informed by surveys of life science executives, industry outlook reports, and other eminence materials produced by the Deloitte Center for Health Solutions in 2023/2024

³ Bureau of Labor Statistics, aggregated by Chmura's JobsEQ

⁴ Peer markets evaluated include Massachusetts, Maryland, Minnesota, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Texas, and Washington

EXECUTIVE SUMMARY (CONT.)

Although the number of awards to California for public research funding to life science organizations in California has decreased since 2023, overall awards in life science remain robust. Institutions in California continue to receive more funding than any other U.S. state. In 2024, California organizations received 10,624 awards worth approximately \$5.7 billion from the National Institutes of Health (NIH) and National Science Foundation (NSF).⁵ Award levels to California from NIH and NSF exhibited a decline for the second year in a row, perhaps a continuation of a market correction from high award growth to California during the COVID-19 pandemic in 2020 and 2021 (see Figure 7). Early-stage companies were awarded large amounts of NIH grants during the year to fill the gap in funding caused by a challenging private investment environment. Nationally, the number of NIH awards declined 2.0% from 73,021 in 2023 to 71,595 in 2024. The value of national NIH funding also decreased 2.3% from \$44.4 billion in 2023 to \$43.2 billion in 2024.⁵ The number and value of national NSF awards also fell in 2024 by 4.2% and 2.6%, respectively.⁵

California institutions continue to receive **more NIH and NSF funding** than any other U.S. state

Many life science roles that moved to virtual/remote during the COVID-19 pandemic are now facing return-to-work initiatives, adding to a challenging talent environment where the supply of life science workforce is already scarce. Unlike many past economic cycles where the working-age population grew, it has stalled in the U.S., limiting labor supply and keeping unemployment near historic lows. Unemployment in life science occupations is particularly low at an average of 2.4% versus a national average of 4.2%, contributing to a scarcity of talent in the industry. To attract and retain talent in this environment, some companies have maintained a remote working model, while others are exploring talent markets outside of the U.S.

California life science companies are attracting significant private investment, primarily from corporate mergers and acquisitions (M&A) activity. Loss of exclusivity, product portfolio gaps, highly competitive therapeutic areas, emerging transformative digital technologies and a difficult exit environment for life science start-ups were all major drivers of private investment activity during the year. The general funding environment (e.g. interest rates, exit uncertainty) has continued to cause difficulties for start-ups seeking additional funding rounds. Venture capital has been more likely to fund later-stage operations over early-stage companies. This has created opportunity for corporate buyers and resulted in significant M&A activity by larger life science companies. In 2024, California-based life science companies led all states in attracting \$63.1 billion in private capital, 67% of which was attributed to corporate M&A deals⁶, with a number of \$1 billion-plus acquisitions.⁷ Nationally, life science companies raised \$276.1 billion in private capital across 4,227 transactions, representing a 19% increase in transaction value and 6.1% decrease in the number of transactions.⁶

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⁵ NIH and NSF Award Search

⁶ PitchBook

⁷ [RayzeBio](#) (Bristol Myers Squibb), [Inhibrx](#) (Sanofi), [Ambrx Biopharma](#) (Johnson & Johnson), [Poseida Therapeutics](#) (Roche), [Kumquat Biosciences](#) (Takeda), [Kate Therapeutics](#) (Novartis)

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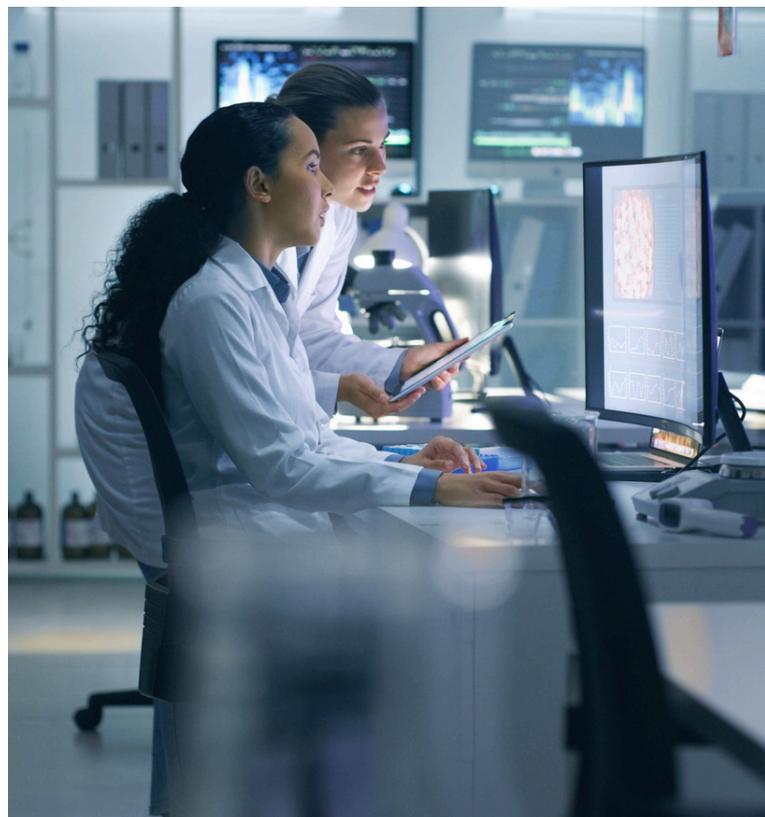
Several therapeutic focus areas emerged through 2024, specifically oncology, infectious diseases, and rare diseases. Major therapeutic areas receiving public funding (NIH, NSF) during the year included: Alzheimer’s disease and related dementias, opioids, stimulants, pain management, Lyme and tick-borne diseases, antimicrobial resistance, universal flu vaccine, mental health research, clinical and translational science, amyotrophic lateral sclerosis (ALS), artificial intelligence, and machine learning. Additionally, of the 50 novel drugs approved by the FDA in 2024, 26 were approved to treat rare diseases.⁸ These trends represent a renewed focus on oncology, infectious diseases, and rare diseases.

Key trends shaping the industry include digital transformation relating to AI technologies and automation, loss of exclusivity, utilizing R&D and M&A activity to fill portfolio gaps, preparation for continued business volatility, and increased focus on customer expectations. New digital technologies continue to emerge in the life science space, presenting transformation opportunities through the use of generative AI (GenAI)⁹ and automation tools. Companies implementing these technologies are achieving a variety of efficiencies, including streamlining R&D processes, timelines, and related costs as well as improving patient experiences. Executives continue to focus on building resilient corporate strategies to combat expected changes in federal policy, geopolitical relationships, reporting requirements, and supply chain stability. As customers become more adamant about the improvement of the customer experience, life science companies have looked to expand their customer engagement strategies through the addition of self-service portals and improved access through direct-to-consumer programs and increased over-the-counter options.

Of the 50 novel drugs approved by the FDA in 2024, 26 were approved to treat rare diseases

California’s regional life science markets landed significant investment projects.¹⁰

In 2024, California attracted life science investments from domestic and international investors, including Switzerland, Japan, Canada, Germany, France, China, Hungary, Chile, and South Africa. San Diego, Los Angeles, and San Francisco counties brought in 14 of the 20 tracked project investments. Switzerland-based Lonza acquired Roche’s Genentech biologics manufacturing facility in Vacaville for \$1.2 billion and plans to invest an additional \$500 million to upgrade the facility.¹¹ Takeda, a Japanese pharmaceutical company, announced a \$230 million investment in expanding its Los Angeles plasma-derived therapy production facility.¹² Astellas announced the opening of a new \$90 million, state-of-the-art innovation center in South San Francisco. The newly built 154,000-square-foot lab and office facility creates a central location for its West Coast employees across Research, Technical Operations, Medical and Development, and Commercial, according to a May 2024 press release from the company.



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⁸ [2024 New Drug Therapy Approvals Annual Report](#)

⁹ Generative AI is a technology that can create content, including text, images, audio, or video, when prompted by a user. Generative AI systems create responses using algorithms that are trained often on open-source information, such as text and images from the internet. AI can be particularly effective at collecting, analyzing, and visualizing large data sets. However, these systems are not cognitive and lack human judgment (U.S. Government Accountability Office)

¹⁰ Investment projects refers to major investment announcements by Pharmaceutical or Biotechnology companies reported by FDI Markets during the period from 10/01/2023 to 09/30/2024. FDI Markets typically only covers larger transactions that receive press coverage

¹¹ [Lonza Press Release](#)

¹² [Takeda Press Release](#)



2024 INVESTMENT INSIGHTS: AI, BIOTECH AND BOLD CAPITAL

- New venture-backed biopharma opportunities in the US focused on autoimmune (\$2.5 billion raised) and metabolic (\$1.8 billion raised) indications in 2024, both yielding more than a 3-times increase in investment compared with 2023.*
- Computational biology-focused companies in the US raised 10% less equity dollars compared with 2023 (\$4 billion), highlighted by artificial intelligence (AI) drug discovery companies.**
- Companies in the US pursuing oncology as their lead asset continued to be the largest source of both venture dollars and deals in 2024, raising \$6.4 billion in private investment.

Top California Venture Deals in 2024 for AI Drug Discovery (AIDD):

- **Xaira Therapeutics (\$1 billion Series A – Brisbane, California)**
- **BioAge (\$170 million Series D – Richmond, California)**
- **Frontier Medicines (\$100 million Series C – South San Francisco, California)**

- In health tech, there was increased investment in technologies to help streamline provider operations and larger investments in alternative care companies delivering solutions outside the hospital, particularly in mental, behavioral health, and women’s health.
- In medical devices, the top indications receiving funding were neurology and noninvasive monitoring, with a sharp drop in imaging investment.
- In diagnostics and tools, there was increased venture investment in R&D tools, specifically in manufacturing and supply capabilities in radiopharma, and in diagnostic tests focused on early cancer detection.

* Private venture-funded companies in the United States and Europe.

** For this analysis, to qualify as a comp bio company, a firm must apply computational tools to acquire novel chemical or biological insights in the therapeutics, R&D tools, and diagnostics sectors only; have a leadership member with computational expertise; and have raised over \$2 million in a financing round.

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INTRODUCTION

In 2024, California’s life science industry remained a cornerstone of the state’s innovation economy, generating \$396 billion in total economic output, directly employing over 452,000 people, and drawing in more than \$63 billion in private capital.

Even amid tightened financial markets and shifting global dynamics, the sector continued to adapt, leveraging new technologies, refining R&D strategies, and investing in more resilient operations. This year’s Economic Impact Report introduces a significant analytical update: for the first time, manufacturing activity across all six major life science sub-sectors has been rolled up to provide a more comprehensive picture of the industry’s production footprint. This change enhances our ability to

measure and communicate the full scale of life science manufacturing in California.

From shifting therapeutic priorities and AI-driven research models to a renewed focus on resilient supply chains, accelerated merger and acquisition activity, and value-based care, this year’s report sheds light on how California’s life science leaders are adapting and advancing in a time of economic complexity and global competition.

LIFE SCIENCE INDUSTRY SCOPE

The Report defines the industry as comprising six major sectors, each with distinct sub-sectors¹³ and activities¹⁴ listed below:

1 | Biotechnology

Research and development in biotechnology (biotechnology R&D); research and development in nanobiotechnology (nanotechnology R&D); cellulosic fiber manufacturing; research and development in physical engineering and life science (general life science R&D)

2 | Biopharmaceuticals

Medicinal and botanical manufacturing; pharmaceutical preparation manufacturing; in vitro diagnostic substance manufacturing; biological product manufacturing; drugs merchant wholesalers (pharmaceutical wholesale)

3 | Medical Devices and Equipment

Ophthalmic goods manufacturing; irradiation equipment manufacturing; surgical and medical instrument manufacturing; surgical appliance and supplies manufacturing; glass product manufacturing, optical instrument and lens manufacturing, dental laboratories; medical, dental, and hospital equipment and supplies merchant wholesalers (medical equipment wholesale)

4 | Research and Testing

Colleges, universities, and professional schools, medical laboratories; testing laboratories

5 | Scientific/ Research Tools

Laboratory instruments manufacturing; laboratory chemicals (basic organic) manufacturing; electromedical and electrotherapeutic apparatus manufacturing

6 | Food and Agriculture Biotechnology

Ethyl alcohol manufacturing; nitrogenous fertilizer manufacturing; phosphatic fertilizer manufacturing; pesticide and other agriculture chemical manufacturing

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¹³ See Appendix B for the complete composition of North American Industry Classification System (NAICS) codes considered for Life Science industries; the 2025 edition of the Economic Impact Report re-categorizes “Research and development in physical engineering and life science” as a “Biotechnology” sub-sector, and re-labeled sub-sector No. 4 as “Research and Testing”

¹⁴ Life science activity represents a fraction of overall activity in this NAICS area where other industry sectors may be more substantial

CALIFORNIA 2024 PERFORMANCE

IMPACT BY THE NUMBERS

\$395.7B

total economic
output

\$5.7B

overall funding
from the NIH
and NSF

1.15M

total jobs
supported

\$65.6B

direct impact
labor income

452,455

directly employed
life science
workers

MORE KEY METRICS

17,220 life science establishments

\$157,532 average yearly salary

10,624 NIH and NSF awards

\$63.1B private investment

\$13.1B venture capital raised

4,940 patents filed

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STATE OF CALIFORNIA 2024 PERFORMANCE

The life science industry in California experienced both setbacks and areas of growth in 2024. While payroll employment declined modestly, down 3.1% from 466,888 in 2023 to 452,455 in 2024,¹⁵ the broader innovation ecosystem demonstrated resilience in other areas not captured in employment metrics. Notably, private investment in life sciences rose by 32%, reaching \$63.1 billion, venture capital raised by California companies increased by 27%, totaling \$13.1 billion,¹⁶ and the total number of life science establishments grew by 3.9%.

Despite these signs of continued investor confidence, the industry faced several structural headwinds, including high capital costs, supply chain challenges, major patent expirations, and ongoing geopolitical and economic uncertainty. These pressures led many life science companies, particularly larger firms, to implement workforce reductions and consolidate operations—continuing a rebalancing trend that began after the rapid scaling during the COVID-19 pandemic. Importantly, California was not alone in these challenges. Similar patterns were observed in peer life science markets across the United States.

Job losses in California were concentrated in key sub-sectors. The largest reductions—each exceeding 1,000 jobs—occurred in:

- Pharmaceutical preparation manufacturing
- R&D in nanotechnology
- R&D in biotechnology
- R&D in engineering, physical, and life sciences
- Medical laboratories
- Medical equipment wholesale
- Analytical laboratory instrument manufacturing

(See Appendix I for a full breakdown of job changes by sub-sector.)

However, these losses were partially offset by gains in several other areas. Surgical and medical instrument manufacturing and employment at colleges and universities each added over 1,000 jobs in 2024. Smaller but notable gains also occurred in:

- Miscellaneous food manufacturing
- Fertilizer manufacturing (mixing only)
- Dental equipment and supplies manufacturing

These figures highlight the complexity of the life science labor market, where sector-wide trends may obscure significant variation by sub-sector and business model.



Jonathan Norris
Managing Director,
HSBC Innovation

2024 LIFE SCIENCE INVESTMENT INSIGHTS

\$10.2B in 148 deals for biopharma

\$2.6B in 83 deals for Dx/Tools

\$3.8B in 153 deals for Healthtech

\$2.5B in 84 deals for Med Device

¹⁵ Bureau of Labor Statistics, aggregated by Chmura's JobsEQ

¹⁶ PitchBook

Prepared for Biocom California, the life science trade association for the State of California. When referencing this document, please use "Biocom California's 2025 Life Science Economic Impact Report" for citation.

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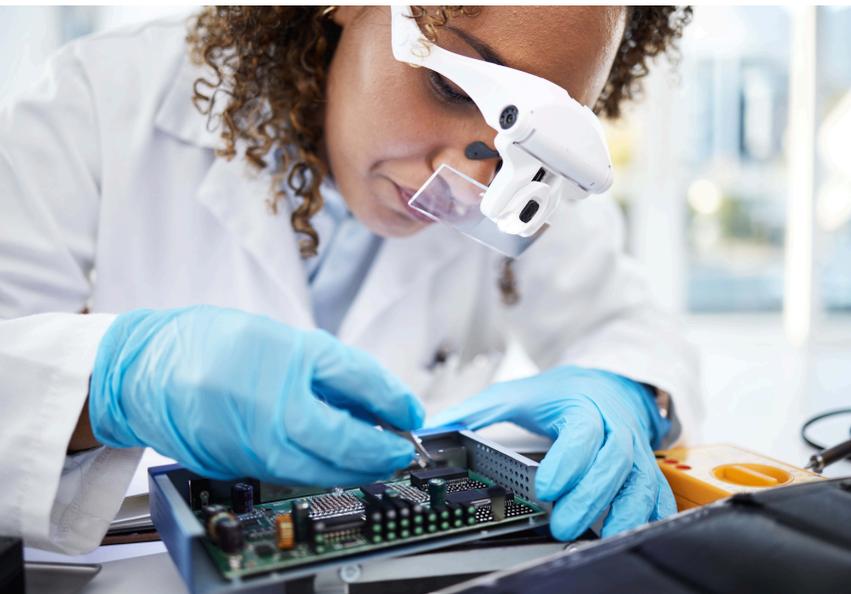
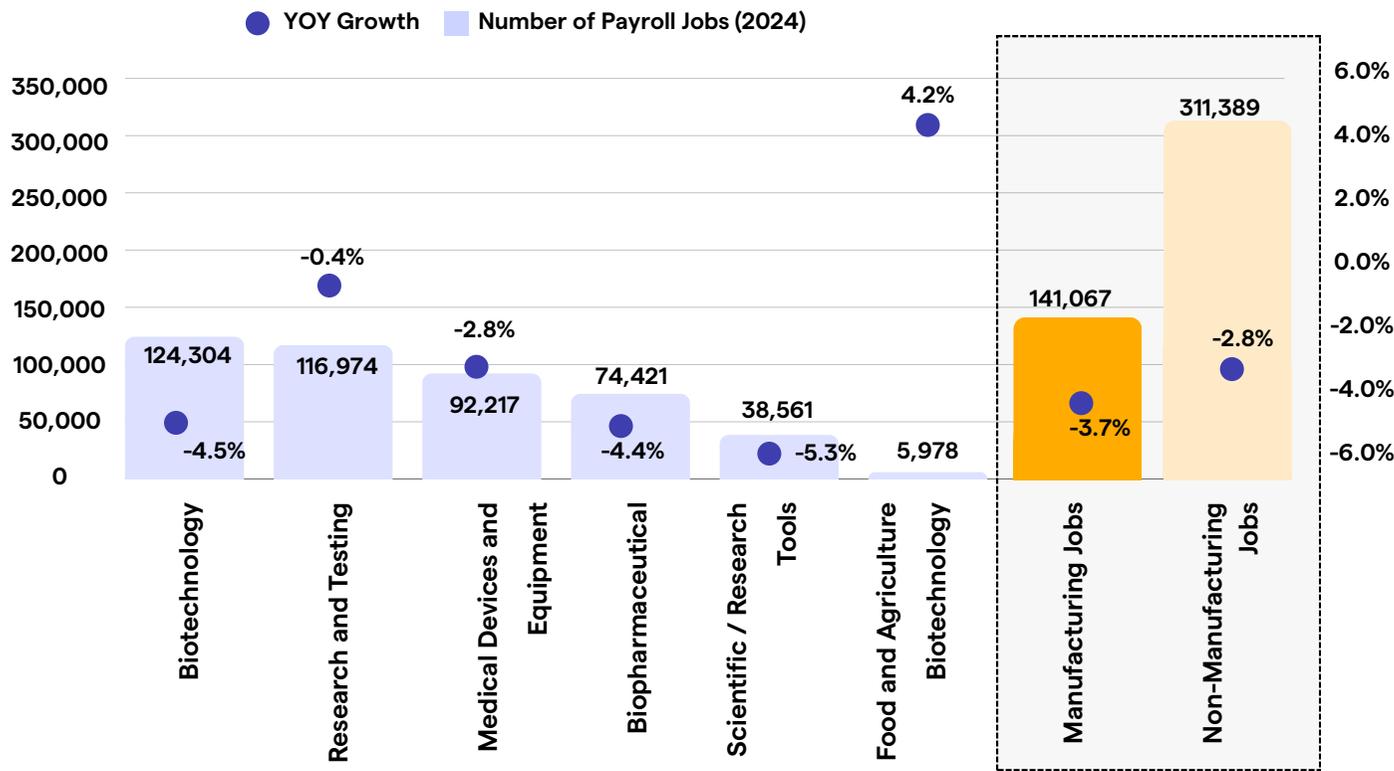
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STATE OF CALIFORNIA 2024 PERFORMANCE

Figure 1 Number of Payroll Jobs and Year-over-Year (YOY) Growth in Life Science Sectors in California, 2024



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STATE OF CALIFORNIA ECONOMIC IMPACT

Life science activity in California generated approximately \$395.7 billion in total business output, contributed approximately \$125.7 billion in salaries and sole proprietor income, and supported approximately 1.15 million jobs in 2024.¹⁷ These totals refer to the overall economic impact of life science sub-sectors defined in Appendix B and depicted in Figure 2, and represent the aggregate direct, indirect, and induced impact.

**Figure 2 Overall Impact of Life Science Industry:
Employment, Labor Income, and Output**

Impact Type	Direct Impact	Indirect Impact	Induced Impact	Total	Multiplier
Employment	452,455	313,543	379,065	1,145,063	2.5X
Labor Income (\$B)	\$65.6B	\$32.5B	\$27.7B	\$125.7B	1.9X
Output (\$B)	\$226.3B	\$88.8B	\$80.6B	\$395.7B	1.8X

Direct impact refers to the business activity (i.e., output, labor income, and employment) of all life science organizations in California as defined within this report's scope. These establishments directly employed 452,455 workers in 2024, generated \$65.6 billion in labor income and produced \$226.3 billion in business sales output.¹⁷

Indirect impact refers to inter-industry activity that results from the purchase transactions of life science establishments, i.e., the business activity of life science supplier and subcontractor industries. Life science suppliers and subcontractor industries in California employed 313,543 workers in 2024, contributed \$32.5 billion in labor income, and generated total business sales output of \$88.8 billion.¹⁷ Indirect impact tends to be higher in manufacturing operations that have numerous suppliers and raw material inputs. Tradable goods sectors also tend to have higher relative indirect impacts, given their demand for transportation and distribution services.

\$395.7B
in total business output

¹⁷ IMPLAN

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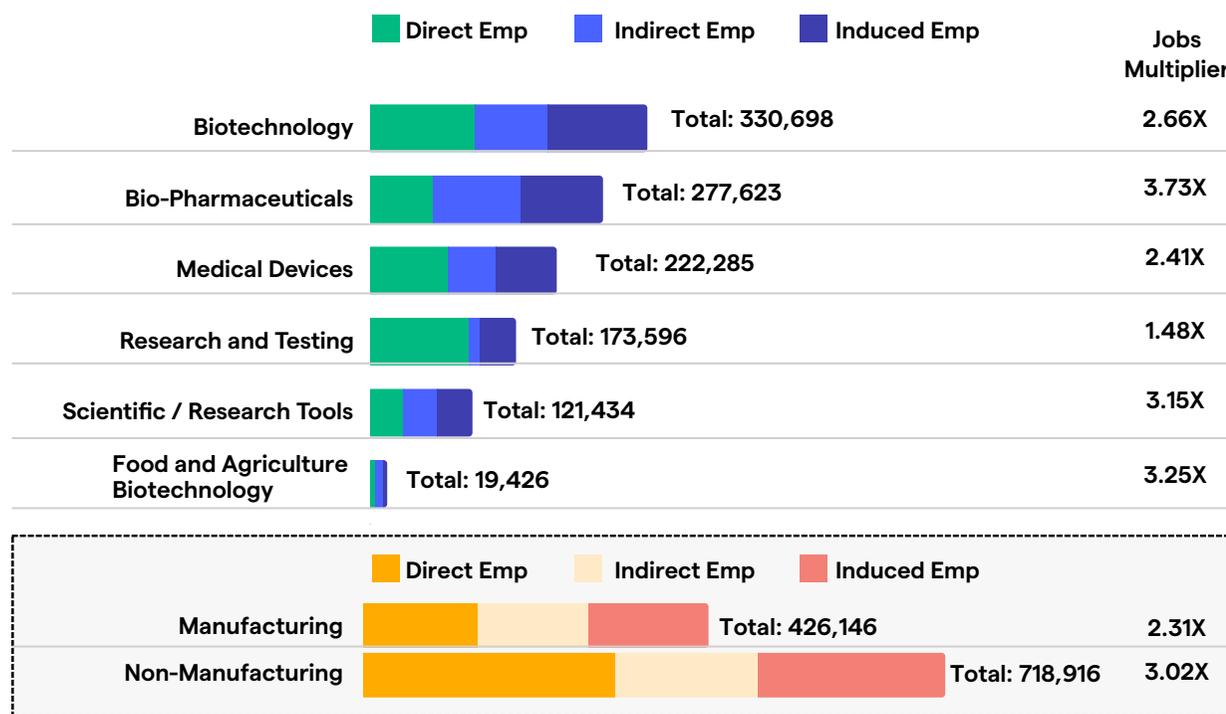
STATE OF CALIFORNIA ECONOMIC IMPACT

Induced impact refers to household spending that is generated by the direct and indirect life science activity, i.e., the household consumption resulting from life science establishments and their suppliers and subcontractors. Household spending, spurred by life science activity in California, supported 379,065 jobs in 2024, contributing \$27.7 billion in labor income and generating \$80.6 billion in total business sales output.¹⁷ Induced impact tends to be higher in sectors featuring either higher wages or higher levels of overall labor income, or both, which spurs greater consumption spending in the economy.

Sectors with high indirect and induced impact, relative to their direct impact, are considered to have a high

multiplier effect.¹⁸ Pharmaceutical manufacturers and wholesale drug distributors have the highest employment multiplier among life science sub-sectors. Every job directly supported by these organizations in California generates approximately 3.7 additional jobs in the state economy. This appears to reflect the more specialized raw material and labor needs associated with drug development relative to other life science sub-sectors. Most biologics manufacturing, for example, requires sterile cleanroom infrastructure, operating technicians with four-year degrees, and sophisticated raw material inputs with strict storage and distribution requirements. See Appendix E for a full list of sub-sectors and their respective multipliers.

Figure 3 Employment Impact of Life Science Sectors in California, 2024



¹⁷ IMPLAN

¹⁸ Input-output analysis is a means of examining the relationships within an economy among businesses and among businesses and consumers. It attempts to capture all monetary market transactions for consumption within a specific time period. The underlying mathematical formula facilitates the examination of the effects of a change in one or several economic activities upon an entire economy (impact analysis). The methodology assumes that industries respond to meet consumption (demand) directly or indirectly by supplying goods and services to other industries. Each industry that produces goods and services generates demand for other goods and services. These iterations can be mathematically summarized and described by "multipliers." This buying of goods and services (indirect purchases) continues until leakages from the region (i.e., transactions with residents or business outside the state) stop the cycle.

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STATE OF CALIFORNIA ECONOMIC IMPACT

Figure 4 Labor Income (\$M) Impact of Life Science Sectors in California, 2024

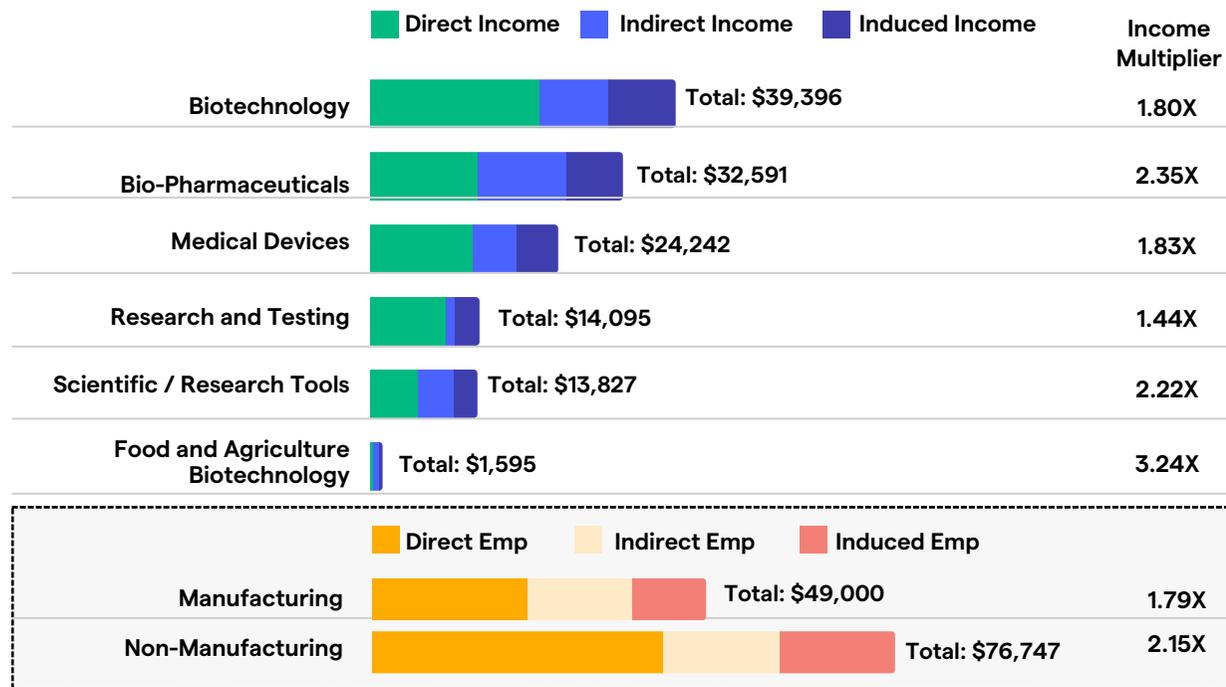
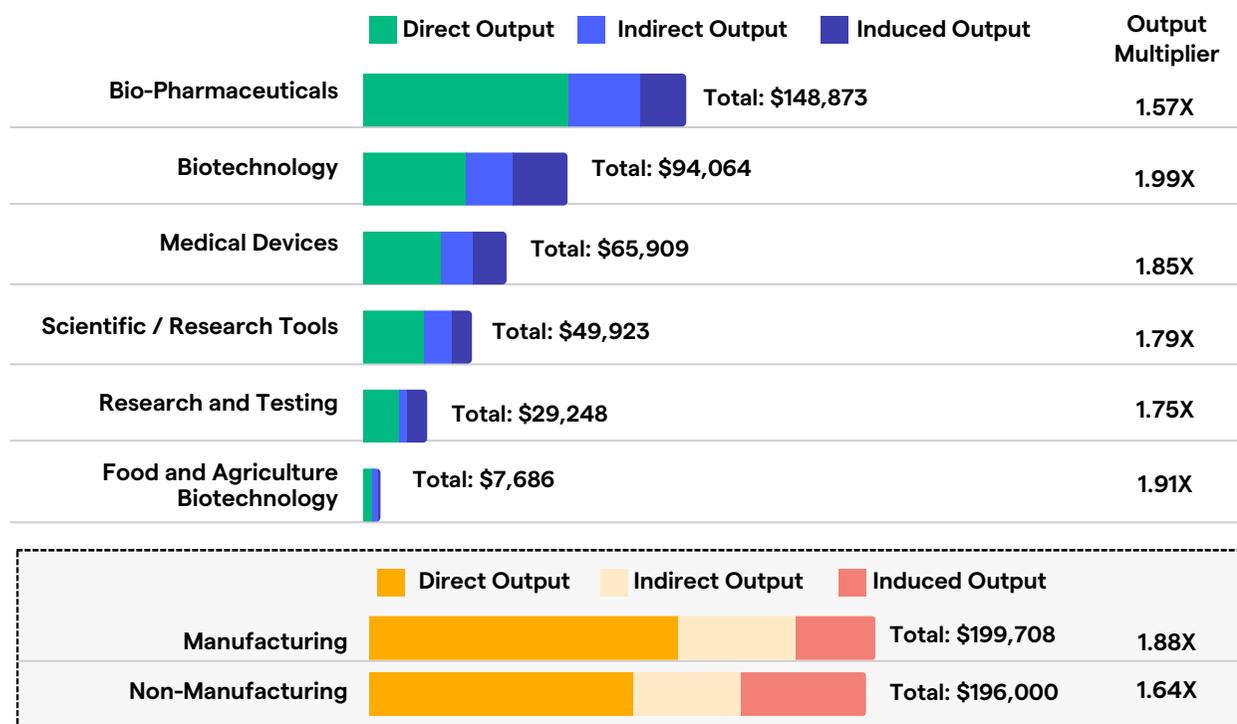


Figure 5 Business Output (\$M) Impact of Life Science Sectors in California, 2024



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STATE OF CALIFORNIA MANUFACTURING

Manufacturing is an important part of the life science value chain. It enables large-scale, reliable production, upholds strict quality and safety standards, supports rapid scaling of innovations, and helps reduce costs through economies of scale and process optimization.

Additionally, robust manufacturing capabilities are vital for global health impact, emergency preparedness, compliance with environmental and regulatory requirements, and tend to have an out-sized impact on local economies due to labor-intensive processes, supply chain complexity, and high-value raw material inputs (see Economic Impact section). Current trends in life science manufacturing include increased automation and digitalization, such as smart factories and digital twins, as well as a shift toward continuous manufacturing for greater efficiency and consistency. The rise of personalized medicine is driving demand for flexible, modular facilities and single-use technologies. Manufacturers are also leveraging real-time data and advanced traceability for improved quality and compliance, while prioritizing sustainability through greener practices. Additionally, companies are building more resilient, localized supply chains and developing specialized capabilities for advanced therapeutics like biologics and gene therapies.

Manufacturing made up 31.2% of California’s life science payroll jobs in 2024 (approximately 141,000

roles),¹⁹ one of the largest proportions among peer markets. Manufacturing jobs comprise an average of 29.7% of life science employment nationally.¹⁹ The three largest clusters of life science manufacturing employment in California—pharmaceutical preparation manufacturing, surgical and medical instrument manufacturing, and electromedical apparatus manufacturing—each employ more than 20,000 workers. While the life science manufacturing sector in California contracted in 2024, there were pockets of growth among sub-sectors. One of the three largest life science manufacturing employment clusters, surgical and medical instrument manufacturing, grew by 5% in 2024, adding more than 1,300 jobs to the state economy.¹⁹ Orange County is a manufacturing hot spot for the state. Approximately 50% of Orange County’s life science payroll jobs were related to manufacturing, and Orange County’s manufacturing job sector grew 2.6% year over year.¹⁹ These metrics highlight the region’s strong track record with med tech and medical device companies, including Masimo, Edwards Lifesciences, and Staar Surgical.

Figure 6 Life Science Manufacturing Payroll Jobs, 2024 and YOY Growth

Region	2024 Manufacturing Life Science Jobs	YOY Growth, %
State of California	141,067	-3.7%
Bay Area	45,575	-6.3%
Los Angeles	24,703	-3.0%
Orange County	30,759	2.6%
San Diego	21,535	-5.5%

¹⁹ Bureau of Labor Statistics, aggregated by Chmura’s JobsEQ

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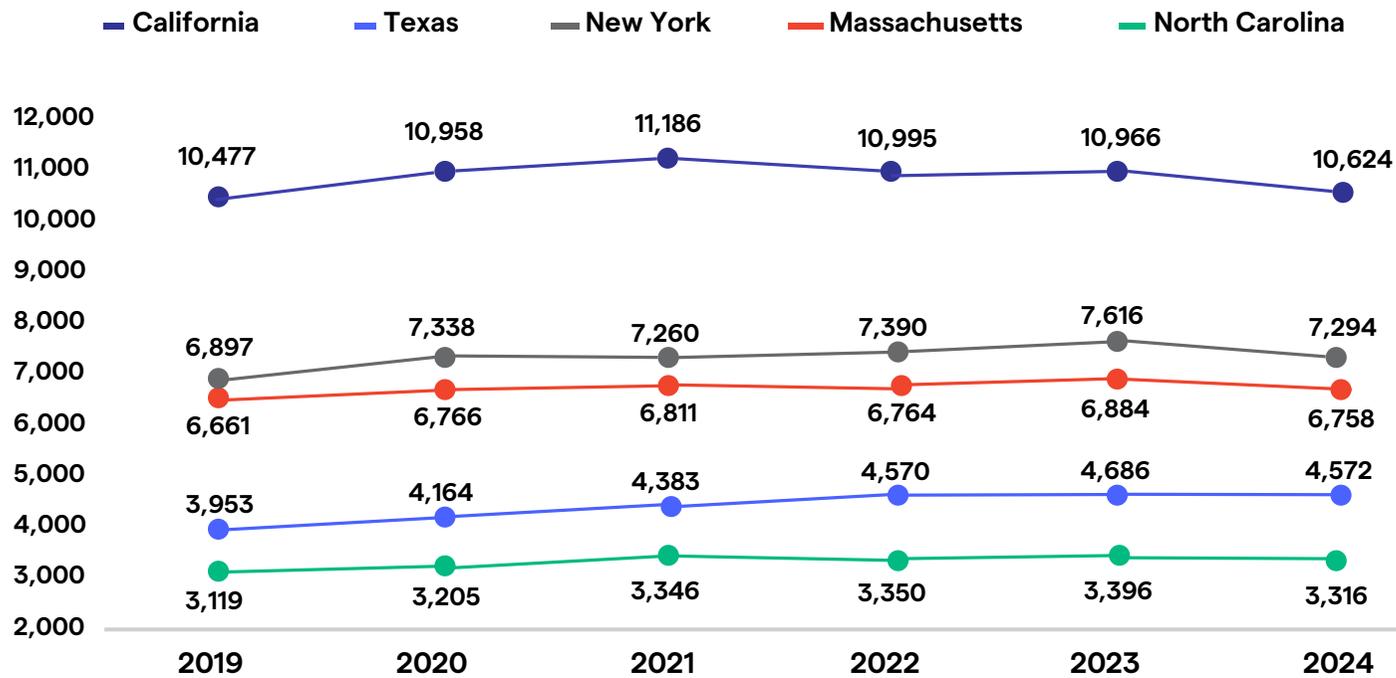
STATE OF CALIFORNIA RESEARCH FUNDING

The federal government plays a critical role in funding basic research through the NIH and the NSF, with organizations in California receiving more funding than any other U.S. state. California organizations were granted an annual average of 10,868 awards per year from the NIH and NSF between 2019 and 2024 (see Figure 7), which represents ~13% of the annual number granted to U.S. organizations.²⁰

In 2024, California organizations received 10,624 awards worth approximately \$5.7 billion in overall funding from the NIH and NSF.²⁰ Award levels to California from NIH and NSF are down slightly from 2023 (see Figure 7). Nationally, the number of NIH awards declined 2.0% from 73,021 in 2023 to 71,595 in 2024.²⁰

The value of national NIH funding decreased 2.3% from \$44.4 billion in 2023 to \$43.2 billion in 2024.²⁰ Also, the number and value of national NSF awards fell in 2024 by 4.2% and 2.6%, respectively.²⁰

Figure 7 Number of NIH and NSF Awards to California and Select U.S. States, 2019 to 2024



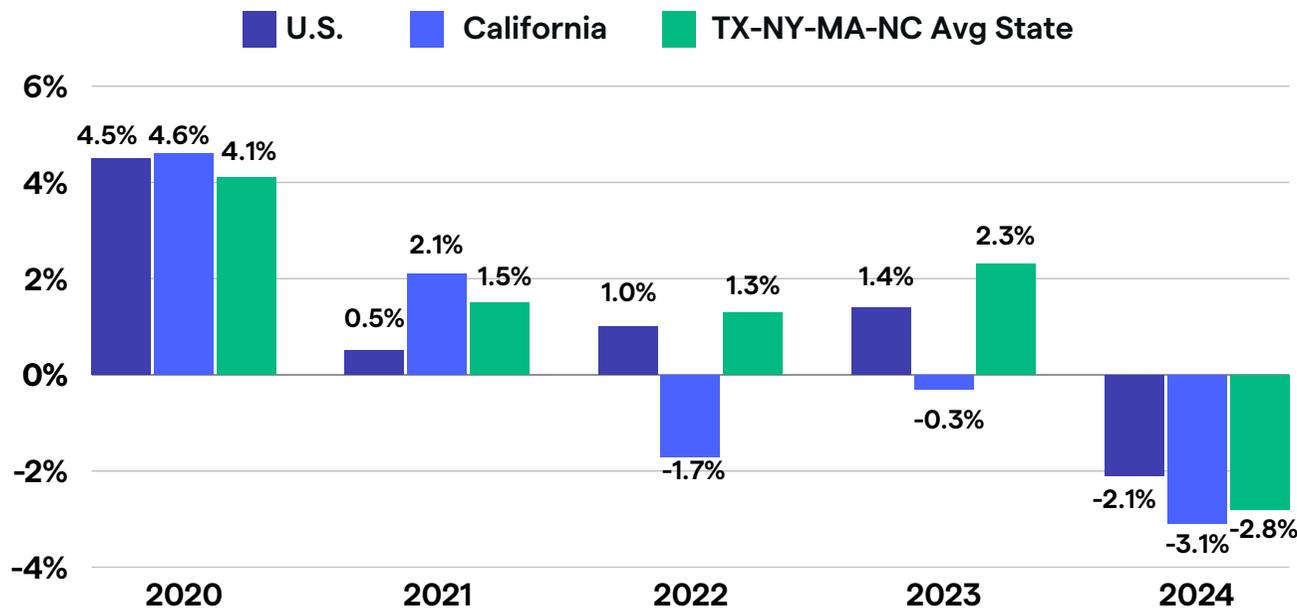
²⁰ NIH and NSF Award Search

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STATE OF CALIFORNIA RESEARCH FUNDING

Figure 8 YOY Growth in NIH and NSF Awards, 2020 to 2024



Federal funding of basic research often acts as a catalyst for incentivizing private industry to develop new products. The NIH and NSF are used as vehicles to drive innovation through public investments in science and technology. In recent years, the federal government has designated funding levels for programs or research areas within NIH accounts throughout the budget and appropriations process, using appropriations report language to specify a certain amount of funding for designated purposes. In 2024, the major therapeutic areas receiving support included Alzheimer’s disease and related dementias, opioids, stimulants, pain management, Lyme and tick-borne diseases, antimicrobial resistance, universal flu vaccine, mental health research, clinical and translational science, amyotrophic lateral sclerosis (ALS), artificial intelligence and machine learning.²¹



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²¹ Congressional Research Service Report: NIH Funding FY24. Prepared for Members and Committees of Congress

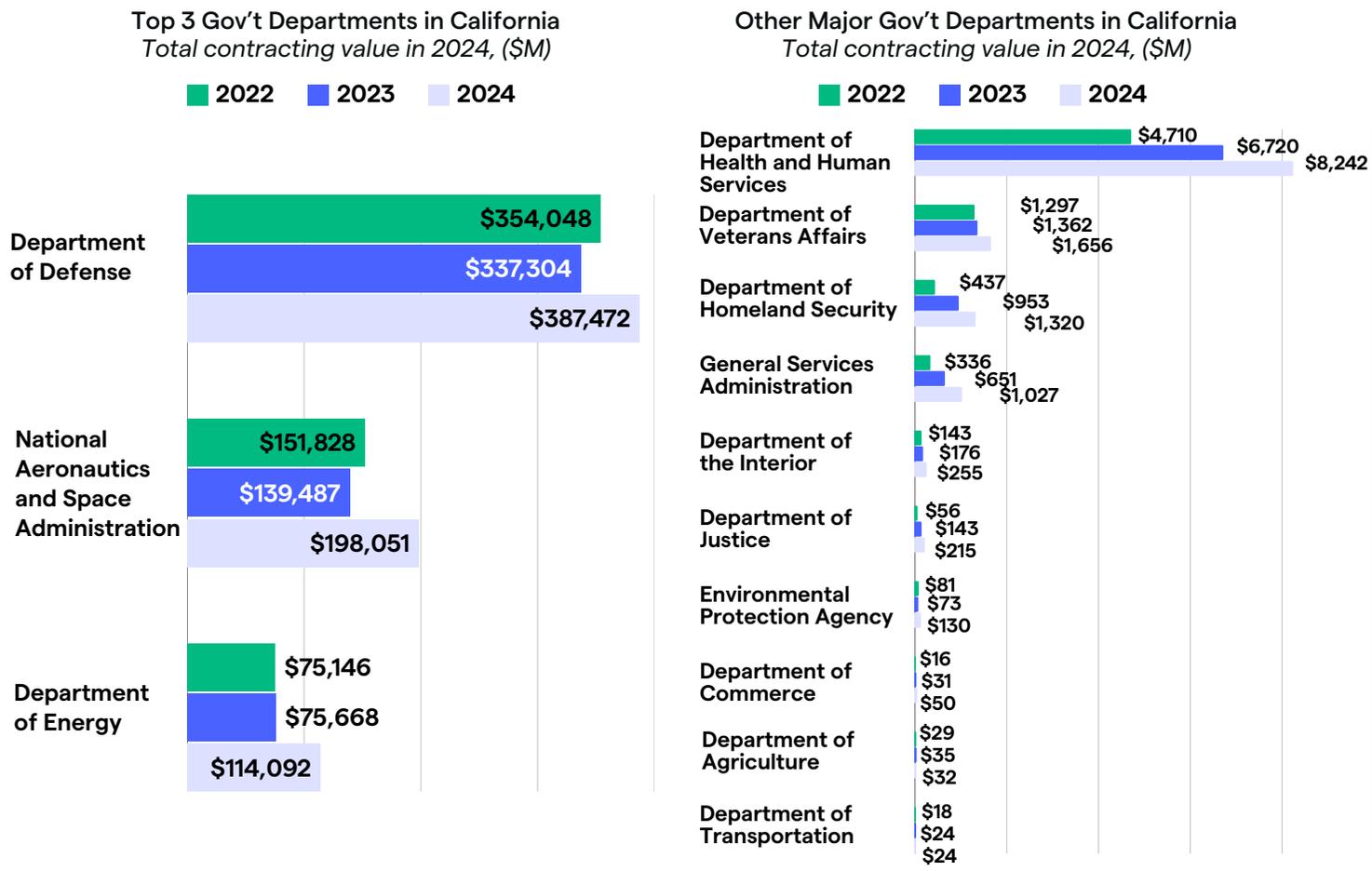
STATE OF CALIFORNIA GOVERNMENT CONTRACTS

In addition to its contracting activity through NIH and NSF, the life science industry is a major recipient of broader federal government contracts.

Key drivers of the growth in federal contracts include defense and cybersecurity, the development and implementation of artificial intelligence tools, a continued focus on small business advancement, and efforts to build secure supply chains following disruptions highlighted by the COVID-19 pandemic. Government contracts to life science organizations in California grew by 27% in 2024 to a total of \$713 billion,²² which is driven by increases in contracting volume at the top three sponsor agencies—the Department of Defense, the National Aeronautics and Space Administration, and the Department of Energy.

Major contracts include a \$95.9 million Department of Health and Human Services (HHS) contract with StringKing for isolation gowns, a \$41.3 million HHS contract with Verily Life Science for wastewater surveillance testing, a \$37.6 million HHS contract with 4J Therapeutics for R&D efforts relating to their programmable antiviral technology platform, and a \$32.1 million HHS contract with Cerus Corporation for R&D efforts relating to red blood cell components used to reduce risk of transfusion-transmitted infections.²²

Figure 9 Government Contracts with California Organizations in Life Science Sectors, 2024



²² [USAspending.gov](https://www.usaspending.gov)

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STATE OF CALIFORNIA INVESTMENT

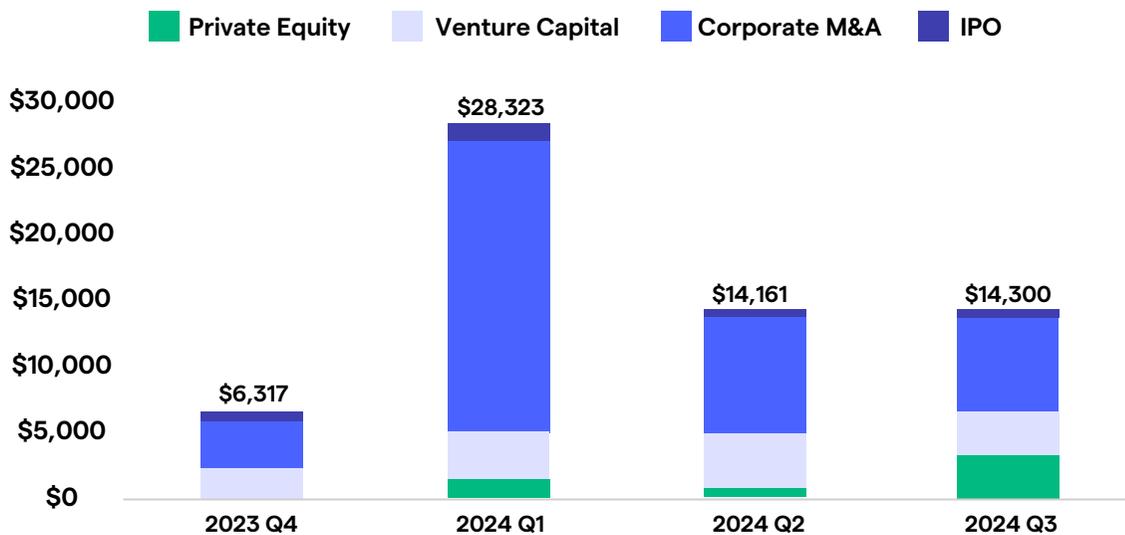
Investment activity in the life science industry was strong in 2024.²³

California-based life science companies attracted \$63.1 billion in investment during 2024, driven mainly by large corporate M&A transactions representing 67% of the annual deal flow, and supplemented by venture capital activity (see Figure 10).²⁴ Capital raised by California life science companies had declined for two consecutive years following a COVID-induced peak in 2021, but broke trend in 2024 with a 32% increase over 2023.²⁴ This likely reflects the impact of large corporate M&A transactions in California during the year, with a number of \$1 billion-plus acquisitions of San Diego-based companies.²⁵ Additionally, venture capital investors have shifted focus to late-stage operations, favoring a smaller portfolio of more established investments over a larger portfolio of early-stage ventures. While the number of annual venture capital transactions in California has fallen to below pre-pandemic levels in 2024 (see Figure 11), the average transaction value has increased from \$24.8 million in 2019 to \$35.3 million in 2024,²⁴ highlighting the shift in portfolio strategy. The trend of venture capital transaction activity—which increased to a peak in 2021 and has since fallen to pre-pandemic levels—likely represents the impact of COVID and a subsequent market correction, as well as

an increasingly challenging exit environment for start-ups.

There were four primary drivers of corporate investment activity in life science during 2024.²⁶ First was the continued need for pharmaceutical companies to proactively invest in strategies to mitigate the impact of the upcoming “patent cliff,” during which it is expected that 190 drugs will lose exclusivity by 2030. This potential threat has led to focused R&D and M&A activity aimed at filling gaps in product portfolios and divestments of lower-margin products. Second was the strategic integration of artificial intelligence (AI) and digitization into life science processes, including its potential to create powerful analysis, streamline activities relating to research, and optimize the results and patient experience in clinical trials. Third was therapeutics focused on specific treatment areas, including GLP-1s and other weight management drugs, oncology, and infectious disease in efforts to gain traction in these highly competitive markets. Lastly, the challenging funding environment for startups led many to turn to exits in the form of corporate M&A when unable to secure additional funding rounds.

Figure 10 Capital Allocated to Life Science Companies in California, (\$M)
Activity excludes private debt transactions and grant funding



²³ Investment activity in this discussion refers to capital raised through private equity, venture capital, corporate M&A, and IPO transactions; private debt transactions and grant funding are not included; more information on the data collection methodology is contained in Appendix D

²⁴ Pitchbook

²⁵ [RayzeBio](#) (Bristol Myers Squibb), [Inhibrx](#) (Sanofi), [Ambrx Biopharma](#) (Johnson & Johnson), [Poseida Therapeutics](#) (Roche), [Kumquat Biosciences](#) (Takeda), [Kate Therapeutics](#) (Novartis)

²⁶ The discussion of key trends in this Report is informed by surveys of life science executives, industry outlook reports, and other eminence materials produced by the Deloitte Center for Health Solutions in 2023/2024

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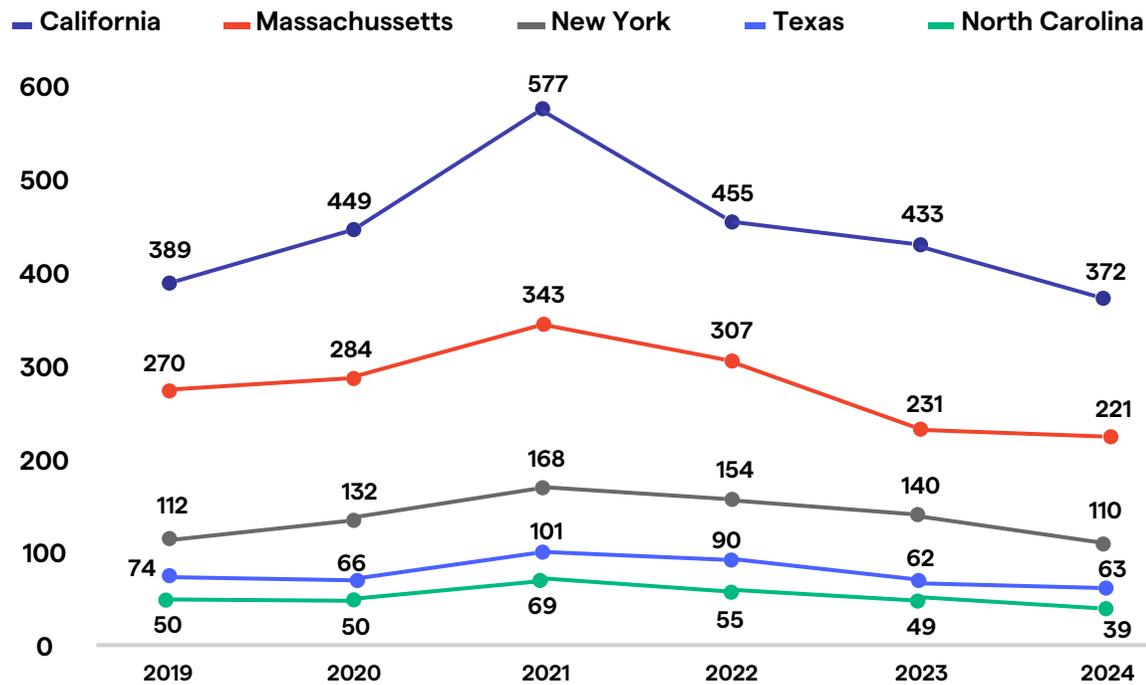
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STATE OF CALIFORNIA INVESTMENT

Figure 11 Number of Annual Venture Capital Transactions by Life Science Companies, 2019-2024
Activity excludes private debt transactions



Jonathan Norris

Managing Director,
HSBC Innovation

2024 U.S. INVESTMENT INSIGHTS: A SHIFT TO LARGER VC ROUNDS

2023 was a year of retrenchment, as investors and venture-backed companies dealt with a mostly quiet IPO market and company valuation resets. Investors conducted “portfolio triage,” right-sizing some investments to hit target value inflection points in order to raise the next round of funding. Many portfolio companies required insider rounds. As a result, new biotech investment was down.

Bucking the trend, the venture healthcare space was up in 2024, as investors increased their pace of new investments over 2023 by 30%.

During 2024, concerns for “next-round risk” remained top of mind for investors. At the same time, deal sizes increased—presumably to mitigate next-round risk. Bigger deals mean more capital, but they also mean additional new investors in the round who can provide support for a later insider round if necessary.

As a result, the average investor-led round swelled from \$26 million in 2023 to \$36 million in 2024. Mega rounds also emerged in 2024, as \$100 million-plus investments nearly doubled—from 87 in 2023 to 152 in 2024.

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STATE OF CALIFORNIA PATENTS

California accounts for roughly 30% of the total annual patent applications filed nationally in life science sectors from 2019 to 2024 - the largest single U.S. state total.²⁷

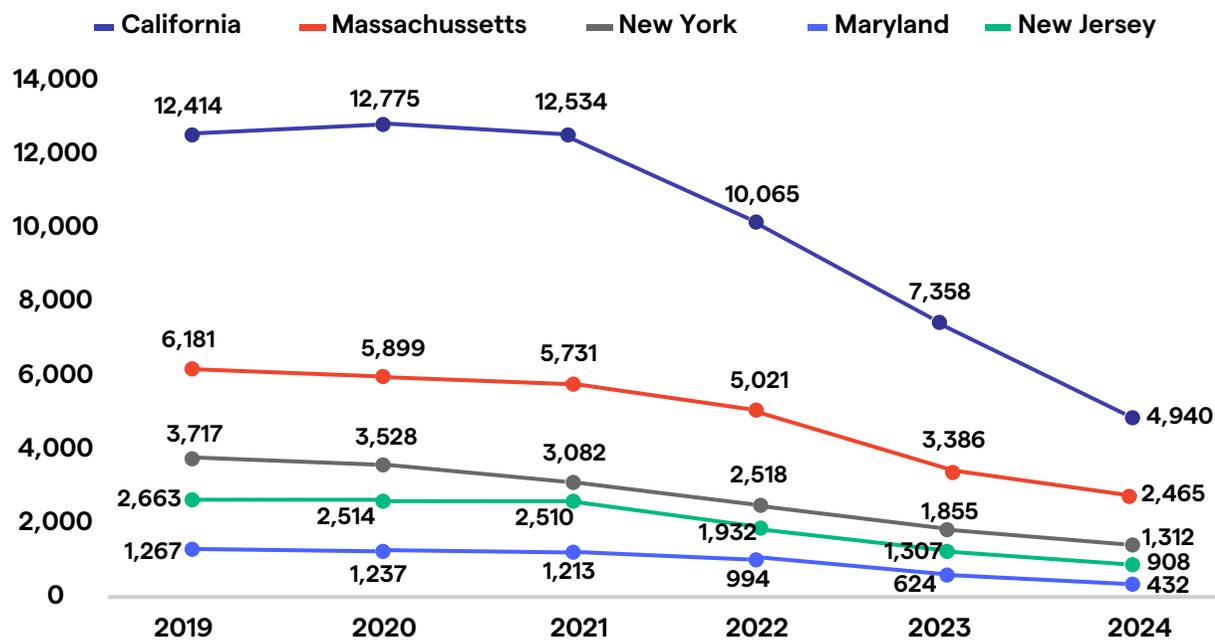
However, in 2024, annual patent filings in life science sectors in California declined 33% to 4,940 filings, down from 7,358 filings in 2023²⁷ (see Figure 12 below). The reduction in California is consistent with a decline in patent filings across other U.S. peer markets.

Biotechnology patents have seen a relative decline in recent years due to stricter patent eligibility rules, increased scrutiny by the U.S. Patent and Trademark Office, the high cost of prosecution, greater reliance on trade secrets and heightened risks of legal challenges and litigation. Several U.S. Supreme Court decisions—including *Mayo v. Prometheus* (2012) and *AMP v. Myriad Genetics* (2013)—have narrowed the scope of what can be patented in biotechnology, particularly regarding natural laws and naturally occurring DNA sequences. As a result, some companies are choosing to protect their

intellectual property through trade secrets, which offer indefinite protection as long as the information remains confidential and is not publicly disclosed. In addition, reduced overall spending has led many companies to focus on patent strategies that align closely with their core technologies. Despite the decline, California has maintained its share of U.S. applications filed in life science sectors at approximately 28% in 2024.²⁷

Patent applications are also down globally. The World Intellectual Property Organization, which oversees a system for countries to share recognition of patents, reports a 0.5% growth in global Patent Cooperation Treaty (PCT) applications and a 2.8% decline in U.S. PCT patent applications in 2024.²⁸ While China returned to growth (+0.9%), the US, Japan and Germany experienced declines of 2.8%, 1.2%, and 1.3%, respectively.

Figure 12 Number of Patents in Life Science Regions, 2019 to 2024
For comparison, the top five states in patent filings are shown



²⁷ U.S. Patent and Trade and Trademark Office (USPTO). Further information on the data collection methodology for patents filed in life science sectors is contained in Appendix D

²⁸ World Intellectual Property Association

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STATE OF CALIFORNIA EXPORTS

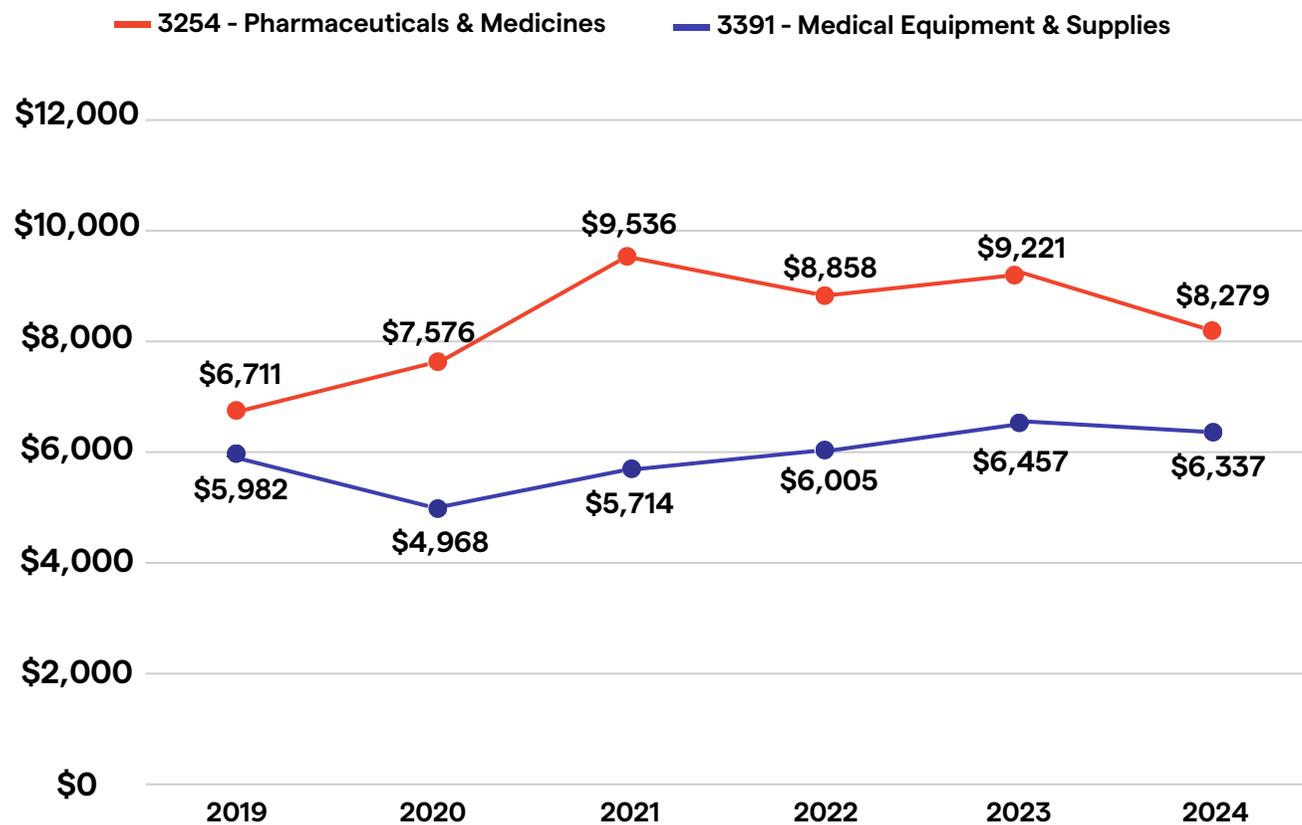
California is a major exporter of life science products, accounting for 7-11% of annual U.S. pharmaceutical and medicine exports, and over 15% of annual U.S. medical equipment and supplies exports since 2019.²⁹

In 2024, California exported a total of \$8.3 billion in pharmaceutical and medicine products²⁹ - a 10% decline from 2023.²⁹ These products made up an average of 4.8% of California's total exports from 2019 to 2023, dipping slightly to 4.5% in 2024.²⁹ Top export destinations included Germany, China, Japan, Switzerland, and Ireland.

California is also the nation's leading exporter of medical equipment and supplies, a position it has held for

several decades. In 2024, California exported \$6.3 billion in medical equipment and supplies, a 2% decline versus 2023.²⁹ Medical equipment and supplies accounted for an average of 3.3% of California's total exports from 2019 to 2023, increasing slightly to 3.5% in 2024.²⁹ Top export destinations include the Netherlands, Mexico, China, Canada, and Japan.

Figure 13 Life Science Merchandise Exports (\$M) from California, 2019 to 2024



²⁹ [Trade.gov](https://www.trade.gov)

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STATE OF CALIFORNIA ESTABLISHMENTS

California continues to be a national leader in life science operations, attracting and expanding a wide range of establishments—including R&D, manufacturing, logistics and distribution, and corporate headquarters. In 2024, the total number of life science establishments in California grew by 3.9%, rising from 16,576 in 2023 to 17,220 in 2024.³⁰

This growth in establishments comes despite a wave of biotechnology bankruptcies in 2023 and reflects renewed momentum across several key sub-sectors, including R&D in biotechnology; R&D in engineering, physical, and life sciences; and drug wholesale.

California attracted several large biological product

manufacturing investments including Takeda, Avid Bioservices (OC), GeminiBio (Bay Area) cGMP Bioprocess liquid manufacturing facility, Bayer (Bay Area) Cell therapy launch facility in Berkeley, MicroVention (OC) expansion (state funding), Kate Therapeutics (SD) acquired by Novartis - gene therapy portfolio expansion.

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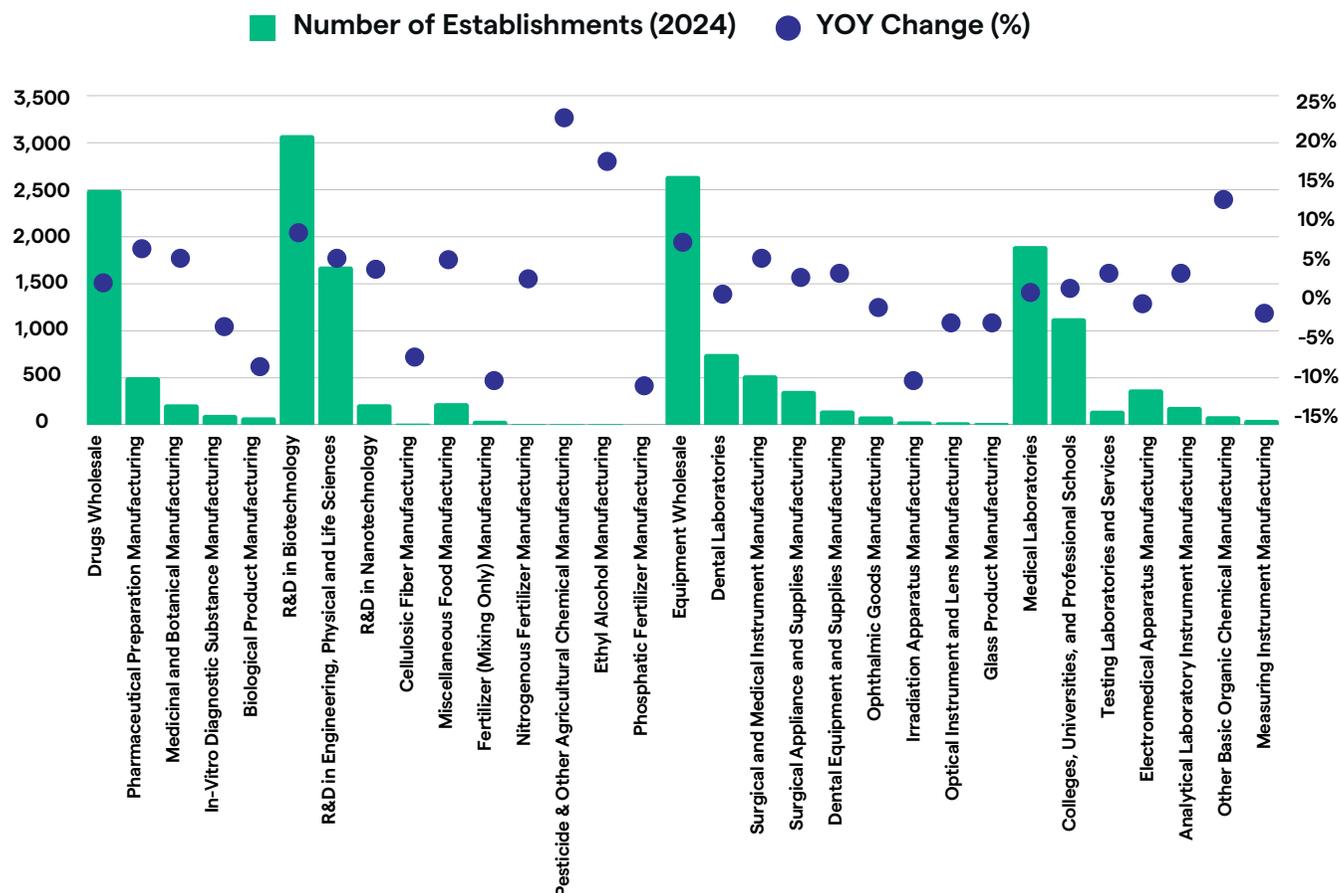
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Figure 14 Number of Life Science Establishments in California and YOY growth, 2024



³⁰ Bureau of Labor Statistics, aggregated by Chmura’s JobsEQ

STATE OF CALIFORNIA OCCUPATIONAL LANDSCAPE: DIVERSE ROLES DRIVING INNOVATION

The life science industry in California supports a wide array of occupations across its core sectors, including manufacturing, research, education, and technology. These roles span a wide range of education levels, skill sets, and compensation—from entry-level production jobs to scientific and management positions. Figure 15 highlights the top 10 occupations³¹ in each of the six major life science sectors included in this report. The distribution of these roles demonstrates how talent needs vary based on each sector’s commercial focus. For example, manufacturing-intensive sub-sectors like Medical Equipment and Food & Agriculture Biotech employ more

production and operations roles. In contrast, research-driven sectors like Biotechnology and Research & Testing are more heavily staffed with scientists, engineers and postsecondary educators.

These occupational trends underscore the importance of targeted workforce development initiatives. Ensuring alignment between training programs and the specific, evolving demands of each sub-sector will be critical to sustaining innovation and maintaining California’s global leadership in life sciences.

Figure 15 Top Occupations in Life Science Sectors in California, 2024

Rank	Occupation	2024 Emp	Avg Comp/yr
Biopharmaceuticals			
1	Packaging and Filling Machine Operators and Tenders	3,927	\$102,813
2	Chemical Equipment Operators and Tenders	3,583	\$121,675
3	Sales Representatives, Technical and Scientific Products	3,198	\$250,885
4	Sales Representatives, Other	2,913	\$191,229
5	General and Operations Managers	2,189	\$417,311
6	Inspectors, Testers, Sorters, Samplers, and Weighers	1,954	\$137,306
7	Chemists	1,793	\$209,997
8	Laborers and Freight, Stock, and Material Movers, Hand	1,745	\$99,346
9	First-Line Supervisors of Production and Operating Workers	1,512	\$191,998
10	Customer Service Representatives	1,435	\$115,379
Biotechnology			
1	Medical Scientists, Except Epidemiologists	4,703	\$214,590
2	Software Developers	4,565	\$266,541
3	Natural Sciences Managers	4,026	\$350,186
4	General and Operations Managers	3,036	\$363,289
5	Biological Technicians	2,375	\$107,947
6	Project Management Specialists	2,274	\$219,287
7	Biochemists and Biophysicists	1,993	\$228,721
8	Managers, All Other	1,951	\$353,102
9	Mechanical Engineers	1,930	\$223,357
10	Biological Scientists, All Other	1,814	\$202,917

³¹ IMPLAN

Prepared for Biocom California, the life science trade association for the State of California. When referencing this document, please use “Biocom California’s 2025 Life Science Economic Impact Report” for citation.

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Figure 15 (cont) Top Occupations in Life Science Sectors in California, 2024

Rank	Occupation	2024 Emp	Avg Comp/yr
Food & Agriculture Biotech			
1	Packaging and Filling Machine Operators and Tenders	562	\$60,100
2	Laborers and Freight, Stock, and Material Movers, Hand	262	\$57,425
3	First-Line Supervisors of Production and Operating Workers	240	\$105,444
4	Chemical Equipment Operators and Tenders	225	\$87,413
5	Packers and Packagers, Hand	219	\$51,299
6	Industrial Truck and Tractor Operators	182	\$66,408
7	Inspectors, Testers, Sorters, Samplers, and Weighers	174	\$67,701
8	Maintenance and Repair Workers, General	126	\$86,651
9	Industrial Machinery Mechanics	126	\$94,613
10	Mixing and Blending Machine Setters, Operators, and Tenders	114	\$66,813
Medical Equipment and Supplies			
1	Miscellaneous Assemblers and Fabricators	7,768	\$90,592
2	Dental Laboratory Technicians	4,215	\$113,943
3	Sales Representatives, Technical and Scientific Products	3,179	\$208,180
4	Sales Representatives, Other	2,602	\$162,301
5	Inspectors, Testers, Sorters, Samplers, and Weighers	2,454	\$108,624
6	Industrial Engineers	2,242	\$225,259
7	Customer Service Representatives	2,144	\$104,596
8	General and Operations Managers	2,033	\$351,366
9	First-Line Supervisors of Production and Operating Workers	1,831	\$161,730
10	Software Developers	1,673	\$288,729

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Figure 15 (cont) Top Occupations in Life Science Sectors in California, 2024

Rank	Occupation	2024 Emp	Avg Comp/yr
Research and Testing			
1	Clinical Laboratory Technologists and Technicians	6,295	\$105,908
2	Health Specialties Teachers, Postsecondary	4,321	\$141,100
3	Phlebotomists	3,648	\$73,702
4	Education Administrators, Postsecondary	3,272	\$128,573
5	Postsecondary Teachers, All Other	2,286	\$85,059
6	Secretaries and Administrative Assistants	2,086	\$56,363
7	Office Clerks, General	2,035	\$40,008
8	Educational, Guidance, and Career Counselors and Advisors	1,890	\$62,785
9	Business Teachers, Postsecondary	1,795	\$116,117
10	Teaching Assistants, Postsecondary	1,744	\$47,382
Scientific / Research Tools			
1	Electrical, Electronic, and Electromechanical Assemblers	3,262	\$76,364
2	Software Developers	3,187	\$244,691
3	Miscellaneous Assemblers and Fabricators	2,153	\$72,995
4	Industrial Engineers	1,452	\$178,057
5	Inspectors, Testers, Sorters, Samplers, and Weighers	1,064	\$91,523
6	Mechanical Engineers	939	\$186,062
7	Electrical Engineers	928	\$204,613
8	General and Operations Managers	890	\$300,089
9	First-Line Supervisors of Production and Operating Workers	846	\$134,725
10	Architectural and Engineering Managers	718	\$302,234

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STATE OF CALIFORNIA TALENT PIPELINE

The life science sector in California continues to benefit from a strong and inclusive in-state talent pipeline.

In a 2024 national ranking of the most educated U.S. cities—based on factors such as high school completion rates, college attainment, and degree equity across race and gender—18 California cities ranked in the top 100, with six in the top 50.³² These rankings underscore the state’s deep bench of educated talent and its commitment to educational access and equity.

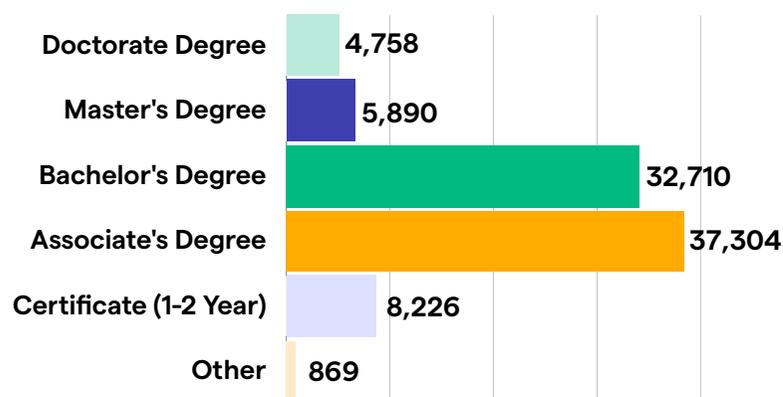
In 2023, California’s educational institutions conferred approximately 90,000 life science-related degrees (see Appendix J for list of degrees in life science fields), maintaining output levels on par with the combined average of New York, Massachusetts, and Texas.³³

Life science degrees accounted for 12.3% of all degrees conferred in the state, highlighting California’s strong

concentration of life science graduates (see Figure 17). Associate degrees made up 42% of life science-related degrees, supporting the sector’s need for skilled technical and manufacturing talent. At the other end of the spectrum, doctorate degrees in life science fields represented 22% of all Ph.D.’s conferred in the state, fueling California’s leadership in scientific research and innovation.³³

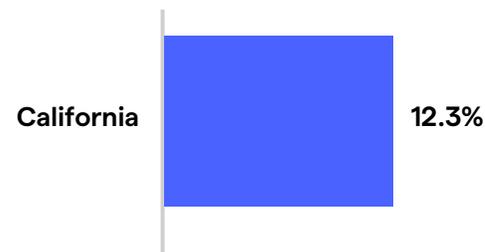
Together, these figures reflect a powerful workforce advantage: California not only produces more life science talent than any other state, but does so across all educational levels, providing a full spectrum of professionals to meet the evolving needs of the industry.

Figure 16 Number of Degrees Conferred in Life Science Fields in California by Award Level, # of Degrees



Total Number of Degrees Conferred in Life Science Fields
89,757

Figure 17 Share of Degrees in Life Science Fields in California



Total Percentage of Degrees Conferred in Life Science Fields
12.3%

³² Forbes Advisor Ranking of Most Educated Cities in the U.S.

³³ Bureau of Labor Statistics, aggregated by Chmura’s Jobs EQ “Other” Award Levels include 2 - 4-year certificate programs, and other post-Master’s and Post-Baccalaureate programs

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STATE OF CALIFORNIA WORKFORCE DIVERSITY: A REFLECTION OF CALIFORNIA'S STRENGTH

California's life science workforce stands out nationally for its racial and ethnic diversity, offering a powerful advantage in a global industry that depends on innovation, collaboration, and inclusive problem solving. Many life science companies across the state are implementing a range of strategies, including training programs, initiatives to promote diversity, and holding forums or other events to support this goal.

The life science workforce in California exhibits greater racial and ethnic diversity than other US states. This trend is particularly evident when analyzing various workforce demographic concentrations within California.

Across the various sectors, individuals reporting as White represent 31% to 43% of total employment in California.³⁴ In contrast, the average for peer states such as Texas, New York, North Carolina, and Massachusetts, ranges from 49% and 63%.³⁴

California also has notably higher concentrations of life science workers identifying as Asian or Hispanic or Latino, as compared to the average concentrations across the other U.S. states analyzed (see Figure 18). Latino representation is particularly strong, signaling meaningful progress in expanding access to science and innovation careers for historically underrepresented communities.

Figure 18 Race and Ethnic Diversity in Life Science Workforce Concentrations

Life Science Sector	Representative Workforce Cluster	Race/Ethnicity Composition of Workforce Cluster				
		White	Asian	Black or African American	Other	Hispanic or Latino
Biotechnology	Research and Development	43%	36%	3%	3%	14%
		63%	17%	8%	2%	10%
Research and Testing	Medical and Diagnostic Labs	34%	28%	5%	3%	30%
		49%	9%	20%	2%	20%
Medical Devices and Equipment	Medical Device and Equipment Mfg	31%	33%	3%	3%	30%
		56%	10%	12%	2%	20%
Biopharmaceuticals	Pharmaceutical and Medicine Mfg	35%	31%	4%	3%	27%
		56%	12%	15%	2%	16%
Scientific / Research Tools	Precision Instrument Mfg	38%	35%	4%	3%	20%
		64%	13%	9%	1%	13%
Food and Agriculture Biotechnology	Basic Chemical Mfg	41%	12%	6%	3%	38%
		62%	6%	10%	1%	20%
Legend		California	CA higher than TX-NY-NC-MA Avg	CA lower than TX-NY-NC-MA Avg		
		TX-NY-NC-MA Average				

³⁴ Bureau of Labor Statistics, aggregated by Chmura's JobsEQ; "Other" race categories include American Indian, Pacific Islander, and Two or More races; Persons reporting as Hispanic or Latino report on a different question related to Ethnicity rather than Race; "peer average" includes average composition for Texas, New York, North Carolina, and Massachusetts.

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STATE OF CALIFORNIA INDUSTRY TRENDS IMPACTING LIFE SCIENCES

In 2024, the life sciences sector experienced significant shifts driven by technological advancements, strategic R&D investments, market volatility, and evolving customer expectations. Insights from the recent Deloitte US Center for Health Solutions survey³⁵ of 150 C-suite executives across global life science companies highlight these transformative trends.

Digital Transformation Driving Change

Digital transformation remained a central focus of the life science industry, with advancements in a variety of digital technologies being leveraged to streamline operations, speed up process timelines, and improve patient experiences. A majority of 150 C-Suite executives surveyed by Deloitte³⁵ said their companies planned to increase generative AI³⁶ investments across the value

chain, suggesting that activity is moving beyond initial pilot projects and beginning to scale. The implementation of generative AI is expected to come with significant cost savings across an array of channels including streamlining R&D activities, simplifying back-office operations, and enhancing customers' abilities to self-service via digital portals.

Key Developments:

- Nearly 60% of executives surveyed said their companies planned to increase deployment of generative AI. AI investments by biopharma companies over the next five years could generate up to 11% in value creation relative to revenue across functional areas, according to Deloitte analysis.³⁵
- Cybersecurity is emerging as an area that will feature new digital investments moving forward, with 29% of executives reporting that increasing cyberattacks are having an impact on operations, and 24% indicating that new investments are being prepared to enhance cybersecurity.³⁵

- Noted challenges to implementing digital transformation include (1) shortage of specific digital skills and talent, with new educational pipelines of digitally skilled professionals yet to mature; (2) funding constraints, with prolonged inflationary pressures and economic uncertainties leading some companies to scale back on their digital investment plans; and (3) organizational silos where cross-departmental collaboration requires coordination and investment in unified digital tools.³⁷

³⁵ [Deloitte Life Sciences Outlook](#)

³⁶ Section 5002 of the National Defense Authorization Act for Fiscal Year 2021, defines AI as: a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. Artificial intelligence systems use machine and human-based inputs to (A) perceive real and virtual environments; (B) abstract such perceptions into models through analysis in an automated manner; and (C) use model inference to formulate options for information or action (U.S. Government Accountability Office)

³⁷ [How Pharma Leaders are Approaching Digital Transformation. Pharmaceutical Technology, October 22, 2024.](#)

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STATE OF CALIFORNIA INDUSTRY TRENDS IMPACTING LIFE SCIENCES

R&D and Portfolio Strategies to Mitigate Competitive Pressures

Life science companies continued to focus on balancing their R&D efforts with M&A activities to address portfolio gaps, increasing patient accessibility to drugs and medical devices, and competing in trending therapeutics areas.

The loss of exclusivity as it relates to the patent “cliff” continues to be top focus of life science executives, with

increasing pressure to protect or gain market share in innovative therapeutics. Generic medicines have regained attention with the significant success of GLP-1 medicines in 2024. Therapeutic areas that received significant focus during 2024 include oncology, infectious disease, and cardiovascular disease.³⁸

Key Developments:

➤ In 2024, 37% of late-stage assets were concentrated in oncology, 11% were in infectious disease, and 7% in cardiovascular.³⁸

➤ More than \$300 billion in sales revenue is at risk through 2030 due to the patent expirations.³⁹

➤ Companies are experimenting with new R&D approaches (e.g. automation, digital twins) to improve productivity, e.g. Sanofi is using AI technology to assist in their predictive modeling activities to shorten their required R&D time significantly, and using digital twins to test novel drug candidates during early phases of development.

➤ With failure rates for new drug candidates in clinical trials being as high as 90%,³⁹ companies are aiming to filter out the most high-potential candidates to balance the need to introduce innovative products while improving R&D productivity.

➤ Due to the increased cost of capital and uncertainty around exit strategies, alternative funding sources are emerging (e.g. contract manufacturing) and other collaboration revenues are helping companies to generate cash flow to fund R&D and commercialization activities.

➤ Market success of GLP-1 receptor agonists in treating obesity is revitalizing interest in general medicines (e.g. drugs that treat common conditions such as sleep apnea, addiction) and could impact the broader industry by reducing demand for medical devices and surgical procedures related to diabetes and obesity.



³⁸ [Deloitte Measuring the Return From Pharmaceutical Innovation](#)

³⁹ [Deloitte Life Sciences Outlook](#)

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 HSBC Innovation

2024 INVESTMENT INSIGHTS: MERGERS & ACQUISITIONS

Biopharma M&A grew in both the number of deals and value in 2024. The median upfront deal value* was \$825 million—over 3 times larger than the previous five years—with 7 of the 12 deals yielding \$1 billion-plus in total deal value. Despite the larger deal sizes, the clinical stage of the lead programs purchased trended early, with 9 of the 12 exiting at preclinical (4) or phase I (5). Indeed, over the last seven years, more than 50% of all private pharma M&A have been preclinical or phase I. Top lead indications in 2024 M&A include oncology, autoimmune, neuro and orphan/rare diseases.

In the diagnostics and tools sectors, private M&A remained challenged. Acquirers shied away from

venture-backed emerging technologies, with just three M&A deals** and a median deal size of \$93 million, both five-year lows. Diagnostics and tools acquirers typically look for significant revenue (\$30 million-plus) and near-EBITDA positive companies.

For medical devices, the number of M&A deals increased in 2024 after a two-year lull***, although the time to exit slipped. Median upfront and total deal values were the second highest over the last seven years. Two of the 10 M&A deals were for cardiovascular devices and included an upfront median value of \$550 million.

Biopharma Private VC-Backed M&A **** Analysis 2018–2024

Private M&A deals and dollars show upsized activity focused on preclinical & phase I

M&A MEDIAN VALUES							
Date	2018	2019	2020	2021	2022	2023	2024
Deals	10	12	14	10	5	5	12
Up-Front (\$M)	180	248	288	350	320	110	825
Milestone TBE (\$M)	339	368	65	220	120	500	13
Total Deal (\$M)	455	775	378	483	320	655	1,113
\$1B+ Total Deal Value Exits	3 (30%)	4 (33%)	5 (36%)	3 (30%)	2 (40%)	2 (40%)	7 (58%)

* 17 deals with a minimum of \$75 million in upfront payments.

** The four deals with a minimum of \$50 million in upfront payments.

*** In 2024, there were 14 medical device deals with a minimum of \$50 million in upfront payments.

**** [2024 HSBC Venture Healthcare Report by Jonathan Norris at HSBC Innovation Banking.](#)

STATE OF CALIFORNIA INDUSTRY TRENDS IMPACTING LIFE SCIENCES

Preparing for Market Volatility

Uncertainty surrounding regulatory changes, geopolitical events, and other business challenges encouraged life science firms to bolster their strategies for resilience. Several regulatory changes pertaining to life sciences in the U.S. and globally continue to keep executives contemplating the impacts on their businesses. Supply chain reinforcement was a trend that emerged out of severe supply chain disruptions during the COVID-19 pandemic, however, it continues to be a top organizational priority—particularly for med tech

companies with highly specialized components often sourced from several countries. Restructuring, outsourcing, workforce reductions and other cost-cutting measures were utilized throughout 2024 to keep life science firms agile and prepared for shifting market conditions. Lastly, companies have dedicated strategic efforts towards several market trends with particular attention on building out cybersecurity capabilities and strengthening climate and sustainability reporting in anticipation of increased regulatory reporting requirements.

Key Developments:

48% of surveyed med tech executives in 2024 noted manufacturing and supply chain risks could significantly impact their strategy; only 30% of biopharma executives noted this concern.³⁹

The FDA released its final guidance on predetermined change control plans (PCCPs) for AI/machine learning aided medical devices, one of several regulatory actions focused on expanding regulation surrounding “software as a medical device” with rapidly advancing AI/digitization capabilities.⁴⁰

In June 2024, a Supreme Court ruling overturned the Chevron Doctrine, a principle of administrative law requiring federal courts to defer to relevant federal agency’s interpretations when the statutes are deemed ambiguous. This overturning presents significant uncertainty for the highly regulated life science industry going forward.

The BioSecure Act was passed by the House of Representatives in September 2024, but died in the Senate. The Act banned federal agencies from procuring equipment or services from specific foreign biotech firms. This poses a potential supply chain risk given that the U.S. relies heavily on imports of active pharmaceutical ingredients (API) and key starting materials (KSM), primarily from China and India.⁴¹

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³⁹ [Deloitte Life Sciences Outlook](#)

⁴⁰ [FDA Software as a Medical Device](#)

⁴¹ <https://www.congress.gov/bill/118th-congress/house-bill/7085/text>

STATE OF CALIFORNIA INDUSTRY TRENDS IMPACTING LIFE SCIENCES

Prioritizing Customer Expectations and Experiences

Life science companies have been centered in their focus on transforming customer experience and incorporating customer feedback to meet expectations. Many companies have recognized the strategic importance of improving their overall customer experience with 29% of surveyed executives indicating they are prioritizing investments in their customer-engagement strategies.³⁹

Healthcare professionals have continued to emphasize the disconnect between life science companies' customer-engagement strategies and their needs for customer-facing resources. Customers are also demanding more advanced tools and technologies including personalized therapeutics, self-service portals, direct-to-consumer programs, and overall, more interactive technologies to transform the customer experience.

Key Developments:

➤ Pfizer and Eli Lilly released direct-to-consumer portals (PfizerForAll and LillyDirect)⁴² aiming to simplify appointment scheduling, home delivery, access to medication discounts, and improve the overall digital consumer experience.

➤ Dexcom introduced Stelo,⁴³ the first glucose biosensor in the US cleared for use without a prescription. This product is expected to increase access for millions of Americans living with Type 2 Diabetes who do not use insulin but benefit from continuous glucose monitoring.

New Therapies, Diagnostics, Devices

New therapies, diagnostics, and devices released in 2024 demonstrate the direction of industry innovation, and how R&D efforts are supporting commercialization activity. In 2024, the FDA approved 50 new drugs never before approved or marketed in the U.S., known as "novel" drugs, including a significant number of rare disease therapies

with orphan drug designation for patients with few to no treatment options. Therapies with orphan drug designations accounted for over 50% of novel drug approvals, including two which treat conditions with no previously approved treatment such as Neimann-Pick disease Type C and WHIM syndrome.⁴⁴

Key Developments:

➤ 68% of the novel drugs approved in 2024 by the Center for Drug Evaluation and Research (CDER) were approved in the U.S. before being approved in any other country.⁴⁴

➤ CDER approved 18 new biosimilars; including three interchangeable biosimilars (Amjevita, Hadlima, and Hyrimoz) for Humira, an immunosuppressive drug used to treat inflammatory conditions.⁴⁴

➤ Several existing approved drugs were approved for new uses; for example, Wegovy, an injectable GLP-1 receptor used for obesity and weight management, is now being used to reduce the risk of major cardiovascular events.

➤ 24 of the 50 novel drugs approved in 2024 were first-in-class, with a notable example being Cobenfy, a novel schizophrenia treatment for adults targeting muscarinic receptors.⁴⁴

³⁹ [Deloitte Life Sciences Outlook](#)

⁴² More information about [LillyDirect](#) and [PfizerForAll](#)

⁴³ [Stelo by Dexcom Announcement](#)

⁴⁴ [2024 New Drug Therapy Approvals Annual Report](#)

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STATE OF CALIFORNIA INDUSTRY TRENDS IMPACTING LIFE SCIENCES

Financial Outlook

After record investment and valuations from 2020 to mid-2022, public market struggles led venture firms to prioritize portfolio triage through 2023. By 2024, new deal activity resumed, but with a clear shift in investor focus. Investors favored larger syndications raising substantial early-stage rounds, or shifted their focus to later-stage, de-risked opportunities. Challenges in securing follow-on financing resulted in less early-stage activity and fewer Seed and Series A deals.⁴⁵



**Jonathan
Norris**

Managing Director,
HSBC Innovation

KEY DEVELOPMENTS:⁴⁵

- Investors retreating to larger financing deals with several co-investors; the top 10% of US deals in 2024 accounted for \$24.7 billion (54% of all venture healthcare dollars).
- Biopharma made a strong investment return in 2024 with investment dollars in US biopharma increasing by 35% during the year.
- The largest biopharma financing deals of 2024 in the US include Xiara Therapeutics, Areteia Therapeutics, Treeline Biosciences, Kailera, and Mirador Therapeutics.
- Biopharma private VC-backed M&A in the US up-ticked in 2024 including these \$1 billion-plus deals: Profound Bio (Genmab), Mariana Oncology (Novartis), HI-Bio (Biogen), Aliada Therapeutics (AbbVie), Alios (GSK), Jnana Therapeutics (Otsuka), and Kate Therapeutics (Novartis).

- Notable diagnostic test and tool investments in the US include Element Biosciences, Freenome, Colossal Labs, Patho Care, Cellanome, and Billion To One.
- 60 computational biology deals related to AI discovery occurred in the US in 2024, raising \$3.8 billion.
- Medical device investments in the US centered around neurology and non-invasive monitoring (both at \$1.2 billion), and orthopedics (\$808 million).
- Major medical device private VC-backed M&A deals in the US include Stryker's acquisition of Artelon, Vertos, and NICO; Edwards acquisition of Endotronix and Jenavalve; and Hologic's acquisition of Gynesonics.

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⁴⁵ 2024 HSBC Venture Healthcare Report by Jonathan Norris at HSBC Innovation Banking

BAY AREA 2024 PERFORMANCE

IMPACT BY THE NUMBERS

\$123.6B

total economic
output

\$2.15B

overall funding
from the NIH
and NSF

254,365

total jobs
supported

\$43.2B

total labor
income

150,491

directly employed
life science
workers

MORE KEY METRICS

3,809 life science establishments

\$210,560 average yearly salary

The Bay Area includes the nine counties surrounding the San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma counties.



**Jonathan
Norris**

Managing Director,
HSBC Innovation

BAY AREA TOP VENTURE DEALS:

\$1,000M Xaira Therapeutics

\$254M Freenome

\$325M ArsenalBio

\$225M Altrubio

\$300M GondolaBio

\$200M Foodsmart

\$259M Alumis

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BAY AREA A SPOTLIGHT ON CALIFORNIA INNOVATION

In August 2024, Gilead Sciences received FDA accelerated approval for Livdelzi (seladelpar) for the treatment of primary biliary cholangitis (PBC), a chronic autoimmune disease of the bile ducts. PBC can lead to liver cirrhosis and failure, and current treatment options are limited.

Livdelzi is a peroxisome proliferator-activated receptor (PPAR) delta agonist developed by Gilead's team of scientists. Through preclinical and clinical studies, they demonstrated that Livdelzi has anticholestatic, anti-inflammatory, antipruritic, and antifibrotic effects. In the RESPONSE study, Livdelzi reduced alkaline phosphatase (ALP) levels and improved pruritus scores compared to placebo.

This approval provides a new treatment option for PBC patients, addressing an unmet medical need, and has the potential to improve the quality of life for PBC patients worldwide.

Source: <https://www.gilead.com/news/news-details/2024/gileads-livdelzi-seladelpar-granted-accelerated-approval-for-primary-biliary-cholangitis-by-us-fda>
<https://www.gilead.com/news/news-details/2025/gileads-livdelzi-seladelpar-demonstrated-consistent-efficacy-and-safety-regardless-of-prior-treatment-history-in-new-data-presented-at-easl-2025>



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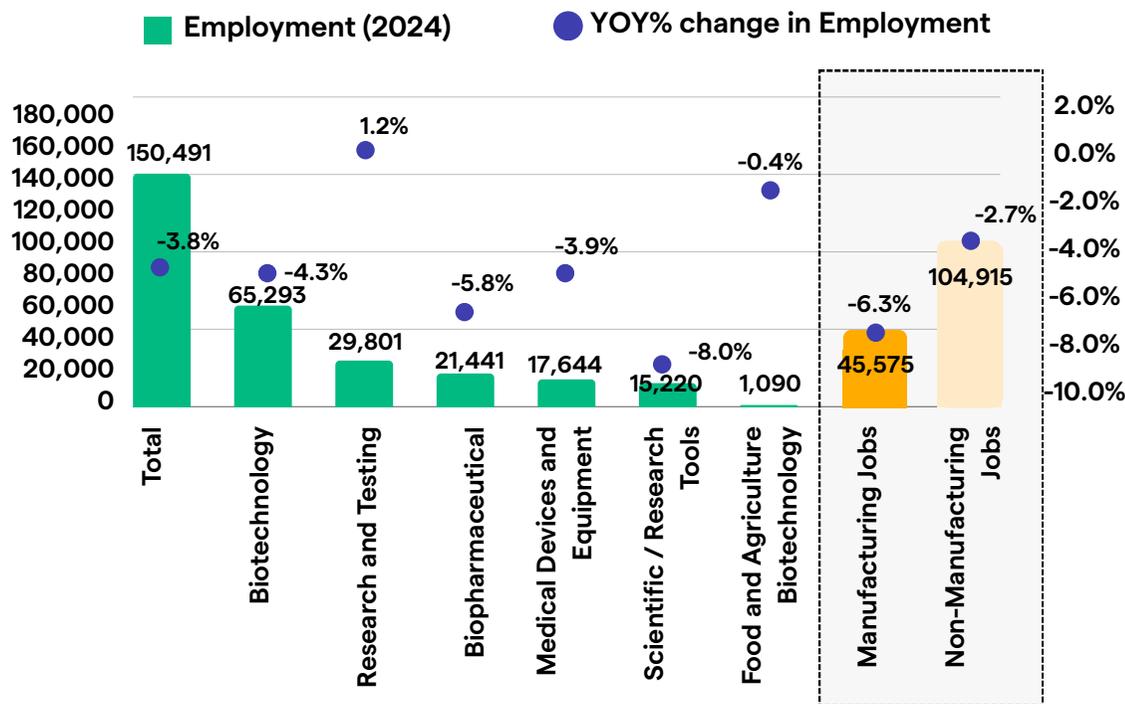
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BAY AREA REGIONAL SPOTLIGHT

The Bay Area region comprising nine counties—Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma—employed 150,491 life science workers in 2024, which represents a 3.8% decline in overall life science employment versus 2023.⁴⁶ The decline is mainly driven by job loss in the analytical laboratory instrument manufacturing; R&D in biotechnology; R&D in engineering, physical and life sciences; and pharmaceutical preparation manufacturing

sub-sectors. Despite the aggregate job loss, job gains were observed in several sub-sectors, namely colleges and universities and electromedical apparatus manufacturing (see Appendix I for job loss/gains by sub-sector). The region’s highly educated workforce, reinforced by proximity to research institutions such as UC San Francisco, Stanford, and UC Berkeley, continues to position the region as one of the most elite and active life science clusters in the world.

Figure 19 Life Science Employment and Growth in Bay Area, 2024



Major life science employers in the region:

- Abbott Laboratories (Regional Office)
- Bayer (Regional Office)
- BioMarin (HQ)
- Boehringer Ingelheim (Regional Office)
- Exelixis (HQ)
- Genentech (Regional Office)
- Gilead Sciences (HQ)
- Grail (HQ)
- Intuitive Surgical (HQ)
- Johnson & Johnson (Regional Office)
- Merck (Regional Office)
- Thermo Fisher Scientific (Regional Office)
- Verily (HQ)



⁴⁶ Bureau of Labor Statistics, aggregated by Chmura’s JobsEQ

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BAY AREA REGIONAL SPOTLIGHT

Notable life science activity during 2024 includes:

Alameda County

- Alamar Biosciences, a precision proteomics company, secured a \$128 million Series C financing to accelerate commercialization of its proteomics platform.⁴⁷

San Francisco City and County

- Atomwise, an AI drug discovery company, completed a \$45 million Series C funding round.⁴⁸

San Mateo County

- Xaira Therapeutics emerged from stealth mode with \$1 billion in financing to transform drug discovery through artificial intelligence.⁴⁹

Solano County

- Swiss-based Lonza acquired Genentech's manufacturing facility in Vacaville from Roche, with plans to upgrade the facility to enhance their mammalian biologics therapeutics capacity and offer approximately 750 Genentech displaced employees continued employment.⁵⁰



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⁴⁷ [Alamar Biosciences Press Release](#)

⁴⁸ [Feb 2025 News Article](#)

⁴⁹ [Apr 2024 News Article](#)

⁵⁰ [Lonza Press Release](#)

BAY AREA REGIONAL SPOTLIGHT

Figure 20 Key Metrics in Bay Area Geographies, 2024

Key Metrics	Direct Employment	Mfg Employment	Direct Emp YOY Growth %	Establishments	Avg Salary/Yr	LQ ⁵¹	NIH Awards	NSF Awards
Alameda County	39,685	12,895	-0.9%	853	\$170,945	4.94	\$322.1M	\$63.4M
Contra Costa County	4,052	1,363	-14.8%	275	\$119,145	1.31	\$8.3M	\$2.0M
Marin County	3,049	1,989	-3.0%	110	\$280,728	35.87	\$25.3M	\$0.4M
Napa County	360	222	-2.6%	25	\$97,823	1.83	\$0.9M	-
San Francisco City and County	16,001	944	-9.5%	547	\$209,066	2.11	\$928.5M	\$18.6M
San Mateo County	42,602	11,028	-3.9%	714	\$267,240	14.42	\$65.8M	\$7.5M
Santa Clara County	39,192	13,541	-3.2%	1,064	\$207,775	4.35	\$653.0M	\$53.8M
Solano County	2,206	1,425	-6.9%	81	\$101,022	3.14	\$0.3M	-
Sonoma County	3,344	2,169	2.3%	140	\$129,582	4.40	\$0.1M	\$2.5M

⁵¹ Location quotient refers to a statistic that measures the concentration of life science employment in the region relative to the concentration of life science employment in the U.S.; higher LQs indicate higher concentrations of employment.

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BAY AREA REGIONAL SPOTLIGHT

Figure 21 Educational Degrees Conferred in Life Science in Bay Area Geographies, 2023⁵²

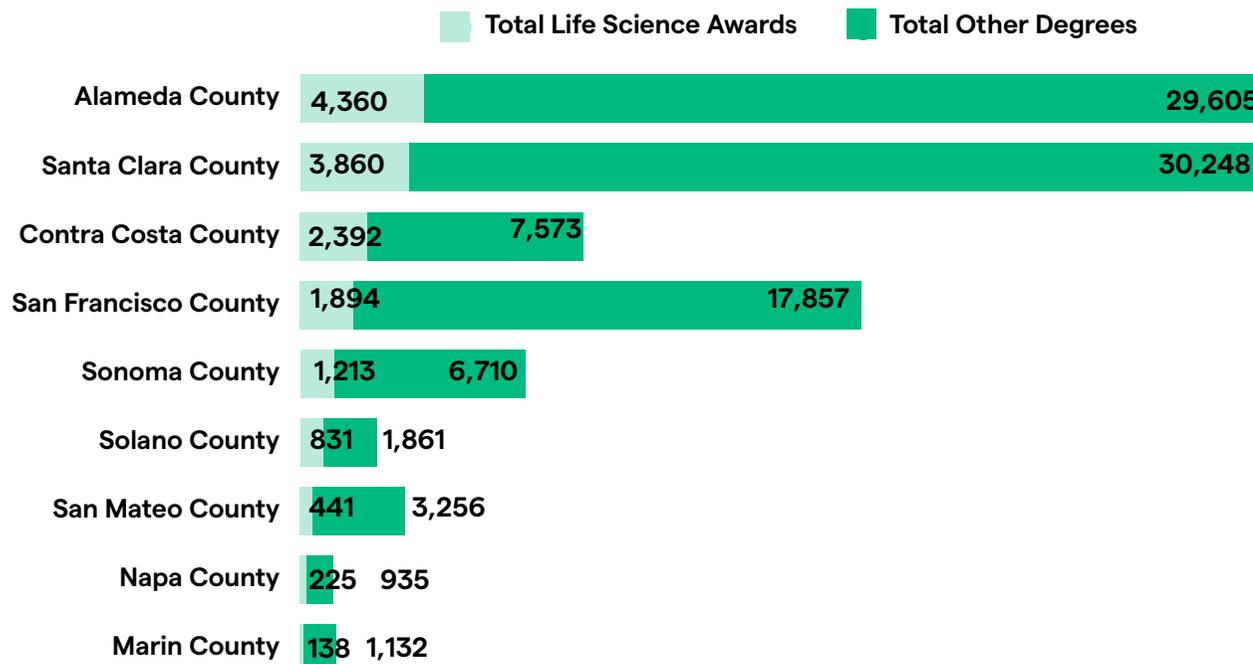
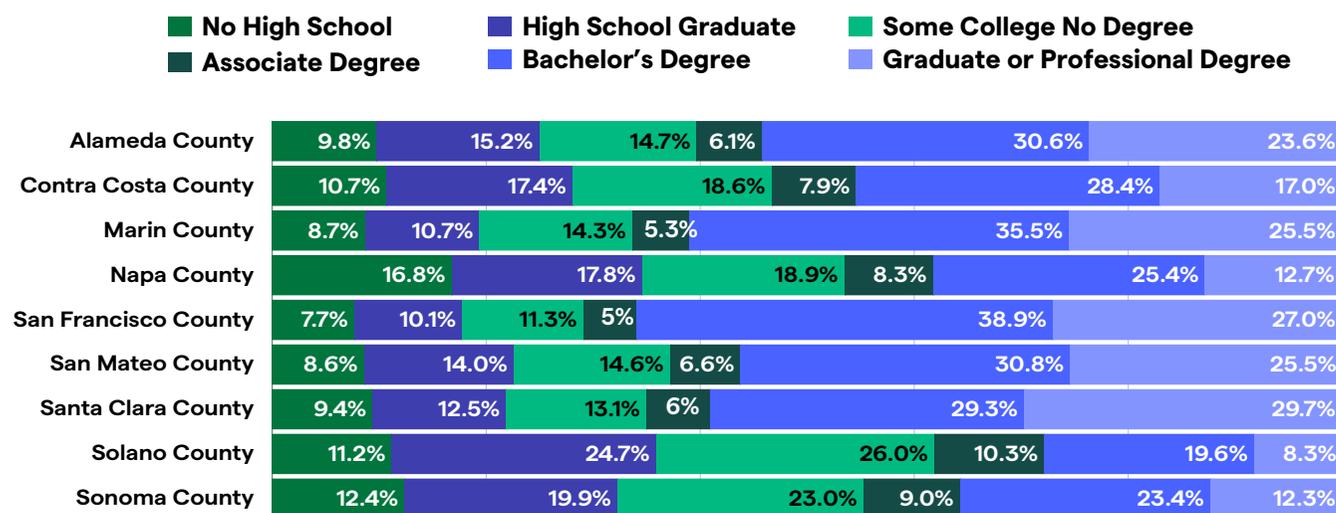


Figure 22 Educational Attainment in Bay Area Geographies, 2023⁵²



⁵² 2023 is the latest year the data is available.

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BAY AREA REGIONAL SPOTLIGHT

Figure 23 Overall Impact of Life Science Sectors in Bay Area, 2024

Impact Type	Direct Impact	Indirect Impact	Induced Impact	Total	Multiplier
Employment	150,491	57,899	45,975	254,365	1.69
Labor Income (\$B)	\$30.5B	\$8.6B	\$4.0B	\$43.2B	1.41
Output (\$B)	\$93.5B	\$19.5B	\$10.5B	\$123.6B	1.32

Figure 24 County-Level Employment in Life Science Sectors in Bay Area Geographies, 2024

County	Biopharma	Biotech	Food and Ag Biotech	Research and Testing	Medical Devices and Equipment	Scientific /Research Tools	Total
Alameda County	3,222	18,435	588	6,456	6,496	4,488	39,685
Contra Costa County	534	1,245	114	832	925	402	4,052
Marin County	2,065	708	3	177	91	5	3,049
Napa County	49	31	3	78	81	118	360
San Francisco City and County	428	6,625	171	7,800	432	545	16,001
San Mateo County	11,218	23,620	111	4,250	2,253	1,150	42,602
Santa Clara County	2,484	14,174	39	9,239	5,518	7,738	39,192
Solano County	1,147	184	7	298	564	7	2,206
Sonoma County	293	271	55	671	1,286	768	3,344

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BAY AREA REGIONAL SPOTLIGHT

Figure 25 County-Level Economic Impact of Life Science Sectors in Bay Area Geographies, 2024

County	Total Emp	Total Labor Income	Total Output
Alameda County	71,817	\$8.8B	\$25.0B
Contra Costa County	7,269	\$0.8B	\$2.4B
Marin County	5,980	\$1.2B	\$4.4B
Napa County	555	\$0.1B	\$0.2B
San Francisco City and County	22,409	\$3.6B	\$7.6B
San Mateo County	71,582	\$15.5B	\$50.3B
Santa Clara County	65,200	\$12.5B	\$29.6B
Solano County	3,356	\$0.3B	\$2.1B
Sonoma County	6,178	\$0.6B	\$1.9B



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GREATER LOS ANGELES

2024 PERFORMANCE

IMPACT BY THE NUMBERS

\$60.2B

total economic output

\$1.51B

overall funding from the NIH and NSF

195,376

total jobs supported

\$17.4B

total labor income

94,585

directly employed life science workers

MORE KEY METRICS

3,966 life science establishments

\$109,170 average yearly salary

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Jonathan Norris

Managing Director,
HSBC Innovation

GREATER LOS ANGELES TOP VENTURE DEALS:

\$158M TORL BioTherapeutic

\$125M Rula

\$150M Patho Care

\$100M Enlaza Therapeutics

\$130M ImmPACT Bio

\$63M Midi Health

\$135M Latigo Bio

\$61M Regard



GREATER LOS ANGELES A SPOTLIGHT ON CALIFORNIA INNOVATION

In May 2024, Amgen's Imdelltra (tarlatamab-dlle) received FDA accelerated approval for the treatment of extensive-stage small cell lung cancer (ES-SCLC) with disease progression after platinum-based chemotherapy. ES-SCLC is an aggressive and often fatal cancer with limited treatment options.

Imdelltra is the first and only DLL3-targeting bispecific T-cell engager therapy. It was developed by Amgen's team of scientists who engineered a novel bispecific antibody that simultaneously binds to the tumor-associated antigen DLL3 and CD3 on T cells, effectively redirecting T cells to attack DLL3-expressing tumor cells. This innovative approach harnesses the body's immune system to target and eliminate cancer cells.

In the Phase 2 DeLLphi-301 clinical trial, Imdelltra demonstrated a 40% objective response rate and a median overall survival of 14.3 months in patients with relapsed / refractory ES-SCLC. This approval offers new hope to patients with limited treatment options and represents a significant advancement in the treatment of ES-SCLC.

Source: <https://www.amgen.com/newsroom/press-releases/2024/05/fda-approves-imdelltra-tarlatamabdille-the-first-and-only-tcell-engager-therapy-for-the-treatment-of-extensivestage-small-cell-lung-cancer>
<https://www.nature.com/articles/s41587-024-02291-3>
<https://www.clinicaltrialsarena.com/projects/imdelltra-tarlatamab-extensive-stage-small-cell-lung-cancer-usa/?cf-view>

For more information
scan QR code:



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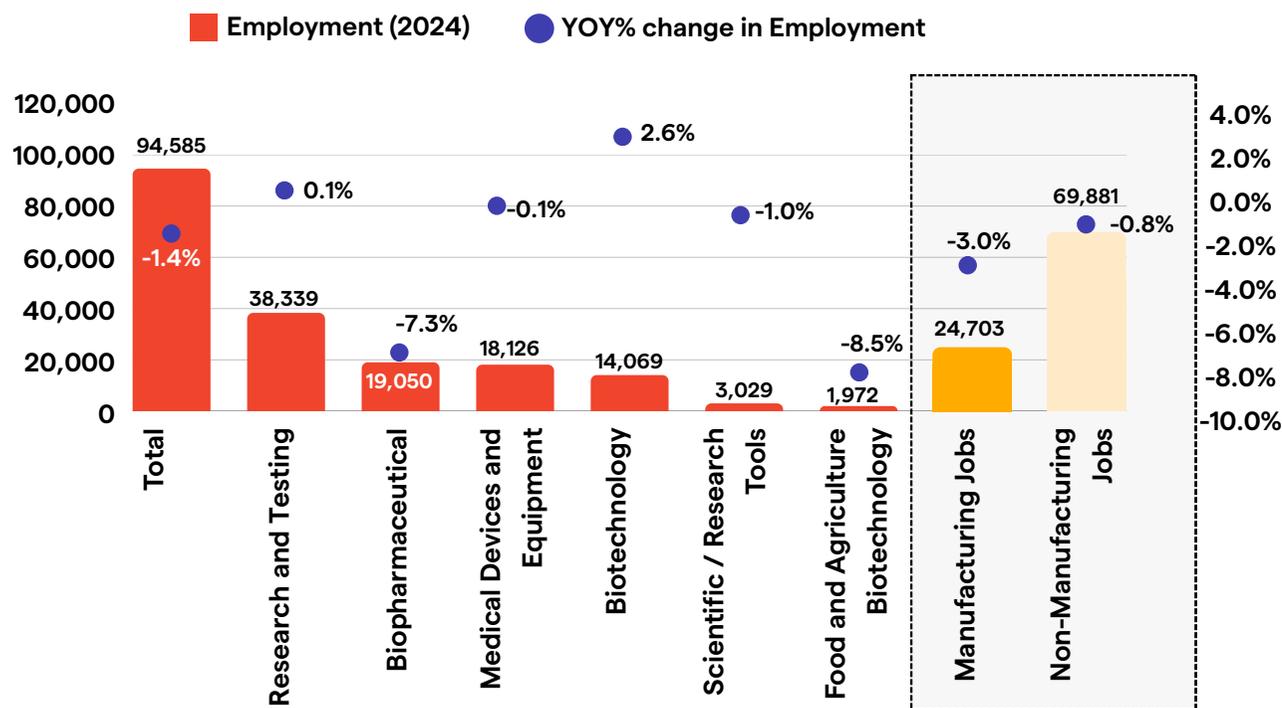
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GREATER LOS ANGELES REGIONAL SPOTLIGHT

The Los Angeles region comprises three counties—Los Angeles, San Bernardino, and Ventura—together employed 94,585 life science workers in 2024, which represents a 1.4% decrease from 2023.⁵³ Employment reductions are concentrated in the surgical appliance and supplies manufacturing; drug wholesale; R&D in engineering, physical, and life sciences; and pharmaceutical preparation manufacturing sub-sectors. A number of sub-sectors experienced increases in

workforce. Surgical and medical instrument manufacturing; R&D in biotechnology; and colleges and universities all added substantial number of jobs during the year (see Appendix I for job loss/gain in sub-sectors). The region’s analytical laboratory instrument manufacturing sub-sector demonstrated considerable growth as Los Angeles continues to be an attractive destination for the clinical laboratory industry (see private investment activity highlighted below).

Figure 26 Life Science Employment and Growth in Greater Los Angeles, 2024



Major life science employers in the region:

- Amgen (HQ)
- Takeda (Regional Office)
- Grifols (HQ)
- Kite Pharma (HQ)
- PolyPeptide Laboratories Inc. (Regional Office)
- Bachem Americas, Inc. (Regional Office)
- Xencor (HQ)



⁵³ Bureau of Labor Statistics, aggregated by JobsEQ

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GREATER LOS ANGELES REGIONAL SPOTLIGHT

Notable life science activity during 2024 includes:

Los Angeles County

- Japan-based pharmaceutical manufacturer, Takeda, announced a \$230 million investment in expanding its Los Angeles manufacturing, specifically adding additional capacity to its plasma fractionation operations which will create 125 new jobs.⁵⁴
- AstraZeneca Pharmaceuticals LP finalized a deal involving a 15-year lease of Instil Bio's facility in Tarzana, California. The lease will expand AstraZeneca's operational footprint in the state and support the company's ongoing biomanufacturing capacity in the region.⁵⁵

Ventura County

- Biological-based pharmaceuticals developer and manufacturer Fujifilm Diosynth Biotechnologies, a subsidiary of Japan-based Fujifilm, announced plans to invest \$100 million (120+ jobs) to add a new development lab and two new independent manufacturing clean rooms at its existing facility in Thousand Oaks.⁵⁶

Figure 27 Key Metrics in Los Angeles Geographies,* 2024

Key Metrics	Direct Employment	Mfg Employment	Direct Emp YOY Growth	Establishments	Avg Wages /yr	LQ ⁵⁷	NIH Awards	NSF Awards
Los Angeles County	81,692	19,813	-1.5%	3,266	\$110,619	0.99	\$1,272.5M	\$223.4M
San Bernardino County	7,488	2,730	4.3%	402	\$76,820	0.69	\$9.3M	\$2.0M
Ventura County	5,405	2,161	-6.9%	298	\$132,100	1.51	\$2.4M	\$0.4M
City of Los Angeles	31,326	4,670	-0.1%	Not reported	\$109,379	1.16	\$1,018.2M	\$87.7M

⁵⁴ [Takeda Press Release](#)

⁵⁵ [Instil Bio Press Release](#)

⁵⁶ [Fujifilm Press Release](#)

⁵⁷ Location quotient refers to a statistic that measures the concentration of life science employment in the region relative to the concentration of life science employment in the U.S.; higher LQs indicate higher concentrations of employment.

* In this analysis, the City of Los Angeles is part of Los Angeles County.

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GREATER LOS ANGELES REGIONAL SPOTLIGHT

Figure 28 Number of Educational Degrees Conferred in Life Science in Los Angeles Geographies, * 2023⁵⁸

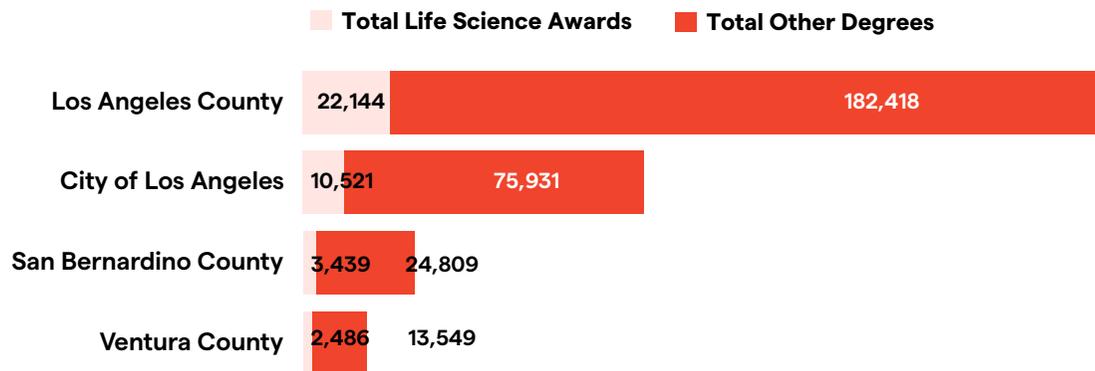
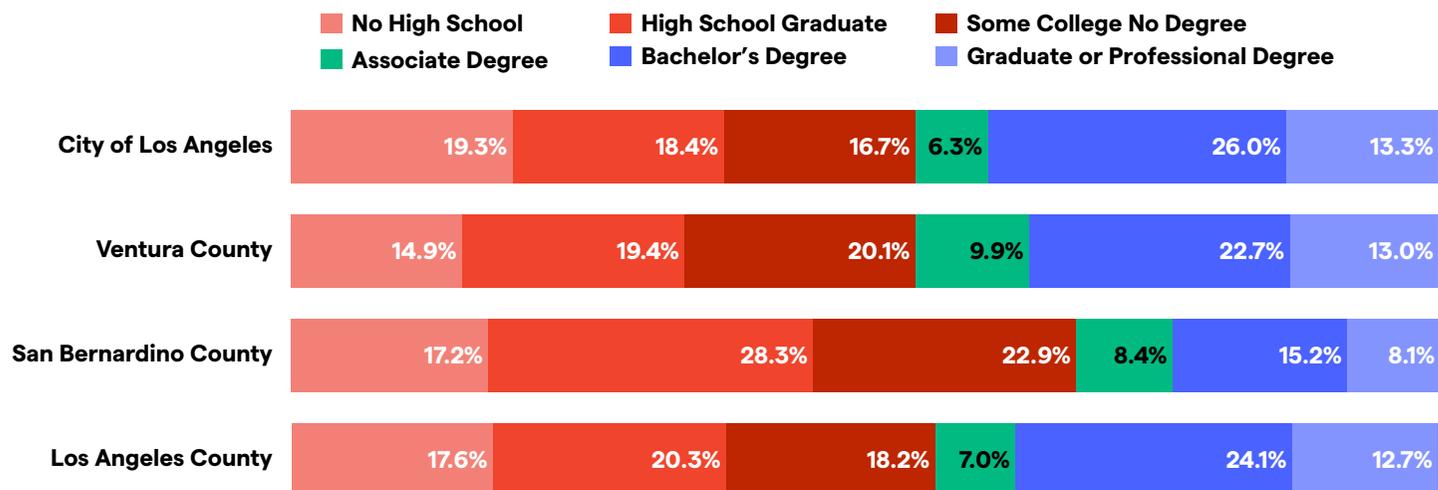


Figure 29 Educational Attainment in Los Angeles Geographies, * 2023⁵⁸



⁵⁸ 2023 is the latest year the data is available.

* In this analysis, the City of Los Angeles is part of Los Angeles County.

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GREATER LOS ANGELES REGIONAL SPOTLIGHT

Figure 30 Overall Impact of Life Science Sectors in Los Angeles,* 2024

Impact Type	Direct Impact	Indirect Impact	Induced Impact	Total	Multiplier
Employment	94,585	53,763	47,028	195,376	2.07
Labor Income (\$B)	\$9.6B	\$4.7B	\$3.1B	\$17.4B	1.81
Output (\$B)	\$38.2B	\$12.8B	\$9.2B	\$60.2B	1.58

Figure 31 County-Level Employment in Life Science Sectors in Los Angeles Geographies,* 2024

County	Biopharma	Biotech	Food and Ag Biotech	Research and Testing	Medical Devices and Equipment	Scientific /Research Tools	Total
Los Angeles County	15,380	13,006	1,423	35,222	14,235	2,425	81,692
San Bernardino County	1,691	170	416	2,134	2,587	490	7,488
Ventura County	1,979	893	133	983	1,303	114	5,405
City of Los Angeles	4,555	3,837	444	18,494	3,461	535	31,326

* In this analysis, the City of Los Angeles is part of Los Angeles County.

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GREATER LOS ANGELES REGIONAL SPOTLIGHT

Figure 32 County-Level Economic Impact of Life Science Sectors in Los Angeles Geographies,* 2024

County	Total Emp	Total Labor Income	Total Output
Los Angeles County	170,231	\$15.3B	\$51.0B
San Bernardino County	12,961	\$1.0B	\$4.5B
Ventura County	12,178	\$1.2B	\$4.7B
City of Los Angeles	59,764	\$5.2B	\$15.8B



* In this analysis, the City of Los Angeles is part of Los Angeles County.

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ORANGE COUNTY 2024 PERFORMANCE

IMPACT BY THE NUMBERS

\$44.8B

total economic
output

\$332.8M

overall funding
from the NIH
and NSF

133,598

total jobs
supported

\$14B

total labor
income

60,986

directly employed
life science
workers

MORE KEY METRICS

1,901 life science establishments

\$115,515 average yearly salary

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**Jonathan
Norris**

Managing Director,
HSBC Innovation

ORANGE COUNTY TOP VENTURE DEALS:

\$60M Beta Bionics

\$28M AtaCor Medical

\$36M Patientfi

\$20M Immunis

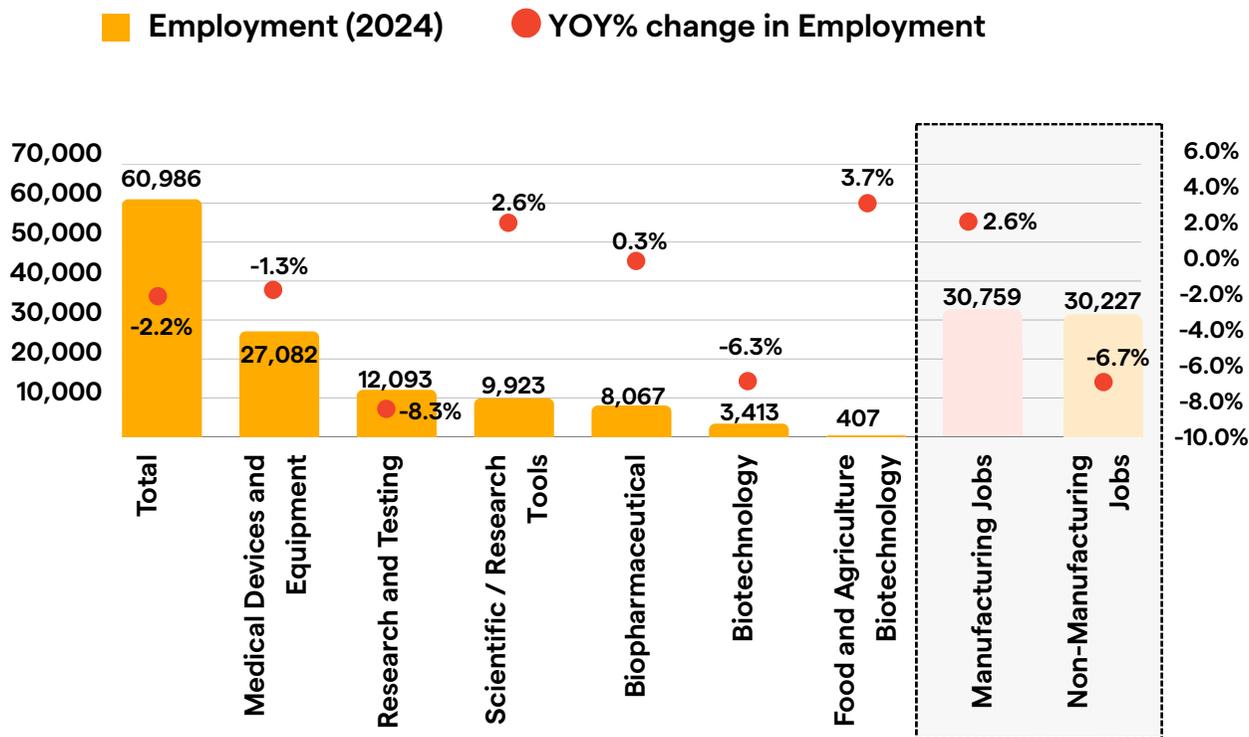
\$32M Bright Uro

ORANGE COUNTY REGIONAL SPOTLIGHT

Orange County employed 60,986 life science workers in 2024, which represented a 2.2% decrease versus 2023.⁵⁹ Workforce reductions were concentrated in the medical laboratories; equipment wholesale; R&D in engineering, physical and life sciences; and dental laboratories sub-sectors. Job gains were observed in several sectors. Electromedical apparatus manufacturing, surgical appliance and supplies manufacturing, irradiation

apparatus manufacturing, and pharmaceutical preparation manufacturing were all substantial contributors to job creation in Orange County during the year (see Appendix I for job loss/gain by sub-sector). In particular, the growth in medical device manufacturing sub-sectors highlights the continued strength of Orange County's existing medical device cluster.

Figure 33 Life Science Employment and Growth in Orange County, 2024



Major life science employers in the region:

- Abbott (Regional Office)
- AbbVie (Regional Office)
- Edwards Life Science (HQ)
- Masimo (HQ)
- Medtronic (Regional Office)



⁵⁹ Bureau of Labor Statistics, aggregated by JobsEQ

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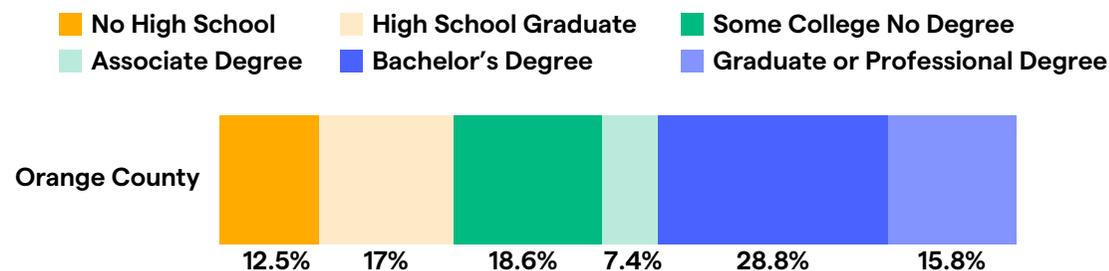
Figure 34 Key Metrics in Orange County Geographies, 2024

Key Metrics	Direct Employment	Mfg Employment	Direct Emp YOY	Establishments	Avg Wages /yr	LQ	NIH Awards	NSF Awards ⁶⁰
Orange	60,986	30,759	-2.2%	1,901	\$115,515	4.89	\$287.3M	\$45.5M

Figure 35 Number of Educational Degrees Conferred in Life Science in Orange County Geographies, 2023⁶¹



Figure 36 Educational Attainment in Orange County Geographies, 2023⁶¹



⁶⁰ Location quotient refers to a statistic that measures the concentration of life science employment in the region relative to the concentration of life science employment in the U.S.; higher LQs indicate higher concentrations of employment.

⁶¹ 2023 is the latest year the data is available.

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ORANGE COUNTY REGIONAL SPOTLIGHT

Figure 37 Overall Impact of Life Science Sectors in Orange County, 2024

Impact Type	Direct Impact	Indirect Impact	Induced Impact	Total	Multiplier
Employment	60,986	37,246	35,366	133,598	2.19
Labor Income (\$B)	\$7.8B	\$3.7B	\$2.4B	\$14.0B	1.78
Output (\$B)	\$28.2B	\$9.7B	\$7.0B	\$44.8B	1.59

Figure 38 County-Level Employment in Life Science Sectors in Orange County Geographies, 2024

County	Biopharma	Biotech	Food and Ag Biotech	Research and Testing	Medical Devices and Equipment	Scientific / Research Tools	Total
Orange County	8,067	3,413	407	12,093	27,082	9,923	60,986

Figure 39 County-Level Economic Impact of Life Science Sectors in Orange County Geographies, 2024

County	Total Emp	Total Labor Income	Total Output
Orange County	133,598	\$14.0B	\$44.8B

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SAN DIEGO 2024 PERFORMANCE

IMPACT BY THE NUMBERS

\$54.1B

total economic
output

\$1.13B

overall funding
from the NIH
and NSF

166,907

total jobs
supported

\$17B

total labor
income

71,448

directly employed
life science
workers

MORE KEY METRICS

2,042 life science establishments

\$171,580 average yearly salary

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**Jonathan
Norris**

Managing Director,
HSBC Innovation

SAN DIEGO TOP VENTURE DEALS:

\$400M Mirador Therapeutics

\$385M Avenzo

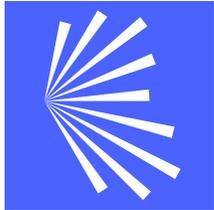
\$370M Candid Therapeutics

\$277M Element Biosciences

\$175M Capstan Therapeutics

\$157M Engrail Therapeutics

\$135M Mainstay Medical



SAN DIEGO

A SPOTLIGHT ON CALIFORNIA INNOVATION

In December 2024, Neurocrine Biosciences received FDA approval for CRENESSITY™ (crinecerfont), a groundbreaking treatment for classic congenital adrenal hyperplasia (CAH). This rare genetic disorder impairs cortisol production, leading to excessive androgen levels and requiring lifelong glucocorticoid therapy, typically at doses higher than needed for cortisol replacement.

The development of CRENESSITY was spearheaded by a team at Neurocrine Biosciences, building upon decades of research initiated by the late Dr. Wylie W. Vale. Dr. Vale's pioneering work in neuroendocrinology uncovered the critical role of corticotropin-releasing factor (CRF) in regulating the hypothalamic-pituitary-adrenal axis. This foundational research led to the identification of the CRF type 1 receptor (CRF1) as a therapeutic target for CAH. The work that Dr. Vale initiated was then continued by Neurocrine scientists under the direction of long-time Chief Research Officer, Dr. Dimitri Gigoriadis.

CRENESSITY is a potent and selective oral CRF1 antagonist that reduces elevated adrenocorticotrophic hormone and downstream excess adrenal androgen production, allowing for glucocorticoid dose reduction. In Phase 3 clinical trials, adults using CRENESSITY reduced their daily glucocorticoid dose by 27% while androgen levels were

Source: <https://neurocrine.gcs-web.com/news-releases/news-release-details/neurocrine-biosciences-announces-fda-approval-crenessitytm>

improved or maintained, whereas those on placebo reduced it by only 10%. In pediatric trials, those on CRENESSITY lowered their daily glucocorticoid dose by 18% while androgen levels were improved or maintained, unlike the placebo group, which increased their dose by almost 6%. In clinical trials, CRENESSITY was generally well tolerated. The most commonly reported side effects were fatigue in adults and headache in pediatric patients.

This approval marks the first new treatment for CAH in more than 70 years since the development of glucocorticoids in the 1950s, offering patients an alternative to high dose glucocorticoid therapy. CRENESSITY has the potential to redefine the standard of care for CAH patients worldwide.



For more information
scan QR code:



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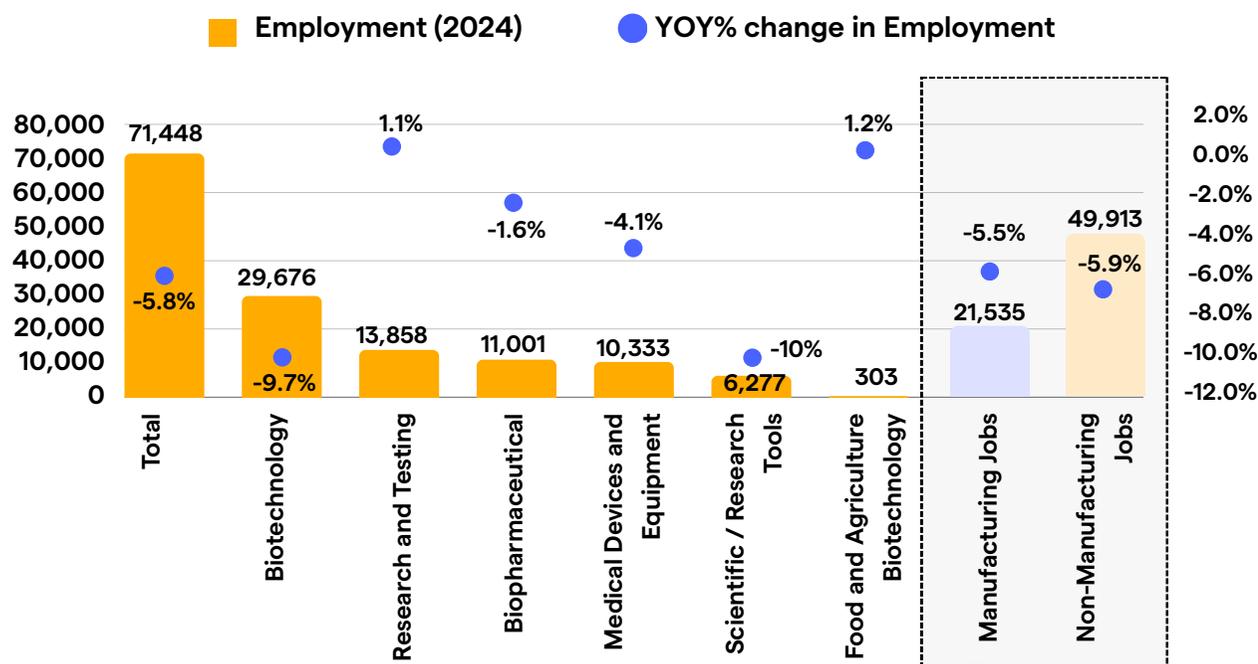
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SAN DIEGO REGIONAL SPOTLIGHT

The San Diego region employed 71,448 life science workers in 2024, which represents a 5.8% decline versus 2023.⁶² Workforce reductions were concentrated in R&D in biotechnology; R&D in engineering, physical and life sciences; electromedical apparatus manufacturing; equipment wholesale; and medical laboratories sub-sectors. A number of sub-sectors experienced job gains. Colleges

and universities and drug wholesale contributed to job creation during the year (see Appendix I for job loss/gain by sub-sector). San Diego continues to be a major life science innovation cluster, with a number of global companies opening new R&D and accelerator facilities in the region during the year (see private investment activity in San Diego below).

Figure 40 Life Science Employment and Growth in San Diego, 2024



Major life science employers in the region:

- Bristol Myers Squibb (Regional R&D Center)
- Eli Lilly (Regional R&D Center)
- Dexcom (HQ)
- Illumina (HQ)
- Hologic (Regional R&D Center)
- Pfizer (Regional R&D Center)
- Quidel (HQ)
- Scripps Research (HQ)
- Vertex (Regional R&D Center)
- A notable closure includes Takeda shuttering their R&D facility in San Diego in July.



⁶² Bureau of Labor Statistics, aggregated by JobsEQ

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SAN DIEGO REGIONAL SPOTLIGHT

Notable life science activity during 2024 includes:

San Diego County:

- German-based Wacker Biotech announced an expansion to its San Diego facilities to grow its mRNA and protein production capacity at an estimated 150+ jobs.⁶³
- Entos Pharmaceuticals, a Canada-based pharmaceuticals manufacturer, launched a GMP clinical manufacturing facility in Carlsbad focused on manufacturing genetic medicines based on the Entos Fusogenix PLV platform.⁶⁴
- Swiss-based Novartis announced its plans to establish a new manufacturing facility in Carlsbad for the manufacturing on radioligand therapies related to cancer treatment.⁶⁵
- Qpex Biopharma, a subsidiary of Japan-based Shionogi, is investing in a new discovery laboratory as an expansion to its R&D facilities in San Diego focused on antimicrobial R&D and drug discovery efforts.⁶⁶
- Eli Lilly announced the opening of its first Gateway Lab in San Diego, offering participating companies state-of-the-art lab space and access to Lilly's scientists, researchers, and expertise.⁶⁷
- Vividion Therapeutics, subsidiary of German-based Bayer, announced it would add onto its operations with a new development center and corporate headquarters to add capacity to its chemoproteomics screening.⁶⁸
- Hungarian medical technology company, MedRes, opened a new technology development center in Carlsbad to accelerate projects related to cardiovascular intervention and minimally invasive surgery.⁶⁹
- Arga Medtech, a Swiss-based start-up, announced plans to expand its offices to support clinical activities related to its non-thermal energy based cardiac ablation system for the treatment of cardiac arrhythmias.⁷⁰



⁶³ [Wacker Press Release](#)

⁶⁴ [Entos Pharmaceuticals Press Release](#)

⁶⁵ [Novartis Press Release](#)

⁶⁶ [Qpex Biopharma Press Release](#)

⁶⁷ [Eli Lilly Press Release](#)

⁶⁸ [Vividion Press Release](#)

⁶⁹ [MedRes Press Release](#)

⁷⁰ [Arga MedTech Press Release](#)

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Figure 41 Key Metrics in San Diego Geographies, * 2024

Key Metrics	Direct Employment	Mfg Employment	Direct Emp YOY Growth	Establishments	Avg Wages /yr	LQ ⁷¹	NIH Awards	NSF Awards
San Diego County	71,448	21,535	-5.8%	2,042	\$171,580	4.24	\$1,031.9M	\$99.7M
City of San Diego	51,996	10,626	-5.1%	Not reported	\$181,695	6.64	\$126.6M	\$26.5M

Figure 42 Number of Educational Degrees Conferred in Life Science in San Diego Geographies, * 2023⁷²

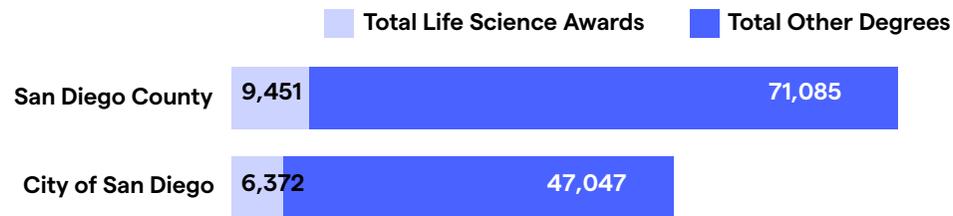
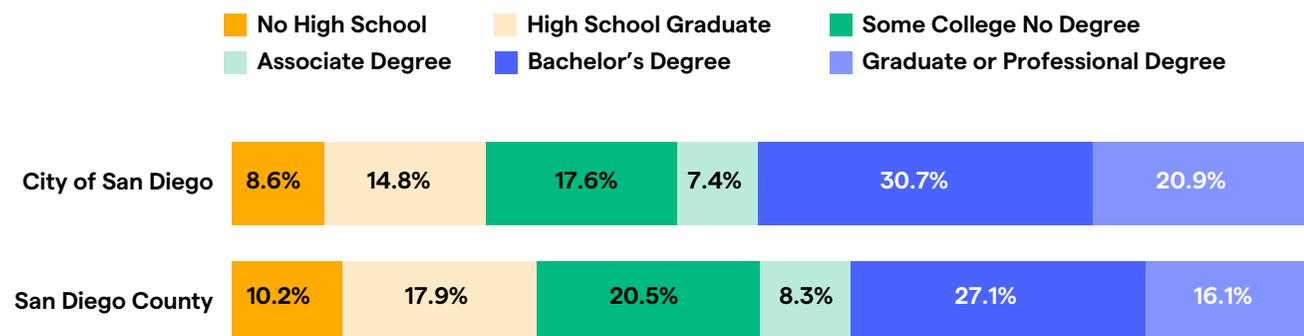


Figure 43 Educational Attainment in San Diego Geographies, * 2023⁷²



⁷¹ Location quotient refers to a statistic that measures the concentration of life science employment in the region relative to the concentration of life science employment in the U.S.; higher LQs indicate higher concentrations of employment

⁷² 2023 is the latest year the data is available.

* In this analysis, the City of San Diego is part of San Diego County.

Prepared for Biocom California, the life science trade association for the State of California. When referencing this document, please use "Biocom California's 2025 Life Science Economic Impact Report" for citation.

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SAN DIEGO REGIONAL SPOTLIGHT

Figure 44 Overall Impact of Life Science Sectors in San Diego, * 2024

Impact Type	Direct Impact	Indirect Impact	Induced Impact	Total	Multiplier
Employment	71,448	44,999	50,460	166,907	2.34
Labor Income (\$B)	\$9.8B	\$4.0B	\$3.2B	\$17.0B	1.73
Output (\$B)	\$33.8B	\$10.9B	\$9.5B	\$54.1B	1.60

Figure 45 County-Level Employment in Life Science Sectors in San Diego Geographies, * 2024

County	Biopharma	Biotech	Food and Ag Biotech	Research and Testing	Medical Devices and Equipment	Scientific / Research Tools	Total
San Diego	11,001	29,676	303	13,858	10,333	6,277	71,448
City of San Diego	5,993	26,781	217	10,397	5,227	3,380	51,996

Figure 46 County-Level Economic Impact of Life Science Sectors in San Diego Geographies, * 2024

County	Total Emp	Total Labor Income	Total Output
San Diego	166,907	\$17.0B	\$54.1B
City of San Diego	119,190	\$12.0B	\$35.4B

*In this analysis, the City of San Diego is part of San Diego County.

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APPENDIX A

ENHANCEMENTS CARRIED FORWARD IN 2025

LIFE SCIENCE ECONOMIC IMPACT REPORT

The 2025 edition of Biocom California’s Annual Economic Impact Report carries forward the adjustments to methodology that were implemented in the 2024 edition, which are summarized as follows:

NAICS Code Adjustment:

- The 2025 edition of the Life Science Economic Impact Report carries forward one NAICS code re-categorization: R&D in engineering, physical and life sciences (NAICS code 541715), continues to be mapped to “Biotechnology.”

Industry Sector Re-labeling:

- Previous years’ reports referred to the industry sector category “Research and Manufacturing.” With the NAICS code adjustment introduced to the 2023 edition, the category continues to be labeled as “Research and Testing.”

Period of Performance:

- Due to the availability of Q4 data at the time of data collection, the period of performance for 2024 is defined as Q4 of 2023 through Q3 of 2024, i.e. the year beginning Oct. 1, 2023, and ending on Sept. 30, 2024.

Peer Markets:

- The 2025 edition carries forward a comparison of California with selected peer markets in the U.S., which were selected based on being either existing or growing clusters of life science activity.

Growth Calculation:

- The data sources used in this report revise their treatment of previous years’ data during the course of the year due to more updated information being available. This report collects data for both 2024 and 2023 defined by the period of performance above, to reflect the most current perspective on prior year data. The year-over-year growth percentages depicted in the report are based on the data collected for this edition of the report, and not based on data collected in previous editions of the report.

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APPENDIX B

NAICS CODE DEFINITIONS

1. Biotechnology

325220 Artificial and Synthetic Fibers and Filaments Manufacturing
 541713 Research and Development in Nanotechnology
 541714 Research and Development in Biotechnology
 541715 Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (46%)

2. Biopharmaceuticals

325411 Medicinal and Botanical Manufacturing
 325412 Pharmaceutical Preparation Manufacturing
 325413 In Vitro Diagnostic Substance Manufacturing
 325414 Biological Product (except Diagnostic) Manufacturing
 424210 Drugs and Druggists' Sundries Merchant Wholesalers

3. Medical Devices and Equipment

327215 Glass Product Manufacturing Made of Purchased Glass(15%)
 333314 Optical Instrument and Lens Manufacturing⁷⁵ (15%)
 334517 Irradiation Apparatus Manufacturing
 339112 Surgical and Medical Instrument Manufacturing
 339113 Surgical Appliance and Supplies Manufacturing
 339114 Dental Equipment and Supplies Manufacturing
 339115 Ophthalmic Goods Manufacturing
 339116 Dental Laboratories
 334517 Irradiation Apparatus Manufacturing
 423450 Medical, Dental and Hospital Equipment and Supplies Merchant Wholesalers

4. Research and Manufacturing

541380 Testing Laboratories (12%)
 611310 Colleges, Universities, and Professional Schools (Private) (25%)
 621511 Medical Laboratories

5. Scientific/Research Tools

325199 All Other Basic Organic Chemical Manufacturing
 334516 Analytical Laboratory Instrument Manufacturing
 334510 Electromedical and Electrotherapeutic Apparatus Manufacturing
 334513 Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables (20%)

6. Food and Agriculture Biotechnology

325193 Ethyl Alcohol Manufacturing
 311999 All Other Miscellaneous Food Manufacturing (10%)
 325311 Nitrogenous Fertilizer Manufacturing (15%)
 325312 Phosphatic Fertilizer Manufacturing (15%)
 325314 Fertilizer (Mixing Only) Manufacturing (15%)
 325320 Pesticide and Other Agricultural Chemical Manufacturing (15%)

⁷⁵ The Census Bureau introduced changes to NAICS code classifications which impacted 1 life science NAICS code. "Optical Instrument and Lens Manufacturing" is now recorded under "Commercial and Service Industry Machinery Manufacturing".

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APPENDIX C

GLOSSARY OF TERMS

Term	Description
AI	Artificial intelligence
DEI	Diversity, Equity, and Inclusion
Direct impact	Those impacts (employment, labor income, output) that are attributed directly to life science organizations
DOD	Department of Defense
DOE	Department of Energy
Company	A specific type of organization typically formed for the purpose of conducting commercial activities, otherwise called a business entity (corporation, partnership, or limited liability company)
ERG	Employee Resource Groups
Establishment	A specific location or facility for conducting organizational activities, where a single organization could have multiple associated establishments
Employment	Payroll jobs
EO	Executive Order
FDA	Food and Drug Administration
Indirect impact	Those impacts (employment, labor income, output) that result from activity between life science organizations and their suppliers and contractors
Induced impact	Those impacts (employment, labor income, output) that result from consumer expenditures of life science workers, and the workers in supplier and contractor industries
IoT	Internet of Things
Labor Income	Salaries, compensation, and sole proprietor income
Location Quotient	The concentration of industry activity in geographic area relative to the industry's concentration in the US overall
M&A	Mergers and acquisitions
Multiplier	The ratio of the total impact relative to the direct impact, i.e. the total impact divided by the direct impact
NIH	National Institute of Health
NSF	National Science Foundation
Organization	A legal entity representing a structured group of people working together to achieve a common goal, e.g. company, institution, association, non-profit, etc.
Output	Business sales
PE	Private equity
Productivity	Output (sales) per worker
STEM	Science, Technology, Engineering & Mathematics
Total Impact	An aggregate sum of the direct, indirect, and induced impacts
VC	Venture capital

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DATA COLLECTION

Data collection was performed using two distinct methods. For sources that provided search options by NAICS codes, the list of NAICS codes in Appendix B and the corresponding industry weightings were used.

For sources that did not provide search by NAICS codes, keyword searches were used. The keywords used across all platforms were biorenewable, biofuel, biopharmaceutical, biotechnology, nanotechnology, bioagriculture, drug delivery, drug discovery, pharmaceuticals, diagnostic equipment, medical supplies, monitoring equipment, surgical devices, therapeutics devices, laboratory services.

The following sources required keyword searches:

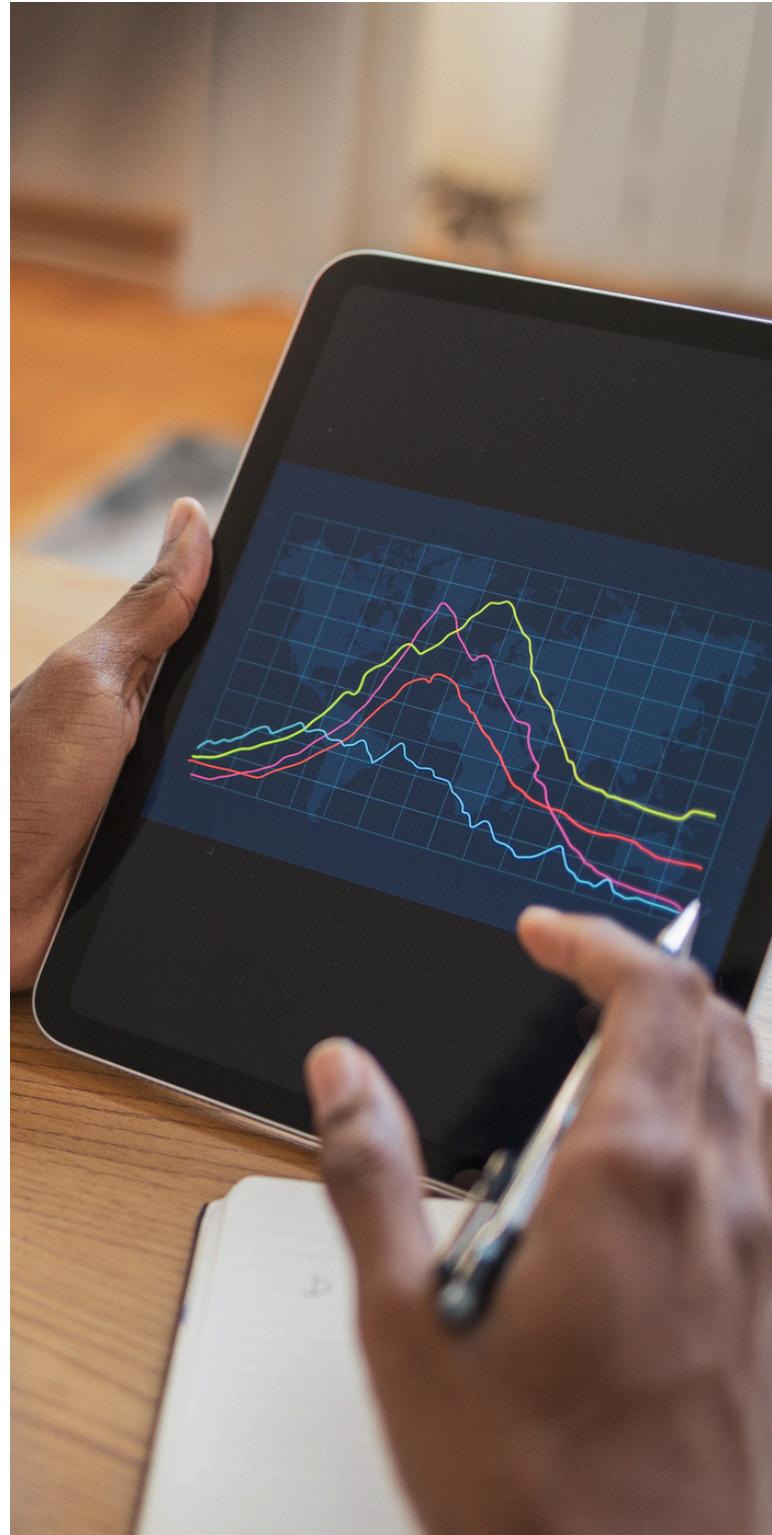
- Pitchbook Inc. Data
- U.S. Patent and Trademark Office

NAICS Code searches were performed to collect data from the following sources:

- Bureau of Labor Statistics, aggregated by JobsEQ
- USASpending.gov

IMPLAN

IMPLAN, a widely used econometric forecasting tool, uses unique industry codes. A majority of these codes for the life science industry map directly to NAICS codes. For those that were not direct matches, an intensive analysis was completed to ensure accuracy of the IMPLAN codes in relation to the industry. IMPLAN models were designed and built to generate the overall economic impacts (direct, indirect, and induced) for California and all four regions within California. These models were run using 2024 employment numbers by industry category.



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ECONOMIC IMPACT OF LIFE SCIENCE SECTORS

Employment Impact (Jobs) – Sorted by Sector, Ranked by Direct Employment

Sector	sub-sector	Employment (Jobs)			
		Direct	Indirect	Induced	Multiplier
Biopharmaceuticals	Wholesale - Drugs	30,888	51,412	39,965	3.96
	Pharmaceutical Preparation Mfg	26,077	38,399	39,214	3.98
	In-Vitro Diagnostic Substance Mfg	8,219	5,477	7,815	2.62
	Medicinal and Botanical Mfg	6,290	6,329	7,787	3.24
	Biological Product Mfg	2,947	3,395	3,411	3.31
Biotechnology	Research and Development in Biotechnology	68,234	48,000	65,268	2.66
	Research and Development in General Life Sciences	51,860	36,481	49,606	2.66
	Research and Development in Nanotechnology	4,112	2,893	3,933	2.66
	Artificial and Synthetic Fibers and Filaments Mfg	98	113	100	3.17
Food and Agriculture Biotech	All Other Miscellaneous Food Mfg	4,620	6,107	3,267	3.03
	Fertilizer (Mixing Only) Mfg	872	1,163	758	3.20
	Ethyl Alcohol Mfg	190	597	305	5.75
	Nitrogenous Fertilizer Mfg	134	474	249	6.39
	Pesticide and Other Agricultural Chemical Mfg	124	243	169	4.32
	Phosphatic Fertilizer Mfg	38	74	44	4.10
Medical Equipment	Surgical and Medical Instrument Mfg	31,312	15,625	24,364	2.28
	Wholesale - Medical Equipment and Supplies	29,813	20,651	26,102	2.57
	Surgical Appliance and Supplies Mfg	10,028	7,566	8,326	2.58
	Dental Laboratories	9,508	2,539	4,055	1.69
	Ophthalmic Goods Mfg	4,285	2,487	2,624	2.19
	Dental Equipment and Supplies Mfg	3,273	1,756	2,166	2.20
	Irradiation Apparatus Mfg	2,844	5,504	4,425	4.49
	Commercial and Service Industry Machinery Mfg	580	506	525	2.78
	Glass Product Mfg Made of Purchased Glass	573	482	364	2.48
Research and Testing	Colleges, Universities, and Professional Schools	83,738	8,555	25,471	1.41
	Medical Laboratories	30,728	5,199	15,692	1.68
	Testing Laboratories and Services	2,508	424	1,281	1.68
Scientific / Research Tools	Electromedical and Electrotherapeutic Apparatus Mfg	22,463	20,969	24,120	3.01
	Analytical Laboratory Instrument Mfg	12,237	11,404	12,636	2.96
	All Other Basic Organic Chemical Mfg	2,479	7,785	3,983	5.75
	Instruments Measuring, Displaying, Etc Mfg	1,383	935	1,041	2.43

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APPENDIX E (CONT.) ECONOMIC IMPACT OF LIFE SCIENCE SECTORS

Labor Income Impact (Wages, Compensation, and Sole Proprietor Income, \$M) – Sorted by Sector, Ranked by Direct Labor Income

Sector	sub-sector	LABOR INCOME (\$ MILLIONS)			
		Direct	Indirect	Induced	Multiplier
Biopharmaceuticals	Pharmaceutical Preparation Mfg	\$5,352	\$4,794	\$2,864	2.43
	Wholesale – Drugs	\$5,343	\$5,010	\$2,919	2.48
	In Vitro Diagnostic Substance Mfg	\$1,403	\$620	\$571	1.85
	Medicinal and Botanical Mfg	\$1,280	\$735	\$569	2.02
	Biological Product Mfg	\$517	\$366	\$249	2.19
Biotechnology	Research and Development in Biotechnology	\$12,046	\$4,812	\$4,766	1.80
	Research and Development in General Life Sciences	\$9,155	\$3,657	\$3,623	1.80
	Research and Development in Nanotechnology	\$726	\$290	\$287	1.80
	Artificial and Synthetic Fibers and Filaments Mfg	\$14	\$12	\$7	2.43
Food and Agriculture Biotech	All Other Miscellaneous Food Mfg	\$342	\$508	\$239	3.18
	Fertilizer (Mixing Only) Mfg	\$86	\$111	\$55	2.93
	Ethyl Alcohol Mfg	\$26	\$53	\$22	3.92
	Pesticide and Other Agricultural Chemical Mfg	\$18	\$26	\$12	3.09
	Nitrogenous Fertilizer Mfg	\$14	\$50	\$18	5.70
	Phosphatic Fertilizer Mfg	\$4	\$7	\$3	3.40
Medical Equipment	Wholesale – Medical Equipment and Supplies	\$4,929	\$1,834	\$1,906	1.76
	Surgical and Medical Instrument Mfg	\$4,646	\$1,678	\$1,779	1.74
	Surgical Appliance and Supplies Mfg	\$1,334	\$826	\$608	2.08
	Dental Laboratories	\$780	\$273	\$296	1.73
	Irradiation Apparatus Mfg	\$567	\$575	\$323	2.58
	Ophthalmic Goods Mfg	\$464	\$216	\$192	1.88
	Dental Equipment and Supplies Mfg	\$380	\$182	\$158	1.90
	Commercial and Service Industry Machinery Mfg	\$78	\$57	\$38	2.21
	Glass Product Mfg Made of Purchased Glass	\$49	\$45	\$27	2.47
Research and Testing	Colleges, Universities, and Professional Schools	\$5,994	\$648	\$1,860	1.42
	Medical Laboratories	\$3,530	\$495	\$1,146	1.46
	Testing Laboratories and Services	\$288	\$40	\$94	1.46
Scientific / Research Tools	Electromedical and Electrotherapeutic Apparatus Mfg	\$3,846	\$2,378	\$1,762	2.08
	Analytical Laboratory Instrument Mfg	\$1,894	\$1,361	\$923	2.21
	All Other Basic Organic Chemical Mfg	\$336	\$692	\$291	3.92
	Instruments Measuring, Displaying, Etc Mfg	\$159	\$109	\$76	2.16

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APPENDIX E (CONT.) ECONOMIC IMPACT OF LIFE SCIENCE SECTORS

Output Impact (Business Sales, \$M) – Sorted by Sector, Ranked by Direct Output

Sector	sub-sector	BUSINESS OUTPUT (\$ MILLIONS)			
		Direct	Indirect	Induced	Multiplier
Biopharmaceuticals	Pharmaceutical Preparation Mfg	\$49,324	\$14,674	\$8,341	1.47
	Wholesale – Drugs	\$28,093	\$12,711	\$8,499	1.76
	Medicinal and Botanical Mfg	\$6,896	\$2,429	\$1,656	1.59
	In Vitro Diagnostic Substance Mfg	\$5,905	\$2,205	\$1,662	1.65
	Biological Product Mfg	\$4,447	\$1,305	\$726	1.46
Biotechnology	Research and Development in Biotechnology	\$25,969	\$11,743	\$13,877	1.99
	Research and Development in General Life Sciences	\$19,737	\$8,925	\$10,547	1.99
	Research and Development in Nanotechnology	\$1,565	\$708	\$836	1.99
	Artificial and Synthetic Fibers and Filaments Mfg	\$98	\$37	\$21	1.59
Food and Agriculture Biotech	All Other Miscellaneous Food Mfg	\$2,174	\$1,646	\$695	2.08
	Fertilizer (Mixing Only) Mfg	\$694	\$468	\$161	1.91
	Ethyl Alcohol Mfg	\$461	\$227	\$65	1.63
	Nitrogenous Fertilizer Mfg	\$325	\$183	\$53	1.72
	Pesticide and Other Agricultural Chemical Mfg	\$302	\$93	\$36	1.42
	Phosphatic Fertilizer Mfg	\$68	\$27	\$9	1.53
Medical Equipment	Surgical and Medical Instrument Mfg	\$12,373	\$4,560	\$5,183	1.79
	Wholesale — Medical Equipment and Supplies	\$10,619	\$4,279	\$5,551	1.93
	Surgical Appliance and Supplies Mfg	\$4,699	\$2,157	\$1,771	1.84
	Irradiation Apparatus Mfg	\$3,147	\$1,598	\$941	1.81
	Dental Laboratories	\$1,547	\$682	\$863	2.00
	Ophthalmic Goods Mfg	\$1,547	\$642	\$558	1.78
	Dental Equipment and Supplies Mfg	\$1,218	\$534	\$461	1.82
	Commercial and Service Industry Machinery Mfg	\$296	\$149	\$112	1.88
	Glass Product Mfg Made of Purchased Glass	\$211	\$132	\$77	1.99
Research and Testing	Colleges, Universities, and Professional Schools	\$9,031	\$2,176	\$5,417	1.84
	Medical Laboratories	\$7,066	\$1,269	\$3,337	1.65
	Testing Laboratories and Services	\$577	\$104	\$272	1.65
Scientific / Research Tools	Electromedical and Electrotherapeutic Apparatus Mfg	\$14,555	\$6,790	\$5,131	1.82
	Analytical Laboratory Instrument Mfg	\$6,701	\$3,139	\$2,688	1.87
	All Other Basic Organic Chemical Mfg	\$6,009	\$2,967	\$847	1.63
	Instruments Measuring, Displaying, Etc Mfg	\$612	\$263	\$221	1.79

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REST OF CALIFORNIA JOBS, GROWTH, AND METRICS

Life Science Jobs⁷⁶ and Growth in the Rest of California (County – Level), 2024

County	2024 Emp/ YOY Growth	Bio- Pharmaceuticals	Bio- technology	Food & Agri Biotech	Research & Testing	Medical Devices & Equipment	Sci/Res Tools
Alpine County, California	2024 Emp	0	0	0	0	0	0
	YOY Growth	121%	9%	195%	0%	155%	214%
Amador County, California	2024 Emp	3	1	1	4	6	3
	YOY Growth	1%	38%	18%	65%	-28%	-96%
Butte County, California	2024 Emp	17	39	5	639	122	5
	YOY Growth	-26%	62%	-5%	-4%	-31%	39%
Calaveras County, California	2024 Emp	3	1	0	0	0	4
	YOY Growth	-26%	-17%	-11%	49%	5%	-62%
Colusa County, California	2024 Emp	30	3	3	1	2	0
	YOY Growth	191%	652%	1407%	48%	1240%	6%
Del Norte County, California	2024 Emp	0	0	2	2	0	0
	YOY Growth	12%	347%	84%	109%	57%	78%
El Dorado County, California	2024 Emp	16	35	2	30	257	35
	YOY Growth	2%	29%	-7%	-37%	-6%	87%
Fresno County, California	2024 Emp	975	114	166	1,644	486	31
	YOY Growth	-8%	5%	11%	8%	-9%	-22%
Glenn County, California	2024 Emp	0	0	20	0	16	0
	YOY Growth	268%	6457%	65%	55%	152%	139%
Humboldt County, California	2024 Emp	122	10	92	393	11	3
	YOY Growth	48%	4%	6%	-4%	-16%	649%
Imperial County, California	2024 Emp	21	6	2	47	7	0
	YOY Growth	-44%	-44%	-63%	17%	1%	21%
Inyo County, California	2024 Emp	0	3	0	3	0	0
	YOY Growth	-27%	-12%	24%	166%	-74%	-13%
Kern County, California	2024 Emp	47	233	70	854	290	324
	YOY Growth	3%	6%	9%	5%	-6%	5%
Kings County, California	2024 Emp	10	1	41	19	5	8
	YOY Growth	-44%	-41%	1057%	-2%	60%	-19%
Lake County, California	2024 Emp	12	1	1	7	0	0
	YOY Growth	234%	-41%	64%	104%	-91%	-72%
Lassen County, California	2024 Emp	0	1	0	13	0	0
	YOY Growth	-15%	543%	39%	-21%	-61%	-15%
Madera County, California	2024 Emp	0	1	3	35	6	28
	YOY Growth	5%	-2%	77%	5%	-21%	-33%
Mariposa County, California	2024 Emp	0	0	0	2	1	36
	YOY Growth	-14%	-1%	33%	11%	-2%	-5%
Mendocino County, California	2024 Emp	15	3	6	9	16	0
	YOY Growth	55%	98%	6%	-15%	-30%	55%
Merced County, California	2024 Emp	35	13	16	543	36	0
	YOY Growth	145%	11%	-51%	1%	-11%	-1%
Modoc County, California	2024 Emp	3	0	0	0	0	0
	YOY Growth	5206%	-14%	24%	-72%	-22%	-17%
Mono County, California	2024 Emp	0	0	0	0	0	0
	YOY Growth	-17%	-62%	-71%	26%	-24%	-19%
Monterey County, California	2024 Emp	28	183	11	490	51	59
	YOY Growth	-36%	19%	38%	2%	2%	9%
Nevada County, California	2024 Emp	32	12	6	88	32	30
	YOY Growth	6%	57%	75%	-2%	-3%	25%
Placer County, California	2024 Emp	263	164	4	106	1,446	128
	YOY Growth	-7%	-11%	51%	-10%	0%	-5%

⁷⁶ This chart presents county level data on payroll jobs employed by life science organizations in 2024, as well as the YOY growth for these organizations from the previous year. Life sciences organizations are defined in Appendix B

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Life Science Jobs⁷⁶ and Growth in the Rest of California (County-Level), 2024

County	2024 Emp/ YOY Growth	Bio- Pharmaceuticals	Bio- technology	Food & Agri Biotech	Research & Testing	Medical Devices & Equipment	Sci/Res Tools
Plumas County, California	2024 Emp	1	2	0	0	0	0
	YOY Growth	-84%	291%	0%	-1%	-74%	-14%
Riverside County, California	2024 Emp	1,690	178	242	2,828	2,764	160
	YOY Growth	-18%	4%	12%	7%	-30%	4%
Sacramento County, California	2024 Emp	882	3,005	93	2,133	2,081	286
	YOY Growth	-19%	-9%	8%	-9%	2%	-5%
San Benito County, California	2024 Emp	68	41	2	4	1	37
	YOY Growth	-56%	-16%	14%	-16%	-45%	-26%
San Joaquin County, California	2024 Emp	71	84	613	758	780	224
	YOY Growth	16%	293%	-2%	1%	34%	17%
San Luis Obispo County, California	2024 Emp	140	236	6	1,056	102	178
	YOY Growth	-19%	-16%	29%	1%	15%	11%
Santa Barbara County, California	2024 Emp	830	870	81	2,115	1,441	762
	YOY Growth	67%	-3%	-16%	7%	37%	-16%
Santa Cruz County, California	2024 Emp	1,152	485	52	1,401	190	81
	YOY Growth	-5%	6%	108%	12%	-7%	18%
Shasta County, California	2024 Emp	11	12	1	157	81	128
	YOY Growth	-71%	19%	48%	-8%	-23%	862%
Sierra County, California	2024 Emp	0	0	0	0	0	0
	YOY Growth	-13%	-45%	-30%	24%	-23%	-25%
Siskiyou County, California	2024 Emp	0	1	1	8	3	0
	YOY Growth	-25%	97%	-32%	300%	-14%	-18%
Stanislaus County, California	2024 Emp	145	37	96	760	234	164
	YOY Growth	-8%	-22%	6%	-3%	-8%	76%
Sutter County, California	2024 Emp	2	1	0	22	5	0
	YOY Growth	-33%	385%	9%	-39%	-23%	65%
Tehama County, California	2024 Emp	10	0	3	1	0	0
	YOY Growth	17%	1%	245%	-62%	-92%	25%
Trinity County, California	2024 Emp	0	5	0	0	0	0
	YOY Growth	-100%	14%	-3%	-44%	170%	-12%
Tulare County, California	2024 Emp	96	17	81	124	265	104
	YOY Growth	-15%	4%	5%	8%	-11%	3%
Tuolumne County, California	2024 Emp	0	3	0	24	12	14
	YOY Growth	-12%	-57%	-60%	90%	183%	-19%
Yolo County, California	2024 Emp	262	593	115	4,719	178	29
	YOY Growth	-5%	-5%	-11%	4%	46%	-21%
Yuba County, California	2024 Emp	0	18	2	20	5	0
	YOY Growth	14%	-7%	52%	-1%	-16%	25%

⁷⁶ This chart presents county level data on payroll jobs employed by life science organizations in 2024, as well as the YOY growth for these organizations from the previous year. Life sciences organizations are defined in Appendix B

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REST OF CALIFORNIA JOBS, GROWTH, AND METRICS

Life Science Key Metrics (County Level)

County	Direct Emp	MFG Emp	Direct Emp Growth	Establishments	Avg salary	LQ ⁷⁷	NIH Awards	NSF Awards
Alpine County	0	0	0%	0	-	0.05	—	—
Amador County	19	9	-76.9%	9	\$61,115	1.33	—	—
Butte County	826	62	-7.8%	81	\$75,176	1.39	\$0 M	\$0.9 M
Calaveras County	8	4	-46.6%	2	\$62,034	0.33	—	—
Colusa County	39	18	227.9%	7	\$114,141	2.07	—	—
Del Norte County	5	2	99.8%	3	\$54,712	10.28	—	—
El Dorado County	374	115	-2.6%	49	\$106,526	2.01	\$1.2 M	—
Fresno County	3,416	490	-0.1%	200	\$62,908	0.95	\$1.3 M	\$1.6 M
Glenn County	37	21	95.6%	2	\$75,191	4.18	—	—
Humboldt County	631	214	4.5%	65	\$69,888	5.76	\$0.1 M	\$2.4 M
Imperial County	83	16	17.7%	22	\$60,385	0.35	—	\$0 M
Inyo County	7	0	35.2%	1	\$63,606	0.13	—	—
Kern County	1,818	607	3.2%	142	\$71,496	0.75	\$0.3 M	\$1.0 M
Kings County	85	49	49.8%	12	\$84,197	1.52	—	—
Lake County	20	11	103.9%	3	\$82,945	0.34	—	—
Lassen County	15	0	-15.8%	3	\$70,630	0.86	—	—
Madera County	74	33	-14.7%	14	\$66,282	0.65	—	—
Mariposa County	39	37	-4.3%	3	\$88,161	12.81	—	—
Mendocino County	49	35	-16.6%	12	\$69,186	1.23	—	\$0.3 M
Merced County	643	57	1.0%	22	\$80,188	1.01	\$6.9 M	\$9.4 M
Modoc County	4	4	299.0%	1	\$75,803	0.61	—	—
Mono County	1	0	-51.3%	0	-	0.02	—	—
Monterey County	820	99	4.2%	79	\$88,766	0.45	\$0.7 M	\$2.0 M
Nevada County	199	70	6.5%	32	\$79,572	1.58	—	\$0.1 M
Placer County	2,111	1,138	2.4%	99	\$74,838	2.71	—	—
Plumas County	4	0	-49.0%	3	\$72,654	0.11	—	—
Riverside County	7,862	2,785	-14.5%	402	\$80,447	0.82	\$43.5 M	\$25.2 M
Sacramento County	8,480	1,868	-7.5%	323	\$123,863	1.08	\$7.8 M	\$2.0 M
San Benito County	153	106	-42.0%	12	\$104,110	6.03	—	—
San Joaquin County	2,530	1,098	13.5%	91	\$68,372	2.11	\$1.6 M	\$1.0 M
San Luis Obispo County	1,719	369	-2.4%	95	\$90,678	1.71	\$1.9 M	\$4.9 M
Santa Barbara County	6,099	2,507	12.6%	141	\$116,678	4.07	\$29.0 M	\$43.9 M
Santa Cruz County	3,361	1,183	4.4%	78	\$91,091	3.09	\$47.0 M	\$15.8 M
Shasta County	390	181	15.9%	44	\$72,354	1.12	—	—
Sierra County	0	0	0%	0	-	0.09	—	—
Siskiyou County	13	1	66.7%	3	\$55,540	0.39	—	—
Stanislaus County	1,435	430	0.8%	93	\$78,188	0.88	—	\$1.2M
Sutter County	30	5	-33.8%	9	\$79,236	0.95	\$0 M	—
Tehama County	15	4	6.4%	6	\$89,566	1.66	—	—
Trinity County	6	0	-68.7%	1	\$79,895	0.8	—	—
Tulare County	685	231	-4.5%	59	\$64,025	1.09	—	—
Tuolumne County	54	15	28.5%	7	\$77,607	0.77	—	—
Yolo County	5,896	407	3.0%	89	\$103,545	7.17	\$284.6 M	\$34.5 M
Yuba County	44	6	-4.0%	6	\$82,391	0.77	—	—

⁷⁷ Location quotient refers to a statistic that measures the concentration of life science employment in the region relative to the concentration of life science employment in the U.S.; higher LQs indicate higher concentrations of employment.

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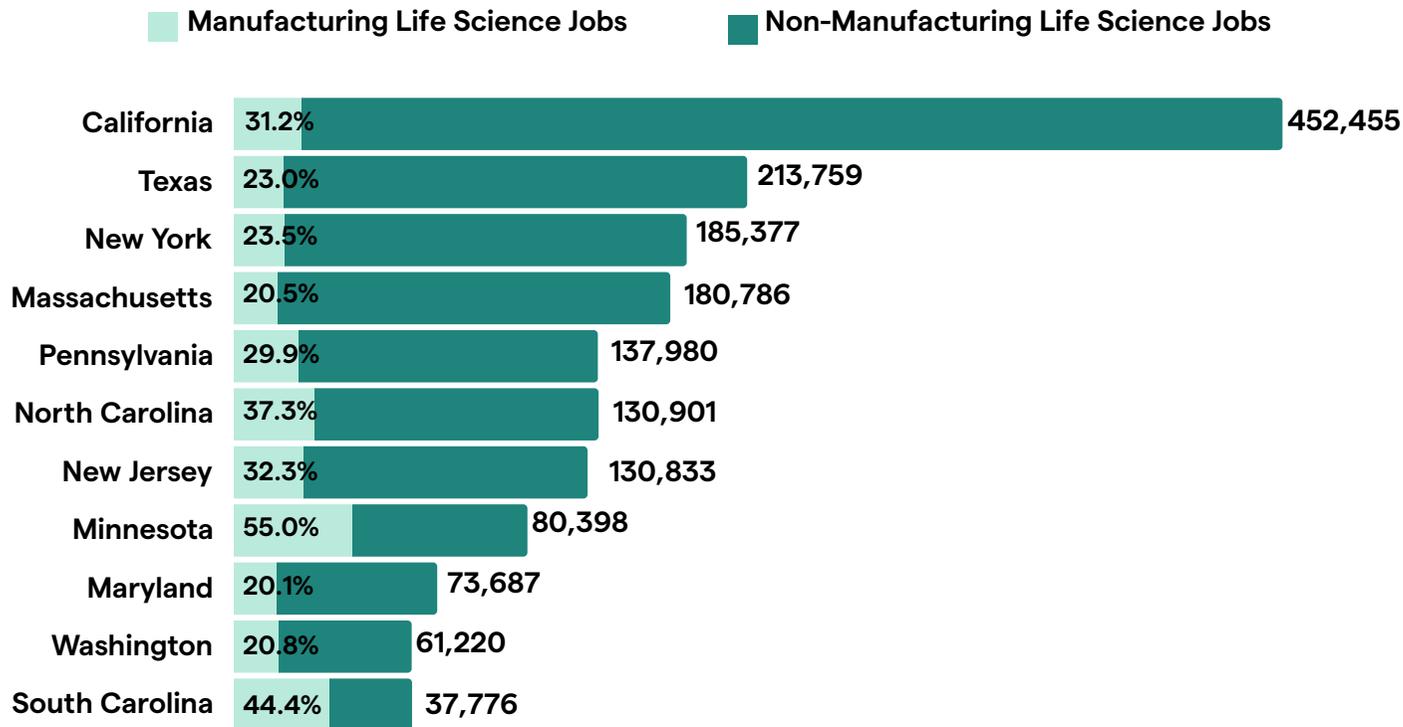
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APPENDIX G

CALIFORNIA COMPARISON WITH OTHER LIFE SCIENCE MARKETS

Payroll Jobs in the Life Science Industry, California vs Other Life Science Markets, 2024



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APPENDIX H

TOP EMPLOYER INDUSTRIES IN CALIFORNIA⁷⁸

California's Top 10 Employer Industries

Industry Cluster	Number of Payroll Jobs	YOY Growth	Jobs Added/Lost
Business Services	1,409,342	2.9%	+40.2K
Distribution and Electronic Commerce	756,832	-0.7%	-5.2K
Education and Knowledge Creation	547,876	4.6%	+24.2K
Hospitality and Tourism	502,850	3.0%	+14.8K
Life Science	452,455	-3.1%	-14.4K
Information Technology and Analytical Instruments	346,883	-9.8%	-37.6K
Marketing, Design, and Publishing	337,304	-1.0%	-3.5K
Agricultural Inputs and Services	264,851	0.2%	+0.4K
Transportation and Logistics	214,011	1.8%	+3.7K
Financial Services	198,450	-0.4%	-0.8K



⁷⁸ Industry categories are defined by US Cluster Mapping Tool developed by Harvard Business School and US Economic Development Administration; Life Science is defined according to Biocom California methodology; data is sourced from Bureau of Labor Statistics Quarterly Survey of Occupation and Employment (Q3 2024). Industries not depicted include Performing Arts (140.6k employment), Music and Sound Recording (9.3k employment), and Wineries and Wine and Distilled Alcoholic Beverage Wholesale (52.7k employment).

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APPENDIX I

JOB LOSS/GAIN BY SUB-SECTOR, CALIFORNIA REGIONS

Life Science sub-sector	State of California	Bay Area	Los Angeles	Orange County	San Diego	Rest of California
In-Vitro Diagnostic Substance Manufacturing	-830	-344	93	1	-261	-319
Medicinal and Botanical Manufacturing	-391	-40	-196	-95	-13	-47
Pharmaceutical Preparation Manufacturing	-1,622	-882	-358	251	-33	-600
Biological Product Manufacturing	-297	67	-160	-105	-161	62
Drug Wholesale	-324	-132	-877	-25	287	423
R&D in Nanotechnology	-1,034	-760	-241	1	-80	45
R&D in Biotechnology	-1,607	-1,229	1,209	71	-2,022	364
Cellulosic Fiber Manufacturing	1	0	3	0	0	-2
R&D in Engineering, Physical, and Life Sciences	-3,243	-953	-609	-300	-1,103	-278
Miscellaneous Food Manufacturing	205	-40	-167	43	4	365
Nitrogenous Fertilizer Manufacturing	15	-2	2	1	1	12
Phosphatic Fertilizer Manufacturing	-831	-22	-74	-48	-18	-669
Fertilizer (Mixing Only) Manufacturing	818	50	51	24	16	678
Pesticide and Other Agricultural Chemical Manufacturing	28	8	4	0	0	16
Ethyl Alcohol Manufacturing	3	0	0	-6	0	8
Testing Laboratories and Services	-130	0	-28	-23	-33	-45
Colleges, Universities, and Professional Schools	1,863	614	340	-162	481	591
Medical Laboratories	-2,202	-249	-268	-906	-293	-486
Surgical and Medical Instrument Manufacturing	1,349	-321	1,795	-241	-159	275
Surgical Appliance and Supplies Manufacturing	-1,555	-183	-1,798	370	50	5
Dental Equipment and Supplies Manufacturing	137	70	-27	113	40	-60
Glass Product Manufacturing	-22	-16	-18	-3	-1	16
Optical Instrument and Lens Manufacturing	-47	-37	-2	-5	1	-5
Ophthalmic Goods Manufacturing	-105	-16	-26	-16	-6	-40
Dental Laboratories	-944	-121	-250	-279	-46	-247
Irradiation Apparatus Manufacturing	-67	-52	158	254	-17	-409
Equipment Wholesale	-1,449	-49	148	-546	-303	-699
Other Basic Organic Chemical Manufacturing	-61	36	8	-29	-46	-29
Electromedical Apparatus Manufacturing	-4	213	-235	437	-434	15
Measuring Instrument Manufacturing	-93	-32	-86	-6	4	28
Analytical Laboratory Instrument Manufacturing	-1,994	-1,541	282	-148	-223	-365
TOTAL	-14,432	-5,963	-1,328	-1,376	-4,368	-1,398

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APPENDIX J

LIST OF DEGREE PROGRAMS IN LIFE SCIENCE FIELDS

Degree Program	Statistical Code
Animal Sciences	01.09
Food Science and Technology	01.10
Plant Sciences	01.11
Soil Sciences	01.12
Veterinary Medicine	01.80
Veterinary Biomedical and Clinical Sciences	01.81
Veterinary/Animal Health Technologies/Technicians	01.83
Agricultural/Animal/Plant/Veterinary Science and Related Fields, Other	01.99
Agricultural Engineering	14.03
Biomedical/Medical Engineering	14.05
Chemical Engineering	14.07
Engineering Physics	14.12
Engineering Science	14.13
Materials Engineering	14.18
Biochemical Engineering	14.43
Engineering Chemistry	14.44
Biological/Biosystems Engineering	14.45
Nanotechnology	15.16
Biology, General	26.01
Biochemistry, Biophysics, and Molecular Biology	26.02
Botany/Plant Biology	26.03
Cell/Cellular Biology and Anatomical Sciences	26.04
Microbiological Sciences and Immunology	26.05
Zoology/Animal Biology	26.07
Genetics	26.08
Physiology, Pathology, and Related Sciences	26.09
Pharmacology and Toxicology	26.10
Biomathematics, Bioinformatics, and Computational Biology	26.11
Biotechnology	26.12
Ecology, Evolution, Systematics, and Population Biology	26.13
Molecular Medicine	26.14

Degree Program	Statistical Code
Neurobiology and Neurosciences	26.15
Biological and Biomedical Sciences, Other	26.99
Mathematics	27.01
Applied Mathematics	27.03
Statistics	27.05
Applied Statistics	27.06
Mathematics and Statistics, Other	27.99
Biological and Physical Sciences	30.01
Science, Technology and Society	30.15
Natural Sciences	30.18
Cognitive Science	30.25
Human Biology	30.27
Marine Sciences	30.32
Climate Science	30.35
Earth Systems Science	30.38
Geobiology	30.43
Physical Sciences, General	40.01
Chemistry	40.05
Physics	40.08
Materials Sciences	40.10
Physical Sciences, Other	40.99
Biology/Biotechnology Technologies/Technicians	41.01
Physical Science Technologies/Technicians	41.03
Science Technologies/Technicians, Other	41.99
Health Services/Allied Health/Health Sciences, General	51.00
Allied Health Diagnostic, Intervention, and Treatment Professions	51.09
Clinical/Medical Laboratory Science/Research and Allied Professions	51.10
Health/Medical Preparatory Programs	51.11
Medicine	51.12
Medical Clinical Sciences/Graduate Medical Studies	51.14

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