



2026

+ THERAPEUTIC BIOLOGICS EDITION

Best Places for Pharmaceutical Manufacturing

Resilience, Readiness & the Future of Biomanufacturing

letter from the GLS team

The world is entering a new era of industrial strategy, one defined not by where we can produce, but where we must.

Nowhere is this shift more visible than in therapeutic biologics manufacturing. As global supply chains strain under geopolitical pressure, tariffs reshape trade, and talent shortages deepen, the ability to locate and scale advanced manufacturing capacity in the right places has become both an economic imperative and a matter of national security.

For manufacturers leading this transformation, the stakes couldn't be higher. The wrong location decision today can set back commercialization timelines, inflate costs, and erode competitiveness for years to come.

But the right location creates a foundation for success: where supply chains are secure, innovation thrives, and production capacity strengthens both economic vitality and the nation's ability to withstand global disruptions.

For the regions that support them, success will depend on readiness. Having the infrastructure, workforce, and vision to meet the sector's rising demands.

At Global Location Strategies, we've spent decades helping the world's leading manufacturers determine where and how to grow. We built GLS Insights to cut through uncertainty and turn complex data into clarity and confidence. What began as a site selection tool has evolved into a strategic lens for understanding where the future of therapeutic biologics manufacturing will unfold.

Our mission is simple: to help innovators find the right ground on which to stand, grow, and lead. Because the choices made today about where to invest, where to train, and where to build, will define not only who leads this industry, but who secures its promise for generations to come.

HERE'S TO TOMORROW,



Didi Caldwell

Didi Caldwell
President and CEO



Tess Fay

Tess Fay
Principal + VP of Location Intelligence

therapeutic biologics

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therapeutic biologics

ABOUT THE INDUSTRY

+ Fast Facts

Therapeutic biologics are a specialized group of medicines made from living cells or organisms, rather than being created through traditional chemical synthesis. Unlike small-molecule drugs such as aspirin or antibiotics, which are built from simple chemical structures, biologics are usually large, complex molecules like proteins, antibodies, or even living cells. They are produced using advanced biotechnology methods — for example, by engineering cells to manufacture therapeutic proteins or by modifying immune cells to fight disease.

Common examples include:

- Monoclonal antibodies (such as adalimumab or trastuzumab)
- Recombinant proteins (like insulin or erythropoietin)
- Cell and gene therapies (including CAR-T treatments)
- Therapeutic vaccines.

Because they closely mimic natural processes in the body, biologics can treat conditions that were once very difficult to manage, such as cancers, autoimmune disorders, and rare genetic diseases.

Industry Name Biological Product (except Diagnostic) Manufacturing

NAICS Code 325414

Active Investors

SARTORIUS

MERCK



ThermoFisher
SCIENTIFIC

cytiva

FUJIFILM



47 K

Nationwide
Employment¹



26.6%

5-Years % change in
total employment¹



\$125 K

Average annual wage
per worker¹

therapeutic biologics

ABOUT THE INDUSTRY

Types of Business Activities

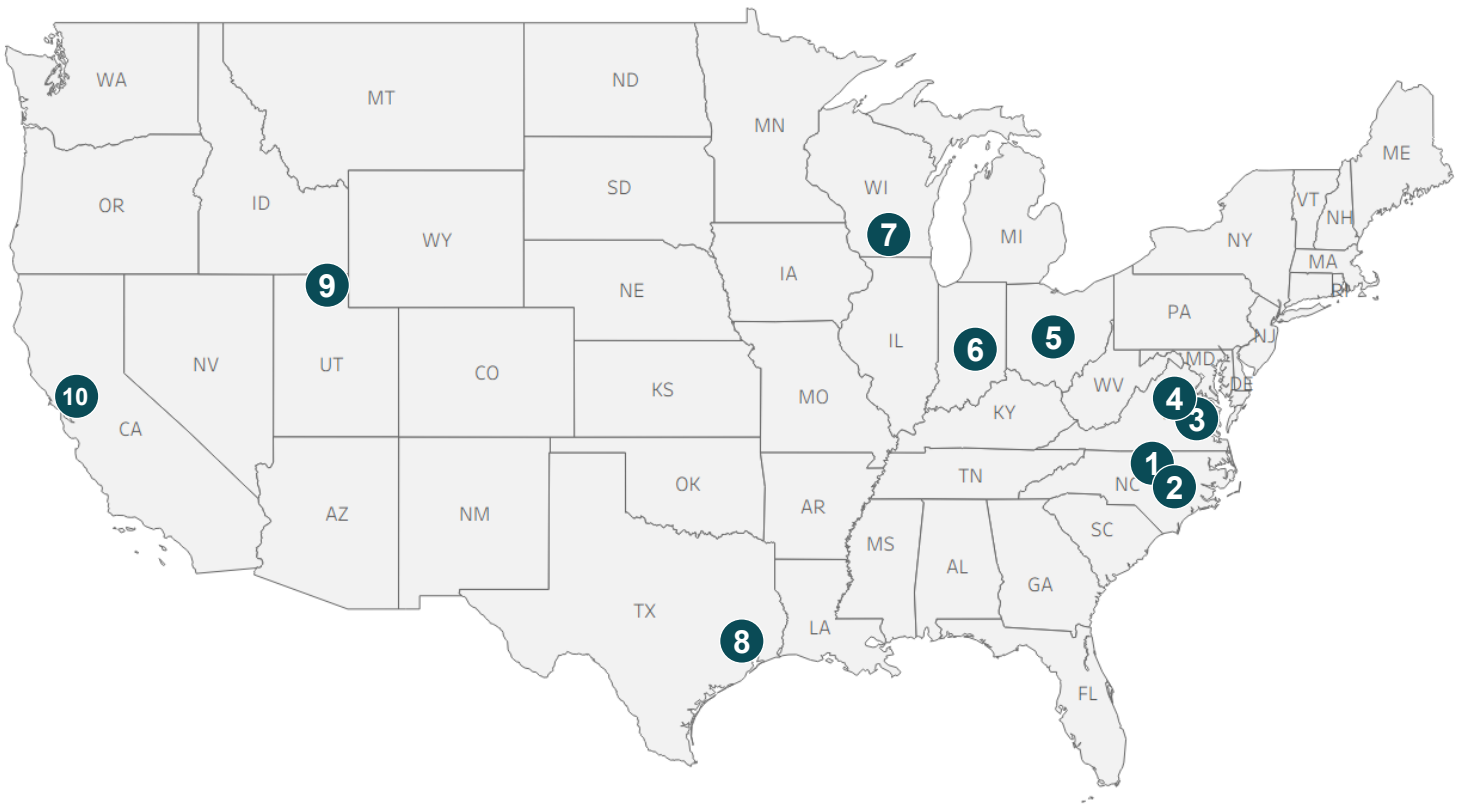
- Vaccines (human and veterinary) – *Biological preparations that stimulate the immune system to prevent infectious diseases in people and animals.*
- Gene Therapy Products – *Treatments that introduce, remove, or alter genetic material to correct or prevent disease.*
- Plasma-Derived Therapies & Blood Factors – *Medicines made from human blood plasma, including clotting factors and immunoglobulins for bleeding and immune disorders.*
- Antisera, Antitoxins & Immunoglobulins – *Antibody-rich preparations used to neutralize toxins, venoms, or infections (often from plasma or animal sources).*
- Allergens & Allergenic Extracts – *Substances used in immunotherapy to desensitize patients with allergies (e.g., pollen, animal dander extracts).*
- Antigens & Immunologic Components – *Proteins or molecules that trigger immune responses, used in vaccines, immunotherapies, or research.*
- Culture Media & Bioprocess Inputs – *Specialized growth materials and reagents used in the production of biologics, not therapies themselves.*
- Recombinant Proteins – *Engineered proteins produced in living cells, such as insulin, growth hormone, or clotting factors, used to replace missing or deficient proteins.*
- Monoclonal Antibodies (mAbs) – *Laboratory-made antibodies designed to target specific disease pathways, widely used in cancer, autoimmune, and infectious diseases.*
- Cell Therapy – *Living cell-based treatments, such as CAR-T therapy, used to repair, replace, or attack diseased cells.*
- Biosimilars – *Highly similar, lower-cost versions of approved biologics (e.g., mAbs or recombinant proteins) that help expand access and reduce healthcare costs.*

Types of Business Activities Not Covered by Therapeutics Manufacturing

- Small-molecule drugs (those fall under 325412 Pharmaceutical Preparation Manufacturing)
- Diagnostic substances (e.g., in vitro reagents)

+ Recent Announcements

The map below highlights the key investments in therapeutic biologics manufacturing since 2024. It showcases some of the most notable projects shaping the industry.



- 1 **Biogen** Durham, NC
Expansion (Jul 2025)
\$2.0 BN Investment, 2,415 Jobs
- 2 **Fujifilm Diosynth Biotechnologies (Fujifilm)** Holly Springs, NC
Expansion (Apr 2024)
\$1.2 BN Investment, 680 Jobs
- 3 **Eli Lilly** Goochland County, VA
New Facility (Sept 2025)
\$5.0 BN Investment, 650 Jobs
- 4 **AstraZeneca** Albemarle County, VA
New Facility (Oct 2025)
\$4.5 BN Investment, 600 Jobs
- 5 **Amgen** New Albany, OH
Expansion (Apr 2025)
\$900 MM Investment, 350 Jobs
- 6 **RayzeBio (Bristol-Myers Squibb)** Indianapolis, IN
New Facility (Jul 2025)
\$160 MM Investment, 193 Jobs
- 7 **Catalent Pharma Solutions (Novo Nordisk)** Madison, WI
Expansion (Jul 2025)
\$45 MM Investment, 200 Jobs
- 8 **Bionova Scientific (Asahi Kasei)** Woodlands, TX
Expansion (Apr 2025)
\$167 MM Investment, 200 Jobs
- 9 **Cytiva (DanaHER)** Logan, UT
Expansion (Jun 2025)
\$148 MM Investment, 170 Jobs
- 10 **Lonza** Vacaville, CA
Expansion (Mar 2024)
\$556 MM Investment, 685 Jobs

+ Industry Insights

Global Trends in Therapeutic Biologics Investment

Worldwide biological product (excluding diagnostics) activity has been steadily rising over the past decade, though investment patterns in manufacturing, research & development (R&D), and headquarters projects have followed different trajectories.

Manufacturing has shown the most volatility, with a sharp surge in 2020–2021 as companies raced to scale up COVID-19 vaccine production through “at-risk” investments; although activity has since declined, it has stabilized at levels comparable to 2017–2019.

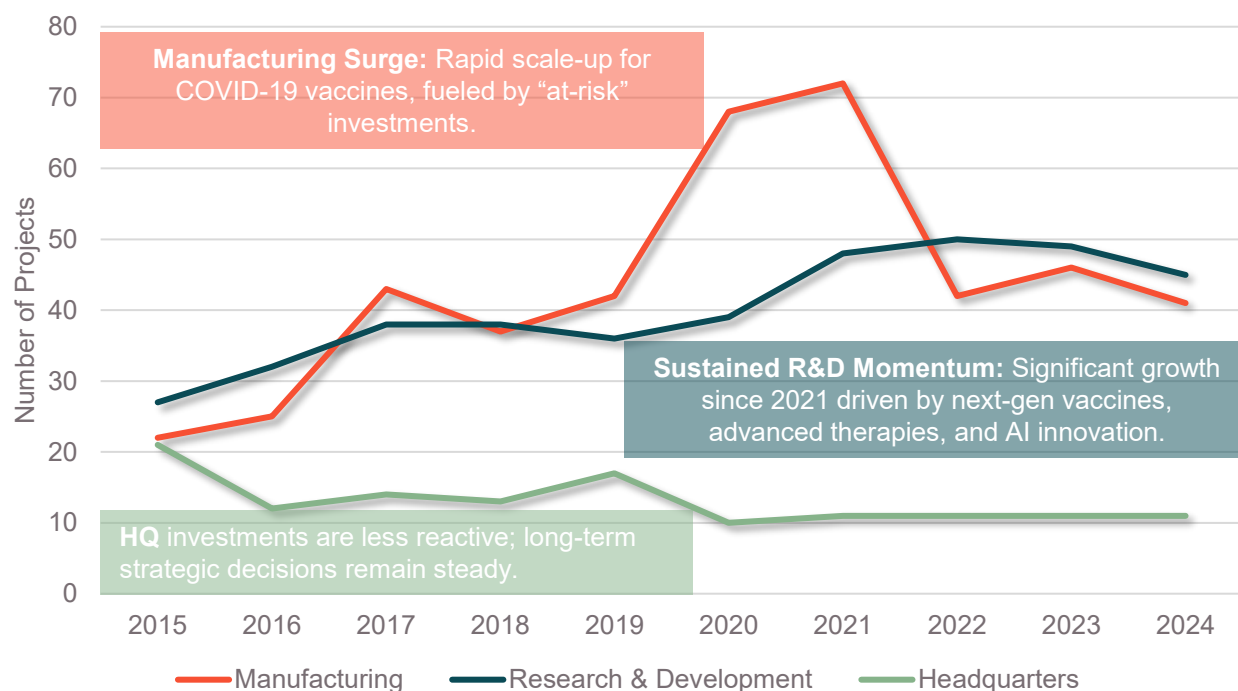
By contrast, R&D activity has remained elevated since 2021, sustaining a significantly higher baseline than before the pandemic. This is a positive sign, given its role as a critical driver of industry growth and a leading indicator of future manufacturing investment.

Headquarters projects have been similarly steady, though the pandemic deprioritized HQ expansion as firms emphasized remote work, cost efficiency, and consolidation of existing footprints, leading to a slightly lower post-COVID baseline.

Looking ahead, the global biologics market is projected to expand at a compound annual growth rate (CAGR) of 10.5% between 2025 and 2035. This will outpace the 8.7% growth forecast for small molecules—underscoring the industry’s strong long-term outlook.² Although the pandemic drove a significant short-term increase in activity, the current patterns indicate durable growth and position the industry well for continued expansion.

Chart 1: Ten-Year Global Biological Product (except Diagnostics) Project Activity

Biologics project activity has expanded over the past decade, though trends differ by activity type: a temporary manufacturing surge during COVID-19, a lasting uplift in R&D momentum, and stable long-term headquarters investments.

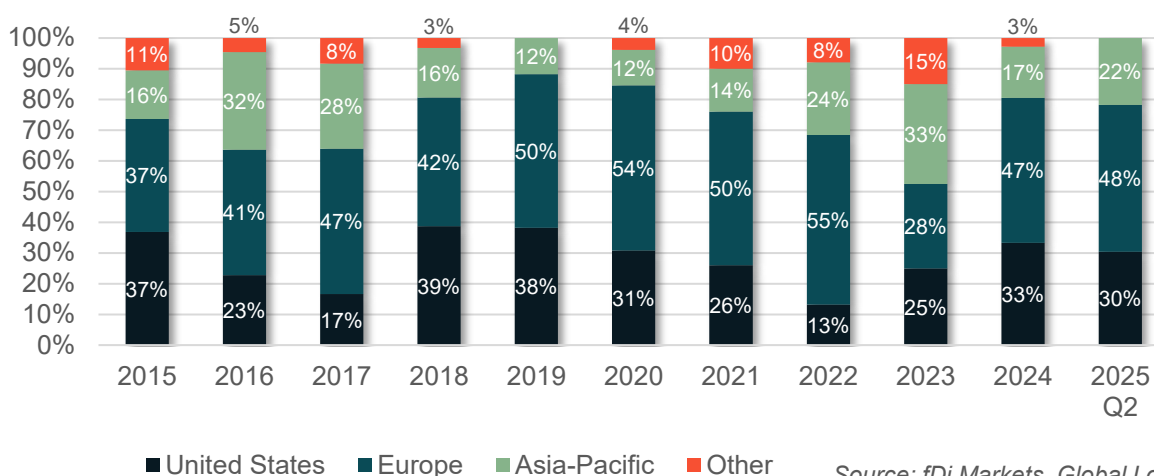


Source: fDi Markets, Global Location Strategies

Regional Landscape

Europe has consistently captured the largest share of global foreign direct investment in the industry, averaging roughly 45% over the past decade. The United States ranks second with an average share of 28%, while the Asia-Pacific region continues to expand its presence, surpassing the U.S. share as recently as 2022 and 2023, underscoring the increasingly competitive global landscape.

Chart 2: Biological Product (except Diagnostics) Manufacturing Projects - Destination Breakdown by World Region



While Europe continues to lead in attracting foreign direct investment, **the United States remains the largest biologics market**, accounting for nearly half of global revenues in 2024 (48%), compared with 26% for Europe.³

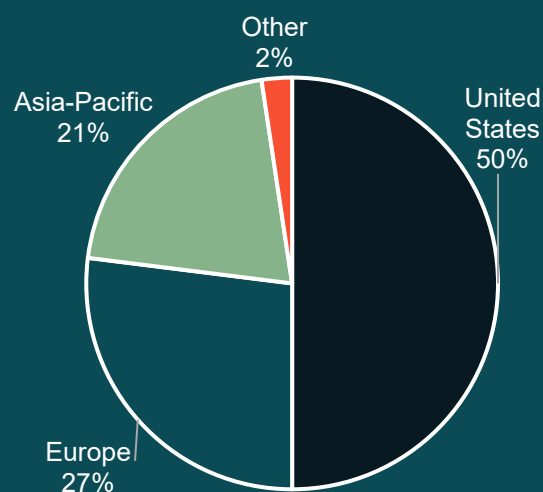
+ Since 2020, half of all announced therapeutic biologics manufacturing projects in the U.S. have originated from domestic investors.

+ Japan has been the largest foreign investor in the U.S., with 17 projects representing 27% of all foreign investment.

+ Europe accounts for more than one-quarter of foreign projects into the U.S., led by Germany with 14 (41% of Europe's total), including 11 expansions and 3 new projects, followed by Switzerland (26%) and the United Kingdom (21%).

+ While China accounted for only five manufacturing projects, it has emerged as a leading foreign investor in therapeutic biologics R&D in the U.S. Announcing 12 projects, or 23% of all foreign R&D activity in the U.S, accounting for 50% of China's total FDI R&D investments in this industry.

Chart 3: Projects Source by World Region - U.S. Biologics (except Diagnostics) Manufacturing



therapeutic biologics

WHY IT MATTERS NOW

Therapeutic biologics hold critical strategic importance at the intersection of public health, national security, and economic competitiveness.

The industry sits at the forefront of modern medicine, addressing complex diseases such as cancer, autoimmune disorders, and rare genetic conditions—areas where traditional drugs often fall short.

The COVID-19 pandemic exposed the vulnerability of nations without domestic biologics manufacturing capacity, as many faced shortages and delays in access to essential therapies and vaccines. This experience underscored the industry's role not only in healthcare resilience but also in national preparedness and global supply chain security.

Economic Impact and Local Anchors

Beyond their health impact, biologics facilities serve as powerful economic anchors, generating:

- High-value STEM employment
- Substantial capital investment
- Specialized supplier networks

Collectively reinforcing regional innovation capacity and long-term competitiveness.

Given the stringent regulatory environment and the high cost and complexity of facility validation, biologics plants are rarely relocated once established.

As a result, these investments become lasting anchors in local economies, catalyzing innovation ecosystems and supporting the development of a highly skilled workforce.

Today, the United States faces mounting pressure to sustain its leadership in this strategically vital sector. Continued investment in innovation ecosystems, workforce development, and a supportive regulatory framework will be essential.

Policy Shifts and Investment Momentum

The current federal administration is putting biopharma companies under growing pressure to adapt to new policy and market realities. A major wave of investment is already underway. But long permitting timelines and complex licensing processes make location strategy more complex than ever.

therapeutic biologics

WHY IT MATTERS NOW

Firms must identify permit-ready sites, competitive cost structures, and the specialized workforce and supplier networks needed to bring new capacity online efficiently.

For U.S. regions with established biomanufacturing strengths, this moment presents a unique opportunity to capture high-value projects.

Emerging Constraints and the Risk of Inaction

Tariffs are accelerating an investment cycle that was already gaining momentum, even as workforce shortages and evolving policy frameworks introduce new constraints.

Failure to scale effectively could erode companies' profits, lead to product shortages, and ultimately constrain R&D spending while driving up costs for patients.

Together, these dynamics point to three key trends:

1. Tariff pressures are reshaping location strategies
2. Workforce and labor policies are defining expansion feasibility
3. Investment activity is beginning to extend into emerging secondary markets

01 REGULATORY CONCERNS

Tariffs Accelerate Biopharma Investment Wave

The current policy landscape marks one of the most significant realignments for the biopharmaceutical sector in decades. The new tariff regime—ending a long era of near-zero import duties on pharmaceuticals—seeks to accelerate the reshoring of drug manufacturing and strengthen national security by reducing dependence on suppliers vulnerable to geopolitical shocks.

For biopharma companies, this shift presents significant challenges: margins are likely to tighten regardless of whether production is moved to U.S. facilities, unless companies can successfully reshuffle their supply chains to offset increased operational costs or the impact of tariffs. Without clear safeguards, the policy could inadvertently constrict supply chains, raise production costs, and ultimately increase prices for patients.

To understand how trade policies may reshape production decisions, it is useful to first examine the current structure and global integration of the U.S. biologics manufacturing base.

Current Structure & Global Integration of U.S. Biologics Manufacturing

There are close to 6,000 FDA-registered biologics facilities worldwide, roughly 90% of which are domestic, suggesting substantial in-country manufacturing capacity.⁴ Trade data from 2024 indicate a relatively balanced flow of biologics imports and exports—\$48 billion imported and \$49 billion exported—revealing a high degree of self-sufficiency.⁴

Yet, FDA data shows that 91% of biologics sales in the U.S. are met by imports, suggesting that while domestic output is strong, much of it is destined for export markets, and significant volumes of finished products and intermediates are sourced from abroad.⁴

Collectively, these dynamics highlight that the U.S. biologics sector remains highly capable but deeply interdependent—its biologics ecosystem robust yet globally entangled. This reliance raises strategic considerations for policymakers and industry leaders around supply chain resilience, potential vulnerabilities to global disruptions, and the need to strengthen domestic manufacturing while maintaining critical international partnerships.

Regulatory & Oversight Vulnerabilities

This interdependence also exposes regulatory and oversight vulnerabilities. Of the more than 290,000 FDA-approved facilities worldwide across all product categories (food, drugs, medical devices, and tobacco), less than half—about 44%—are based in the U.S.⁴

While the FDA conducts roughly 12,000 domestic inspections annually, only about 3,000 occur abroad, and foreign plants often receive weeks of advance notice.⁵ Even so, FDA inspectors identify serious deficiencies at foreign facilities more than twice as often as at U.S. sites.⁵

In 2022, the agency inspected only 6% of overseas drug and ingredient facilities, reflecting limited reach and enforcement capability—further constrained during the pandemic.⁶ Weak foreign oversight creates both public-health and competitiveness concerns, as seen in the 2023 contamination incident involving India-made eye drops linked to multiple deaths.⁷

In May 2025, the FDA announced plans to expand unannounced foreign inspections, but it remains too early to gauge their impact.⁵ These dynamics reinforce the strategic rationale for expanding domestic production capacity—not only to bolster national security and supply resilience but also to improve quality oversight and safeguard public health.

Tariff Impacts

The new 100% tariff on imported branded and patented drugs, effective October 1, 2025, may sound dramatic, but its near-term impact is likely to be more limited than headlines suggest. Temporary exemptions are being granted to companies that commit to, and make demonstrable progress on, U.S. manufacturing projects, until construction is completed. Additionally, the administration has confirmed it will honor the 15% cap in trade arrangements with the European Union and Japan, so the full 100% rate does not apply to those markets.

The policy's targeting of branded and patented drugs—responsible for about 7% of prescriptions but nearly 87% of drug spending—is deliberate.⁸

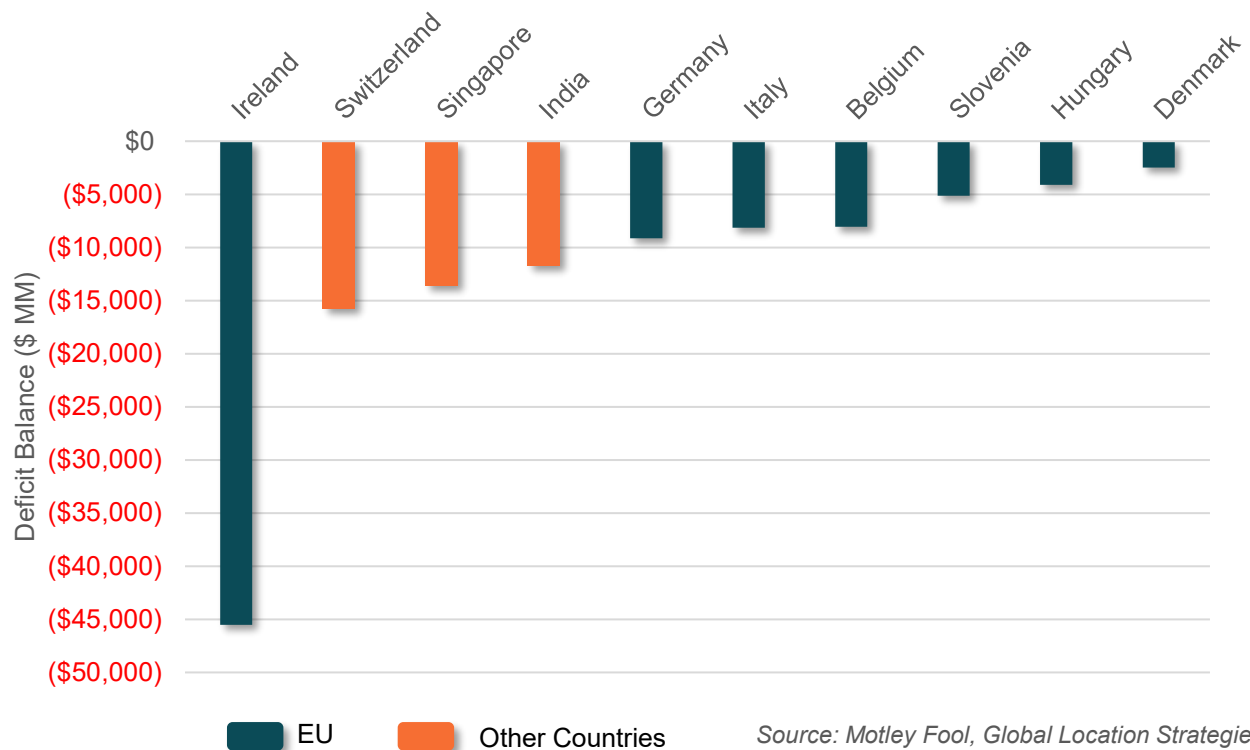
These products' higher margins provide both the incentive and capacity to invest in domestic production, whereas applying tariffs to low-margin generics could backfire by increasing costs and risking shortages.

Trade data show that in 2024 the greatest pharmaceutical deficits were with Ireland (\$46 billion), Switzerland (\$16 billion), and Germany (\$9 billion)—markets exempt from the 100% tariff. India, with a \$12 billion deficit, remains outside exemption agreements but primarily supplies generics, which are not currently targeted.⁹

The administration's approach is calibrated, using tariffs and targeted exemptions to reshape supply chains without triggering abrupt price spikes. The recent federal agreement with Pfizer, offering temporary tariff relief in exchange for price concessions, and new U.S. investment commitments by biopharma companies illustrate how these goals can be achieved, at least temporarily.

Chart 4: U.S. Pharmaceutical Trade Deficit by Country - Top 10

The European Union has been a major contributor to the U.S. pharmaceutical trade deficit, with Ireland driving much of the imbalance in 2024 and the first half of 2025.



The Pressure on Drug Prices

Beyond the tariff headwinds, the biopharma industry faces intensifying pressure from the White House to align U.S. drug prices with those in other high-income countries, creating additional margin strain.

American patients pay roughly three to four times more than their peers abroad for branded drugs.¹⁰ About 90% of all spending on prescription medicines last year went to branded products, though they accounted for only 7% of prescriptions.¹⁰

Generics, by contrast, remain relatively inexpensive compared to those in other high-income countries. This pricing gap reflects a fragmented U.S. system in which manufacturers negotiate with multiple private intermediaries, unlike the centralized, value-based price setting common in Europe.

Despite higher prices, the U.S. retains a clear innovation advantage: between 2014 and 2022, one in five drugs approved by the FDA never received approval in Europe, and more than two-thirds of those that did were approved in the U.S. first—typically about six months earlier.¹⁰ Thus, while U.S. consumers pay premium prices, they also gain earlier access to innovative therapies.

While lowering branded-drug prices supports public-health goals, *The Economist* estimates that manufacturers capture only about two-fifths of excess system profits, with the remainder absorbed by insurers and pharmacy benefit managers.¹⁰

As a result, pricing reforms risk reducing R&D investment capacity without delivering the expected reduction in costs for patients.

Reshaping The Economics of the Biopharma Industry

The Trump tariffs and pricing reforms are reshaping the economics of the biopharma industry. Major drugmakers are responding by committing to large-scale U.S. investments, viewing domestic expansion as a strategic hedge.

Morningstar estimates that relocating production could reduce profits by about 4%, versus 7% if companies fail to adapt.¹¹ As a result, the U.S. is experiencing one of the largest biopharma investment waves in decades, with more than \$350 billion in announced spending by 2030 across manufacturing, R&D, and supply chain functions.¹¹

Notable examples include:

- GSK's \$30 billion investment in research and supply-chain infrastructure
- Eli Lilly's \$6.5 billion facility in Houston and \$5 billion site near Richmond, VA
- Johnson & Johnson's \$55 billion U.S. expansion
- AstraZeneca's \$50 billion commitment through 2030.¹²

While large multinationals are well positioned to absorb these shifts, smaller firms—particularly those reliant on foreign Contract Development and Manufacturing Organizations (CDMOs) for drug substance or fill-finish—may face greater pressure.

02 WORKFORCE TRENDS

Talent Availability: The Defining Constraint on U.S. Biologics Manufacturing Growth

Talent availability, not just labor cost, is the defining constraint on U.S. therapeutic biologics manufacturing growth. Addressing this challenge will require both sustained domestic workforce development and continued access to specialized international expertise.

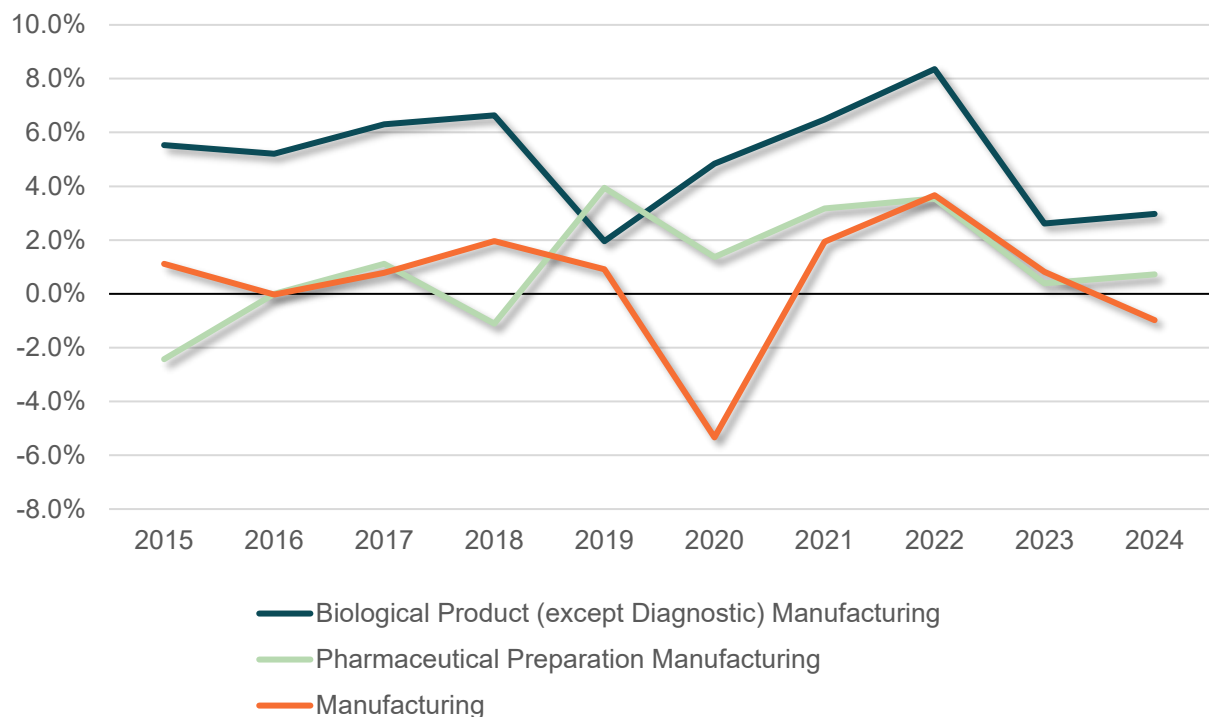
Biological Product (except Diagnostic) Manufacturing employs over 46,000 people in the United States and has experienced robust growth over the past decade, averaging 5.1% annually. This far outpaces both the broader manufacturing sector, which expanded by less than 0.5% per year, and Pharmaceutical Preparation Manufacturing, a partially related industry in terms of workforce skills, which grew by 1.8% annually.¹

While the therapeutic biologics manufacturing industry represents only about 0.4% of the total U.S. manufacturing workforce, it plays a critical role in driving life sciences innovation.¹

Yet, from a site selection perspective, its small size makes workforce availability a major limiting factor. Only a handful of regions can offer talent at sufficient scale to support large biologics facilities.

Chart 5: Annual Change in U.S. Employment (%)

Employment growth in Biological Product (except Diagnostic) Manufacturing significantly outperforms the broader manufacturing sector.



Source: jobsEQ, Global Location Strategies

A Shift in Wages

While wages in biologics manufacturing remain among the highest in U.S. industry, evidence of scarce specialized talent, their growth has averaged slower than that of overall manufacturing, suggesting the market has reached a ceiling where higher pay alone can no longer attract additional qualified workers.

Average annual pay in biologics manufacturing stands at \$127,000, nearly 50% higher than the manufacturing average of \$84,000.¹

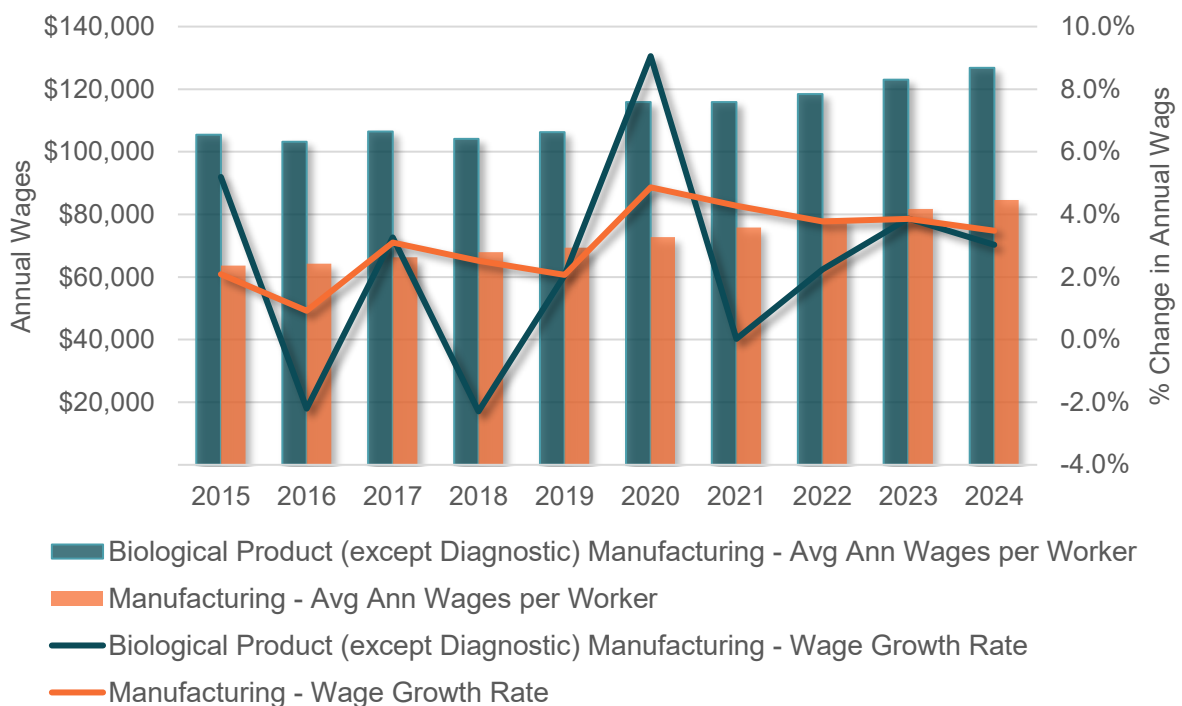
Over the past decade, wages in this field have grown by 2.5% per year, slower than the overall manufacturing average (3.1%) but with sharper year-to-year volatility, underscoring uneven labor supply conditions.¹

Costs vary widely by metro: San Francisco–Oakland–Fremont (\$180,000) and Raleigh–Cary (\$176,000) command top-tier wages, while Boston–Cambridge–Newton (\$140,000) also remains high.¹

By contrast, emerging regions such as St. Louis (\$81,000) and Cincinnati (\$58,000) are far more cost-competitive, illustrating the trade-off between labor cost and talent depth.¹

Location strategy can consider whether a company requires a highly specialized workforce available only in established life science hubs, or if an emerging market with a growing talent pool could sufficiently support its operations, offsetting costs. Each metro offers a distinct set of advantages, underscoring why there is no one-size-fits-all solution and why careful site selection analysis is essential in identifying the right fit for a company's specific operations.

Chart 6: Annual Change in Wages in Biological Product (except Diagnostics) Manufacturing



Source: jobsEQ, Global Location Strategies

Immigration Constraints Deepening Talent Shortages

The greatest constraint for biologics manufacturers is not cost but the sheer availability of skilled labor. Biologics manufacturing depends on expertise in bioprocessing, cell culture, and GMP operations that cannot be easily substituted or trained for quickly.

An estimated 60,000 pharmaceutical job postings remain open nationwide, representing a vacancy rate near 8%, and roughly 80% of pharma employers report persistent skills gaps.^{13, 14} Developing a domestic talent pipeline is essential but insufficient to meet immediate industry demand.

To bridge this gap, companies have long relied on international specialists for knowledge transfer, process validation, and operational alignment. Yet increasingly stringent U.S. immigration policies are making the country less welcoming to highly skilled international talent.

The increased \$100,000 fee on H-1B petitions and the proposed wage-based H-1B lottery could sharply limit firms' ability to bring in needed expertise, particularly for smaller companies, while larger multinationals may be better positioned to absorb the added costs and administrative requirements.

Compounding this, recent enforcement actions and visa scrutiny have fueled perceptions that foreign technical workers are unwelcome, deterring relocation and complicating expansion plans for foreign-owned firms.

Many companies establishing a new facility in a foreign country rely on transferring a limited number of employees from abroad, typically in specialized or managerial roles critical for knowledge transfer, operational alignment, or the implementation of proprietary systems. Most of these transfers are temporary and enable the U.S. subsidiary to expand more effectively, ultimately generating additional local employment opportunities.

Although other visa pathways remain available, recent high-profile enforcement actions (for example, an ICE raid at a South Korean–owned factory in Georgia and the controversial arrests and detention of Korean workers) along with a broader perception that foreign workers are unwelcome, risk reducing the country's attractiveness among highly skilled workers.¹⁵

Protecting U.S. jobs is a legitimate objective, but limiting access to specialized global talent risks undermining national competitiveness, especially when domestic training capacity remains insufficient to meet surging demand in biologics and other advanced manufacturing fields.

For new entrants evaluating U.S. locations, these constraints can directly affect project timelines, budgeting, and risk profiles.

Dual-Track Workforce Strategy

Sustaining industry growth will require a dual-track workforce strategy by expanding the domestic talent pipeline while maintaining access to specialized international expertise.

State and regional partners should:

- Scale bioprocessing and GMP programs
- Develop apprenticeships and co-ops
- Reskill workers from adjacent industries
- Strengthen industry–university partnerships tied to measurable placement outcomes

At the same time, targeted immigration pathways for experienced specialists must complement these efforts to meet immediate operational needs as domestic capacity builds.

For site selectors and investors, this dual-track perspective is essential. Evaluating locations means not only comparing wage levels but also assessing training infrastructure, time-to-hire, and retention with local stakeholders.

The United States remains a global leader in biologics, but without coordinated investment in education, training, and immigration, workforce shortages could limit future expansion and erode competitiveness.

03 INVESTMENT ACTIVITY

Broadening Footprint: Emerging Secondary Biologics Hubs Gain Ground

Understanding current industry trends and the geography of therapeutic biologics investment provides valuable insight into how the sector's footprint is evolving. While traditional strongholds such as Boston, New York, and San Diego continue to anchor activity, a growing number of secondary and tertiary metros are emerging as credible alternatives, reflecting a more diversified and resilient U.S. biologics landscape.

According to fDi Markets, 126 biological product (except diagnostics) manufacturing projects have been announced in the U.S. since 2020, representing more than \$26 BN in investment and nearly 27,000 jobs—an average of \$234 million in capital expenditure and 225 jobs per project.¹⁶

Activity trended upward from 2016, accelerated sharply during the pandemic, and reached its high point in 2021 with record job creation and capex levels more than double those of the 2018–2020 period. **Unlike many other manufacturing industries that are becoming more capital-intensive but less labor-intensive, therapeutic biologics manufacturing continues to expand on both fronts—growing in capital intensity and in jobs created per project.**

Although new project announcements slowed in 2022, R&D-related activity hit a decade high, and manufacturing momentum returned in 2023–2024, including three \$1.0 billion–plus projects in North Carolina.¹⁶ 2025 Q2 data suggest another strong year if the current pace continues.

Chart 7: Project activity in the U.S. Biological Product (except Diagnostics) Manufacturing

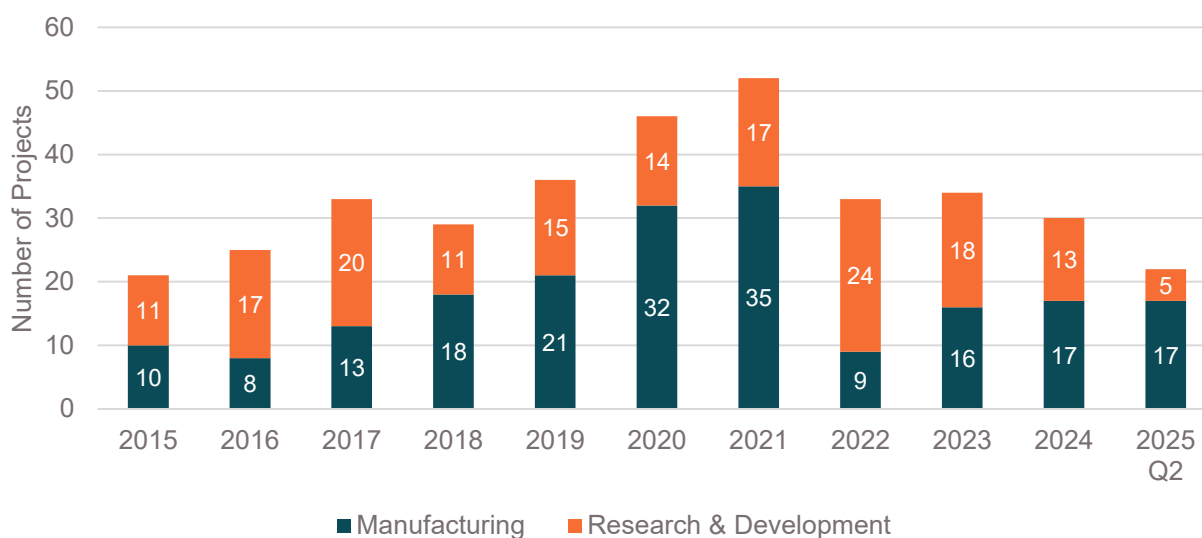
The pattern shows pre-pandemic expansion, a COVID-19–driven surge, brief normalization, and renewed growth—evidence of the resilience and strength of the U.S. biologics industry. While activity in 2020–2021 was propelled by emergency vaccine and therapeutic scale-ups, the 2023–2024 rebound appears broad-based across modalities and geographies, indicating a durable, sustained pipeline of projects.



Source: fDi Markets, Global Location Strategies

Chart 8: U.S. Biologics (except Diagnostics) Manufacturing and R&D Projects Breakdown

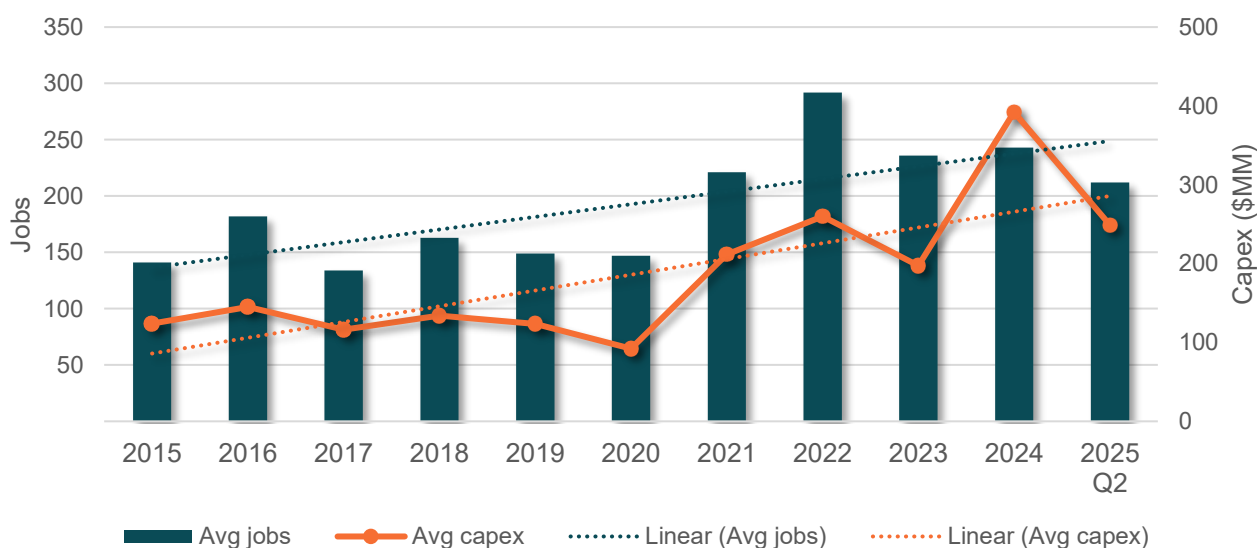
Manufacturing projects peaked in 2020–2021, followed by a surge in R&D activity that reached record levels in 2022 and remained strong through 2023. 2025 has so far seen only five R&D investments announced, including Novartis's \$1.1 BN biomedical research and innovation center in San Diego. The project is expected to create around 1,900 jobs and support domestic production of all the company's key medicines for the U.S. market.



Source: fDi Markets, Global Location Strategies

Chart 9: Average Jobs and Capex per U.S. Biologics (except Diagnostics) Manufacturing Project

While many manufacturing industries today show rising capital expenditure but declining average job creation per project, therapeutic biologics manufacturing stands out by growing in both capital intensity and jobs created.



Source: fDi Markets, Global Location Strategies

From Established Clusters to Expanding Frontiers

At the metro level, Boston–Cambridge–Newton, MA–NH remains the top destination, with 15 project announcements since 2020 totaling approximately \$1.6 billion in investment and 2,142 jobs.¹⁶

However, Raleigh–Cary, NC has surpassed Boston in total scale, attracting nearly \$6.0 billion in investment and over 3,000 jobs, driven largely by FUJIFILM’s three projects totaling \$3.2 billion.¹⁶ Neighboring Durham–Chapel Hill contributed an additional \$500 million in investment and 800 jobs, further reinforcing the Research Triangle’s position as one of the nation’s primary biologics hubs.¹⁶

San Diego–Chula Vista–Carlsbad, CA has also been a strong investment location, with six projects averaging \$146 million in capital expenditure and 185 jobs each—including Genentech’s \$300 million expansion projected to add nearly 400 jobs.

New York–Newark–Jersey City, NY–NJ attracted five investments totaling nearly \$800 million in capex.¹⁶ Houston and San Francisco each secured four new projects, while Washington, DC–VA–MD–WV reported three, averaging just over 159 jobs and \$196 million in investment.¹⁶ Each of these three metros has recorded more than \$500 million in total announced investment since 2020.¹⁶

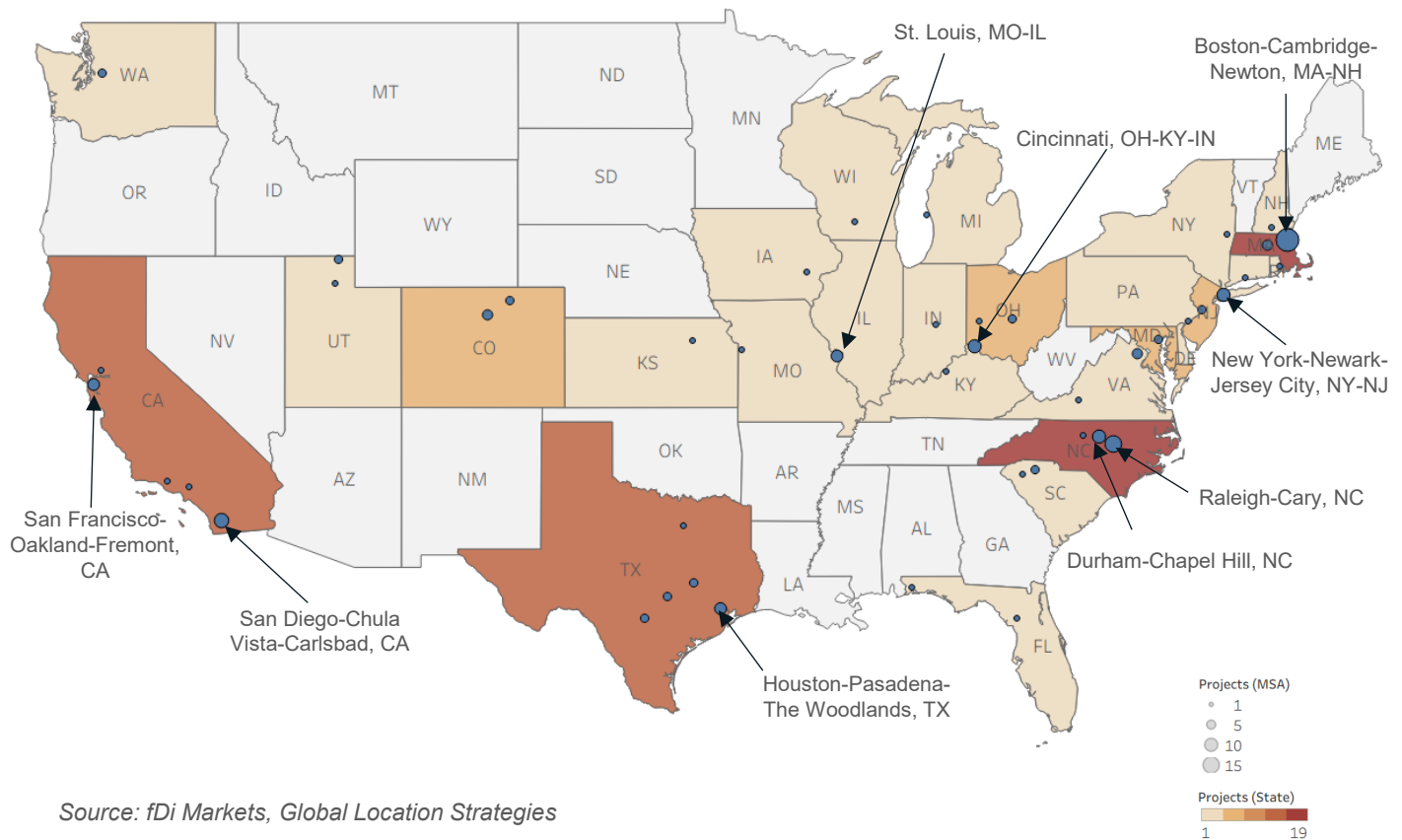
While these are all established biopharma hubs, a new generation of metros is steadily gaining ground. Cincinnati, OH–KY–IN, for instance, reported five manufacturing projects since 2020, with total capex of over \$700 MM, while St. Louis, MO–IL secured four projects averaging \$70 million and 103 jobs.¹⁶ These trends illustrate how the next tier of U.S. markets is beginning to capture meaningful biologics activity, signaling a broader and more geographically diverse industry footprint.

The table below highlights the top ten U.S. metropolitan areas ranked by project activity since 2020 – 2025 Q2, including total projects, capex, and job creation metrics.

National Ranking	Metro	Total Projects	Capex	Jobs	Avg Capex	Avg Jobs
1	Boston-Cambridge-Newton, MA-NH	15	\$1.6 BN	2,142	\$106 MM	143
2	Raleigh-Cary, NC	8	\$6.0 BN	3,094	\$746 MM	387
3	San Diego-Chula Vista-Carlsbad, CA	6	\$879 MM	1,107	\$146 MM	185
4	Cincinnati, OH-KY-IN	5	\$714 MM	863	\$143 MM	173
5	New York-Newark-Jersey City, NY-NJ	5	\$792 MM	934	\$158 MM	187
6	Durham-Chapel Hill, NC	5	\$527 MM	815	\$105 MM	163
7	San Francisco-Oakland-Fremont, CA	4	\$681 MM	804	\$170 MM	201
8	Houston-Pasadena-The Woodlands, TX	4	\$535 MM	621	\$134 MM	155
9	St. Louis, MO-IL	4	\$280 MM	412	\$70 MM	103
10	Washington-Arlington-Alexandria, DC-VA-MD-WV	3	\$587 MM	478	\$196 MM	159

U.S. Biological Product (except Diagnostics) Manufacturing Projects (2020 – 2025 Q2)

While major hubs such as Boston, New York, and the Research Triangle continue to attract significant investment, some less top-of-mind MSAs—such as Cincinnati, OH-KY-IN and St. Louis, MO-IL—have also captured a notable number of projects.



This pattern of activity illustrates that while legacy primary biopharma hubs still dominate in total scale, investment is clearly expanding into the next tier of markets to locations that combine available land, competitive labor costs, and growing specialized talent pools.

The rise of these secondary hubs not only spreads economic opportunity but also enhances national supply chain resilience by reducing dependence on a few dominant metros.

For companies evaluating new facility locations, these trends underscore the importance of considering both proven clusters and emerging contenders. Established hubs offer deep ecosystems and innovation networks, while rising metros may deliver better cost positions, workforce availability, or expansion potential—a compelling mix as the industry scales to meet global biologics demand.

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METHODOLOGY

GLS Insights is a vision from the talented team at Global Location Strategies, an internationally-recognized location strategy firm with over a century of location strategy experience and offices in the United States and Europe.

Our reports exemplify the same rigor and transparency we bring to our site selection evaluations.

To produce our GLS Insights rankings, we combine data from more than a dozen public and private data providers to analyze over 120 criteria in categories including workforce strength, talent pipeline, industry presence, innovation ecosystem, business environment, logistics infrastructure, quality of life, and operating costs.

+ Analysis

This analysis evaluates the location quality and estimated annual location-dependent operating cost for a therapeutic biologics manufacturing operation in the 387 metros across the country.

Metros, also referred to as Metropolitan Statistical Areas (MSAs), are defined by the US Census Bureau as regions with at least one urbanized area consisting of a city and its surrounding communities that are linked by social and economic factors with a minimum population of 50,000 residents.

Using our site selection methodology, this analysis evaluates top locations based on quality and operating cost factors to identify the most competitive options for a global biopharma company establishing a new commercial biologics facility.

Data Sources

Data came from various public and private data sources including:

- American Community Survey
- Bureau of Transportation Statistics
- CoStar
- County Health Rankings
- Federal Aviation Administration
- Federal Emergency Management Agency
- JobsEQ
- fDi Markets
- National Center for Education Statistics
- Tax Foundation
- US Bureau of Labor Statistics
- US Energy Information Administration
- US Environmental Protection Agency
- U.S. Food & Drug Administration
- American Council on Education
- National Center for Science and Engineering Statistics
- National Library of Medicine
- Council of State Bioscience Associations

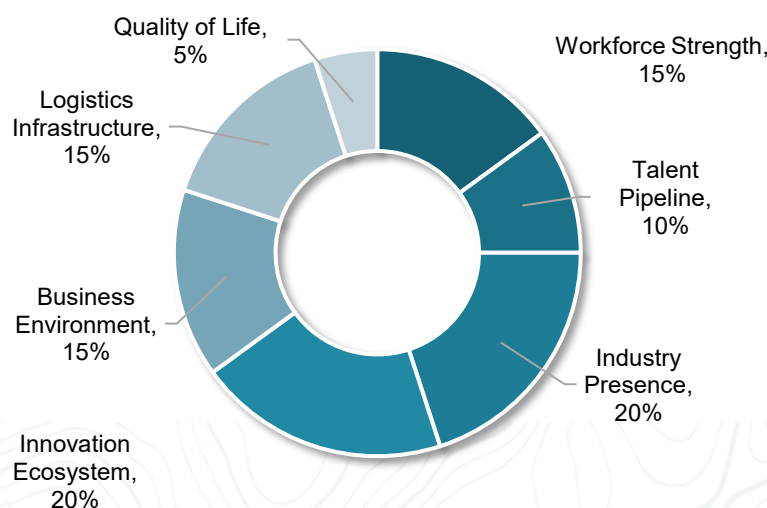
The **location quality score** assesses more than 120 datapoints to measure the competitiveness of each metro for therapeutic biologics manufacturing, based on the project profile developed for this analysis.

The quality criteria included in the evaluation are grouped into the following primary categories:

- **Workforce Strength:** Examines population demographics, workforce stability, and key manufacturing and target industry occupations.
- **Talent Pipeline:** Assesses the relevant graduate pool, educational attainment and future workforce readiness, focusing on the strength of the talent pipeline and the quality of school system.
- **Industry Presence:** Evaluates the presence of core and supportive manufacturing industries, with an emphasis on Biological Product (except Diagnostic) Manufacturing.
- **Innovation Ecosystem:** Assesses the strength of academic and research institutions, R&D commercialization activities, collaboration networks, and participation in clinical trials.
- **Business Environment:** Evaluates the business climate, including state tax and incentive environment, as well as environmental and operational risks.
- **Logistics Infrastructure:** Considers the overall road and interstate infrastructure, as well as accessibility to airports and the strength of the cold chain system.
- **Quality of Life:** Encompasses commuting patterns, economic well-being, affordability indicators, community health, and environmental factors such as air pollution.

Each primary category includes weighted secondary categories, which in turn contain weighted and scored tertiary categories. Together, these layers create a comprehensive, data-driven evaluation of non-financial factors that influence the viability and success of a therapeutic biologics manufacturing project.

**Primary Categories and Weights
Applied in the Model**



In addition to the quality analysis, **location dependent operating costs** are incorporated in our model and weighted as 20% of the final ranking. Costs that are immaterial and/or not location-dependent are not included in this analysis.

Logistics costs are excluded from this analysis as they are highly variable and dependent on each operation's supply chain. In therapeutic biologics manufacturing, logistics is shaped more by specialized requirements, such as ultra-cold storage, validated packaging, real-time monitoring, and strict regulatory compliance, than by transportation volume or distance, as is the case in food processing or bulk chemicals. As a result, while logistics is critical from a quality and risk management perspective, it is generally not among the largest cost drivers.

The location-dependent cost criteria considered for this evaluation are grouped into the following primary categories:

- **Labor Costs:** Payroll for an industry-specific staffing profile, including benefits
- **Utilities:** Electricity, natural gas, water, and wastewater
- **Industrial Lease Costs**

An evaluation of indicative costs across U.S. metros shows that for a therapeutic biologics manufacturing project, labor costs are expected to comprise 69 percent of all considered location-dependent costs. By comparison, utilities account for 25 percent of annual operating costs, followed by lease costs at 5 percent. Labor costs are expected to represent the largest share of location-dependent expenses.

Location-Dependent Operating Cost Distribution



Optimal locations are those that offer an above-average quality score at a lower-than average operating cost.

The comparison of cost and quality metrics illuminates the strengths, weaknesses, opportunities, and threats for each metro, and allows corporations to make informed decisions about potential tradeoffs when choosing their location.

Focusing on the highest potential metros based on these rankings allows site selection efforts to be focused only on the regions that will be the most optimal for their unique project.

+ Optimizing Cost and Quality

In the GLS Insights' composite model, each metro is assigned a position on the chart based on its location quality score and location-dependent operating cost. A location's position will change depending on the project specifications and the competing locations in consideration.

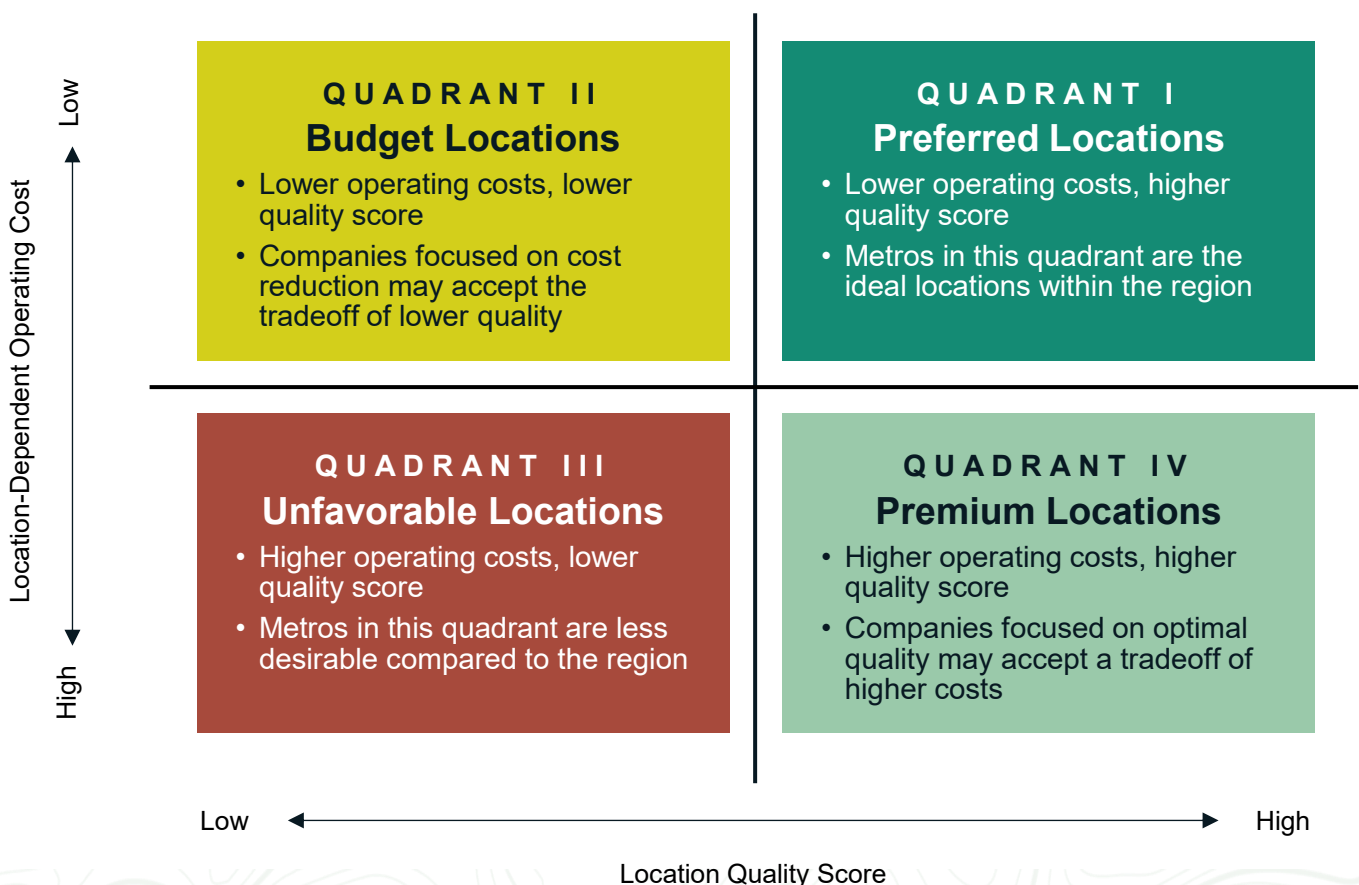
Locations falling within the **top right quadrant (Quadrant I)** are considered preferred as they provide an optimal balance of a high location quality score and a competitive location-dependent operating cost within a specified region.

Metros that fall within the **bottom left quadrant (Quadrant III)** have relatively lower quality scores and higher operating costs, making them unfavorable locations and likely for elimination unless project-specific critical factors, such as the presence of a key supplier or customer, exist.

Locations in the **bottom right quadrant (Quadrant IV)** have above-average location quality scores but also above-average location-dependent operating costs.

The **upper left quadrant (Quadrant II)** includes locations with a location-dependent operating cost below the average but also a location quality score below the average. Lower costs often cannot make up for a lack of quality and therefore these locations should be considered cautiously.

The top-ranking metros fall within Quadrant I – Preferred Locations and Quadrant IV – Premium Locations. Premium Locations may be considered despite their higher costs, particularly if incentives can be leveraged to offset these cost implications or if the long-term benefits of higher quality attributes are weighed (for example, reduced turnover).



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PROJECT PROFILE

+ Project Specifications

While every project has unique requirements, companies within the same industry often face common location drivers. Drawing on over a century of cumulative industry experience and insights from recently announced therapeutic biologics manufacturing projects, GLS developed a project profile to represent a global biopharma company establishing a new large-scale commercial manufacturing site for therapeutic biologics.

The primary goal is to secure a steady, skilled workforce while strengthening supply chain reliability through established industry clusters and surrounding innovation ecosystems. A friendly business environment and strong logistics infrastructure are also key considerations.

This capital-intensive project involves complex manufacturing systems and requires a larger team, including bioprocess operators, QA/QC staff, engineers, and maintenance personnel. Utility demands are significant and operations run at near full capacity, 24/7 for most of the year. This project profile strikes a balance between innovation and cost, serving as a sustainable long-term anchor.

The table below outlines the project-specific analysis inputs. In addition to total employment, the labor model incorporates an industry-specific occupational mix of white- and blue-collar roles to evaluate labor quality, availability, and cost.

Project Profile

REAL ESTATE	250K SF Building			
INITIAL INVESTMENT + EMPLOYMENT	\$700MM Capital Investment	350 Employees		
OPERATING SCHEDULE	24 hrs. / 7 days, 340 days/year			
UTILITY DEMANDS	15 MW Electric Load Factor 0.85	50 MCFPH Natural Gas	180K GPD Water	12K GPD Wastewater

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RANKING RESULTS

All 387 U.S. metropolitan areas were evaluated using a two-step process: 1) elimination 2) benchmarking and structured around the requirements of a biological product manufacturing project.

The elimination stage identified metros with a sufficient biopharma manufacturing labor base to support a new facility projected to create 350 jobs. To ensure workforce depth, ramp-up capacity, and backfill potential, the analysis required a local biopharma manufacturing talent pool at least five times the project headcount ($\geq 1,750$ workers). This filter narrowed the field to 33 metropolitan areas.

The benchmarking stage then applied a weighted assessment across the quality categories detailed in the methodology section, accounting for 80% of the final score. Location-dependent operating costs represented the remaining 20%.

The resulting rankings highlight U.S. metropolitan areas offering the strongest combination of quality factors critical to therapeutic biologics manufacturing and competitive operating costs—aligning with the priorities of a company seeking to establish a large-scale, reliable commercial manufacturing site for a new therapeutic biologic.

National Ranking	Metro	Score	Quality Score	Est. Annual Operating Cost (\$MM)
1	Raleigh-Cary, NC	90.62	8.42	\$50.7
2	Salt Lake City-Murray, UT	85.56	7.60	\$47.3
3	Durham-Chapel Hill, NC	83.70	7.97	\$51.6
4	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	83.06	8.09	\$55.9
5	Indianapolis-Carmel-Greenwood, IN	82.48	7.91	\$50.7
6	Madison, WI	81.24	7.73	\$50.6
7	Houston-Pasadena-The Woodlands, TX	78.72	7.45	\$48.5
8	Dallas-Fort Worth-Arlington, TX	69.98	7.35	\$47.4
9	Phoenix-Mesa-Chandler, AZ	66.82	7.35	\$50.3
10	Boston-Cambridge-Newton, MA-NH	66.20	7.49	\$72.7

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TOP MSA SPOTLIGHTS

The top 10 MSAs represent a mix of established hubs and emerging contenders, highlighting U.S. metro areas that combine strong life sciences ecosystems with competitive operating costs. These metros provide both strong industry and innovation system depth and manufacturing readiness.

#1 Raleigh–Cary, NC



Image sourced: [Abhiram Juvvadi](#)

Raleigh–Cary offers one of the most balanced profiles in the ranking. It leads the group in industry presence and quality of life, while also placing in the top three for workforce strength and talent pipeline.

Its business environment is highly favorable, though it falls slightly behind the largest global hubs — Boston, Philadelphia, New York, and San Francisco — in innovation ecosystem scale and logistics infrastructure.

The metro's biological product manufacturing industry demonstrates strong momentum, with double-digit forecasted growth, a high location quotient, and one of the largest employment bases specifically classified under biological product manufacturing.

Supporting industries — including pharmaceutical preparation manufacturing and analytical laboratory instrument manufacturing — also show the highest forecasted growth rates among all top 10 metros, matched by similarly strong projections for R&D in biotechnology.

Raleigh–Cary benefits from:

- The second highest population annual growth rate
- Low turnover rate in biological product manufacturing
- Low unionization in manufacturing
- The strongest forecasted growth across target occupational groups

Anchored by the Research Triangle's concentration of universities and research institutes, the metro combines specialization, resilience, and growth potential, positioning it as one of the most dynamic hubs for biologics manufacturing in the United States.

#2 Salt Lake City-Murray, UT



Salt Lake City–Murray, UT rises in the rankings due to its competitive operating costs, particularly lower labor expenses, which help offset somewhat lower quality scores relative to other top-ranked metros.

The region benefits from a strong biotechnology R&D base, robust clinical trial activity, and high forecasted growth in the biopharma industry, supported by substantial industry-sponsored research that underscores active university–industry collaboration.

While the metro has a smaller concentration of top-tier research universities compared with major biopharma markets, the University of Utah serves as a powerful anchor—consistently ranking among the top U.S. public universities for patents issued and licensing revenue. The workforce is another key strength, with depth across scientific R&D, engineering, quality assurance and control, and process optimization roles, supported by a strong talent pipeline.

Salt Lake City combines affordability, workforce quality, and strong R&D-to-commercialization linkages, making it an increasingly attractive location for biologics and biopharmaceutical manufacturing investment.

#3 Durham–Chapel Hill, NC



Durham–Chapel Hill demonstrates distinct strengths, leading the top 10 in workforce strength and ranking second in both industry presence and quality of life.

Its performance is more moderate, however, in areas such as talent pipeline, logistics infrastructure, and innovation ecosystem compared with the nation's largest hubs.

As another cornerstone of the Research Triangle, Durham–Chapel Hill excels through a strong blend of academic research and commercial application. The metro reports the highest specialization in therapeutic biologics manufacturing and the second-highest location quotient in biotechnology R&D among the top 10 metros (after Boston), with continued growth projected. It also ranks near the top in total university life sciences R&D expenditures and industry-funded research, reinforcing its position as a key node within the national innovation landscape.

Durham–Chapel Hill shows the highest specialization in biological product manufacturing among the top ten metros and the second-fastest forecasted growth, supported by a strong concentration in pharmaceutical preparation manufacturing. Like Raleigh, it benefits from low unionization rates and one of the highest population growth rates among peers. Though its overall employment base is smaller than major biopharma hubs such as Boston, San Francisco, Philadelphia, or New York, Durham–Chapel Hill offers some of the strongest specialization in biologics-related occupations and robust projected growth.

#4 Philadelphia–Camden–Wilmington, PA–NJ–DE–MD



Image sourced: [Toniklemm](#)

Philadelphia's performance is anchored by its strong innovation ecosystem, and it also ranks among the three leading metros in our top 10 for logistics infrastructure and talent pipeline.

Its industry presence sits above the top-10 average, reflecting both depth and maturity. Although the metro trails behind peers in workforce strength, contributing to relatively lower occupational forecasted growth rates, it continues to offer an abundant and highly capable labor base.

Philadelphia's scale and stability further distinguish it. The metro records a low turnover rate in biological product manufacturing and hosts the largest number of establishments classified under that sector among the top 10 metros.

It is also a national leader in university life sciences R&D expenditures, industry-funded R&D, and active or recent clinical trials in biologics and biotechnology—evidence of its extensive research and commercialization ecosystem.

This metro's logistics strength is reinforced by a robust presence in refrigerated warehousing and storage as well as specialized refrigerated trucking, supporting the temperature-sensitive supply chains essential for biologics. Together, these factors underscore Philadelphia's position as one of the most mature and comprehensive hubs for biologics manufacturing in the United States.

#5 Indianapolis-Carmel-Greenwood, IN



Image sourced: [alexeatwhales](#)

Indianapolis–Carmel–Greenwood, IN boasts a sizable biopharma manufacturing workforce of approximately 14,000, placing it on par with larger hubs such as Philadelphia.

The metro combines established manufacturing expertise with affordability, supported by lower labor costs and utility rates that, while not as competitive as in Texas, still provide a meaningful advantage over globally recognized biopharma centers such as Boston or San Francisco.

The region performs strongly in logistics, with an extensive temperature-controlled warehousing and distribution network serving pharmaceutical and biotechnology clients. Its innovation ecosystem benefits from a high number of active or recently completed clinical trials in biologics and biotechnology.

#5 Indianapolis-Carmel-Greenwood, IN

While the metro scores lower than larger innovation hubs for academic and research institution presence, it maintains a strong talent pipeline.

Indiana's business environment is bolstered by targeted incentives, including the SBIR State Matching Grant, Manufacturing Sales Tax Exemption on Equipment, and R&D Tax Credit for Product Development.

The manufacturing base is further strengthened by Eli Lilly's \$9 billion investment in new production facilities—one of the largest U.S. commitments to synthetic medicines and active pharmaceutical ingredient (API) manufacturing—expanding the metro's industrial capacity and supply-chain ecosystem.

Overall, Indianapolis combines affordability, a skilled workforce, and continued investment momentum, making it one of the most competitive Midwestern metros for biologics manufacturing.

#6 Madison, WI



Image sourced: [Warren LeMay](#)

Madison's biologics ecosystem is anchored by the University of Wisconsin–Madison, one of the nation's top research institutions with a substantial share of funding dedicated to life sciences and biotechnology.

Surrounding the university is a dynamic network that includes established firms such as Catalent and Aldevron, alongside early-stage biologics and diagnostics manufacturers. Together, these entities create deep capabilities in biotech R&D, process development, and biologics-supporting industries.

Madison leads the top 10 metros in talent pipeline and ranks second in workforce strength, also performing strongly in business environment and quality of life. Its smaller employment base compared to larger hubs is offset by high specialization in scientific R&D and QA/QC roles, paired with robust forecasted growth.

Talent quality in the region is reinforced by exceptional educational attainment and strong academic performance. The metro records high graduation rates and a low pupil–teacher ratio, reflecting a well-supported education system. Only 4% of residents lack a high school diploma, while it holds the highest share of bachelor's degree holders among the benchmarked metros.

On the industry side, Madison records the second-highest location quotient in Biological Product Manufacturing, reflecting a sizable employment concentration relative to its scale. Its industry presence, however, is constrained by a limited number of FDA-licensed biologics facilities, and its logistics performance is tempered more by airport connectivity and infrastructure than by cold-chain capacity, where it maintains a solid foundation.

Madison stands out as a smaller yet highly specialized hub where academic excellence, workforce quality, and scientific depth offset scale limitations—positioning it uniquely among the top 10 U.S. metros for biologics manufacturing.

#7 Houston-Pasadena-The Woodlands, TX



Image sourced: [Kenneth C. Zirkel](#)

Houston–Pasadena–The Woodlands, TX combines strong biopharma industry capabilities with competitive operating costs.

While labor costs in Houston are comparable to markets such as Chicago, Philadelphia, and Raleigh, the region, along with other Texas metros, benefits from some of the lowest electricity and natural gas rates among the benchmarked metros.

Looking strictly at biologics manufacturing, employment numbers may appear modest; however, many of the core competencies essential to biologics production such as: aseptic processing, quality control, validation, and bioprocess operations, are well established within Houston's broader pharmaceutical and biotechnology sectors.

Because official data often classify biologics firms under Pharmaceutical Preparation Manufacturing, our analysis considers both direct biologics activity and the broader biopharma ecosystem—an approach that highlights Houston's deep and transferable expertise across the life sciences value chain.

This metro offers substantial biotech R&D and biopharma manufacturing talent pools, anchored by institutions such as:

- The University of Texas MD Anderson Cancer Center
- Baylor College of Medicine
- University of Houston

All of which collectively drive sustained research funding, translational innovation, and workforce development.

These strengths underpin Houston's high performance in the Innovation Ecosystem category, reflecting the region's depth in academic research and its rapidly expanding clinical and commercial biomanufacturing base. The metro also performs well in logistics infrastructure, benefitting from robust cold-chain capacity and international air connectivity through George Bush Intercontinental Airport.

Reinforcing Houston's growing biomanufacturing profile, Eli Lilly announced a \$6.5 billion facility at Generation Park, projected to create approximately 615 high-skilled permanent jobs. The cost advantage, combined with its strong institutional base and logistics strengths, makes Houston one of the most competitive large metros for biologics manufacturing investment in our ranking.

#8 Dallas-Fort Worth-Arlington, TX



Image sourced: [UT Southwestern](#)

Dallas–Fort Worth–Arlington, TX, the second Texas metro in the top 10 ranking, stands out for its exceptional logistics performance, earning the highest score among benchmarked metros.

Its extensive cold-chain infrastructure and strong air connectivity through Dallas/Fort Worth International Airport support the reliable movement of temperature-sensitive biologics materials.

Dallas’s innovation ecosystem is anchored by UT Southwestern Medical Center, globally recognized for research excellence in molecular biology, structural biology, genetics, immunology, and oncology.

The metro’s life sciences presence is set to expand further with the planned \$4 billion Texas Research Quarter (TRQ) development in Plano—a 200-acre innovation district designed to accommodate advanced research, development, and cGMP biomanufacturing facilities

The project, expected to open its first phase in early 2026, will significantly strengthen North Texas’s capacity for biologics and biopharmaceutical activity.

While Dallas offers a comparatively smaller biotech R&D talent pool than Houston, it compensates with a larger biopharma manufacturing workforce and competitive operating costs.

Like other Texas metros, Dallas benefits from some of the lowest electricity and natural gas rates in the benchmarked group. Combined with the state’s business-friendly tax and regulatory environment, these advantages reinforce Dallas’s position as one of the most attractive large metros for biologics manufacturing investment.

#9 Phoenix-Mesa-Chandler, AZ



Image sourced: [Phoenix Bioscience Core](#)

While Phoenix–Mesa–Chandler does not stand out in any of the benchmarked categories, it demonstrates solid performance across all indicators and benefits from relatively low operating costs.

The metro shows strong specialization in therapeutic product manufacturing and considerable employment in R&D in biotechnology.

The region supports a growing concentration of life sciences activity centered around the Phoenix Bioscience Core, Arizona State University, and the Translational Genomics Research Institute (TGen).

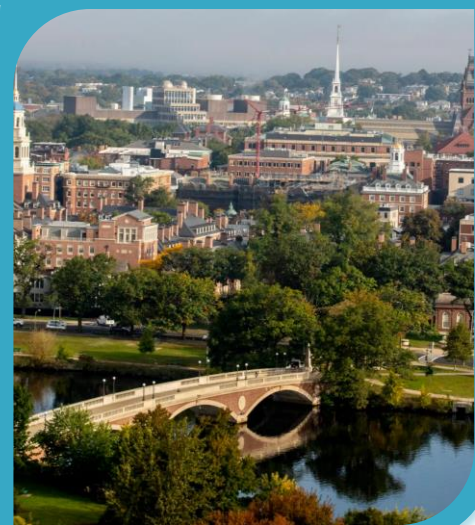
#9 Phoenix-Mesa-Chandler, AZ

While manufacturing union membership is low, overall workforce stability is challenged by a high rise in manufacturing wages over the past five years and elevated turnover—particularly within biologics manufacturing. The metro performs strongly in engineering, process optimization, scientific R&D, and QA/QC talent; however, manufacturing and production occupations receive comparatively lower scores.

In terms of educational attainment, the metro also ranks lower, as does its performance on future workforce readiness indicators that evaluate K–12 system strength. Phoenix further scores below average for the concentration and presence of academic and research institutions, though it offsets this with a high number of active and recent clinical trials in biologics and biotechnology.

The combination of a strengthening innovation ecosystem and competitive operating costs—supported by Arizona’s relatively low natural gas prices—positions Phoenix as an emerging, cost-effective option for biologics investment and manufacturing.

#10 Boston–Cambridge–Newton, MA–NH



Boston–Cambridge–Newton is the nation’s innovation leader, combining a top-tier innovation ecosystem, robust industry presence, and one of the highest talent pipeline scores.

The metro also ranks strongly in logistics infrastructure, reinforcing its position as a global life sciences hub.

While it ranks slightly lower in overall workforce strength compared with the Research Triangle metros, as well as in business environment and quality of life, the region employs the most biochemists, biophysicists, and medical scientists nationally.

Its relative underperformance stems from a smaller share of specialized manufacturing workforce, which—though abundant—is less concentrated than in metros such as Durham–Chapel Hill or Madison.

Boston–Cambridge–Newton hosts the greatest number of top-tier research universities and is unmatched in biotechnology R&D. It produces the second-highest number of advanced biologics degrees, just behind New York, and leads in location quotient and workforce scale in pharmaceutical preparation manufacturing, highlighting the depth of its supporting industries.

The metro also records some of the highest numbers of active or recent clinical trials in biologics and biotech, underscoring its pivotal role in advancing discovery and commercialization.

Overall, Boston–Cambridge–Newton stands as the leading U.S. life sciences hub, combining scale, specialization, and a research ecosystem that gives it a distinct advantage over other regions.

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TOP 10 MSA CONDITIONAL RESULTS

Across the top 10 metros, quality scores are strong, but differences in category performance underscore the diverse strengths that make each location attractive for biologics investment.

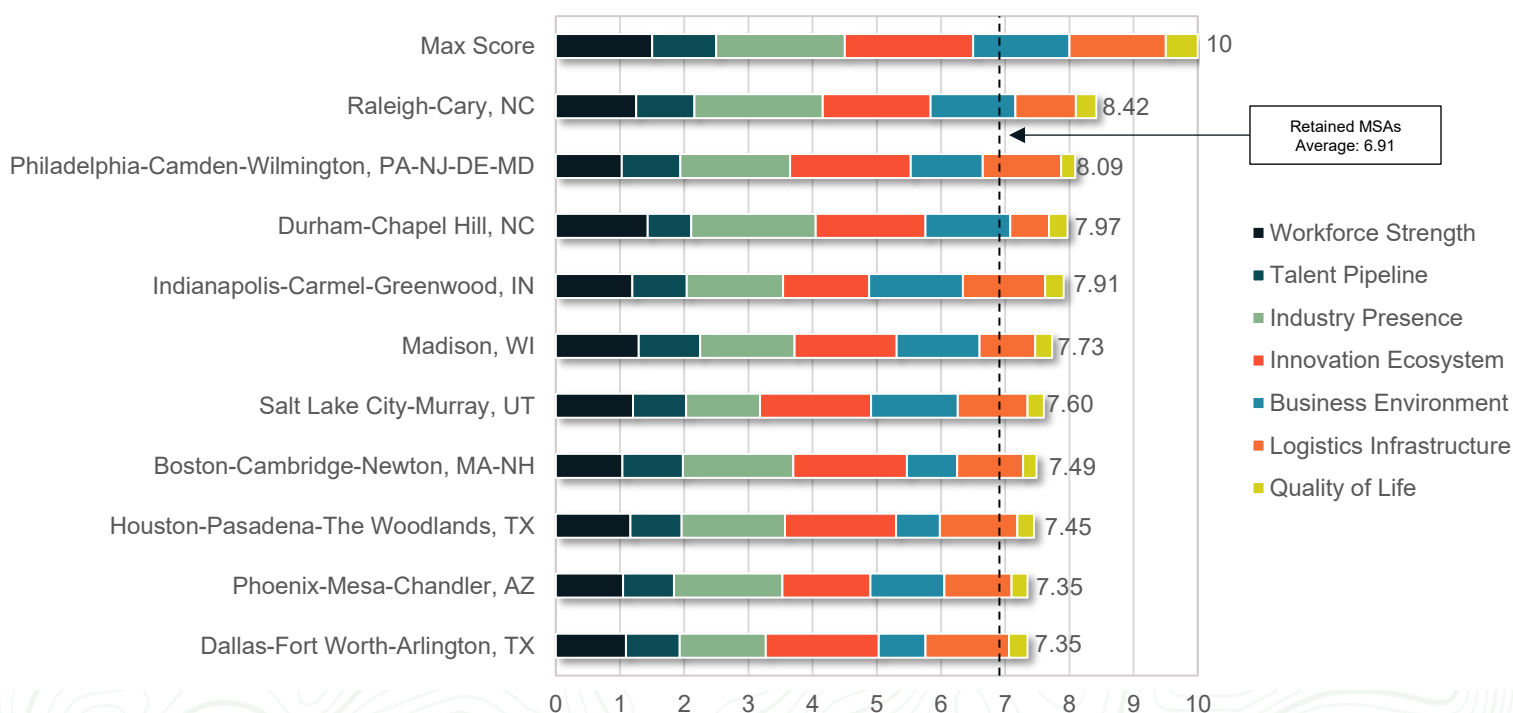
Raleigh-Cary, NC achieved the highest overall quality score, driven by top performance in Industry Presence and Quality of Life. The metro benefits from a concentration of therapeutic biologics employers and a university-supported talent base within the Research Triangle. The neighboring **Durham-Chapel Hill, NC**, closely followed in Industry Presence and Quality of Life, and leading the top 10 metros in Workforce Strength.

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD ranked second overall in the quality component, earning the top score in the Innovation Ecosystem category. Its strength is driven by premier research institutions (such as the University of Pennsylvania, Drexel University, and Thomas Jefferson University), a high concentration of biopharma R&D activity, and an extensive clinical trials footprint that supports biologics development and commercialization.

Dallas-Fort Worth-Arlington, TX received the highest score overall in the Logistics Infrastructure category, supported by its excellent airport connectivity, and expansive cold-chain distribution capacity. **Madison, WI** achieved the highest score in Talent Pipeline, supported by the University of Wisconsin-Madison's strong bioscience programs, which provide a steady flow of scientific and technical graduates, complemented by high educational attainment levels and strong K-12 education characteristics. **Indianapolis-Carmel-Greenwood, IN** led the top 10 in the Business Environment.

The diversity in category performance across the top 10 metros reflects multiple pathways to competitiveness, emphasizing that biologics manufacturing success depends as much on ecosystem balance as on individual regional advantages.

Conditional Analysis - Top 10



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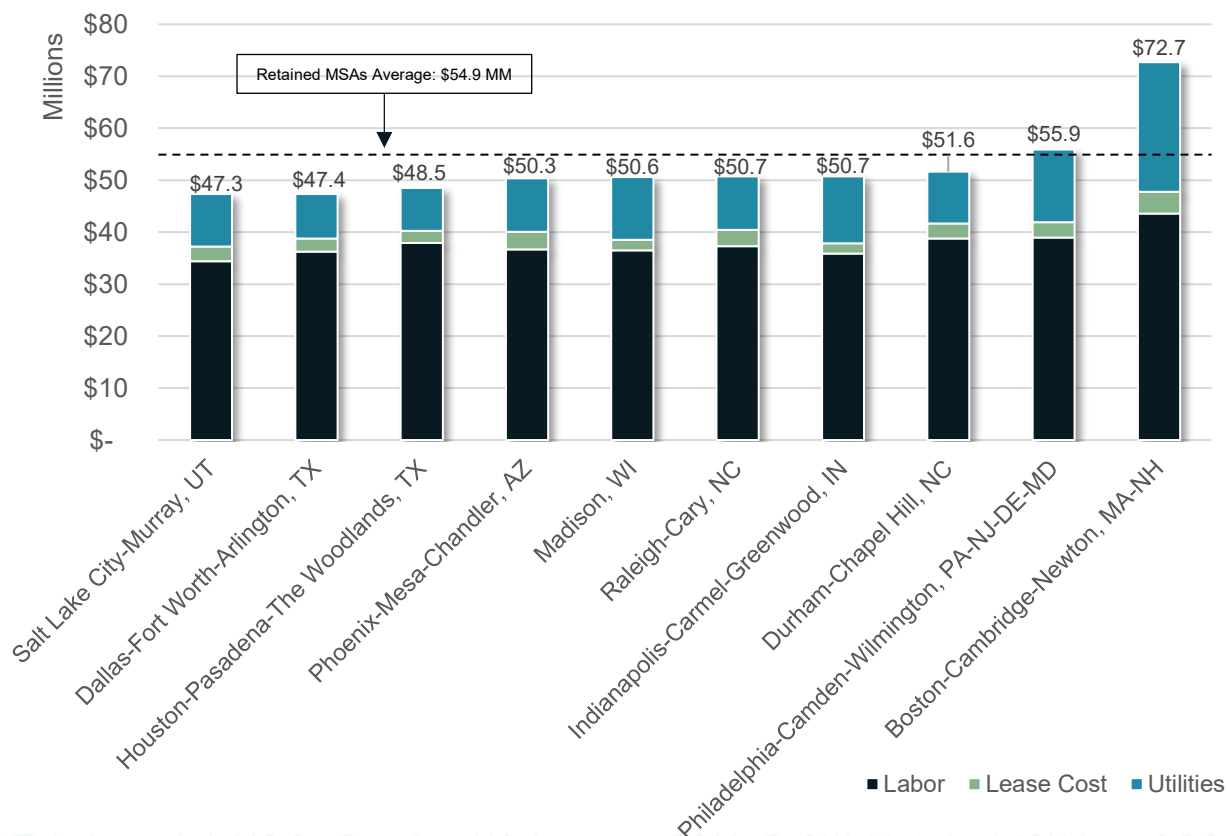
TOP 10 MSA LOCATION-DEPENDENT COST RESULTS

Cost competitiveness remains a defining factor in evaluating potential locations for biologics manufacturing, as operating expenses can vary widely across metros depending on labor markets, real estate conditions, and utility profiles. Across the top 10 metros, **Boston–Cambridge–Newton, MA–NH** stands out as the most expensive location, driven by high labor costs, lease rates, and utility expenses. While the exact cost mix may shift based on a project’s utility intensity and labor requirements, there is little doubt that premium global biopharma hubs typically carry a significant cost premium. Therefore, it is essential to assess whether a specific project’s operational and talent needs can be effectively met by lower-cost, second-tier biopharma hubs that still provide strong workforce and infrastructure capabilities.

Philadelphia–Camden–Wilmington, PA–NJ–DE–MD presents a unique balance, combining the advantages of a globally recognized biopharma hub with comparatively lower costs than other established centers such as Boston, San Francisco, or San Diego. At the other end of the spectrum, **Salt Lake City–Murray, UT** ranks as the least costly among the top 10 locations, followed closely by **Dallas–Fort Worth–Arlington, TX** and **Houston–Pasadena–The Woodlands, TX**.

The cost differential across the top 10 metros exceeds 50%, underscoring the importance of integrating cost efficiency with strategic operational priorities in site selection. This wide variation highlights how balancing cost with ecosystem maturity and talent depth is critical to optimizing biologics manufacturing investment decisions.

Cost Analysis – Top 10



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COMPOSITE RESULTS ANALYSIS

All 33 MSAs retained in the benchmarking phase are considered capable of supporting the project parameters defined in this analysis.

At this stage, the objective is to better understand the cost–quality tradeoffs among these leading metros to guide the next phase of narrowing and prioritization.

In a full site-selection engagement, shortlisted locations would then advance to a more detailed evaluation that includes:

- Site availability and suitability
- Deeper workforce and industry analyses
- Coordinated outreach with state and local economic development organizations (EDOs)

To help visualize those cost–quality dynamics, we plot each metro on a composite chart comparing overall quality against relative cost.

This chart highlights trade-offs and strategic positioning among candidate locations, making it easier to identify metros that offer the best balance of competitiveness and value. Additional detail on the composite-chart methodology is provided in the Methodology section of this report.

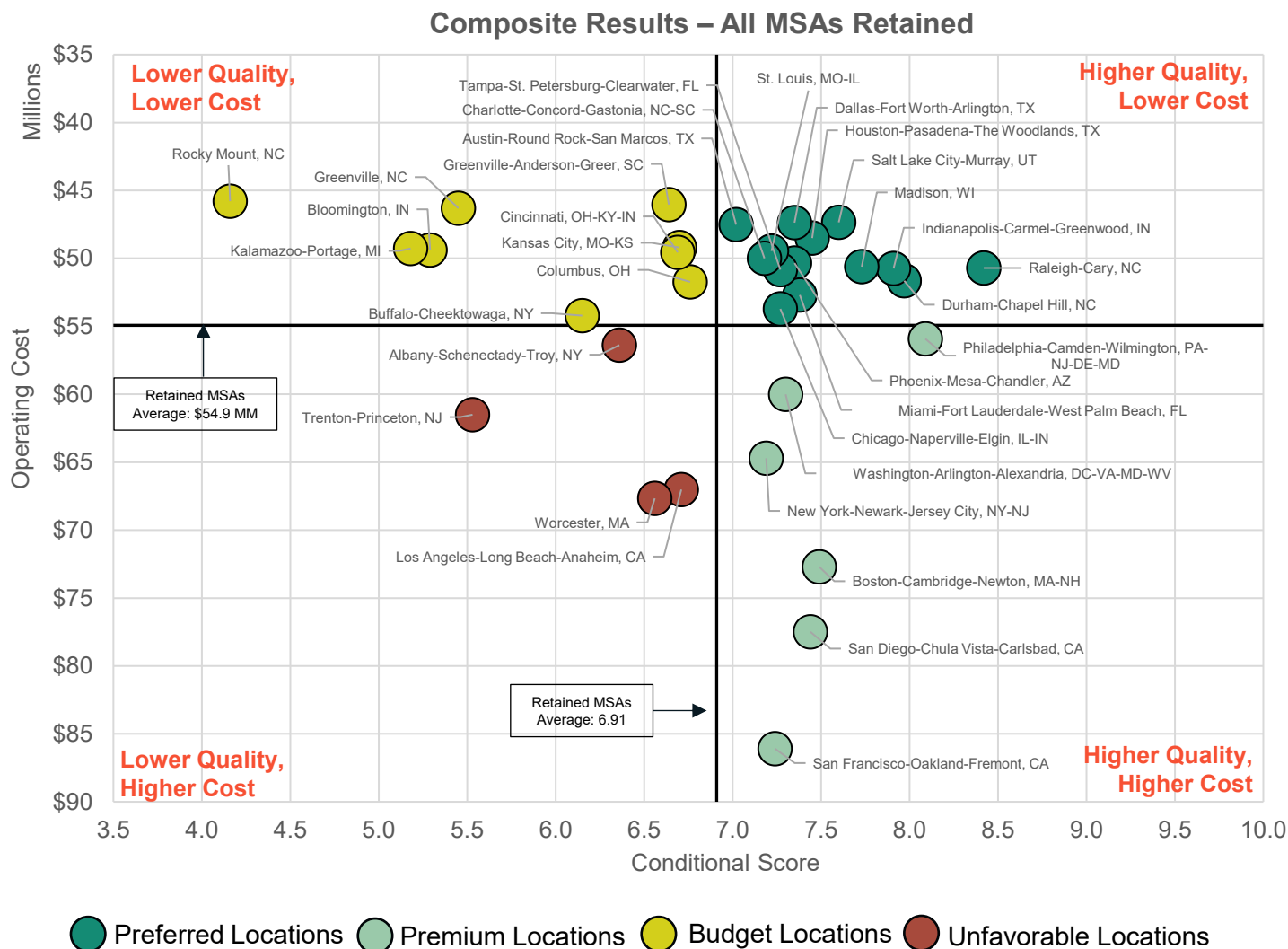
The composite chart below groups the 33 MSAs into four categories based on their relative performance:

1. **Preferred Locations** (14 MSAs)
2. **Premium Locations** (6 MSAs)
3. **Budget Locations** (9 MSAs)
4. **Unfavorable Locations** (4 MSAs)

The horizontal axis represents average location-dependent operating costs, while the vertical axis reflects the average quality score for all retained MSAs.

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COMPOSITE RESULTS ANALYSIS



Fourteen metros have been identified as Preferred Locations based on the composite analysis, eight of which also appear among the top 10 metros in the overall ranking.

All Preferred Locations combine above-average quality scores with below-average operating costs, making them highly attractive candidates for further consideration in the next phase of analysis.

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COMPOSITE RESULTS ANALYSIS

Preferred metros that did not make the top 10 list but still fall within the preferred quadrant include:

1. Austin–Round Rock–San Marcos, TX
2. Charlotte–Concord–Gastonia, NC–SC
3. Chicago–Naperville–Elgin, IL–IN
4. Miami–Fort Lauderdale–West Palm Beach, FL
5. St. Louis, MO–IL
6. Tampa–St. Petersburg–Clearwater, FL

These six locations offer a strong balance between quality and cost, positioning them as competitive alternatives to the highest-ranked metros.

However, it is important to note that premium locations may still merit consideration depending on a company's strategic priorities, particularly where innovation access, ecosystem maturity, or global connectivity are key drivers.

In the early stages of analysis when operating cost estimates are indicative rather than detailed, it can be appropriate to assign a lower weighting to cost and a higher weighting to quality factors.

For example, in this assessment, the quality component was weighted at 80% and cost at 20%, which helped elevate premium metros like Philadelphia and Boston into the top 10 list.

Ultimately, the relative attractiveness of premium versus preferred locations will depend on each company's cost sensitivity, operational model, and specific ecosystem needs.

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PREMIUM MSA SPOTLIGHTS

Among premium locations that did not make the top 10, several merit mention. While these locations are associated with higher costs, they represent world-class biopharma clusters offering highly innovative, diverse ecosystems.

This may be especially valuable for biologics manufacturers that prioritize speed-to-talent, R&D integration, and adaptability over cost efficiency or large-scale production.

These markets often provide the deepest talent pools and a highly developed innovation ecosystem, supported by robust R&D activity and strong technology transfer capabilities.

New York–Newark–Jersey City, NY–NJ

New York–Newark–Jersey City, NY–NJ leverages its unmatched scale, strong innovation ecosystem, and logistics infrastructure.

Its talent pipeline is another major strength, producing the large number of technicians, specialists, and advanced degrees related to biologics manufacturing.

In terms of target occupation workforce size, New York trails Boston but offers an even broader base of manufacturing occupations.

While the metro's location quotient in Biological Product (except Diagnostic) Manufacturing is lower, indicating less concentration, the absolute employment base remains extensive, supported by the nation's largest workforce in Pharmaceutical Preparation Manufacturing.

The region also hosts one of the highest numbers of FDA-licensed biologics manufacturing facilities. Its logistics advantage is reinforced by strong refrigerated warehousing and specialized refrigerated trucking sectors' presence, supporting the cold chain networks essential for biologics.



Image sourced: [Public Domain](#)

San Diego—Chula Vista—Carlsbad, CA

San Diego is one of the top U.S. life sciences clusters and home to world-leading research institutions including UC San Diego, The Scripps Research Institute, The Salk Institute, and Sanford Burnham Prebys.

Compared to metros such as Boston or New York, which have larger FDA-licensed biologics manufacturing bases, San Diego's strength has historically been upstream in the value chain—focused on discovery, testing, and advancing new biologics rather than mass production.

Over the past five years, however, the region has seen a stronger shift towards manufacturing capacity through CDMOs like Bora Biologics, Abzena, and Wacker Biotech.

San Diego stands out as a consistently solid and reliable performer across most categories. Its strengths are concentrated in industry presence and workforce, which position it as a leading hub for biologics and biotech activity.

San Diego scores relatively lower in business environment, quality of life, and talent pipeline. The talent pipeline is particularly constrained by weaker educational attainment levels and K–12 system characteristics, which may affect long-term workforce sustainability.

At the same time, the metro benefits from being on the lower end of manufacturing unionization rates, supporting greater operational flexibility for employers. San Diego combines a globally recognized discovery ecosystem with a growing base of biologics CDMOs, giving it a unique trajectory as it evolves from a research powerhouse into a stronger player in biologics manufacturing.



Image sourced: [Scripps Research](#)

San Francisco-Oakland-Fremont, CA

San Francisco is one of the world's leading biotech clusters, so it is no surprise that it also ranks among the premium metros for therapeutic biologics manufacturing.

The region is anchored by UCSF, Stanford, UC Berkeley, and the Gladstone Institutes, along with major companies such as Genentech (Roche), Gilead Sciences, and BioMarin, and a growing base of CDMOs and emerging biotechs.



Image sourced: [Visit California](#)

San Francisco-Oakland-Fremont, CA

This strong research and industry combination has made the Bay Area a center of scientific discovery, advanced bioprocess innovation, and commercial-scale biologics production, supported by one of the deepest life sciences talent pools and venture ecosystems in the world.

The metro ranks among the national leaders in life sciences R&D expenditures, biotech-related clinical trials, and employment in target biologics occupations.

The talent pipeline is hindered by weaker K–12 performance, but this is offset by one of the highest shares of residents with bachelor's and advanced degrees.

San Francisco scores lower in therapeutic biologics manufacturing specialization, though this is partly due to the way firms are classified under NAICS codes. The region demonstrates strong employment and specialization in Pharmaceutical Preparation Manufacturing and Analytical Laboratory Instrument Manufacturing, highlighting its significant capabilities in supporting biologics-related industries.

What distinguishes San Francisco is the intersection of biotechnology, technology, and venture capital. Its proximity to Silicon Valley fosters powerful synergies in AI, cloud computing, and computational biology, while the world's leading venture capital ecosystem provides the funding and support needed to translate innovation into impact.

Together, these factors position San Francisco as a premier launchpad for the next generation of biologics and biomanufacturing innovation.

Washington–Arlington–Alexandria, DC–VA–MD–WV

Washington, DC's metro is a well-balanced hub, with notable strengths in talent pipeline and a robust innovation ecosystem, reflecting the influence of federal R&D and major research institutions.

The talent pipeline is supported by strong production of technicians, specialists, and advanced degrees in biologics, alongside one of the highest percentages of the population holding a bachelor's degree or higher.

The region also stands out for its high number of FDA-licensed biologics manufacturing facilities and ranks among the leading metros in the number of top-tier research universities.



Image sourced: [Pixabay](#)

A unique differentiator for Washington is the concentration of federal research, funding, and regulatory agencies. The National Institutes of Health (NIH) in Bethesda continues to provide the world's largest biomedical research budget, while the Food and Drug Administration's (FDA) Center for Biologics Evaluation and Research (CBER) at White Oak oversees biologics approval and safety.

Several agencies remain key supporters of biologics, vaccine, and biosecurity initiatives:

- Biomedical Advanced Research and Development Authority (BARDA)
- Defense Advanced Research Projects Agency (DARPA)
- National Institute of Standards and Technology (NIST)

Though some programs have been restructured or reprioritized under current federal budget policies.

Overall, Washington's proximity to federal agencies and its concentration of research institutions give it a distinctive role in biologics—anchoring policy, regulation, and discovery even if manufacturing specialization is less pronounced.

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OPPORTUNITIES BEYOND THE BENCHMARK

As noted, all 33 MSAs retained in the benchmarking phase are considered capable of supporting the project. Within this group, however, metros falling into the Budget or Unfavorable quadrants are less likely to advance to the shortlist for this specific project profile.

If additional incentives become available or project parameters change, these locations could warrant further evaluation in subsequent stages.

It is also important to note that some metro areas with biologics potential did not appear on the list due to the screening criteria, which required each metro to have a workforce at least five times larger than the project's projected job creation. Nonetheless, several MSAs excluded from the final model may still be well-suited for smaller-scale or specialized projects.

One notable example is **Seattle–Tacoma–Bellevue, WA**, which benefits from a unique convergence of technology and life sciences.

Anchored by Microsoft, Amazon, and leading research institutions such as the University of Washington, Fred Hutchinson Cancer Center, and the Allen Institute, the region excels in AI-driven biology, computational research, and antibody–drug conjugate development.

Seattle performs strongly in workforce strength, particularly in engineering and process optimization roles, though it faces challenges including high industry turnover, above-average unionization rates, and comparatively weaker K–12 education outcomes.

The Southeast also presents emerging opportunities for biologics manufacturers, reflecting the region's growing specialization in advanced manufacturing and life sciences. **Greenville–Anderson–Greer, SC** leverages a strong advanced manufacturing base, anchored by automotive and industrial clusters, which provide a solid foundation for biopharma production.

The state's pro-business environment and competitive incentives further enhance its appeal. Nearby **Columbia, SC** benefits from state-led workforce initiatives such as SCBIO and an expanding life sciences ecosystem.

In Georgia, **Atlanta–Sandy Springs–Roswell, GA** combines global logistics leadership—anchored by the world's busiest airport and a robust multimodal infrastructure—with a steadily expanding life sciences base. Georgia's tax incentives and workforce programs further strengthen Atlanta's position for biologics operations requiring national or international distribution.

Further west, **Ogden, UT** offers similar logistics advantages at even lower operating costs, supported by a diverse manufacturing and aerospace base. Its affordability and proximity to Salt Lake City's infrastructure make it highly competitive for large-scale or cost-sensitive manufacturing projects.

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OPPORTUNITIES BEYOND THE BENCHMARK

Finally, **Lincoln, NE**, while not a traditional biopharma hub, presents compelling structural advantages for biologics and biosimilars manufacturing. Its central location, cost-efficient operating environment, and stable workforce make it attractive for scale-driven operations.

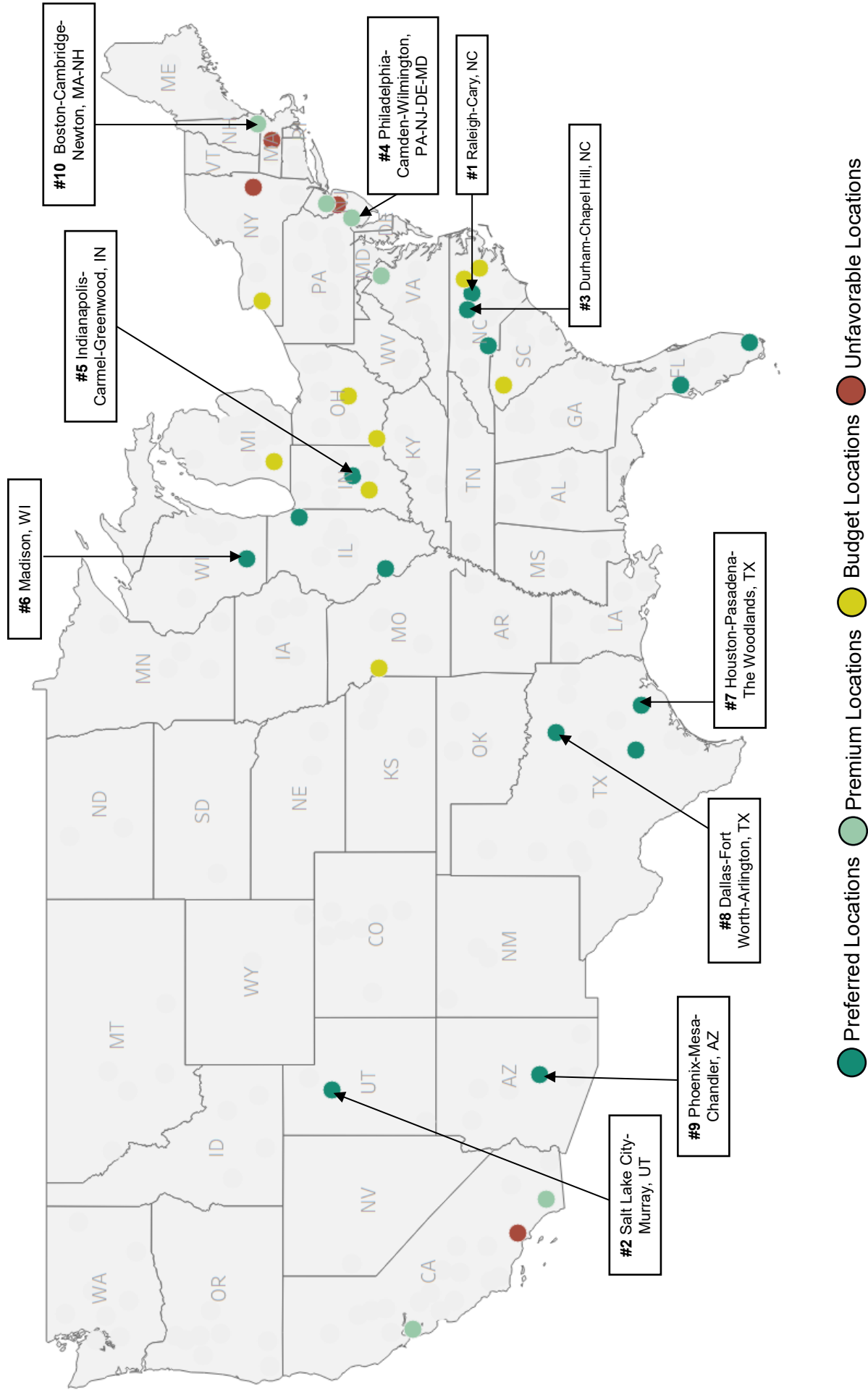
The city's biotechnology sector is rooted in veterinary and animal health products, supported by the University of Nebraska—Lincoln's expertise in animal sciences and the region's link to the Midwest Animal Health Corridor.

Although historically focused on veterinary biologics, the skills, infrastructure, and regulatory experience developed in this sector are highly transferable to human therapeutics.

These emerging and secondary metros broaden the range of viable options for biologics manufacturers, offering alternative pathways to competitiveness beyond the traditional coastal hubs.

Whether through cost efficiency, specialized workforce capabilities, or sectoral crossover with advanced manufacturing and technology, these locations illustrate how diverse regional strengths can be leveraged to support different biologics manufacturing project profiles.

+ Ranking Results Map



Ranking for Therapeutic Manufacturing

National Ranking	Metro	Score	Quadrant	Quality Score	Est. Annual Operating Cost (\$MM)
1	Raleigh-Cary, NC	90.62		8.42	\$50.7
2	Salt Lake City-Murray, UT	85.56		7.60	\$47.3
3	Durham-Chapel Hill, NC	83.70		7.97	\$51.6
4	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	83.06		8.09	\$55.9
5	Indianapolis-Carmel-Greenwood, IN	82.48		7.91	\$50.7
6	Madison, WI	81.24		7.73	\$50.6
7	Houston-Pasadena-The Woodlands, TX	78.72		7.45	\$48.5
8	Dallas-Fort Worth-Arlington, TX	69.98		7.35	\$47.4
9	Phoenix-Mesa-Chandler, AZ	66.82		7.35	\$50.3
10	Boston-Cambridge-Newton, MA-NH	66.20		7.49	\$72.7
11	Miami-Fort Lauderdale-West Palm Beach, FL	64.94		7.38	\$52.7
12	San Diego-Chula Vista-Carlsbad, CA	60.62		7.44	\$77.5
13	Washington-Arlington-Alexandria, DC-VA-MD-WV	54.36		7.30	\$60.0
14	Tampa-St. Petersburg-Clearwater, FL	54.32		7.27	\$50.8
15	Chicago-Naperville-Elgin, IL-IN	54.30		7.27	\$53.7
16	St. Louis, MO-IL	53.74		7.22	\$49.5
17	Austin-Round Rock-San Marcos, TX	49.34		7.02	\$47.5
18	Charlotte-Concord-Gastonia, NC-SC	47.46		7.18	\$50.0
19	San Francisco-Oakland-Fremont, CA	42.48		7.24	\$86.1
20	Kansas City, MO-KS	40.58		6.70	\$49.2
21	New York-Newark-Jersey City, NY-NJ	40.56		7.19	\$64.7
22	Greenville-Anderson-Greer, SC	39.36		6.64	\$46.0
23	Columbus, OH	38.12		6.76	\$51.7
24	Cincinnati, OH-KY-IN	35.60		6.69	\$49.6
25	Los Angeles-Long Beach-Anaheim, CA	29.94		6.71	\$67.0

National Ranking	Metro	Score	Quadrant	Quality Score	Est. Annual Operating Cost (\$MM)
26	Greenville, NC	26.18		5.45	\$46.3
27	Rocky Mount, NC	20.00		4.16	\$45.8
28	Albany-Schenectady-Troy, NY	19.96		6.36	\$56.4
29	Bloomington, IN	19.32		5.29	\$49.4
30	Worcester, MA	19.30		6.56	\$67.7
31	Buffalo-Cheektowaga, NY	18.72		6.15	\$54.2
32	Kalamazoo-Portage, MI	17.48		5.18	\$49.3
33	Trenton-Princeton, NJ	13.74		5.53	\$61.5

 Preferred Locations
  Premium Locations
  Budget Locations
  Unfavorable Locations

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CONSIDERATIONS FOR YOUR COMMUNITY

Biopharma projects deliver outsized benefits for host communities. They create high-quality jobs that require a skilled workforce and pay well above average wages, while large capital investments expand the local tax base. These projects also generate strong multiplier effects: for every direct biopharma job, an additional three to five indirect jobs are typically created across suppliers, contractors, logistics providers, and supporting services.

In the case of biologics manufacturing, the impact is even more pronounced. Because FDA approvals bind production to specific facilities, companies are highly unlikely to relocate once they invest, creating long-term economic stability that most other forms of manufacturing cannot match.

Beyond immediate economic gains, a major biopharma investment signals that a region can support highly regulated, complex industries, enhancing its reputation and positioning it to attract future high-value investments.

+ Call to Action for Communities

Make your biopharma presence visible.

While the largest clusters may be established, the expansion of biologics manufacturing is fueling the growth of strong secondary hubs nationwide. Communities that want to compete must first understand their local life sciences ecosystem — employers, workforce depth, research assets, and infrastructure — and then package that information into clear, digestible marketing materials that showcase regional strengths to potential investors.

Prioritize workforce development.

The U.S. biopharma industry depends on highly skilled talent across a wide spectrum of occupations and educational levels. From PhD researchers and senior managers to manufacturing technicians, quality specialists, and logistics personnel, the industry requires a steady pipeline of STEM talent at every stage. With skilled labor in short supply, communities that offer proactive, targeted workforce initiatives stand out. Partnerships with universities, community colleges, and training providers can demonstrate to companies that a region is committed to building and sustaining the workforce they need.

Take a proactive approach.

Attracting high-stakes biopharma investments requires more than waiting for projects to arrive. Communities must actively cultivate the ecosystem — from talent to infrastructure to business climate — and communicate those efforts clearly. Regions that position themselves as collaborative, forward-looking partners are far more likely to secure commitments from companies making billion-dollar, long-term investment decisions.

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TAKING THE NEXT STEPS

+ Considerations for Your Business

The GLS Insights Best Places Ranking leverages site selection methodology to focus a project's initial search region at the outset of a location search. Results point to the optimal search region based on a typical industry project and offer insight into the likely tradeoffs that can be expected within each metro area.

Project-Specific Considerations

Cost and quality scores and rankings will change depending on the project requirements and the search region.

- As a project's requirements deviate from the specifications defined for this ranking, results of the ranking may begin to change. For example, a project with a higher power demand will be more impacted by differences in electricity prices, which may impact the order of the highest-ranked locations. The GLS Insights quality and cost models are designed to enable rapid sensitivity analysis, allowing location rankings to be updated based on a project's specific requirements.
- This ranking evaluates locations at the national, regional, and state levels. However, supply chain considerations often constrain the practical geographic scope for a project, as proximity to key suppliers or customers plays a critical role in site selection. The GLS Insights Best Places ranking includes all U.S. metros and does not directly account for a project's specific supply chain footprint. Rankings within the model can vary depending on the designated search region, and once a project's supply chain network defines the relevant area, the optimal location may shift accordingly.

Next Steps

The GLS Insights Best Places ranking is intended to identify potential search regions for a therapeutic biologics manufacturing project. While this ranking incorporates the availability and pricing of industrial facilities, it does not guarantee that a location will possess a property suitable for a specific project's needs.

When possible, companies should not limit their search region to one metro area, as it is not guaranteed that real estate optimal for that project will be available within the project's timeline. Furthermore, a multi-jurisdictional search will be more advantageous for competition and leveraging potential economic incentives.

Additionally, once real estate has been identified within optimal metros, property-specific quality and cost rankings should be performed. This evaluation should include factors such as property characteristics, permitting processes, utility infrastructure, workforce availability within a drive time, and other property-specific considerations that refine the metro analysis. Once specific real estate is incorporated into the model, a location may rank better or worse for the project.

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TAKING THE NEXT STEPS

Optimizing a Location

It is not always feasible to select a location that simultaneously optimizes for both cost and quality. However, a thoughtful incentives strategy can be used to close that gap, aligning project priorities with local capabilities and resources.

Improve Quality

Workforce development incentives can improve the quality of a location's workforce relative to a project's requirements. These programs can include customized skill development, exclusive job advertisements and hiring events, and onboarding programs developed by the local community college.

Infrastructure commitments can also be structured to enhance logistics and utility access. Communities may, for instance, fund deceleration lanes, lighted intersections, or utility upgrades to support safe and efficient operations. Streamlined or expedited permitting, whether offered programmatically or negotiated for a specific project, can further reduce regulatory friction and improve speed-to-market.

Decrease Cost

Cost-reducing incentives can make relatively high-cost locations more competitive by temporarily offsetting major expenses. Investment-focused incentives may include reduced or no-cost land, utility extensions, or capital grants. Operating incentives often take the form of property tax abatements, tax credits, or discounted utility rates, typically linked to the project's job creation and investment commitments.

Not All Incentives are Created Equal

Incentives should level the playing field between strong locations, not compensate for structural disadvantages. The most effective incentive packages target a project's unique needs and mitigate the specific cost or quality gaps of finalist locations.

Beyond negotiation, it is essential to assess the true value and realizability of proposed incentives. Statutory credits or offsets are often overestimated in headline figures. A rigorous, multi-year financial model comparing finalist locations — accounting for actual incentive value, timing, and eligibility — ensures the project makes a well-informed, data-driven decision.

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