

LIFE SCIENCES GLOBAL CITIES COMPARISON REPORT 2024



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Foreword

It is with great excitement that I introduce this report, which highlights London's exceptional standing as a global leader in the life sciences sector. This study underscores the pivotal role that London plays on the international stage, placing it firmly among the top three cities worldwide for life sciences innovation and growth. With its unparalleled talent, world-leading research institutions, established investment environment, and advanced clinical infrastructure, London's ecosystem continues to thrive at the intersection of academia, industry, finance, and healthcare.

As we have long championed at MedCity, the strength of London's life sciences sector lies not only in its individual components but in how they work together. The partnerships between our world-class universities, cutting-edge industry, extensive hospital networks, and supportive investment landscape forms the bedrock of London's success. These elements come together to create a rich environment for life sciences companies to flourish, attract investment, and, ultimately, deliver impactful innovations that benefit patients worldwide.

This report offers a comprehensive comparison of global cities based on five key metrics: Research Innovation, Health Research Environment, Talent Ecosystem, Investment Environment, and Business Environment. It is particularly encouraging to see London ranked third overall, demonstrating the city's robust position in a highly competitive field. However, while this achievement is significant, we must remain proactive. The findings identify key opportunities for London to further develop its talent pipelines, foster greater community engagement, and strengthen its investment base to ensure continued growth. This report serves as a timely reminder of London's unique value proposition in the global market, and it provides valuable insights into the steps we can take to ensure we remain at the forefront of life sciences innovation.

As we look to the future, the challenges we face are as significant as the opportunities. Addressing the skills gap, enhancing access to capital, and fostering innovation at all levels will be crucial to maintaining London's competitive edge. With the ongoing commitment of our stakeholders, I am confident that London will continue to be a magnet for talent, a hub for research excellence, and a global leader in the life sciences sector for years to come.

Thank you to everyone who contributed to this important work, and to those who continue to support London's life sciences journey.



Angela Kukula
CEO, MedCity

Expert Testimonials



Sadiq Khan
Mayor of London

I'm incredibly proud that London has been recognised as a world leader in life sciences - nowhere else brings together the research excellence, clinical facilities, and entrepreneurial drive of our city.

Our world-beating life sciences industry is a key pillar of London's economy, creating thousands of highly-skilled jobs, contributing billions of pounds to our economy, and improving our healthcare system, as we continue building a better and more prosperous London for everyone.



Professor, the Lord Darzi

Co-director of the Institute of Global Health Innovation, Imperial

It is a privilege to count myself a leader in the vibrant London life sciences ecosystem. I have always been a proud advocate for London's innovative endeavour, its devoted researchers, and esteemed research institutions. The analysis included in the first MedCity Life Science Global Cities Comparison Report not only evidence my long-held belief, but robustly captures the strengths of this great city life sciences ecosystem. Most importantly his report gives direction that will take London from strength to strength.



Virginia Acha

Associate Vice President,
Global Regulatory Policy, Merck Sharp & Dohme

We at MSD are thrilled to see London recognized among the top three global life sciences cities in MedCity's latest report. This honor highlights the city's incredible strengths—a talented workforce, proximity to world-class research institutions, and a vibrant spinout ecosystem—all of which make it a uniquely valuable environment for innovation in pharmaceutical development. Our base in King's Cross has given us firsthand experience of the dynamic collaboration between industry and academia that London fosters. The report's insights reinforce our commitment to growing within this ecosystem and emphasize London's role as a key player in global healthcare progress. We're excited to continue being part of this ecosystem's growth, especially in strengthening talent pipelines and driving new breakthroughs that improve patient outcomes worldwide.

Expert Testimonials



Steve Bates

CEO, Bioindustry Association

I am thrilled to see London recognized as the third-best city for life sciences globally in MedCity's latest report, recognising the capital's world-leading capabilities across science base, clinical environment, investment landscape and talent pool. For many years, BIA has championed the UK as a life sciences superpower and the third 'global cluster', fostering innovation and collaboration across the sector. This latest report puts the UK firmly at the forefront of the global life sciences community, and we look forward to hosting the world's life sciences leaders and investment community at [London Life Sciences Week](#) in November.



Carolyn Dwyer

Portfolio NED in Economic Growth, Built Environment, Urbanism

I welcome MedCity's Life Sciences Global Cities Comparison 2024. The report shows against comprehensive metrics that Boston, New York and London are the top three cities in the world for life sciences. Indeed, London is second only to New York in the Global Cities Index 2024 based on Economics, Human Capital, Quality of Life, Environment and Governance. However, the Medcity report identifies opportunities for London to build on its competitive talent system and investment environment to retain its position. An insightful recommendation is the opportunity for increased engagement with London's communities at all ages to raise awareness of the multitude of opportunities and to inspire people to develop careers in the life sciences sector.



Professor Deborah Ashby

Dean of the Faculty of Medicine, Imperial

I very much welcome this MedCity report confirming London's position as a one of the world's leading life sciences cities. With its global universities, comprehensive health research infrastructure and diverse population, London can deliver health and wealth impacts for the capital, the nation and beyond. At Imperial, we are committed to realising the full potential of our innovation clusters at South Kensington, Paddington Life Science and White City as part of the flourishing West Tech Corridor. I look forward to working with MedCity to fortify London's talent acquisition capability, including the recruitment and retention of global experts to further strengthen our international ranking.

Executive Summary

This report examines five key rankings to benchmark 20 global cities and their life sciences ecosystems. Five metrics were included to benchmark each of the following rankings: Research Innovation, Health Research, Talent, Investment and Business Environment. These scores were totalled to produce an overall cities ranking. In this report, Boston ranks #1 city for life sciences ecosystem, followed by New York #2, London #3, San Francisco #4 and Paris #5.

On a country level the US, Germany, Spain, China and Japan are strong competitors to the UK as a whole. When we examine metrics for life sciences industry success on a city level, London has a uniquely strong value proposition as a top city for life sciences outside of the US and a globally leading life sciences cluster with exceptional talent, research innovation, clinical infrastructure and investment and business environment. The findings of this study are in line with previous reviews by the likes of Nature Index^[16] which ranked the UK as the #2 country globally in life sciences in 2019. This study provides further clarity on the UK's strengths on a city level.

A key differentiator for top cities is cluster development, whether through city planning or organic formation in smaller geographical areas. We see the positive impact of cluster development in Boston, London and Paris. In these cities, large pharmaceutical companies are drawn to a highly skilled workforce who graduate from groups of world-leading universities, which generate a fruitful spin-out ecosystem and drive further job opportunities and large quantities of investment.

To enable continued growth for London's life sciences and close the gap to New York and Boston's leadership, innovative solutions to workforce and investment development must be considered. For example, as apprenticeship routes for high-demand technician, bioinformatics and clinical trials roles, development of local jobs talent to harness the value of London's diverse population, and the provision of equitable opportunities in STEM. Financial incentives such as those established in New York and China^[14] would support economic growth for London's early-stage companies and address the possibility of high-potential company drain to the US in search of more ubiquitous funding. Cross-industry partnerships will be crucial to this work to align local government, cluster leads, educators, industry, investors and infrastructure providers to deliver cohesive, sustainable, and collaborative growth of London's life sciences sector.

Introduction

Globally, life sciences innovations have become vital for health and economic security post-pandemic. The sector is at a pivotal moment, driven by shifts in technology, health policy and investment. As countries move beyond crisis mode, efforts now focus on accelerating innovation, enhancing healthcare resilience, strengthening pharmaceutical supply chains and investing in advanced technologies.

In 2021, biotech saw a surge in global investment due to the race for Covid-19 vaccines and treatments, boosting R&D in gene therapy, precision medicine, and biologics. However, since late 2022, venture capital funding has slowed, threatening the viability of many biotech startups reliant on sustained investment.

As cities recover post-Covid, their ability to support life sciences growth will be crucial for continued innovation. Identifying cities best equipped to foster life sciences ecosystems—through infrastructure, talent, and investment—will be key to driving recovery and commercialisation. This report will highlight the cities, including London, poised to lead the next wave of biopharmaceutical innovation and investment.

Methodology

The research strategy for this benchmarking report ensures a comprehensive and objective comparison of London with other major life sciences hubs. Data was gathered to assess life sciences outputs and infrastructure in each city, such as workforce, investment, research and sector valuations. Government-led initiatives are discussed but not factored into the rankings, which focus on the quantitative features of each city. The following methods were applied in data collection, analysis and evaluation:

1. Selection of Benchmark Cities

The report examines 20 global cities known for their life sciences clusters, selected in consultation with London & Partners' global markets teams. Cities were chosen for a range of metrics including their established or emerging life sciences hubs, investment capacity and critical mass of life sciences companies and workforce. For the purpose of this study, Boston refers to the combined area of central Boston and Cambridge, and for all other cities, metropolitan regions were used where applicable.

2. Data Collection

Data was collected from multiple sources, including:

Publicly available data: National and international databases such as the OECD, World Bank and relevant government statistics were used to obtain data on investment, employment and infrastructure.

Industry reports: Research from organisations such as CBRE, JLL and Cushman & Wakefield provided data on lab space, real estate and investment trends in life sciences.

Company databases: Private sector data platforms including GlobalData, fDi Benchmark and Dealroom.co were used to collect information on the number of life sciences companies and startups in each city and their levels of investment activity.

Academic institutions: Data on research outputs, such as publications and patents, were gathered from databases such as PubMed and Google Scholar.

Government and non-profit sector data: Reports from local government agencies and non-profits involved in the life sciences sector were used to understand public investment, support schemes and strategic initiatives within each city.

Full data definitions can be found in the data glossary on page 19.

3. Comparative Analysis

Cities were evaluated across metrics with weightings based on their relevance to fostering a competitive life sciences ecosystem. Rankings covered research and innovation, healthcare research environment, talent ecosystem, investment and business environments.

4. Validation and Cross-Referencing

Data was cross-checked and inconsistencies resolved through comparison with an additional source. Company count, employment and investment data was validated across multiple sources.

5. Scoring and Ranking

A score was assigned using the minimax formula, shown below, to scale values between 0 to 1, and assign an overall score per category.

$$\text{Normalised Value} = \frac{\text{Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

The final score was calculated by summing scaled values, with research, innovation and talent ecosystem weighted 1, and investment and business environments each weighted 0.5, to emphasise life sciences priorities, while taking into account the breadth of factors which may influence investment and business criteria.

City Rankings & Discussion

Overall ranking

	Research Innovation	Health Research Environment	Talent Ecosystem	Investment Environment	Business Environment	Overall Rank
Boston	1	3	1	2	3	1
New York	3	2	5	1	1	2
London	2	1	4	4	2	3
San Francisco	4	8	2	3	8	4
Paris	8	5	9	8	7	5
Tokyo	10	4	8	10	4	6
Singapore	11	10	6	6	16	7
San Diego	6	7	17	7	6	8
Shanghai-Shuzhou	9	6	12	5	18	9
Cambridge	5	15	13	16	5	10
Oxford	7	12	16	18	13	11
Amsterdam	17	11	10	12	9	12
Munich	15	13	7	13	11	13
Basel	14	20	3	20	12	14
Berlin	18	9	19	9	15	15
Stockholm	13	18	11	14	10	16
Melbourne	12	14	15	17	14	17
Hong Kong	16	19	18	15	17	18
Shenzhen	19	16	20	11	19	19
Hyderabad	20	17	14	19	20	20



Boston ranks #1 globally for life sciences, leading in research and innovation and talent ecosystem, and scoring #2 in investment environments, though lower in business environment and health research (#3).

- Massachusetts, home to 122 colleges and universities, was an early adopter of DNA experimentation, allowing companies such as Biogen to establish a cutting-edge research base, accelerated by Harvard and MIT.
- Being in one of the smallest states by size in the US, Boston naturally forms a life sciences cluster with high concentrations of hospitals, universities and private companies. In contrast, while there is a significant research base on California's West Coast, the spread of companies across San Francisco to San Diego, somewhat dilutes the state's life sciences industry which, if clustered, would likely rival Boston.
- Boston's top-tier talent pipeline from world-class universities has attracted 18 of the world's 20 largest pharma companies, ensuring stability and reinforcing its appeal to talent.



New York excels in health research, benefiting from a large network of clinics, clinical trials and strong investment and business environments due to its financial capital status. These strengths combine to rank New York #2 overall, and within the top five across all metrics.

- The city has a long history of clinical excellence; Rockefeller Institute Hospital opened in 1910 as the first centre for clinical research in the US., and remains an important landmark for bench to bedside development as part of a tri-institutional programme with Cornell and the Sloan Kettering Institute.
- Significant scientific advances have taken place in the city from the discovery of an oncogenic virus in 1916, to the molecular basis of the first approved malaria vaccine at NYU. This long history of research excellence is reflected in its joint-first position as the greatest producer of Nobel Prize winners, alongside Boston.
- Despite these strengths, New York ranks #3 in research and innovation, and #5 in talent ecosystem, with smaller workforces, lower quality of life and earnings potential compared to Boston and San Francisco.



London ranks in the top five across all metrics, excelling in health research, high investigator concentration and the second-highest number of clinical trials in Europe.

- Like New York, London is a key financial capital with a long and rich history of scientific discovery, which has been bolstered by the recent growth in AI-based drug discovery technologies in the City.
- London is home to more life sciences AI and data companies than anywhere else in the world, which have raised more than \$2.9bn (£2.1bn) in venture capital investment to date are supported by leading research centres such as the Alan Turing Institute and Google's DeepMind.
- Additionally, GSK has made London its home for AI, with the largest in-house strategic function in the biopharma industry, meaning the city is primed as a global hub for the next iteration of biotechnology innovation.
- London is also developing distinct clusters of life sciences activity, which have received significant infrastructure investment in recent years including more than 6.2m square feet of lab space in development between 2024-2032 as reported in MedCity's [London Lab Showcase](#). These clusters enable companies to co-locate with similar scaleups, academic institutions or big pharma companies to foster knowledge exchange and partnership opportunities.





Paris is Europe's #2 city and #5 globally, with a strong healthcare research environment but weaker talent and investment scores compared to other top five cities

- Paris excels in medical Nobel Prize production and is the second-highest in Europe for scientific publications.
- With public-private healthcare partnerships, major pharmaceutical presence such as Sanofi, and the strongest venture capital presence in mainland Europe, Paris is positioned as the mainland Europe's premier life sciences hub.
- Paris is one of the few European countries with just one main city for life sciences, forming a capital city cluster for the country.



In the APAC region, Tokyo and Singapore rank #6 and #7 globally, with Tokyo excelling in health research and business, and Singapore in talent and investment

- Both cities offer a high quality of life, fast trial enrolment and efficient regulatory approval. Tokyo stands out for patent activity and enterprise value, while Singapore leads in university presence and foreign direct investment (FDI) projects.
- Singapore and Tokyo have fast rates of phase I trial enrolment and relatively fast regulatory approval, and offer fast and inexpensive clinical trials environments in phase I and II studies, as shown in figure 1.



London's neighbouring cities of Oxford and Cambridge rank an impressive #10 and #11 for such geographically small cities.

- Together, Oxford, Cambridge and London have been known as the golden triangle in life sciences, and are well connected by public transport to provide a fertile ground for collaboration and knowledge exchange.
- While the two cities rank slightly lower for health research environment, talent and investment, this can broadly be attributed to their small population and geographical size meaning there are fewer investigators, clinical trials, venture capital firms and students.
- However, the knowledge and innovation power of these world-leading hubs is undisputed. Publication numbers are comparable to those of San Diego and San Francisco, despite hosting just 60% of the number of investigators, highlighting their high productivity.
- Cambridge also has a very high combined company value, being home to AstraZeneca's global headquarters, CMR Surgical and Centessa Pharmaceuticals, as well as SMEs such as Bicycle Therapeutics, Artios Pharma, and bit.bio.



Many European cities including Amsterdam, Munich, Berlin, Basel, and Stockholm (ranked #12-16) show strengths in talent, business and healthcare research but lack the critical mass of life sciences activity needed to lead globally.

- Each of these cities have key strengths, such as Basel and Munich's high scores at #3 and #7 for talent, Stockholm at #11 for talent and business environment, and Berlin #9 for health research environment and investment.
- This is a good demonstration of the power of clusters for life sciences. European countries often have multiple hubs for life sciences, which dilutes the power of individual cities. For example, while Germany is an incredibly strong country for life sciences in general, its industry is spread across Munich, Hamburg, Berlin, Nuremberg, Stuttgart, Frankfurt and other satellite cities. Therefore, there is not the critical mass of talent, active investigators, clinical trials centres or life sciences companies to compete with denser hubs such as Boston, London and New York.
- In mainland Europe, Paris is France's main life sciences cluster and accounted for 48% of France's biological sciences research output in 2021^[4]. With this clustering of activity comes a globally competitive advantage as a city for life sciences.



Research & Innovation Ranking

Research and Innovation measures each city's patent and publication output, the presence of world-leading universities, international research collaboration in biology, and the generation of Nobel Prize-winning scientists. These metrics evaluate the scientific productivity, knowledge economy and global recognition of researchers from each city, providing a comprehensive view of their contributions to the life sciences.

	Patents Filed (US) - 2023 ¹	Publications 2022-4 (PubMed) ²	Top 10 Global Universities ³	International research collaboration ⁴	Nobel Prizes in life science ⁵	Rank
Boston	0.50	0.83	1.00	1.00	1.00	1
London	0.12	1.00	1.00	0.31	0.65	2
New York	0.58	0.80	0.00	0.55	0.95	3
San Francisco	1.00	0.16	0.50	0.61	0.30	4
Cambridge	0.06	0.13	0.50	0.19	0.40	5
San Diego	0.86	0.09	0.00	0.20	0.10	6
Oxford	0.02	0.17	0.50	0.19	0.30	7
Paris	0.18	0.37	0.00	0.10	0.45	8
Shanghai-Shuzhou	0.23	0.53	0.00	0.27	0.05	9
Tokyo	0.63	0.23	0.00	0.11	0.10	10
Singapore	0.04	0.19	0.50	0.07	0.00	11
Melbourne	0.01	0.37	0.00	0.10	0.05	12
Stockholm	0.01	0.09	0.00	0.10	0.25	13
Basel	0.04	0.03	0.00	0.00	0.30	14
Munich	0.04	0.09	0.00	0.14	0.10	15
Hong Kong	0.00	0.21	0.00	0.10	0.00	16
Amsterdam	0.00	0.21	0.00	0.05	0.00	17
Berlin	0.05	0.16	0.00	0.00	0.05	18
Shenzhen	0.01	0.15	0.00	0.00	0.00	19
Hyderabad	0.00	0.00	0.00	0.00	0.00	20

Boston leads on research and innovation power, topping three of the five categories measured.

- Boston's universities dominate global rankings, with MIT at #1 and Harvard at #4. It also has the highest share of biological research collaborations, with 1.5x the collaboration output of San Francisco.
- Interestingly, while Boston excels in publications, cities on the West Coast, particularly San Francisco and San Diego, outpace it in patent filings, highlighting the tech-driven innovation of Silicon Valley compared to the East Coast's academic strength.

Contrasting the top 10 cities for research

- London ranks closely behind Boston, driven by its top-ranking universities, Imperial #2 and UCL #9, and a leading volume of publications. However, its international collaboration rate trails US cities, and mirrors Boston's high publication output but lower patent generation.
- New York, holds a unique position, combining strong patent and publishing activity with a Nobel Prize track record equal to Boston's, despite lacking top 10 universities.
- Oxford and Cambridge continue to be global R&D powerhouses, ranking #7 and #5 respectively, despite their smaller sizes. Cambridge, for instance, has 10% of Boston's investigators but produces one third of its publication output, and is also home to AstraZeneca's global R&D headquarters.
- In mainland Europe, Paris leads in research power, boasting more Nobel Prize winners and a higher publication volume than even Oxford and Cambridge. However, like other European cities, its international collaboration lags behind.
- Shanghai and Tokyo excel in international publications and patent ownership, ranking #10 and #11 globally for research and innovation. Shanghai, with a high international collaboration rate, is second only to London outside the US, while Tokyo surpasses Boston in patent filings.
- This analysis uses US patent office and PubMed data, which may underrepresent non-English publications and patents registered first in local markets. Shanghai's publication volume since 2022 ranks #4 overall, and Tokyo has a higher US patent office filing rate than Boston, despite potential biases in data collection.

Paris, Stockholm and Basel have high Nobel Prize outputs, and Melbourne stands out at #12, bolstered by a strong publication rate, solidifying its position as Australia's life sciences hub.



Health Research Environment

Health Research Environment evaluates cities based on their number of healthcare practices, clinical trials, and investigators, along with the speed of early-phase enrolment and regulatory processes. This provides insight into the efficiency and ease of conducting clinical research and trials. It also reviews trends in the time and cost to run trials at various phases, at a national level.

	Healthcare Practices ⁶	Speed of Phase I Trial Enrolment ⁷	Count of Clinical Trials ⁷	Experienced Investigators ⁷	Speed of Regulatory Approval ⁸	Rank
London	1.00	0.67	0.35	0.67	1.00	1
New York	1.00	0.00	0.56	1.00	0.78	2
Boston	0.11	0.19	1.00	0.87	0.78	3
Tokyo	0.40	0.94	0.13	0.60	0.83	4
Paris	0.89	0.35	0.59	0.43	0.59	5
Shanghai-Shuzhou	0.26	1.00	0.65	0.32	0.13	6
San Diego	0.44	0.62	0.23	0.05	0.78	7
San Francisco	0.31	0.62	0.17	0.24	0.78	8
Berlin	0.57	0.65	0.17	0.11	0.59	9
Singapore	0.25	0.92	0.16	0.10	0.62	10
Amsterdam	0.41	0.66	0.08	0.19	0.59	11
Oxford	0.01	0.67	0.02	0.09	1.00	12
Munich	0.32	0.65	0.08	0.07	0.59	13
Melbourne	0.05	0.73	0.13	0.10	0.70	14
Cambridge	0.00	0.67	0.01	0.00	1.00	15
Shenzhen	0.46	1.00	0.06	0.00	0.13	16
Hyderabad	0.16	0.97	0.00	0.07	0.38	17
Stockholm	0.11	0.62	0.16	0.01	0.59	18
Hong Kong	0.33	0.76	0.11	0.08	0.00	19
Basel	0.02	0.73	0.02	0.00	0.50	20

London ranks first globally for its healthcare research environment, thanks to a high concentration of clinics, rapid phase I enrolment and a favourable regulatory landscape.

- The UK has the most favourable regulatory environment with the fastest speed of regulatory approval in this study. This will only be enhanced by its recently announced International Recognition Programme to support cross-border collaboration and recognise decisions by approved regulatory bodies. The first drug was approved via this route in 2024 in just 30 days.
- However, the count of clinical trials in London is significantly lower than in Boston, New York, Paris and Shanghai. While there is a large volume of early-stage trials with fast enrolment, the city sees fewer phase II and III trials than other hubs, and the UK generally becomes a slower and more expensive environment to run these later-stage trials in comparison to US and APAC competitors (figure 1).
- The Medicines and Health Products Regulation Agency (MHRA) is globally recognised for its high standards of safety, quality and effectiveness of medicines, and has become a global leader in the regulation of machine learning-based drug development, with the innovative AI Airlock, a proactive, collaborative and agile approach to addressing AI as a medical device.
- As biopharmaceutical programmes increasingly harness AI to streamline existing processes and operate as an engine for discovery, this proactive stance should position the UK as a global thought leader in next-generation medicines regulation.

New York follows closely in #2 excelling in most metrics with a large number of healthcare practices and investigators.

- However, slow phase I enrolment and fewer trials than Boston prevent it from taking the top spot.
- While Boston leads in clinical trial count and has an incredibly high rate of investigational new drug submissions ^[7], its lower availability of healthcare practices compared to New York, London and Paris affects its ranking.
- As large cities with a significant number of clinics and healthcare practitioners, New York and London enjoy an advantage over of scale competitor cities in this category.

Paris ranks #5, with a large volume of healthcare practices and the most clinical trials in mainland Europe in this study.

- Figure 1 shows very slow and costly phase I and II clinical trials in France, so France is a less desirable location for early-stage development.

Tokyo ranks #4, with fewer trials than other top cities. However it compensates with a high number of experienced investigators and a fast, cost-effective trial environment.

Shanghai competes with the fastest enrolment rate and a robust clinical trial infrastructure, while Amsterdam and Shenzhen offer significant healthcare practice volumes.

Figure 1: Clinical Trial Cost & Duration by Country & Phase ^[7]

India and China are consistently faster and cheaper than other countries in this study to enrol and run trials, as are the US and Japan. Most European countries hold more affordable but slower early-phase trials, and significantly more expensive phase II and II trials.

The UK is a strong location to run early-phase trials, with a large number of hospitals, an integrated healthcare system excelling in clinical research, and a large number of experienced trial investigators. The UK provides a relatively less expensive early-phase trials environment, but in later-phase trials the cost becomes increasingly less competitive, though trials remain relatively fast compared to those in France, Singapore, Sweden and Germany.

Talent Ecosystem

Talent Ecosystem assesses workforce size and public education investment to gauge talent quality and quantity in each city, while quality of life, cost of living and potential earnings indicate each city's appeal to high-quality talent.

	Quality of Life ⁶	Cost of Living ⁶	Public Expenditure on Education ⁶	Size of Workforce ⁹	Earnings potential ⁶	Rank
Boston	0.93	0.07	0.29	1.00	0.72	1
San Francisco	0.72	0.07	0.34	0.86	1.00	2
Basel	1.00	0.07	1.00	0.14	0.66	3
London	0.79	0.26	0.52	0.50	0.70	4
New York	0.71	0.23	0.28	0.69	0.68	5
Singapore	0.95	0.27	0.43	0.26	0.59	6
Munich	0.98	0.31	0.41	0.09	0.38	7
Tokyo	0.98	0.55	0.26	0.10	0.26	8
Paris	0.73	0.30	0.27	0.21	0.61	9
Amsterdam	0.87	0.30	0.44	0.08	0.42	10
Stockholm	0.85	0.43	0.54	0.11	0.17	11
Shanghai-Shuzhou	0.41	0.65	¹⁰ 0.03	0.45	0.53	12
Cambridge	0.80	0.50	0.33	0.05	0.30	13
Hyderabad	0.00	1.00	¹¹ 0.00	0.83	0.00	14
Melbourne	0.80	0.43	0.13	0.14	0.32	15
Oxford	0.65	0.47	0.30	0.07	0.27	16
San Diego	0.76	0.00	0.21	0.28	0.48	17
Hong Kong	0.74	0.21	0.31	0.01	0.45	18
Berlin	0.65	0.37	0.20	0.11	0.28	19
Shenzhen	¹⁰ 0.30	0.77	0.03	0.00	0.35	20

Boston and San Francisco rank #1 and #2 respectively for talent ecosystem, with large workforces and high earnings potential for researchers.

- Boston's performance is driven by its robust life sciences workforce and pipeline of talent from top-tier universities such as Harvard and MIT.
- The city's high potential earnings and renowned quality of life make it a global destination for life sciences talent, although the high cost of living can counterbalance its attractiveness.
- Boston's established ecosystem, with 18 of the world's 20 largest pharmaceutical companies located there, also contributes significantly to its talent pool and industry stability.

Basel and London rank #3 and #4 in this category, as two European cities with excellent quality of life and earnings potential.

- Basel is the leading city in this study for public expenditure on education and quality of life, with strong earnings potential, but London offers a larger life sciences workforce, more affordable cost of living and greater earnings potential than Switzerland's life sciences capital.
- London is a global leader for talent in AI, so future-facing biopharmaceutical companies can benefit from this wealth of data expertise.

Contrasting the top 10 cities

- In the top 10, New York ranks #5, benefitting from its position as a global financial hub with a large workforce. However, it faces competition from cities such as Boston and San Francisco due to its higher cost of living and lower quality of life indices, which is not balanced by a competitive earnings potential in life sciences
- Singapore (#6) and Tokyo (#8) provide high levels of public investment in education and quality of life.
- Singapore in particular stands out for its investment in education and larger workforce in the region.
- Munich offers a high quality of life with ample expenditure on education, but has a relatively small workforce, making it a great place to learn and live for talent, but less attractive to companies looking for a sizeable workforce.
- Paris (#9) and Amsterdam (#10) have strong earnings potential and quality of life, with Paris taking the lead with a larger workforce, despite Amsterdam's stronger public expenditure on education.

Investment Environment

Investment Environment considers the number of venture capital firms and the size and frequency of investments in each city. It also factors in unicorn generation (companies valued over \$1bn) and the number of FDI projects each city attracts.

	Venture Capital Firms ¹²	Median Size of Funding ¹²		Life Science Unicorns ¹²	Healthcare FDI Projects ⁵	Rounds of Investment ¹²	Rank
		Series A&B ¹¹	Seed ¹¹				
New York	1.00	0.20	0.09	0.86	0.33	0.97	1
Boston	0.29	0.50	0.06	0.86	0.55	1.00	2
San Francisco	0.66	0.25	0.04	1.00	0.11	0.72	3
London	0.60	0.20	0.03	0.28	0.77	0.76	4
Shanghai-Shuzhou	0.21	0.14	0.26	0.17	0.72	0.24	5
Singapore	0.21	0.08	0.02	0.03	1.00	0.23	6
San Diego	0.07	0.44	0.08	0.31	0.21	0.35	7
Paris	0.21	0.16	0.06	0.10	0.51	0.28	8
Berlin	0.10	0.13	0.06	0.03	0.40	0.24	9
Tokyo	0.21	0.00	0.04	0.00	0.36	0.19	10
Shenzhen	0.05	0.13	0.50	0.07	0.02	0.01	11
Amsterdam	0.09	0.25	0.00	0.00	0.20	0.18	12
Munich	0.07	0.14	0.06	0.00	0.31	0.09	13
Stockholm	0.08	0.21	0.01	0.07	0.00	0.26	14
Hong Kong	0.14	0.11	0.11	0.07	0.21	0.00	15
Cambridge	0.01	0.22	0.07	0.03	0.10	0.17	16
Melbourne	0.04	0.05	0.00	0.10	0.13	0.15	17
Oxford	0.01	0.32	0.06	0.03	0.02	0.02	18
Hyderabad	0.00	0.16	0.00	0.00	0.26	0.00	19
Basel	0.00	0.08	0.02	0.07	0.18	0.04	20

The investment environment rankings are dominated by US cities, with New York, Boston and San Francisco home to the most life sciences unicorns, investment rounds and venture capital firms.

- Despite the highest number of venture capital firms found in New York, much of the investment is received by companies outside the City. For example, the median value of Series A and B funding in Boston and San Diego is twice that in New York, and the frequency of funding in Boston is also higher than New York.
- Interestingly, New York's seed-stage companies secured funding rounds in 2022-2023 which were 1.3x larger than in Boston and 1.1x larger than in San Diego. This could be supported by recent regulatory changes in New York, aimed at stimulating growth in small companies by reinstating tax credits for biotech firms of up to \$250,000 per year for companies with a total annual cap of \$3m^[13].
- Spin-out and early-stage companies may benefit from proximity to financial markets, or from a burgeoning tech ecosystem in New York, as they gain the highest median seed-stage investment values outside of the APAC region.

London has a remarkably high number of investment firms with life sciences experience, and could be dubbed Europe's life science financial capital.

- The UK capital's life sciences ecosystem see a high frequency of investment rounds from venture capital firms, with a higher number of investments than in San Francisco, and 2.5x as many rounds of investment as any other city outside the US.
- London could be compared to New York as a financial capital, with neighbouring life sciences cities raising a significant amount of funding through London-based venture capital offices. However, there is a higher frequency of companies raising funding in London than from elsewhere in the UK, unlike New York and Boston's dynamic.
- London maintains a higher frequency of investment than Oxford and Cambridge combined, but in a similar trend to New York and San Diego, the median size of these investments is significantly lower than the neighbouring cities from seed to series B rounds, where Oxford's median value of funding is almost 1.5x that of London-based companies.

Whilst the rate of "unicorn" company generation is highest in US cities, London, Shanghai and Singapore lead on inward investment project frequency.

Shanghai and Singapore rank #5 and #6 with the best investment environment in the APAC region, bolstered by their high frequency of FDI projects, competitive and of investments, and venture capital firms in each city.

Chinese cities Shanghai and Shenzhen have incredibly high median sizes of funding at seed stage, with Shenzhen's ticket number 4x larger than any other city (barring Shanghai), but with a lower frequency of investment.

- In China, the biotechnology industry is considered a strategic national industry with core focus on synthetic biology, regenerative medicine and large-scale applications of genomics^[14].
- Recent Chinese government policies have spurred growth in biotech innovation. These include subsidies, financial incentives, science parks, incubators, public-private partnerships and reforms to expedite drug review.

In Europe, Paris and Berlin are the only top 10 cities in this category, with a steady stream of healthcare FDI projects and investment rounds.

- However they receive a slightly lower investment frequency at lower values, and significantly fewer venture capital firms are located in these cities.

Business Environment

Business Environment examines the concentration of life sciences companies and their combined valuations, as well as business cost and operating environments to provide an overview of the ease of commercial operation and success of resident companies.

	Life Science Companies ¹²	Labour Cost ⁶	Operating Risk ⁶	Sustainability Score ¹⁵	Combined Enterprise Value ¹²	Rank
New York	1.00	0.25	0.79	0.85	1.00	1
London	0.85	0.51	0.81	0.91	0.46	2
Boston	0.49	0.24	0.79	0.85	0.46	3
Tokyo	0.16	0.67	0.85	0.72	0.42	4
Cambridge	0.04	0.65	0.81	0.91	0.33	5
San Diego	0.33	0.34	0.77	0.85	0.22	6
Paris	0.19	0.43	0.76	0.76	0.37	7
San Francisco	0.51	0.12	0.77	0.85	0.19	8
Amsterdam	0.09	0.46	1.00	0.88	0.00	9
Stockholm	0.13	0.57	0.76	0.91	0.06	10
Munich	0.06	0.43	0.78	0.88	0.26	11
Basel	0.01	0.00	0.83	1.00	0.56	12
Oxford	0.01	0.66	0.81	0.91	0.00	13
Melbourne	0.19	0.54	0.83	0.78	0.02	14
Berlin	0.16	0.47	0.78	0.88	0.00	15
Singapore	0.10	0.64	0.87	0.57	0.02	16
Hong Kong	0.04	0.71	0.91	0.46	0.02	17
Shanghai-Shuzhou	0.05	0.82	0.00	0.46	0.11	18
Shenzhen	0.00	0.85	0.00	0.46	0.09	19
Hyderabad	0.03	1.00	0.26	0.00	0.05	20

New York and London are extremely competitive as the top places to do business in life sciences.

- New York gains the lead with the largest combined life sciences enterprise value, home to multi-billion dollar organisations such as Pfizer, Bristol Myers Squibb, Royalty Pharma, Telavant, Intracellular Therapies and more, along with the largest total number of life sciences companies in the city.

London comes in a close second in terms of of companies with over 2,400 life sciences companies in the city, lower operating risk, high sustainability scores, and competitive labour costs compared to US cities.

Key trends in the top 10 cities for business environment

- Boston has a lower density of life sciences companies than New York and London and higher labour costs than European and APAC competitors.
- Tokyo and Cambridge at #4 and #5 both have high combined enterprise values, low operating risk and favourable labour costs, so offer a cost-effective, stable location to grow large enterprises.
- These cities are home to global headquarters for big pharmaceutical companies such as AstraZeneca in Cambridge, and Daiichi Sankyo, Otsuka Pharmaceutical and Astellas Pharma in Tokyo.
- Paris and Basel both have high company valuations as homes to Sanofi, Ipsen, Novartis, Roche and CRISPR Therapeutics.
- Basel was found to have the highest cost of operation in this study, and a relatively low volume of companies in the city.
- Cities on the US West Coast rank #6 and #8, with high concentrations of companies but lower valuations and high labour costs. This is in line with US cities being hubs for tech-first life sciences companies at an earlier stage, and in a highly competitive environment for talent and driving high salaries.

Discussion

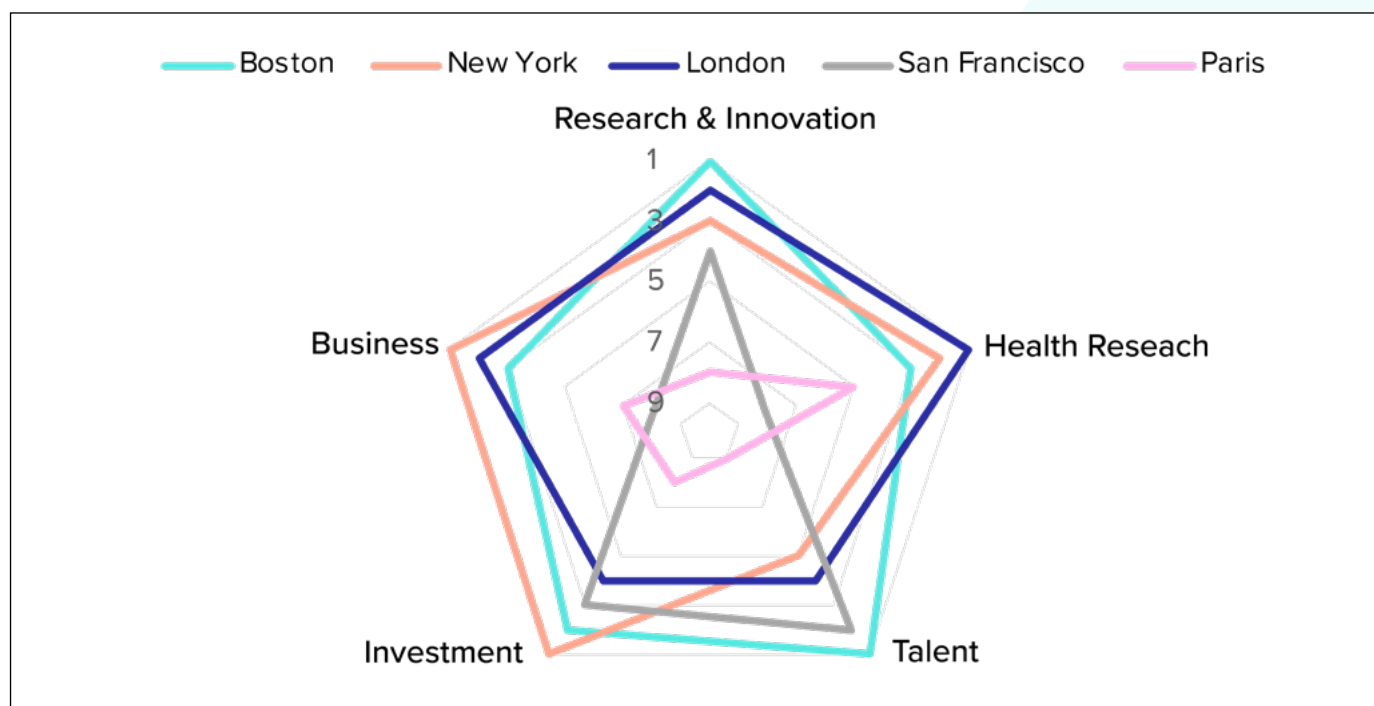
A key finding from reviewing the scores of these top cities was the importance of strength across multiple metrics, in particular research, clinical environment, talent and investment. With the exception of Basel, those cities which rank in the top three for one metric also rank in the top three for at least one other metric. This suggests that research, clinical development, talent, business and investment environment are not independent of each other, and that leadership in any one metric is supported by or correlated to strength in adjacent metrics. For example, if a city has strength in research innovation, it also tends to have a strong clinical environment, high quality talent and competitive levels of investment.

Oxford and Cambridge are notable exceptions to this rule. They both have strong research environments but weaker metrics for clinical, talent, and investment measures. However, these cities are outliers because of their small population size, which impacts the capacity for clinical infrastructure, workforce and number of investigators.

Another key finding was the impact of life sciences clusters on global competitiveness. A country may have a strong life sciences industry, such as Germany, but if industry is widely distributed across the country or region, individual cities become less compelling on a global scale. Boston is in one of the smallest states in the US and forms a natural geographic cluster. This physical limitation concentrates Boston's research community and forms a hub for knowledge exchange through industrial co-location with universities. These in turn generate high-quality talent who can work in Boston thanks to its concentration of biopharmaceutical industry and job opportunities.

There is a clear difference between the top three and top five cities, where Boston, New York and London all demonstrate leadership across the five metrics measured in this study (figure 2). The diagram shows the importance of combined talent, research power and finance (often coined a triple helix) which our top three cities all demonstrate.

Figure 2: Relative Strengths of Top 5 Cities in this Comparison



To maintain its position, London's life sciences ecosystem should focus on greater support of talent pipelines, where skills gaps are reported by UK life sciences companies and the workforce has been impacted by Brexit. In a report by Hobson Prior^[17], London has suffered an exodus of life sciences talent to the US, Germany and Switzerland due to a lack of certainty for immigration, lower job opportunity, and challenging employment for foreign nationals in the UK.

This report identifies opportunities for London to build on its competitive talent ecosystem and investment environment. This could be achieved through investment streams such as financial incentives for seed and angel investors or co-schemes between large corporations and venture capital firms. Options also include London-focused pooled capital funds for innovation and early growth support programmes. For example, the regional Bio BIC programme was recently set up in Liverpool to provide targeted research and development (R&D) funding, access to facilities, IP support, coaching and networking. Similarly, New York's Economic Development Corporation has led to investment of more than \$1bn (£762m) to create 40,000 new jobs and strengthen the city's global life sciences offering. Boosting ties between large biotech investors in both the US and Asia-Pacific (APAC) could also open routes for more venture capital into London's biopharmaceutical industry.

To fortify London's talent ecosystem and build a long-term workforce supply, the focus should be on developing local talent pipelines by raising awareness of and access to career opportunities. Collaboration between industry, universities, colleges, real estate developers with community lab space, and local government could enable widening access to research education and work experience across London. A proactive approach to talent development should be taken as London's industry grows and international talent import is curbed post-Brexit which provides challenge and opportunity to promote 'home-grown' talent. Investment in community engagement will also be key to raising awareness of life sciences career opportunities, publicly justifying investment in the sector and building trust with residents. This work would enhance the clinical trial environment, increase visibility of STEM careers and positively impact individual health and wellbeing in the city through community education and acceptance.



Data Glossary

Patents Filed: Non-provisional registered at the US patent office

Publications: Scientific publications including clinical trial, meta-analyses, randomised controlled trials, reviews, and systematic reviews on PubMed database

Collaboration Share: The share of internationally co-authored biological science publications with authors from top 100 life sciences universities in each city. If there are 4 authors on a paper, and one is from a given university, the share for that University is calculated as 0.25

Nobel prizes in Physiology and Medicine: The total count of Nobel prize winners who were either born in a city, or undertook their prize-winning work in that city

Healthcare practices: Count of healthcare practices based on SIC codes

IND filings: Count of IND filings submitted by investigators in each city

Count of clinical trials: the number of clinical trials (single centre and multi centre) recorded in the city. Multi centre trials are counted multiple times for each location

Experienced investigators: current count of active investigators in the region, marked as experienced meaning they have a role in clinical trials as a principal investigator, sub-investigator, co-investigator, study director, study chair, contact person, author, or co-author

Size of workforce: count of employees on LinkedIn currently working in the biopharmaceutical, pharmaceutical manufacturing, or research and development industries

Earnings potential: Based on the potential earnings of a Head of R&D in a biopharmaceutical company

Series A & B fundings: Median value of Series A & B fundings in each city based on venture capital investments in 2022 and 2023

Seed fundings: Median value of seed fundings in each city based on venture capital investments in 2022 and 2023

Life sciences unicorns: Count of life sciences companies which have a valuation of over \$1BN, or which have successfully completed an exit of over \$1BN, between Jan 2020-Jan 2024

Rounds of investment: Count of investment rounds backed by venture capital firms in 2023

Life science companies: Count of life science and healthcare companies in the city which are currently active (as at September 2024)

Labour cost: Estimated total labour cost of a life sciences company workforce of 100 employees (includes salary, pension contributions, insurance, and other hiring costs per head)

Operating risk: A score generated by fDi benchmark based on Financial Times data, which takes into account factors including credit rating, capital controls, business, investment, and economic freedom, market based competition, economy ownership, terrorism index, political stability, military interference in law and politics, and private companies permitted & protected

Life science company value: The combined enterprise valuation of companies headquartered in that city

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