

Life Sciences Cluster Report

Global | 2014



Global competition heats up as small and mid-tier companies dictate demand

- Innovative leadership is recalibrating as emerging countries, particularly those in Asia, report impressive growth figures in patent applications, R&D funding, labor productivity and science degrees.
- The demand environment has shifted from one driven by Big Pharma companies to one where mid-tier companies and specialty players are experiencing overnight growth and highly variable needs in response to promising products and treatments.

A message from Roger Humphrey



Roger earned his M.B.A. from Babson College and holds a B.S.B.A. from Northeastern University.

Roger Humphrey is the Executive Managing Director and practice lead for the life sciences business at JLL. Roger guides a team of more than 1,400 professionals dedicated to developing customized solutions that help pharmaceutical and biotech companies reduce costs and boost productivity throughout their real estate and facilities portfolios.

His background includes over 29 years in Commercial Real Estate and Facilities Management. Prior to joining JLL, Roger spent seven years as Executive Director, Global Real Estate & IFM Governance at Merck & Co. Inc. During his tenure at Merck, Roger built and led both the Global Real Estate Organization and the Integrated Facilities Management Outsourcing Organization.

2013 was an exciting year for life sciences, with much of the activity initiating major changes in industry dynamics. By year-end 52 life sciences companies completed initial public offerings (IPOs) on U.S. exchanges, collectively raising \$7.0 billion, up from 16 life sciences IPOs at \$1.1 billion in 2012, according to *The Burrill Report*. The industry has not seen that type of activity since the tech bubble of the 2000s, and isn't showing any sign of slowing down thus far in 2014. As the first quarter of 2014 drew to an end, 32 companies went IPO on U.S. exchanges, totaling \$2.0 billion.

Why the surge in activity? During the past 18 to 24 months, the industry has noticeably shifted. The doom and gloom forecasts of a few years ago focused on patent cliff expirations, depleted product pipelines and uncertainty in U.S. healthcare reform. As a result, large industry players reacted quickly. Big Pharma players made swift moves to become more nimble: overhead reductions in the form of building sales and decommissioning, large-scale layoffs of sales and marketing employees and increased use of outsourcing for clinical trials, manufacturing and other non-core services became the norm. The M&A heyday for Big Pharma seemed to slow down. Strategic bolt-on acquisitions and acquisitions of foreign firms to tap new markets became the preferred growth model for market leaders.

Meanwhile small- to medium-sized companies and specialty players are steadily growing and driving much of the activity in the marketplace today. Most of the new innovation happening in the industry is coming from these small and medium-sized organizations. As their products gain momentum in the development cycle, that's when they seem to attract a large amount of investment interest, propelling them toward initial public offering. Although investors were wary of investing too heavily in the market over the past few years, that attitude has now shifted, as many of these companies are getting acquired soon after going public and the payout can be significant.

Beyond the shifting demand among big and small industry players, we have also noticed the changes in geographic activity and demand continuing over the past year. The United States and Europe have enjoyed deep-seated roots as the leaders of high-value aspects of the development cycle, like new product research & development (R&D). In recent years, however, innovative leadership is recalibrating, with many developing nations making moves to grow their domestic capabilities for innovation. Asian countries, led by Japan, Korea and China, have dramatically increased their share of patent applications and the number of doctorate and other higher education degrees awarded in science and engineering fields. The United States remains the dominant contributor of life sciences patent applications by a significant margin, but its year-on-year growth rates have fallen behind.

Beyond geographic differences, the industry is performing well overall. The Bureau of Labor Statistics projects that life scientists and engineers will remain in demand through 2020 in the United States, with 23.1 percent and 10.6 percent growth, respectively, from 2010 to 2020. Additionally, the overall number of science and engineering doctorate degrees have increased steadily over the last decade. Some early rumblings within the industry, however, suggest that not enough talent with proper skills and knowledge will be available to replace the large number of retiring baby boomers. While the number of researchers and doctorate holders have increased, fewer millennials are taking on technical and trade positions. Without this critical demographic to staff life sciences facilities, the industry may have to implement major changes to their facility operations.

The trends we are seeing on a global level are stimulating significant changes to space needs. Mid-tier companies and specialty players are spurring a majority of new demand as they experience overnight growth and highly variable needs in response to promising products and treatments. While the larger life sciences players might not be enjoying that same type of growth, the need for strategic portfolio planning is at an all-time high. While markets with traditional headquarter campuses are experiencing an uptick in vacant space as large companies consolidate operations, opportunity exists in retrofitting and parceling large campuses to meet the growing needs of the mid-tier and specialty pharma companies. Further, huge opportunity exists within the walls of life sciences facilities to further optimize and streamline systems and operations. To date the industry has been reluctant to outsource key facility functions within the manufacturing and research spaces, as the threat of non-compliance and manufacturing slip-ups are severe and costly. However, as further overhead cost cutting is required for Big Pharma and mid-tier players grow beyond their current capabilities, the prospect of outsourcing strategic facility functions will become more attractive.

Roger's Global Watch List: 10 cities in the spotlight



London/Cambridge/Oxford, United Kingdom

Specialized projects aim to transform Greater South East England into a “golden triangle” of innovation

- A \$6.4 million investment aims to connect and transform London, Cambridge and Oxford into a regional innovation powerhouse. Local governments hope this funding will support the commercialization of local innovation.



Leiden, Netherlands

Business-friendly environment and new training center allures new companies & expansions

- Efforts by The WestHolland Foreign Investment Agency (WFIA) aided 42 company relocations/expansions during 2013, the most commitments in 13 years. One such company, medical diagnostic equipment manufacturer, Welch Allyn, plans to consolidate European operations into a single site in Leiden and noted business-friendly taxes in its decision.



Beijing, China

Continued investment and development planned for Zhongguancun

- Nicknamed “China’s Silicon Valley”, Zhongguancun is the one of the densest scientific, educational and talent resource bases in China. Through 2015, the hub will further improve its science & technology cities, promote the development of the northern R&D and industrial belt, and the southern high-tech manufacturing and emerging industrial belt.



Tsukuba, Japan

Tsukuba Science City aims to become Japan’s flagship science and technology hub

- Home of the Tsukuba Science City, which is comprised of dozens of national research institutes and hundreds of private research facilities. The city is applying for ‘Strategic Global Innovation Center’ status to secure tax benefits for small and medium sized businesses, infrastructure development and training for overseas personnel.



Osong Bio Valley, Chungcheong Province, Korea

The geographical focus of national government efforts to establish a life sciences hub in Korea

- In total, the government plans to invest approximately \$5.3 billion in its development over the next 30 years and six governmental institutions will relocate to Osong including the Ministry of Food and Drug Safety and Korea National Institute of Health.



Moscow, Russia

Public and private projects aim to grow Moscow’s infrastructure and capabilities

- Russia’s spend on medicines has grown dramatically over the past five years and is expected to grow anywhere from 8.0 to 13.0 percent by 2020. Private medicine is on the rise and the Russian government, currently the biggest spender, is also focused on growing domestic capabilities.



Tel Aviv, Israel

A start-up friendly infrastructure further bolstered by new R&D park

- Country-wide, industry companies have grown more than 400.0 percent since 1996. Several incubators have been created to encourage new talent and foster mentoring, which continually attract multi-national interest. A sizable high-tech presence and infrastructure to support start-ups provide additional resources.



Seattle, United States

Poised to join the ranks of Boston, San Diego and the Bay Area with strong R&D capabilities

- The industry and lifestyle dynamics of Seattle strongly mirror those of well-established life sciences hubs in the United States. Specifically nearly half of life sciences employment is based in R&D functions and it’s coastal geography and urban environment are highly sought after by the younger generation of workers.



Vancouver, Canada

A rich infrastructure for biotech and R&D bodes well as the industry favors smaller, nimbler organizations

- Among the major Canadian cities with active life sciences industries, Vancouver has the greatest share of R&D jobs and tends to feature more start-ups and small to medium-sized companies, as opposed to large pharmaceutical campuses.



São Paulo, Brazil

A stable national economy & improved industry practices bode well for the city’s critical mass of companies

- Brazil currently ranks second among global nations for the production of biotech crops and has the largest medical equipment market in South America. Roughly 68.0 percent of medical device manufacturers are located in São Paulo and the largest share of biotech companies among Brazilian cities.

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Cluster profiles

Americas

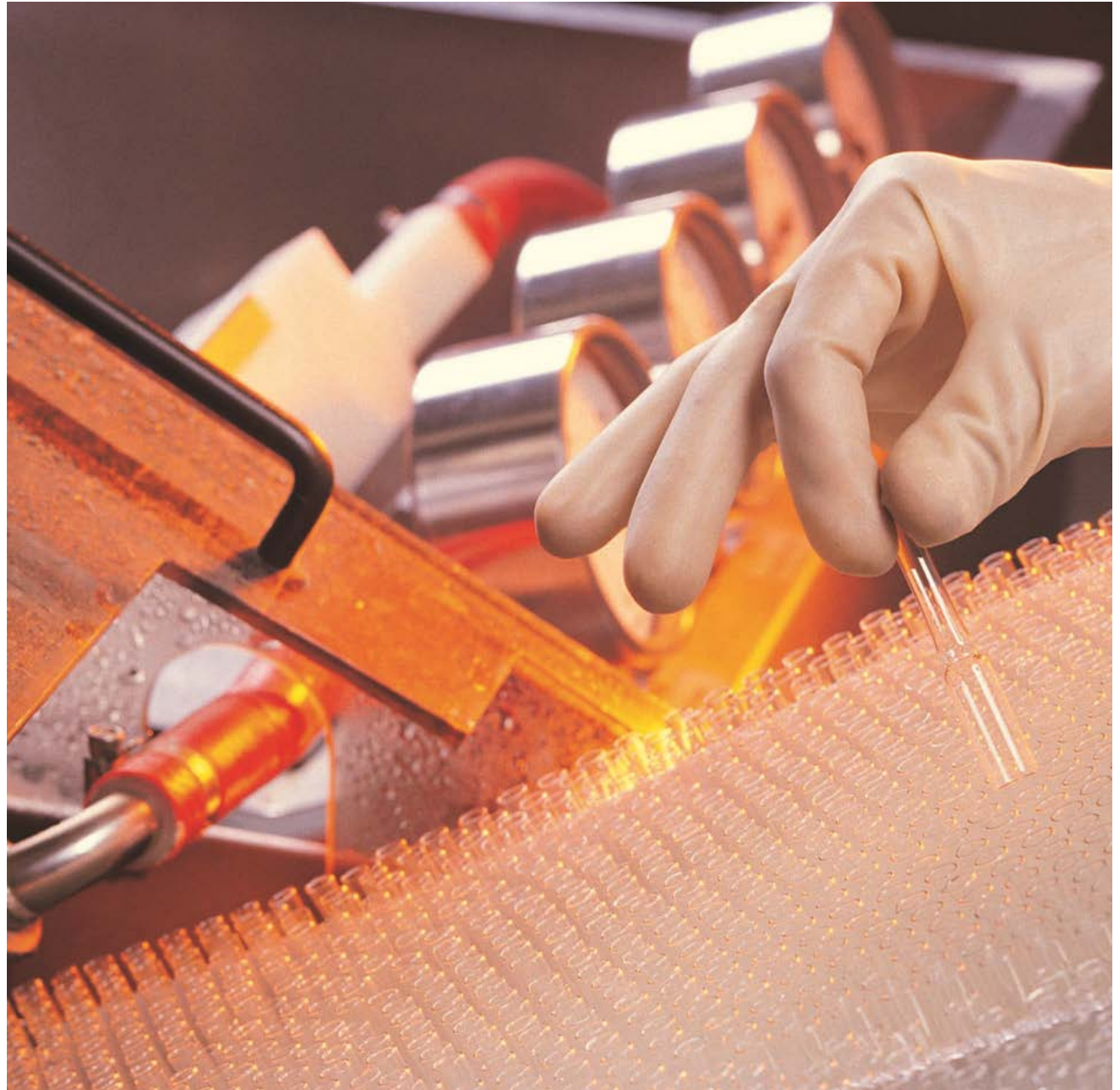
- United States
- Brazil
- Canada
- Mexico
- Puerto Rico

EMEA

- France
- Germany
- The Netherlands
- Switzerland
- United Kingdom

Asia Pacific

- Australia
- China
- India
- Indonesia
- Japan
- Korea
- Singapore



Global trends spotlight



Geographic shifts in innovation

Globally innovation is shifting to emerging markets.

1 Innovation around the globe

Asia has surpassed both North America and Europe in overall Patent Cooperation Treaty (PCT) applications, a measure of innovative output.



North America:
54,398 applications



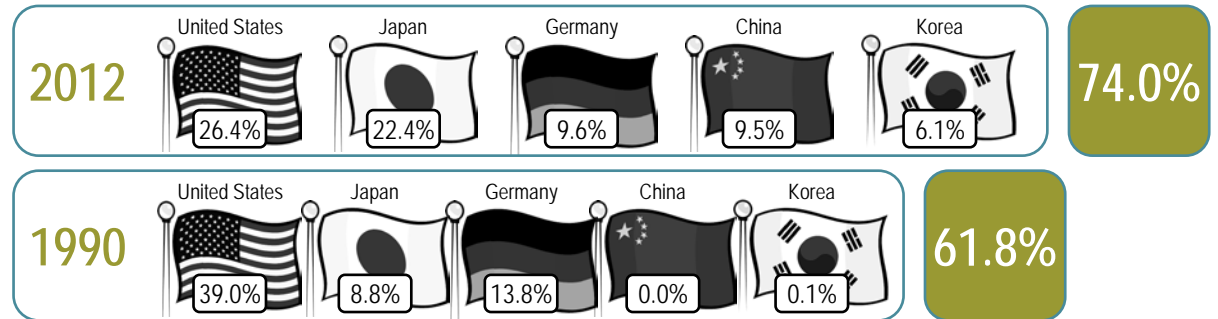
Europe:
58,141 applications



Asia:
78,990 applications

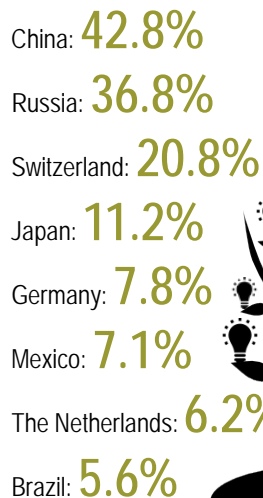
2 Global innovation share shifts

As of 2012, the top five countries accounted for 74.0% of all PCT applications. Since 1990, China and South Korea are new to the top five, and the United States and Germany have lost share.



3 Innovation growth

Life sciences PCT applications witnessed 3.7% growth from 2011 to 2012. Leading growth clusters include:



4 Innovation without collaboration

Emerging clusters showing the highest levels of PCT growth are also the least collaborative, reporting the least amount of collaboration among total applications.

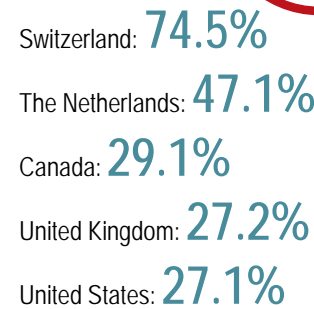
Share of foreign inventors on PCT applications:



5 Innovation with collaboration

Mature North American and Western European countries are among the most collaborative nations on PCT applications.

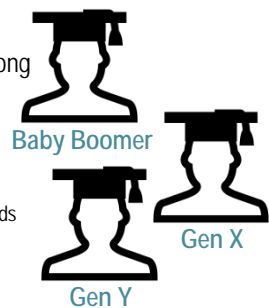
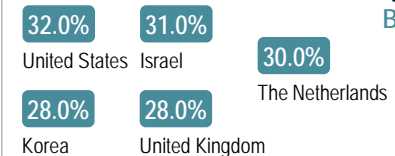
Share of foreign inventors on PCT applications:



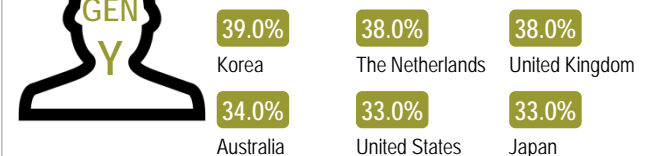
6 Global education levels

While the United States maintains the highest percentage of the working population (25-64 years old) with bachelor's-type degrees, it loses its lead when only the younger generations (ages 25-34) are considered.

Attainment of bachelor's degree among total population aged 25-64



Attainment of bachelor's degree among total population aged 25-34

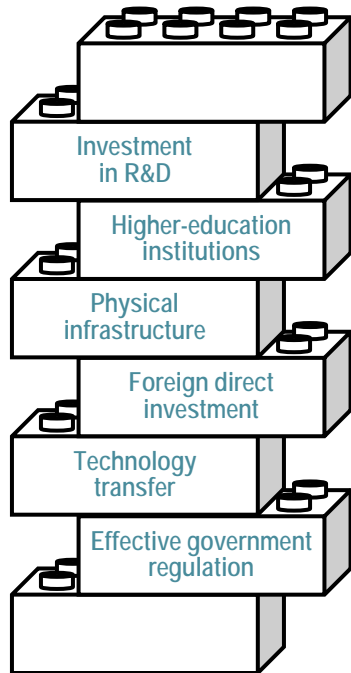


Technology transfer from bench to marketplace

Getting a promising new drug or treatment to market is reliant on factors beyond R&D funding and innovation.

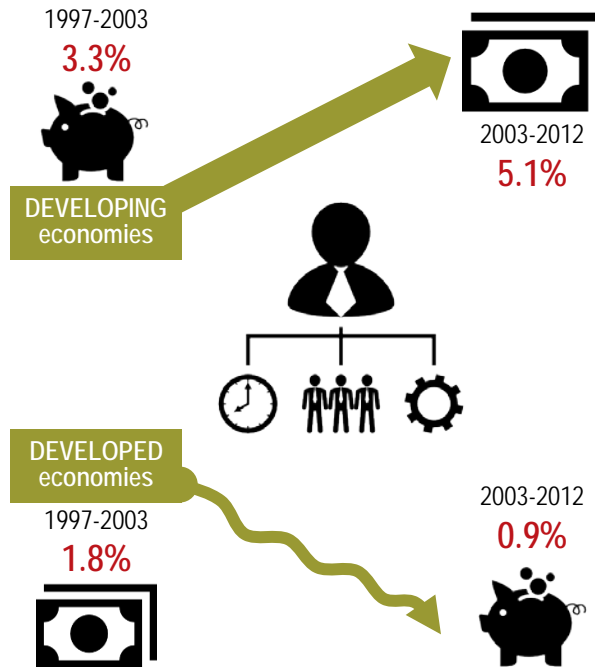
1 Building blocks of development

These foundational components of cluster development are also critical to labor productivity



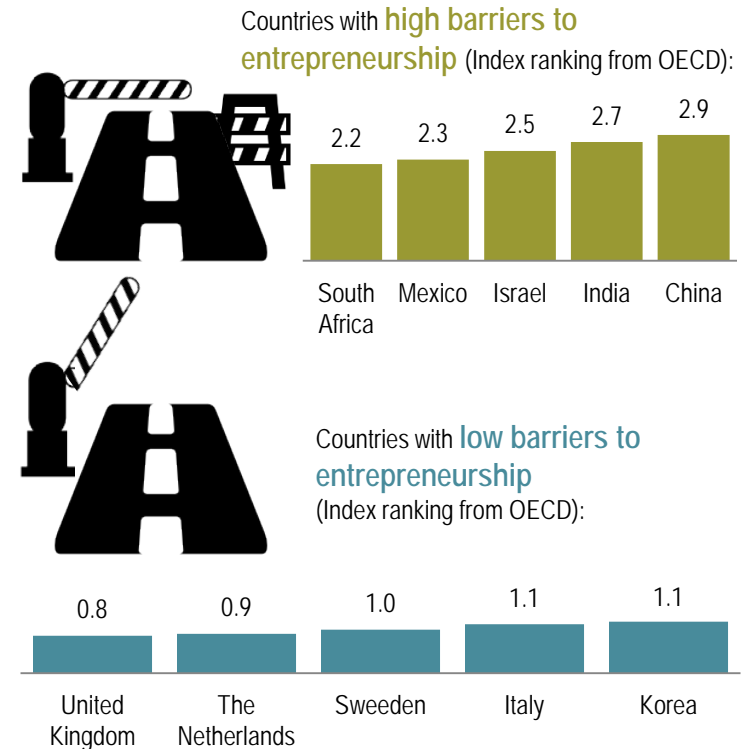
2 Labor productivity differences

Changes in **labor productivity** differ greatly between developing and developed economies



3 Declining entrepreneurship barriers

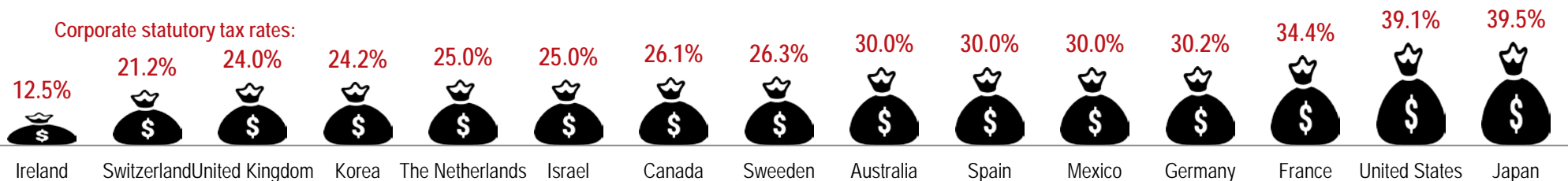
On the whole, barriers to entrepreneurship have declined in most countries and more established global clusters; however they remain high among emerging life sciences clusters.



4 Taxes and regulation

Corporate statutory tax burdens are **highest among Japan and the United States** at 39.5% and 39.1%, respectively; however these countries also have some of the best regulatory systems and high political and transparency rates.

Corporate statutory tax rates:



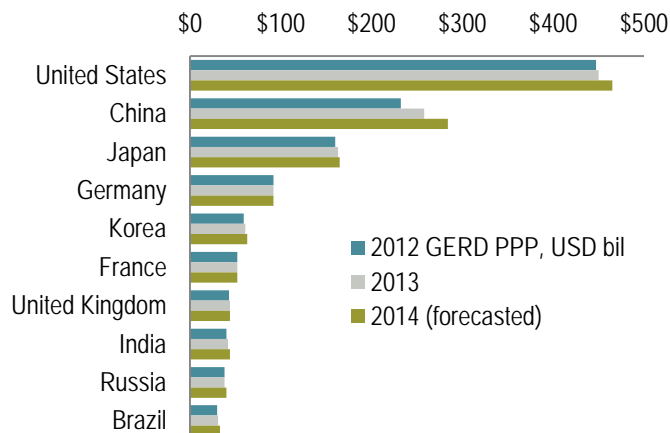
Global R&D funding perspective

Globally, the US still leads the world in R&D funding, but developing markets are emerging as new leaders.

1 Global R&D leaders (3-year view)

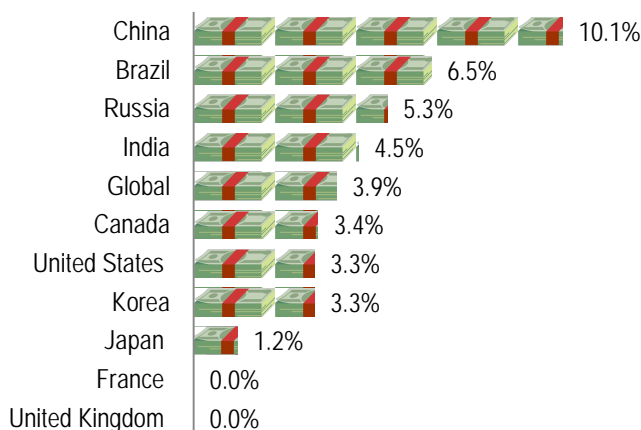
European nations post flat growth while developing nations continually post year-over-year increases in

Gross Expenditures on Research and Development (GERD)



2 Emerging R&D leaders

The BRICK nations are emerging as global R&D leaders. China, Brazil, Russia, and India are expected to outpace the overall global total for year-over-year increases in GERD.



3 Concentration of R&D spend

10 countries account for 80.0% of global R&D spend.



4 Source of R&D funding

While businesses contribute the most to R&D spend for most countries, the contribution ratios of this, and other funding sources, vary widely.

(The following is based off an industry-representative sample set of countries)

Highest percentages of:

Business R&D funds:



1. Israel
2. Japan
3. Korea

Higher education R&D funds:



1. The Netherlands
2. Canada
3. Mexico

Government R&D funds:



1. Mexico
2. Russia
3. South Africa

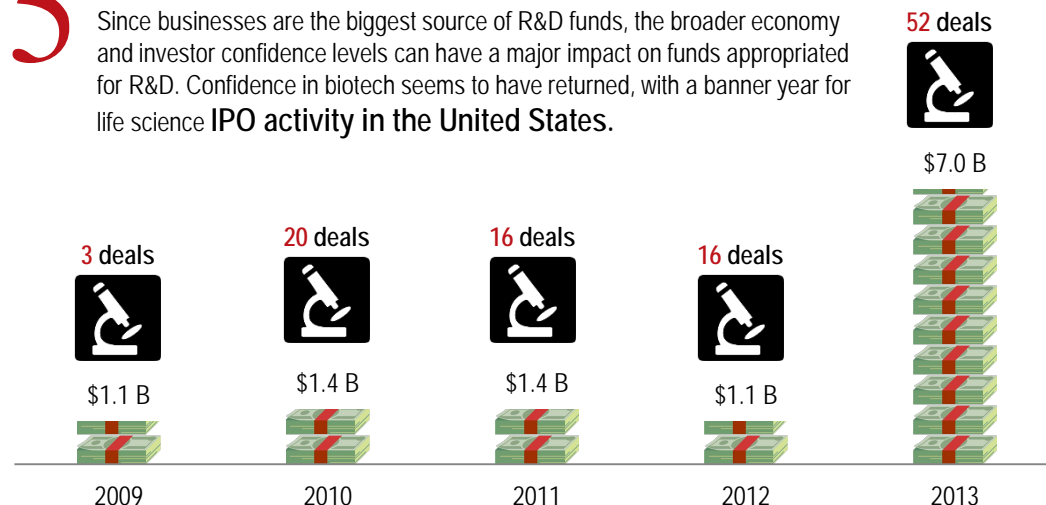
Public non-profit R&D funds:



1. United States
2. Israel
3. Australia

5 Economic impact to R&D funding

Since businesses are the biggest source of R&D funds, the broader economy and investor confidence levels can have a major impact on funds appropriated for R&D. Confidence in biotech seems to have returned, with a banner year for life science IPO activity in the United States.



Efficiency, compliance & facility trends

"The need to streamline costs and fill talent shortages leads to increased scope in IFM outsourcing."

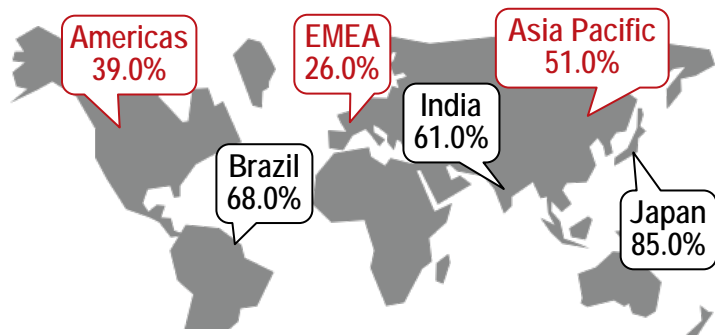
1 To streamline costs, open new doors

Real estate and facility expenses are among the industry's biggest costs. So for the first time, many industry decision makers are now **open to outsourcing** functions in critical and highly regulated space.



4 Global talent shortages

The ManPowerGroup's annual global survey of 38,000 employers in 42 countries revealed that **35.0% report difficulty in filling jobs**, of those 54.0% report this difficulty has a medium or high impact on their ability to meet client needs (up 12 percentage points over 2012).



Regional challenges filling jobs
Top 3 countries reporting difficulty in filling jobs

2 Move beyond the yellow line

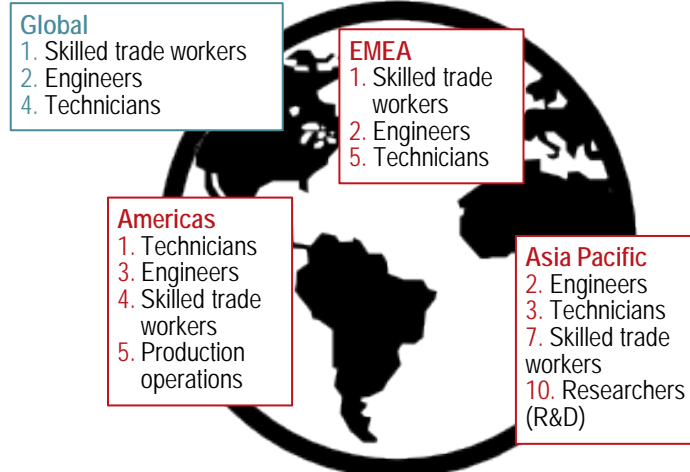
For decades, the yellow line designating a critical/regulated area has served as an actual and symbolic boundary for IFM providers. Advancements in the IFM world, are **breaking down some of the barriers** to entry.



- Technical development of 3rd party providers
- Efficiency gains
- Cost savings
- Synergy between critical & non-critical operations
- Integration & standardization

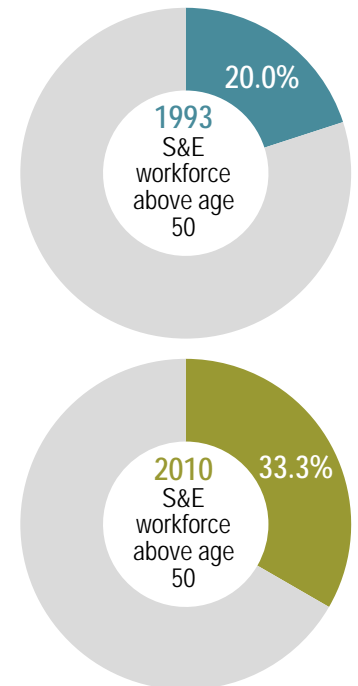
5 Difficult jobs to fill

The difficulty filling Life Sciences jobs may potentially **lead to rising costs and prevent getting the job done in time and on budget**. As the industry builds more complex and sophisticated facilities, the need for highly skilled workers will only exacerbate this problem.



3 Ageing U.S. workforce

From 2010 to 2020 nearly **2 million life scientist and engineering jobs are expected to open**. A large share of that projection is attributed to a retiring baby boomer S&E workforce.

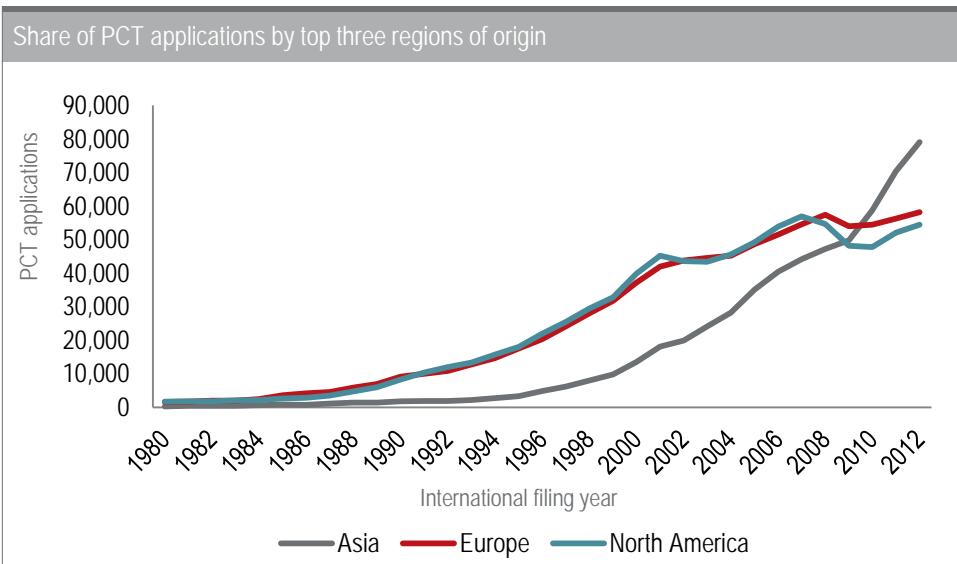


Geographic shifts in innovation

Analyzing geographic changes in product innovation and output via patent applications, higher education enrollment rates and research and development (R&D) employee pools have started to show some remarkable year-over-year changes. Developing countries are laying the foundation to compete among global knowledge-based economies and, in some instances, their success is coming at the expense of developed nations.

Tracking innovation via Patent Cooperation Treaty Applications

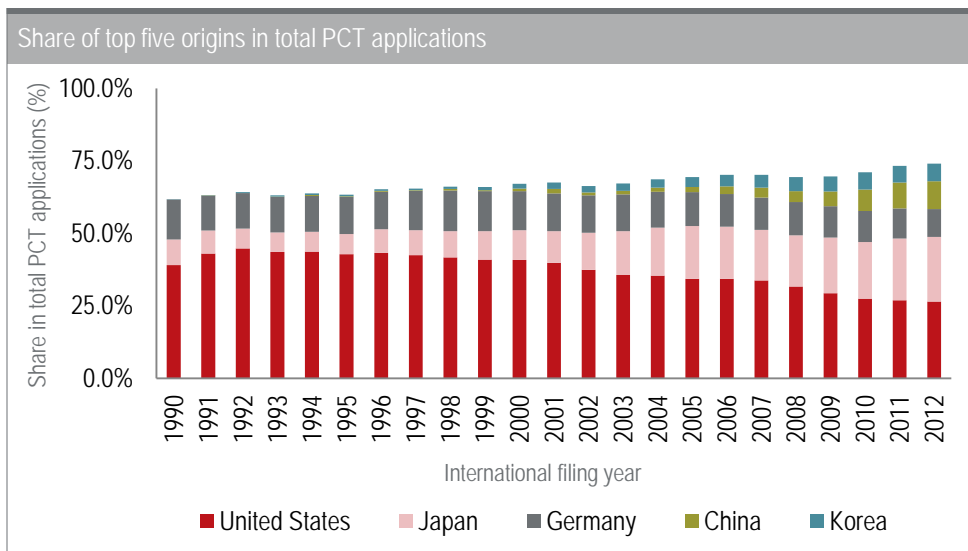
Patent Cooperation Treaty (PCT) applications filed through the World Intellectual Property Organization (WIPO) offer an accurate way to measure innovation concurrently across multiple countries and regions. Requesting patent protection through the PCT offers applicants the ability to patent an innovation simultaneously in all participating international contracting states; in 2013, the PCT had over 148 participating members. It is important to note that PCT applications are not “one for one” with patent applications filed in individual country and regional offices, and a PCT application’s country of origin is based upon the location of the first-named applicant. With these caveats in mind, the use of PCT application data enables us to make some observations about how innovation patterns are shifting regionally, and assumptions about which countries might become the leaders of tomorrow. The share of PCT applications by region has started to show some dramatic shifts in recent years. WIPO has reported a remarkable 670.0 percent growth in worldwide PCT applications over the past two decades, with just shy of 200,000 PCT applications in 2012 and a year-on-year growth rate of 7.1 percent. In recent years, Asia surpassed both North America and Europe in the number of overall patent applications, posting 12.2 percent, 4.5 percent and



Source: WIPO PCT Yearly Review, 2013

3.4 percent year-over-year growth, respectively. PCT applications for the remaining regions of Latin America and the Caribbean, Africa and Oceania only make up 1.9 percent of the worldwide total. However, Latin America and the Caribbean’s growth rate has increased notably over the past decade, most recently coming in at 7.0 percent year-over-year, above that of North America and Europe and right on par with the global average. Oceania was the only region to post negative year-over-year growth, at -2.7 percent.

On a country-level basis, the United States endures as the leader in overall PCT applications, with 51,640 in 2012 and Japan closely behind with 43,660. Currently, Germany is the source of the third-highest amount of PCT applications, with 18,764 in 2012. However, WIPO anticipates that China (18,617 PCT applications in 2012) will surpass Germany in 2013 given the current growth rates of each country. Rounding out the top five origins in total PCT applications is Korea, with 11,848.



Source: WIPO PCT Yearly Review, 2013

The top five countries combined comprise 74.0 percent of overall PCT applications, reporting about a 4.5 percentage point increase since their 2008 share (69.4 percent). After peaking two decades ago, the United States has been progressively losing share of overall PCT applications, dropping from 44.7 percent in 1992 to a new low of 26.4 percent in 2012. Conversely, China, Japan and Korea have been assuming that difference, and then some, now enjoying a combined 38.0 percent share of all PCT applications, a remarkable increase from a combined low of 7.2 percent in 1992.

Colombia (26.3 percent), the Netherlands (16.2 percent) and Russia (9.4 percent) also reported notable year-over-year growth. On the whole, Western European countries experienced moderate positive growth. Mexico, Canada, Israel, Australia and India all posted negative changes since 2011 at -15.1 percent, -6.3 percent, -5.2 percent, -1.8 percent and -1.4 percent, respectively.

PCT applications for select countries of origin

Country of Origin	2009	2010	2011	2012	% to global total 2012	Change vs. 2011
United States	45,628	45,031	49,110	51,640	26.4%	5.2%
Japan	29,802	32,150	38,875	43,660	22.4%	12.3%
Germany	16,797	17,568	18,852	18,764	9.6%	-0.5%
China	7,900	12,296	16,402	18,617	9.5%	13.5%
Korea	8,035	9,669	10,447	11,848	6.1%	13.4%
France	7,237	7,246	7,438	7,851	4.0%	5.6%
United Kingdom	5,044	4,891	4,848	4,895	2.5%	1.0%
Switzerland	3,672	3,728	4,008	4,192	2.1%	4.6%
The Netherlands	4,462	4,063	3,503	4,071	2.1%	16.2%
Sweden	3,568	3,314	3,462	3,587	1.8%	3.6%
Italy	2,652	2,658	2,695	2,863	1.5%	6.2%
Canada	2,527	2,698	2,945	2,758	1.4%	-6.3%
Australia	1,740	1,772	1,739	1,707	0.9%	-1.8%
Spain	1,564	1,772	1,729	1,700	0.9%	-1.7%
Israel	1,555	1,475	1,451	1,376	0.7%	-5.2%
India	961	1,286	1,331	1,313	0.7%	-1.4%
Russia	711	798	997	1,091	0.6%	9.4%
Singapore	593	641	661	708	0.4%	7.1%
Brazil	492	488	564	589	0.3%	4.4%
Ireland	482	443	415	390	0.2%	-6.0%
South Africa	375	295	319	314	0.2%	-1.6%
Mexico	194	191	225	191	0.1%	-15.1%
Chile	54	88	118	118	0.1%	0.0%
Colombia	63	46	57	72	0.0%	26.3%
Argentina	10	16	25	27	0.0%	8.0%
Indonesia	7	16	13	13	0.0%	0.0%

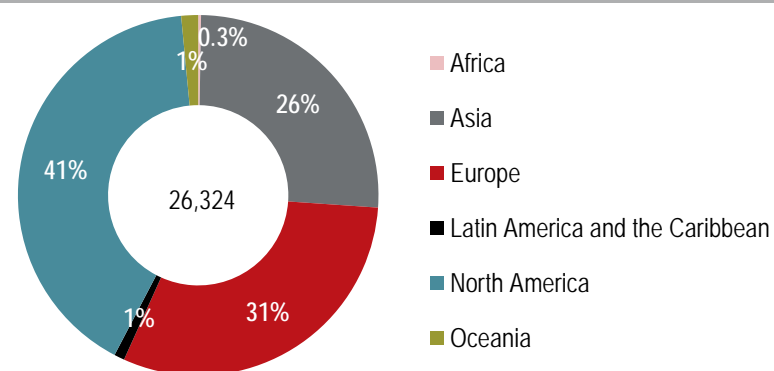
Source: WIPO Statistics Database, February, 2014

Note: Figures include PCT applications for all technology classes, beyond life sciences

Asia also gaining share among life sciences technology classes

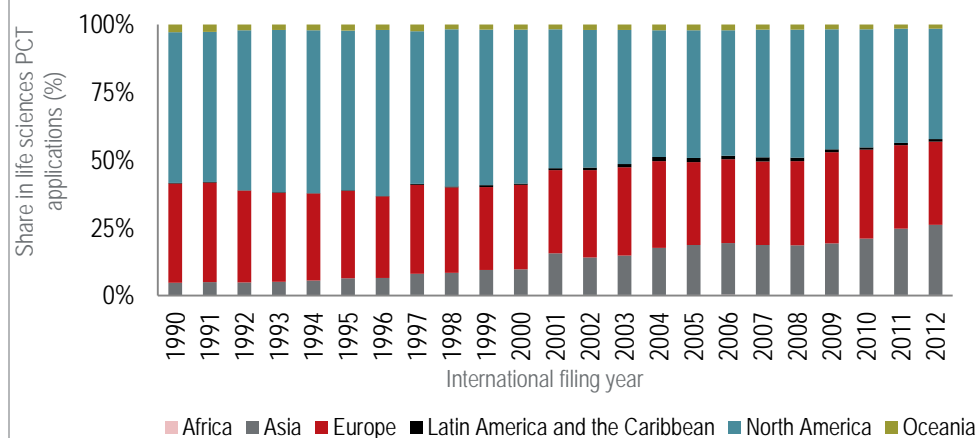
Life sciences PCT applications, comprised of medical equipment & instruments, pharmaceutical & biotechnology and crop & food sciences, accounted for 13.5 percent of total PCT applications, or 26,324. Overall the sector posted moderate growth at 3.7 percent. Unlike the regional breakdown for overall PCT applications, North America continues to be the dominant contributor with a 40.8 percent share of 2012 applications. Europe and Asia follow closely with 30.7 percent and 25.8 percent shares, respectively. However, similar to overall PCT applications, when the regional shares of life sciences applications are viewed over time, we once again see the trend of decreasing shares in the well established regions of North America and Europe, and ever-increasing shares in Asia and Latin America and the Caribbean. On a country level, the United States reported the most life sciences PCT applications with 10,324 in 2012.

Life sciences PCT applications by region of origin, 2012



Source: WIPO Statistics Database, February 2014

Historical share of life sciences PCT applications by region of origin



Source: WIPO Statistics Database, February 2014

Life sciences PCT applications for select countries of origin							
Country of Origin	Technology Area	2009	2010	2011	2012	% to total life sciences 2012	Change vs. 2011
United States	Total	10,903	10,505	10,263	10,324	39.2%	0.6%
	Medical equipment & instruments	5,120	4,826	4,664	4,825		3.5%
	Pharmaceutical & biotechnology	5,389	5,299	5,192	5,108		-1.6%
	Crop & food science	394	380	407	391		-3.9%
Japan	Total	2,572	2,674	2,941	3,271	12.4%	11.2%
	Medical equipment & instruments	1,012	1,174	1,369	1,704		24.5%
	Pharmaceutical & biotechnology	1,308	1,260	1,289	1,253		-2.8%
	Crop & food science	252	240	283	314		11.0%
Germany	Total	1,769	1,793	1,810	1,952	7.4%	7.8%
	Medical equipment & instruments	756	849	890	1,011		13.6%
	Pharmaceutical & biotechnology	931	860	850	856		0.7%
	Crop & food science	82	84	70	85		21.4%
Korea	Total	742	843	1,135	1,168	4.4%	2.9%
	Medical equipment & instruments	229	290	443	403		-9.0%
	Pharmaceutical & biotechnology	464	480	583	675		15.8%
	Crop & food science	49	73	109	90		-17.4%
China	Total	488	590	799	1,141	4.3%	42.8%
	Medical equipment & instruments	158	179	254	390		53.5%
	Pharmaceutical & biotechnology	293	369	503	675		34.2%
	Crop & food science	37	42	42	76		81.0%
Switzerland	Total	988	843	816	986	3.7%	20.8%
	Medical equipment & instruments	306	234	263	287		9.1%
	Pharmaceutical & biotechnology	561	499	447	524		17.2%
	Crop & food science	121	110	106	175		65.1%

Source: WIPO Statistics Database, February, 2014

Life sciences PCT applications for select countries of origin							
Country of Origin	Technology Area	2009	2010	2011	2012	% to total life sciences 2012	Change vs. 2011
France	Total	952	971	959	935	3.6%	-2.5%
	Medical equipment & instruments	332	316	289	278		-3.8%
	Pharmaceutical & biotechnology	569	608	613	598		-2.4%
	Crop & food science	51	47	57	59		3.5%
United Kingdom	Total	1,056	955	850	845	3.2%	-0.6%
	Medical equipment & instruments	388	364	337	337		0.0%
	Pharmaceutical & biotechnology	615	523	457	450		-1.5%
	Crop & food science	53	68	56	58		3.6%
The Netherlands	Total	805	832	728	773	2.9%	6.2%
	Medical equipment & instruments	332	432	363	405		11.6%
	Pharmaceutical & biotechnology	339	281	255	248		-2.7%
	Crop & food science	134	119	110	120		9.1%
Canada	Total	498	429	428	418	1.6%	-2.3%
	Medical equipment & instruments	167	134	149	145		-2.7%
	Pharmaceutical & biotechnology	303	263	251	247		-1.6%
	Crop & food science	28	32	28	26		-7.1%
India	Total	322	369	416	407	1.5%	-2.2%
	Medical equipment & instruments	37	28	66	40		-39.4%
	Pharmaceutical & biotechnology	268	321	336	350		4.2%
	Crop & food science	17	20	14	17		21.4%
Israel	Total	490	366	376	365	1.4%	-2.9%
	Medical equipment & instruments	263	210	200	199		-0.5%
	Pharmaceutical & biotechnology	205	144	157	154		-1.9%
	Crop & food science	22	12	19	12		-36.8%

Source: WIPO Statistics Database, February, 2014

Life sciences PCT applications for select countries of origin							
Country of Origin	Technology Area	2009	2010	2011	2012	% to total life sciences 2012	Change vs. 2011
Australia	Total	394	367	328	315	1.2%	-4.0%
	Medical equipment & instruments	161	157	139	140		0.7%
	Pharmaceutical & biotechnology	204	188	172	157		-8.7%
	Crop & food science	29	22	17	18		5.9%
Spain	Total	227	256	277	244	0.9%	-11.9%
	Medical equipment & instruments	73	88	86	80		-7.0%
	Pharmaceutical & biotechnology	125	142	161	129		-19.9%
	Crop & food science	29	26	30	35		16.7%
Sweden	Total	328	260	219	165	0.6%	-24.7%
	Medical equipment & instruments	201	171	150	79		-47.3%
	Pharmaceutical & biotechnology	120	75	64	72		12.5%
	Crop & food science	7	14	5	14		180.0%
Russia	Total	128	104	106	145	0.6%	36.8%
	Medical equipment & instruments	46	40	40	48		20.0%
	Pharmaceutical & biotechnology	73	58	52	87		67.3%
	Crop & food science	9	6	14	10		-28.6%
Brazil	Total	89	110	108	114	0.4%	5.6%
	Medical equipment & instruments	24	52	37	29		-21.6%
	Pharmaceutical & biotechnology	57	52	56	72		28.6%
	Crop & food science	8	6	15	13		-13.3%
Singapore	Total	83	114	139	98	0.4%	-29.5%
	Medical equipment & instruments	33	36	56	37		-33.9%
	Pharmaceutical & biotechnology	43	68	80	58		-27.5%
	Crop & food science	7	10	3	3		0.0%

Source: WIPO Statistics Database, February, 2014

Life sciences PCT applications for select countries of origin							
Country of Origin	Technology Area	2009	2010	2011	2012	% to total life sciences 2012	Change vs. 2011
Mexico	Total	49	37	42	45	0.2%	7.1%
	Medical equipment & instruments	12	8	19	13		-31.6%
	Pharmaceutical & biotechnology	25	21	15	25		66.7%
	Crop & food science	12	8	8	7		-12.5%
Ireland	Total	24	32	22	10	0.0%	-54.5%
	Medical equipment & instruments	15	16	16	8		-50.0%
	Pharmaceutical & biotechnology	8	14	6	2		-66.7%
	Crop & food science	1	2				N/A
South Africa	Total	9	5	8	7	0.0%	-12.5%
	Medical equipment & instruments	4	3	6	6		0.0%
	Pharmaceutical & biotechnology	4	2	2	1		-50.0%
	Crop & food science	1	0	0	0		N/A
Indonesia	Total	1	4	1	4	0.0%	300.0%
	Medical equipment & instruments	0	0	0	1		N/A
	Pharmaceutical & biotechnology	1	4	1	3		200.0%
	Crop & food science	0	0	0	0		N/A

While the United States continues to enjoy a leadership position in the number of life sciences PCT applications, a review of year-over-year growth among the select countries provides a very different story. Outside of Indonesia, whose overall contributions on a numbers rather than percentage base are nominal, China reported the largest year-over-year increase in the total number of life sciences PCT applications at 42.8 percent. Growth was reported in all industry technology sub-classes, with the highest increase occurring in the crop and food science subcategory. Additionally, China's growth in life sciences applications far outpaced the country's change in overall PCT applications (13.5 percent), suggesting intentional efforts to grow in these technology classes. Russia, Switzerland, Japan, Germany, Mexico, the Netherlands and Brazil also posted significant year-over-year growth. Conversely, Singapore and Sweden posted a double digit year-over-year loss in overall life sciences PCT applications despite positive growth in PCT applications of all technology classes.

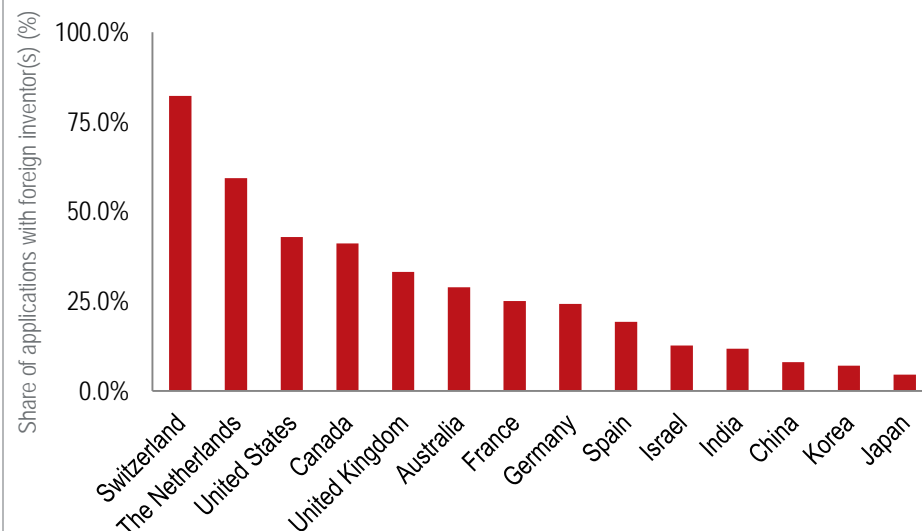
International collaboration among PCT application filings

Throughout the past several years, much of the news on industry activity centers on the idea of globalization and the multiregion collaborations occurring in R&D, production and general business operations. Therefore it is important to examine the occurrence of collaboration and foreign inventors named in PCT applications.

Looking at the instance of collaboration along two measures, share of applications with at least one foreign inventor and share of foreign inventors versus all inventors' names on applications, some very distinct trends emerge on a country and regional basis. Overall we see Western European and North American countries showing some of the highest instances of collaboration, and Asian countries reporting the fewest instances. Further, the three of the fastest growing countries in both overall PCT and life sciences applications (China, Korea and Japan) are also among the least collaborative countries noted here.

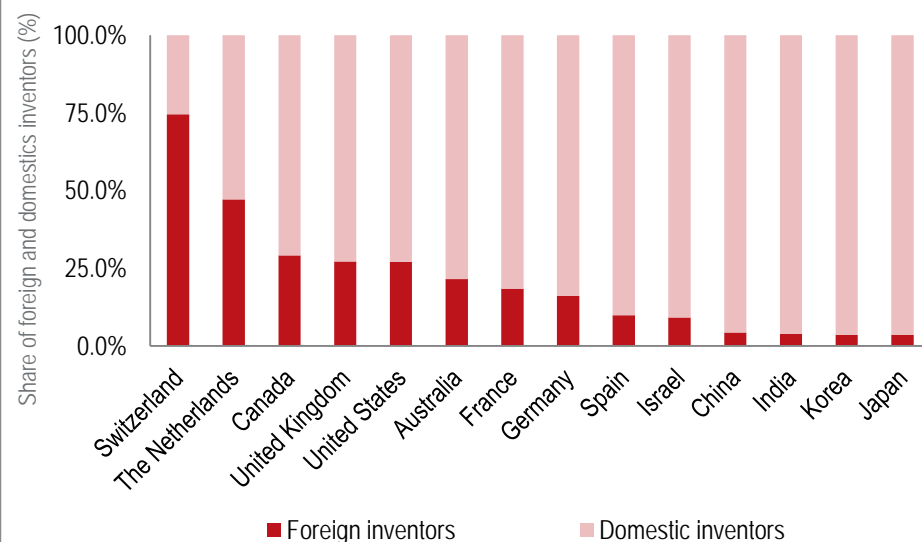
When we consider the idea that globalization of the industry and cross-country collaboration is expected to speed up innovation and bolster multinational companies' access to emerging markets, these low levels of collaboration on new patent applications among some of the fastest growing countries allude to a potential gap in further globalization. In recent years, many Asian scientists have been returning back to their native countries after pursuing degrees and early work experience in Europe and the United States, oftentimes incentivized by government grants and enticing lead scientist roles. The return of talent to Asian countries and aggressive government funding toward research parks, incubator centers and R&D efforts have allowed many emerging Asian countries to become self-sustaining, as demonstrated by these lower than average instances of cross-country collaboration, yet increasing PCT applications. Multinational companies hoping to establish a foothold in these emerging countries will want to create local R&D operations to capitalize on the rich resources, talent and innovation capabilities.

Select share of PCT applications with at least one foreign inventor, 2012



Source: WIPO PCT Yearly Review, 2013

Select share of domestic and foreign inventors, total PCT applications, 2012



Source: WIPO PCT Yearly Review, 2013

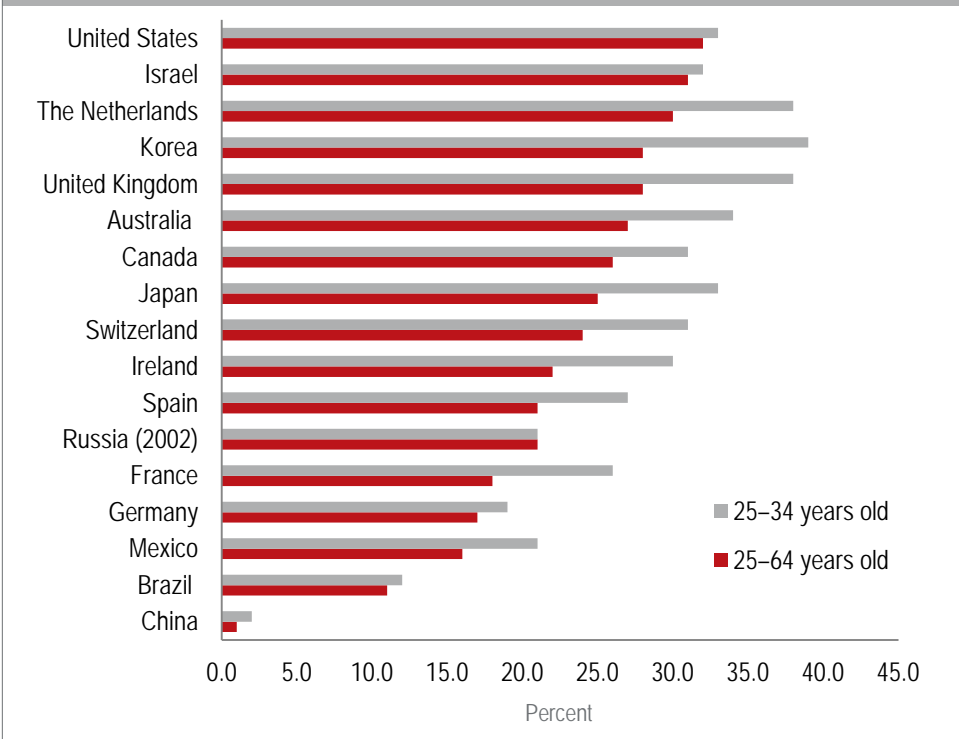
Note: The share of domestic and foreign inventors is calculated using all inventors named in PCT applications published in 2012.

Tracking geographic origins of science & engineering degrees

Over the past few decades, global countries have been working hard to develop their higher education systems. At the onset of the baby boomer generation, the United States' higher education system blossomed, becoming the worldwide leader for bachelor's, master's and doctorate degree programs. In recent years, however, the global landscape has become much more competitive. Global governments are funneling greater shares of their gross domestic product into their education systems, not only to compete among the international institutions in attracting foreign student bodies, but also to domestically educate scientists for their growing knowledge-based economies.

According to the National Science Foundation, the United States remains among leading countries for tertiary-type A degree (bachelor's or master's degree) attainment as a percentage of the population aged 25 to 64 years old. However, when the sample size is narrowed to represent the younger generations newly in the workforce, aged 25 to 34 years old, the declining advantage of the United States is seen. Other developed countries such as the Netherlands, Korea, the United Kingdom, Australia and Japan have all outpaced the United States on this measure. While China has some of the lowest tertiary degree enrollment among countries noted here, the sheer size of the Chinese population should be considered for perspective.

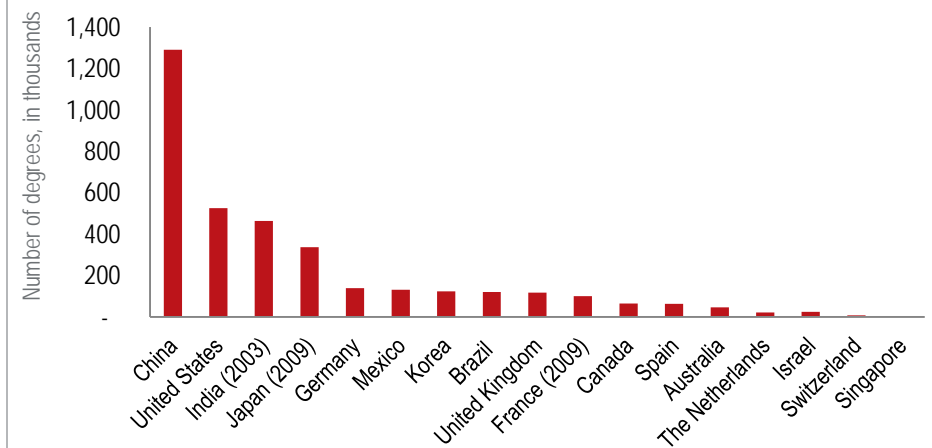
Attainment of tertiary and advanced research programs, by select country and age group, 2010



Source: National Science Foundation *Science and Engineering Indicators 2014*

Although China's overall attainment of a bachelor's or master's degree as a percentage of the population remains well below that of other large nations, when the focus is narrowed to just bachelor's of science and engineering (S&E) degrees, China clearly emerges as a leader.

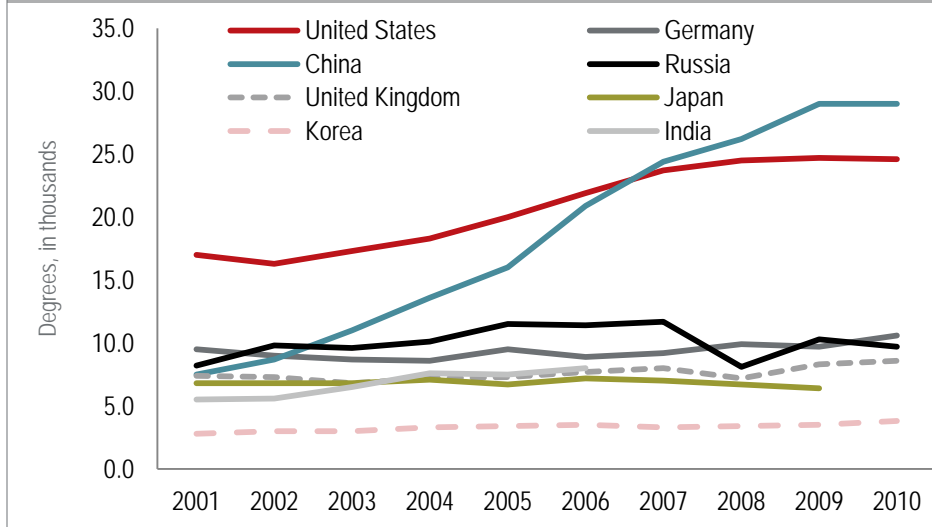
Bachelor's of science and engineering degrees, by select country, 2010



Source: National Science Foundation *Science and Engineering Indicators 2014* database
Note: Data from 2010, or most current year available

Further, in 2007 China surpassed the United States as the leader in science and engineering doctoral degrees.

Science and engineering doctoral degrees, by select country: 2001-2010



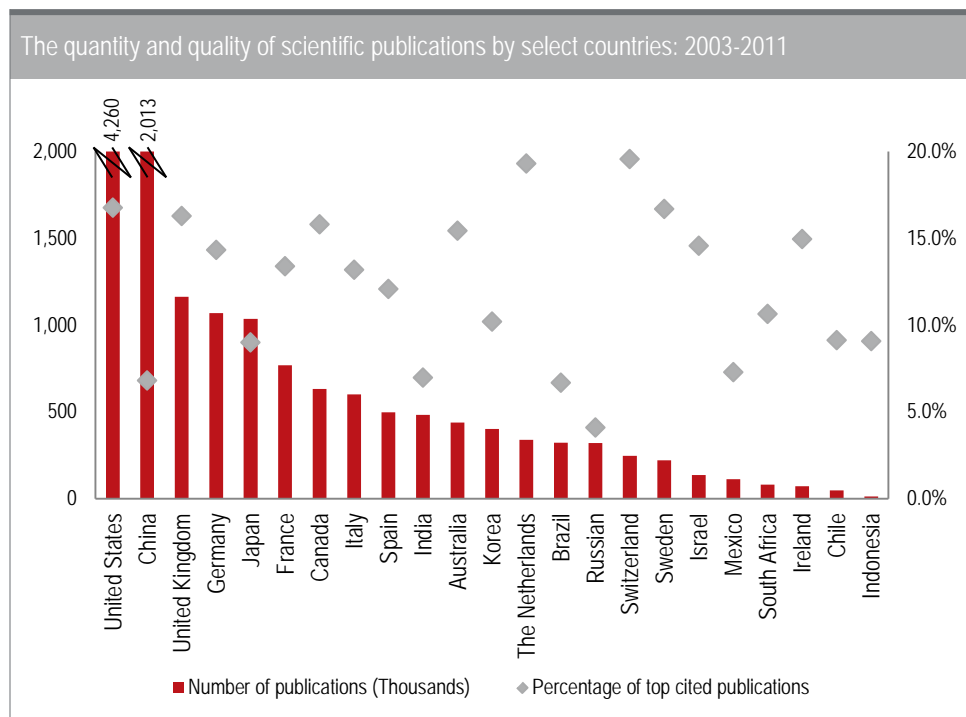
Source: National Science Foundation *Science and Engineering Indicators 2014*

In the mid-1990s, around the same time that global countries began to improve their higher education programs and the United States began to lose its edge, a massive shift occurred in the number of Chinese students seeking doctoral degrees in science and engineering. According to the National Science Foundation, Chinese students in science and engineering were fairly equally enrolled in United States and Chinese universities. However, since that time, that number has changed dramatically, and not necessarily at the expense of the United States. While the number of S&E doctoral candidates at U.S. universities has remained fairly stable over time, Chinese doctoral candidates at domestic universities has grown by more than 10-fold.

Beyond individual country comparisons, the important thing to note is that science and engineering doctorate degrees are on the rise for developing countries. Overall these types of degree holders are highly mobile and oftentimes incentivized to relocate from country to country. High-technology and knowledge-based economic growth is a top priority for most nations, developed and developing alike, and therefore policies and measures are being taken to increase the ease of employing foreign scientists and engineers.

Using scientific publications to track innovative output

Scientific publications offer a different view of innovative output. By looking at both the number of publications, as well as the percentage of top-cited publications, we get two different perspectives on which countries are leading in thought leadership. Here we see the United States and China



Source: OECD Science, Technology and Industry Scoreboard 2013

leading in terms of overall scientific publications from 2003 to 2011; however, the quality (measured by the percentage of top cited publications) of China's publications remain much lower than the United Kingdom, Germany and Japan, the remaining countries that round out the top five contributors. Switzerland and the Netherlands have the highest percentage of top-cited publications overall. According to the Organisation for Economic Co-operation and Development (OECD), top-cited publications tend to be more collaborative than the average publication, across both international and domestic institutions. Countries with high-impact, top-quality research publications correlate highly to countries with high collaboration rates.

Employment in R&D

Overall, few apples to apples measurements exist to examine science and engineering employment across different countries and regions, thus making it difficult to compare the human capital capabilities of individual countries, and how those may be shifting over time. While data on research and development employees is available for many countries, the collection year varies so widely that it seems unfair to make comparisons.

Generally speaking it appears that R&D employment has been steadily growing among most countries worldwide. Developing nations, in particular, have seen drastic upticks in R&D employment, largely driven by domestic policies to grow high-technology capabilities and supportive infrastructure for a knowledge-based economy. In a roughly 10-year period (2001 to 2011) China posted over 200.0 percent growth in R&D employment, followed by 102.3 percent growth in the Korea, 96.8 percent in Brazil, 90.3 percent in Singapore and 82.4 percent in Mexico. Developed countries posted more moderate growth during the same period with Canada growing at 23.5 percent, the Netherlands at 21.1 percent, France at 17.8 percent, Germany at 14.1 percent and Japan at 1.0 percent growth. Full data for the other countries was not available for inclusion.

Conclusions

In this section we examined several measures of innovation including the students and employees that comprise the industry's human capital resources to the actual product outputs in the form of PCT applications and scientific publications. On the whole, strides are being made by developing nations to grow their domestic capabilities for innovation, hoping to compete on the world stage among knowledge-based economies. And, according to one measure, PCT applications, those efforts seem to be working. The Asian region has surpassed both North America and Europe in total applications for all technology classes. While the United States remains a leader within the technology classes relevant to life sciences, the year-over-year growth among developing nations like China and Korea should not go unnoticed. When increases to developing Asian countries' higher education and R&D workforces are also considered, one can assume these countries are appropriating resources and funds to create highly functional innovative communities.

Transferring technology from bench to marketplace

Once a promising drug or treatment has been patented and tested, a complex system of supporting businesses and systems are needed to push that product beyond the workbench and into the marketplace. Many of the mature life sciences clusters today are also cities that have robust and developed financial, legal, marketing and transportation and logistics industries. The ability for life sciences companies to outsource non-core aspects of product development is crucial to success, particularly for small start-up and growing mid-size companies. Among emerging global clusters, some industry-minded groups are purposefully creating research and development parks to include members from these supporting industry groups.

Favorable conditions for start-ups crucial to future industry success

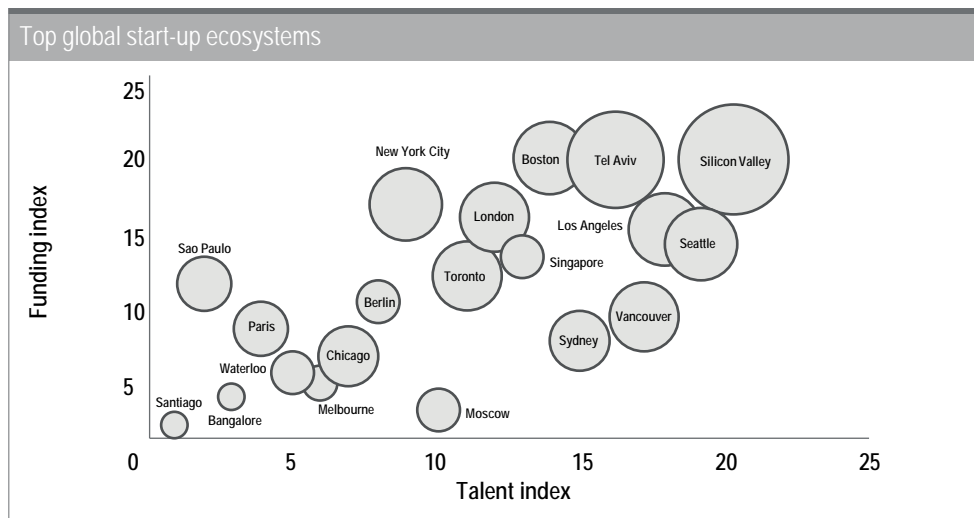
As the life sciences industry shifts from one driven by Big Pharma to one where small and medium-sized enterprises are largely generating innovation, partnership and M&A activity and favorable start-up environments are more important than ever. When scientists have a breakthrough, they require funding and support to help propel their research to the next phases of the development cycle, including larger studies, clinical trials, etc. Therefore, funding geared toward start-ups, like angel and seed investments, is needed beyond traditional R&D and venture capital funding. The following graph from the 2013 *Global Innovation Index* report measures major global cities on their propensity for successful start-ups based off of funding and talent. Clearly most of the current leading cities in start-up infrastructure are already highly innovative and successful in transferring

technology, but unfortunately a proven formula of success doesn't exist for emerging markets to simply copy and implement. However, knowing that funding and providing business support to early stage projects is a critical element to start-up success, some emerging regions are starting by focusing their efforts there. According to the Global Innovation Index, several countries in Latin America have already made some headway. For example, several states in Brazil, including Minas Gerais, São Paulo and Rio Grande do Sul, are investing and promoting university spin-offs.

Knowledge-intensive industries and cluster infrastructure ties to labor productivity

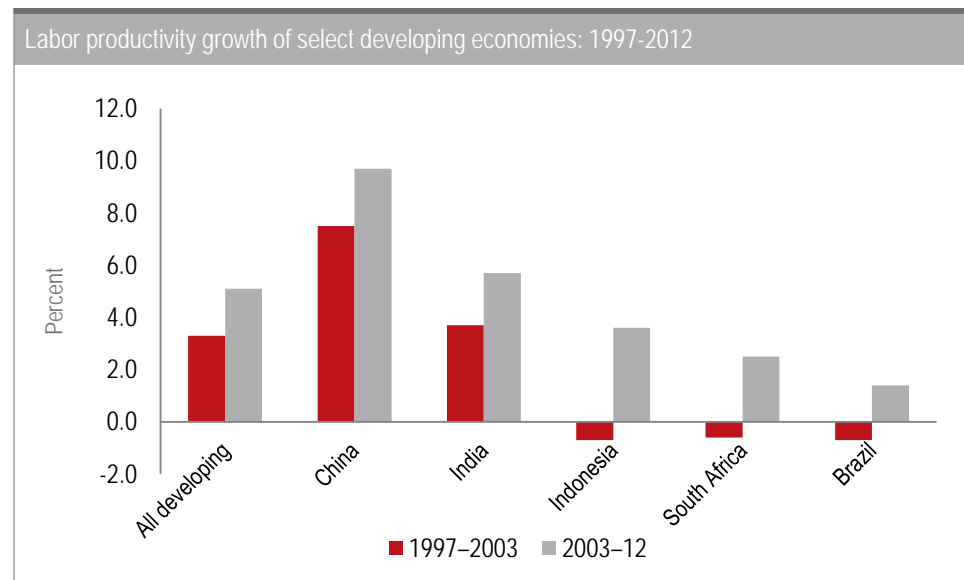
Labor productivity measurements offer another lens by which to assess economic growth and developmental success. In the National Science Foundation's (NSF) *Science and Engineering Indicators 2014* report, labor productivity is measured on the gross domestic product (GDP) per employed person and provides a ratio of production outputs to resource inputs. The report notes that rapid increases and elevated productivity growth is correlated with global economies increasing their concentration of knowledge-intensive industries, such as life sciences. Further, many factors that are attributed to increases in labor productivity are also cornerstone components of cluster development, including investment in R&D, education and physical infrastructure and foreign direct investment and technology transfer.

In the following tables from the *Science and Engineering Indicators 2014* report, the evolution of labor productivity for select countries are noted. China and India were leaders among developing countries with 10.0 percent and 6.0 percent growth between 2003 and 2012, respectively. While these economies have seen rampant growth in productivity, the gap in per capita GDP when compared against developed countries is notable and likely to remain for some time.



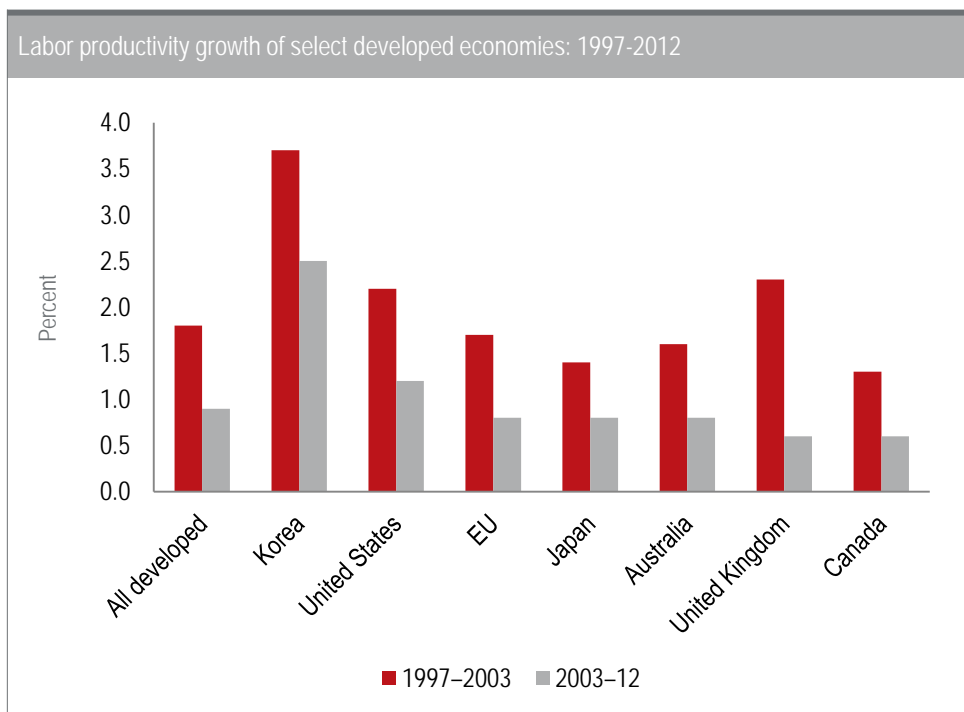
Source: *Global Innovation Index*, 2013

Note: The bubble size indicates the positioning of each territory in the total ranking, where Silicon Valley ranks at the top and Santiago at the bottom. The funding measures the availability of risk capital, while talent ranks the skills of the start-up founders in each territory.



Source: National Science Foundation *Science and Engineering Indicators 2014*

While most developed countries witnessed a massive decline in productivity growth during the recession, most have returned to modest positive growth, estimated at about 1.0 percent between 2011 and 2012. Outside of Korea, which is relatively new to the developed country list, the United States remains the leader among developed countries; its success is largely attributed to faster adoption of technology, more flexible labor markets, high-quality research universities and an influx of skilled immigrants, according to the *Science and Engineering Indicators* report.



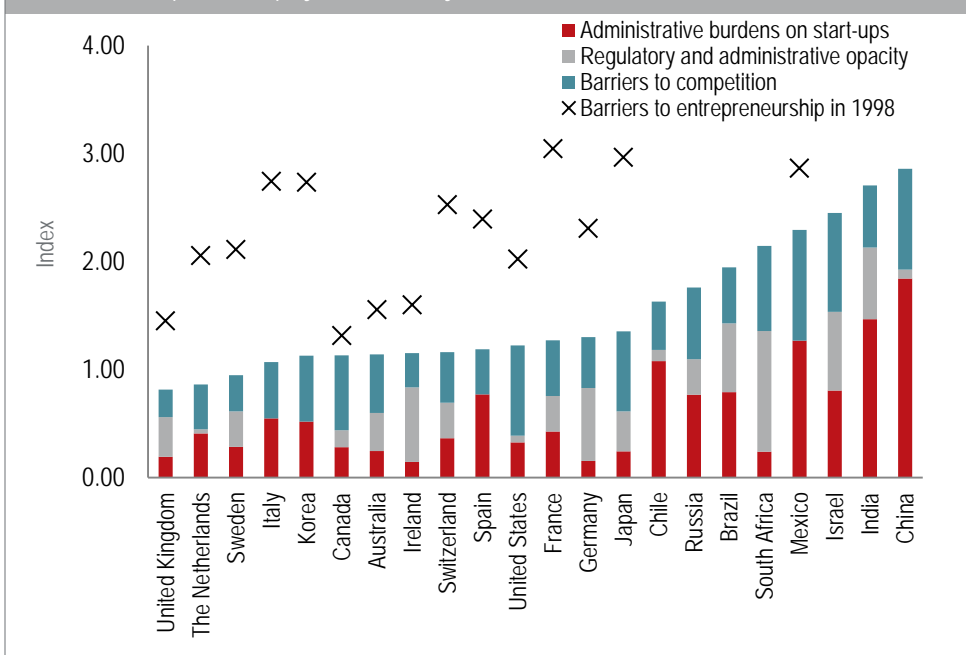
Source: National Science Foundation *Science and Engineering Indicators* 2014

Public policy's effect on entrepreneurship

Government policy plays an important role in technology transfer and business growth. An environment that enables companies to originate and grow with few barriers to entry and provides support to keep those companies healthy and growing are generally considered business-friendly environments. Low corporate tax structures, clear and developed regulatory frameworks and minimal administrative obstacles are crucial to allowing small and medium-sized enterprises to efficiently establish roots and flourish over time.

We anticipate that small and medium-sized companies will lead a substantial amount of activity and growth in the life sciences industry in the coming years. Therefore countries that proactively enable and foster entrepreneurship and small, yet growing, companies, will not only see organic growth, but will also attract interest from companies looking to expand globally.

Barriers to entrepreneurship by select country, 2008



Source: OECD Science, Technology and Industry Scoreboard 2013

Corporate statutory tax rates vary widely from country to country. Lower tax rates are favorable to companies of all sizes and are commonly cited among location strategy decisions. Ireland is by far the most favorable country from a corporate tax rate perspective, at 12.5 percent. Not surprisingly, many large pharmaceutical companies have manufacturing sites there. Other favorable countries include Switzerland (21.2 percent), the United Kingdom (24.0 percent), Korea (24.2 percent), the Netherlands and Israel (both 25.0 percent) as well as Canada (26.1 percent) and Sweden (26.3 percent). Australia, Spain and Mexico become a bit higher at 30.0 percent, Germany with 30.2 percent and France with 34.4 percent. The United States and Japan have the highest corporate tax rates with 39.1 percent and 39.5 percent, respectively. Many of the high tax rate countries, however, also have some of the best regulatory systems and high political and financial transparency rates, which help to balance the high rates and keep them competitive.

Conclusions

Having an economy where new businesses can easily set up shop and effectively market their products is crucial to attract multinational interest and to help organically grow domestic companies. Many of the factors considered in cluster economics, such as human capital, funding, business-friendly policies, developed infrastructure, quality education institutions, etc., also aid speedy commercialization of products. Geographies that support start-up companies through funding and collocation of key industry resources, as well as those that have the infrastructure and demand to continue to support start-ups as they grow, will hold preference.

Global R&D funding perspective

As noted in the review of technology transfer, creating an environment ripe for innovative and commercial success is a complex blend of many factors, some of which are measurable and others not so. One crucial piece of the puzzle, however, is the availability of funding. A review of Research and Development (R&D) spend as a percentage of gross domestic product (GDP) as well as the gross expenditures on R&D (GERD) captures both public and private expenditures on innovation.

According to the *2014 Global R&D Funding Forecast* report from Battelle and *R&D Magazine*, overall global R&D funding in 2013 fell victim to economic uncertainty in the United States and Europe, as demonstrated by slowed funding versus the growth seen in 2011 and 2012. Conversely, year-over-year change among most Asian countries continued on an aggressive upward trend in 2013, far outpacing the rest of the world. Regarding 2014 estimates, China, Brazil and India are expected to remain above the average year-over-year global growth rate of 3.9 percent, while Canada and the United States will return to significant growth, back on par with Korea.

The top 10 countries together account for over 80.0 percent of worldwide investments, and further, the top three account for over 50.0 percent of total spend. A detailed chart of select countries' R&D spend from 2012 through 2014 (forecasted) is on the following page.

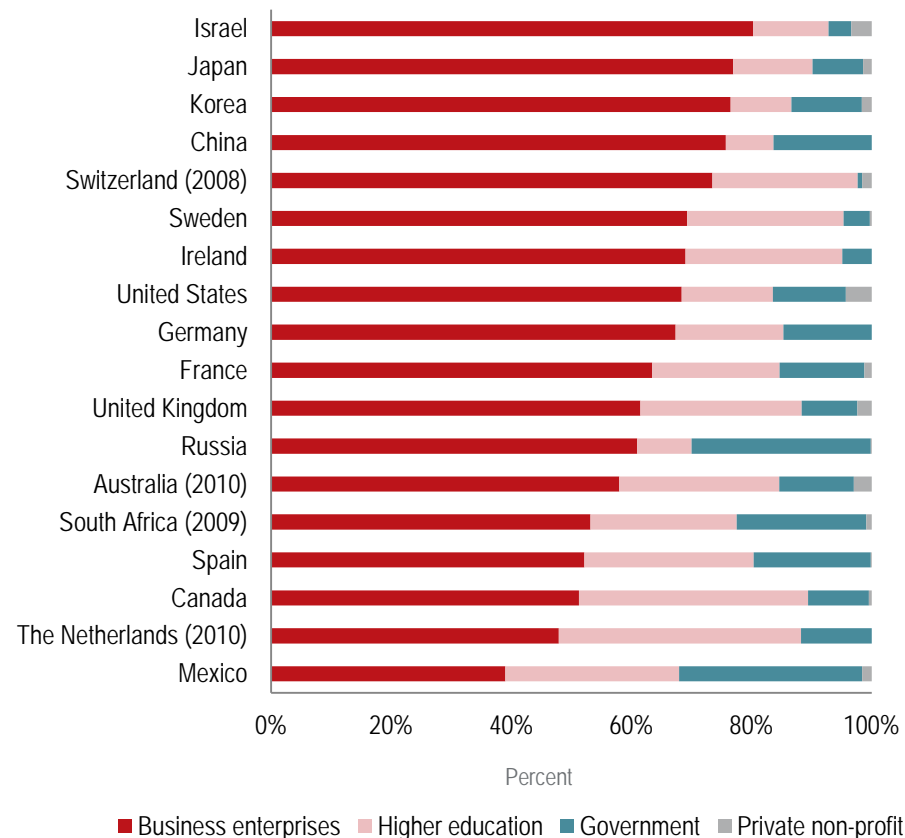
A look under the hood of R&D spend

As noted before, overall R&D spend comes from a mix of both public and private sources. Looking at an individual country's R&D spend composition can tell you a lot about the relative strengths and weaknesses of its innovation system. For most economies, private, business-funded R&D provides the most amount of spend. Knowing this, most countries' innovative future is dependent on the health of private sector life sciences companies and the broader investment community. Maintaining confidence and high margins of individual companies is crucial to fund new research via partnerships and acquisitions, and keeping investors interested and confident in the industry will continue to generate support through venture capital (VC) funding, angel funding and capital raised for initial public offerings (IPOs).

GDP growth of BRICK nations translates into more money for R&D

The BRICK nations of Brazil, Russia, India, China and Korea have entered the world stage over the past five years as global economies not to be overlooked. Over the past 30 years, these countries have demonstrated massive growth in their overall GDP. According to data from Thompson Reuters' *Building BRICKs* report, not one of the BRICK nations had GDP figures above \$500.0 billion in the early 1980s (incomplete data for Russia); yet by 2011 all countries reported GDP above \$1,000.0 billion. China's story is especially impressive, growing nearly 30 times over its 1980s figures, now second only to the United States.

Select R&D expenditure by performing sectors, 2011



Source: OECD Science, Technology and Industry Scoreboard 2013

Since increases in GDP mean more prospective money available to channel into R&D, anticipated growth trajectories could have major implications on these countries' influence within the global innovation arena. Already, we have seen Asia surpass both North America and Europe in terms of overall patent applications. Consider further the strategic initiatives targeted at the life sciences industry and the competitive landscape is sure to become a lot more exciting in the coming decades.

Forecast gross R&D expenditures; select countries

Country		2012			2013				2014			
	Rank among all countries	GDP PPP US\$ bil.	R&D as % GDP	GERD PPP US\$ bil.	GDP PPP US\$ bil.	R&D as % GDP	GERD PPP US\$ bil.	GERD % change year-over-year	GDP PPP US\$ bil.	R&D as % GDP	GERD PPP US\$ bil.	GERD % change year-over-year
United States	1	15,940	2.8%	447	16,195	2.8%	450	0.7%	16,616	2.8%	465	3.3%
China	2	12,610	1.8%	232	13,568	1.9%	258	11.2%	14,559	2.0%	284	10.1%
Japan	3	4,704	3.4%	160	4,798	3.4%	163	1.9%	4,856	3.4%	165	1.2%
Germany	4	3,250	2.8%	92	3,266	2.8%	92	0.0%	3,312	2.9%	92	0.0%
Korea	5	1,640	3.6%	59	1,686	3.6%	61	3.4%	1,748	3.6%	63	3.3%
France	6	2,291	2.3%	52	2,296	2.3%	52	0.0%	2,319	2.3%	52	0.0%
United Kingdom	7	2,375	1.8%	43	2,408	1.8%	44	2.3%	2,454	1.8%	44	0.0%
India	8	4,761	0.9%	40	4,942	0.9%	42	5.0%	5,194	0.9%	44	4.5%
Russia	9	2,555	1.5%	38	2,593	1.5%	38	0.0%	2,671	1.5%	40	5.3%
Brazil	10	2,394	1.3%	30	2,454	1.3%	31	3.3%	2,515	1.3%	33	6.5%
Canada	11	1,513	1.9%	29	1,537	1.9%	29	0.0%	1,571	1.9%	30	3.4%
Australia	12	987	2.3%	22	1,012	2.3%	23	4.5%	1,040	2.3%	23	0.0%
Spain	15	1,434	1.3%	19	1,415	1.3%	18	-5.3%	1,418	1.3%	18	0.0%
The Netherlands	16	719	2.0%	15	710	2.1%	15	0.0%	712	2.1%	15	0.0%
Sweden	17	399	3.4%	14	403	3.4%	14	0.0%	412	3.4%	14	0.0%
Israel	18	253	4.3%	11	263	4.2%	11	0.0%	271	4.2%	11	0.0%
Switzerland	19	369	2.9%	11	375	2.9%	11	0.0%	382	2.9%	11	0.0%
Singapore	22	332	2.6%	9	344	2.6%	9	0.0%	355	2.7%	9	0.0%
Mexico	25	1,788	0.5%	8	1,809	0.5%	8	0.0%	1,864	0.5%	8	0.0%
South Africa	29	592	1.0%	6	604	1.0%	6	0.0%	621	1.0%	6	0.0%
Ireland	37	195	1.8%	3	196	1.7%	3	0.0%	200	1.7%	3	0.0%
Indonesia	40	1,237	0.1%	2	1,303	0.2%	2	0.0%	1,374	0.2%	3	50.0%
Global		83,434	1.8%	1,517	85,751	1.8%	1,558	2.7%	88,733	1.8%	1,618	3.9%

Source: 2014 Global Funding Forecast

Notes: GERD = Gross Expenditures on Research and Development; PPP = Purchasing Power Parity (used to normalize)

Modest growth forecasted to return for the United States and Europe

On a regional level, the European Union reported flat growth for R&D spend from 2012 to 2014. According to the *2014 Global R&D Funding Forecast* report, the highly unstable political climates of Greece, Spain and Italy led to reduced economic confidence, and thus depressed year-over-year commitments for R&D expenditures. However, strong recovery among Europe's larger economies, like Germany, the United Kingdom and France, may be bringing winds of change for the region as a whole.

Beyond broad economic recovery, government initiatives to bolster growth in the region further indicate a brightened future for Europe. The European Union's Horizon 2020 is Europe's biggest research and innovation program ever. The program will fund EUR 80.0 billion (\$106.7 billion)¹ over the next seven years with an end goal of securing Europe's global competitiveness. Similar to emerging economies, regional leaders recognize that a large part of future growth will stem from high-technology industries. Realizing this, they are appropriating public funds for research and commercialization of European-borne innovation.

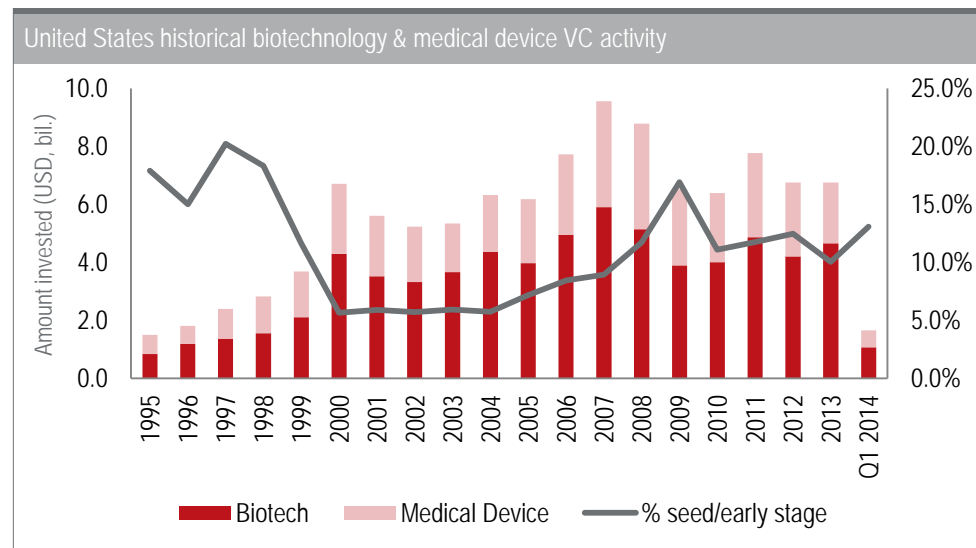
Similar to Europe, the United States has reported relatively flat growth in R&D spend over the past few years in response to the belt-tightening following the recession. A forecast from the *2014 Global R&D Funding Forecast* report, however, estimates that GERD in the United States will increase roughly 3.3 percent to \$465.0 billion in 2014.

In the United States, biotechnology and medical device venture capital (VC) investment activity has remained relatively stable over the past five years after it sharply declined following the recession. In line with the industry's focus on small and medium-sized companies, funding of seed and early stage projects has increased overall in recent years.

Although capital from initial public offerings (IPOs) is not a direct source of funds for R&D as it relates to data on the previous page, tracking IPO activity is highly indicative of overall investor confidence in the industry. In the United States, the life sciences industry had a phenomenal year, with 52 life sciences companies completing IPOs on U.S. exchanges, collectively raising \$7.0 billion (according to G. Steven Burrill). This compares to 16 companies and \$1.1 billion in raised funds during 2012.

Conclusions

Asia's largest economies continue to demonstrate year-over-year increases in R&D spend. Impressive growth trajectories of their overall GDP suggest that developing countries in Asia will continue to gain strength among global innovation economies. However, government commitments and increased private funding activity in the United States and Europe will keep things competitive in the near term.



Source: PricewaterhouseCoopers MoneyTree Report, May 2014

¹ Twelve-month average conversion rate of EUR .075 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Efficiency, compliance & facility trends

Over the past few years we have noticed a significant increase in the attention life sciences companies are paying to their facilities and operations. Outside of research and development, real estate and facility costs are among some of the biggest expenses for life sciences companies. Therefore, it's not surprising that we've seen many of the industry's large and medium-sized players looking to consolidations, asset disposal and improvements to building efficiency as a means of cost savings. Markets and geographic clusters that are dominated by large campuses and headquarter operations, such as Northern New Jersey, Minneapolis, Toronto and the outlying suburbs of major European cities, have been subject to the industry's general right-sizing over the past few years. Large-scale layoffs and decommissioning of manufacturing and distribution facilities have been all too frequent headlines for some of these industry clusters.

As we witness a shift in the industry from one driven by Big Pharma to one where mid-market companies are driving growth and activity, the types and sizes of facilities in demand have shifted. Large campuses are being parceled into singular facilities for single or multitenant use. Incubator-style buildings that offer flexible space options and access to shared laboratory services like inventory management and glass washing are in high-demand. Life sciences clusters in the United States, Canada and Europe that are founded on research institutions and smaller tenant make-up, such as San Diego, Boston, Montreal, Cambridge and Basel, are thriving and emerging clusters in Asia are building innovation cities and incubator-type facilities, geared toward this new era of the industry.

The juggling act of streamlining costs, while mitigating risk

Beyond the facilities themselves, the operations within the building walls are also top of mind. Opportunities taken to increase the efficiency of building systems can result in additional cost savings, allowing for more money to be funneled back into research or other company priorities. However, industry decision-makers remain cautious and have not been diving into all of these measures head-first. Because life sciences companies manufacture drugs and treatments for human use, they are highly subject to regulations and standards set forth by governing bodies such as the U.S. Food and Drug Administration (FDA), European Medicines Agency (EMA), Health Canada, the Japanese Pharmaceuticals and Medical Devices Agency, etc., and an instance of non-compliance could result in massive financial and social penalties.

Unfortunately, the mention of recalls, warning letters to manufacturers and the legal repercussions of such events have been all too common among industry news. Companies cannot afford downtime among their manufacturing operations or losses in consumer and prescriber confidence and have therefore been reluctant to outsource or streamline certain operations within GMP facilities. However, advancements in facility maintenance technology, coupled with a continued need for cost savings, have started to shift the industry's mindset.

Preventative maintenance optimization (PMO) programs are one measure that life sciences companies have started to take to improve efficiencies and compliance. The more effective programs are carefully scoped and tailored to individual building and operational needs. PMO systems have evolved in recent years to address the concerns of the industry, not only from a regulatory compliance standpoint, but also to make them cost-effective for the industry to implement, considering how margins have thinned in recent years. Two of the biggest considerations are to determine the criticality of an asset to the operation of the overall business and to analyze the impact to the business should that asset fail. A site closure can be devastating, particularly if it's the only manufacturing site for a particular product or company operation. Lost production time means lost revenue, shaky consumer confidence and higher scrutiny from regulatory agencies. Understanding and, further, mitigating one's risk through PMO is important for any company to prioritize and safely optimize systems and processes.

Beyond PMO, we are starting to see more life sciences companies more open to having service providers perform work beyond the yellow line and into cGMP space including the management of service contracts, and performance of maintenance and calibration of production equipment. Companies are also starting to outsource projects in manufacturing spaces to service providers that can integrate the facilities maintenance staff with the project engineers to drive a better result than if managed as a separate activity and MRO and Laboratory Supplies are starting to be integrated into the third party service provider so firms can take advantage of lower costs, increased service levels and synergies between MRO storerooms and Laboratory storerooms. All of these initiatives aim to improve efficiencies and control costs, but require a high degree of planning and continuous meticulous execution.

How real is the risk of a skilled technician shortage?

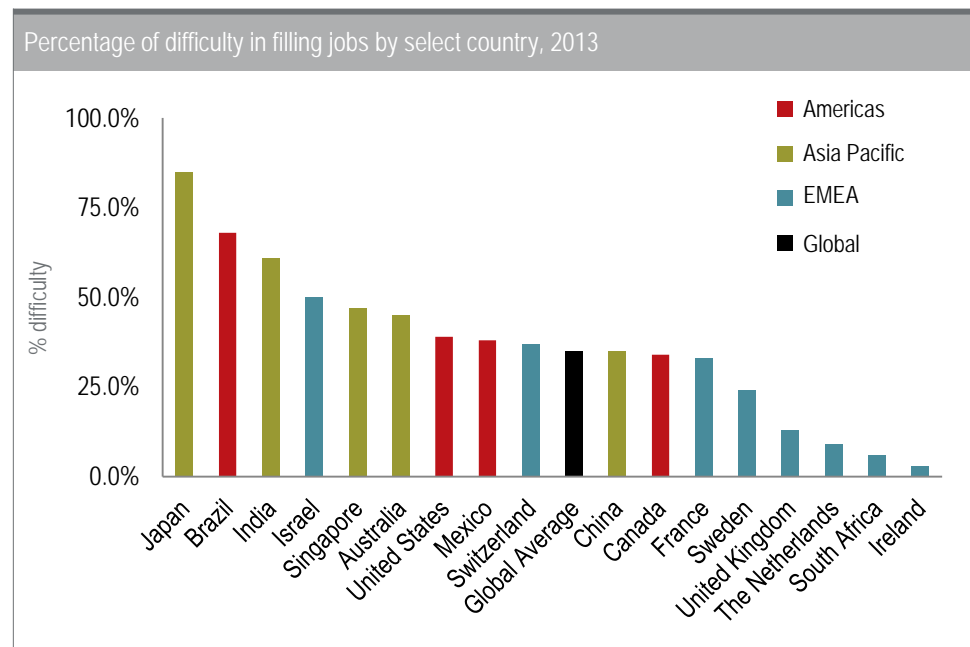
The topic of labor shortages have been fairly common among recent research publications and industry articles, as the event of a shortage poses major threats to industry operations and productivity. Different authors utilize different data to support their viewpoints and thus far the projections have been mixed.

While viewpoints on shortages vary, most reports agree that global demand for science and engineering occupations is projected to grow over the next few years as nations work to maintain or build up their capabilities as knowledge-based economies. Specific to the United States, the Bureau of Labor Statistics is projecting double-digit growth for all science and engineering occupations over the next 10 years. Nearly 1.3 million life scientist jobs are expected to open between 2010 and 2020, representing 23.1 percent growth, while engineering job openings are estimated around 526,000 for the same time period, or 10.6 percent growth. A portion of the projected new job openings are attributed to net replacements as individuals vacate positions due to firings, vacancies or retirement. And in fact, a majority of these net replacements are expected to come from a sizable baby boomer generation retiring from the workforce. According to the National Science Foundation, one in every three scientists and engineers were over age 50 (between 51 and 75 years of age) in 2010, or roughly 33.3 percent of the workforce, and up from 20.0 percent in 1993 and the median age among the S&E labor force has also increased to 44 years in 2010, from 41 years in 1993. Further indicators show that the higher the degree attainment, the older the individual will likely be before

retiring; many doctorate level scientists oftentimes will elect to work part-time or in a reduced capacity, rather than leaving the workforce outright. Lower degree occupations, however, show a sharp increase in retirement level around age 60. Therefore we can assume that many of the projected job opening stemming from the sizable baby boomer retirements will likely be among technicians, skilled trades and engineers.

For the past eight years, the *Talent Shortage Survey* from the ManpowerGroup has reported qualitative data on global staffing needs and pain points. The 2013 survey encompassed 38,000 employers across 42 countries. Globally, roughly 35.0 percent of employers report difficulties in filling jobs due to a lack of available talent. Since 2006 the global average reporting difficulty filling jobs has fluctuated between 30.0 and 40.0 percent; however, individual countries and regions have varied greatly.

Most Asian countries are reporting greater difficulty in filling jobs versus the global average. While China is right on par with the global average at 35.0 percent, it has increased 12.0 percentage points over 2012. Japan and India's reported difficulties in filling jobs are dramatically higher than the global average at 85.0 percent and 61.0 percent, respectively. Japan's percentage of difficulty is the highest its been since reporting began eight years ago, and India is up drastically since 2006 when its reported level of difficulty was only at 12.0 percent. Within the Americas, Brazil reports the highest level of difficulty at 68.0 percent. The United States has reported a decline in reported difficulty for the second year in a row at 39.0 percent and Mexico is close behind at 38.0 percent.



Source: ManpowerGroup *Talent Shortage Survey*, 2013

Canada is up year-over-year but remains just below the global average at 34.0 percent difficulty. As a region, EMEA reports the lowest levels of difficulty in filling jobs with eight countries reporting levels below 20.0 percent. Israel is on the higher end at 50.0 percent. Germany and South Africa reported a decrease in difficulty year-over-year while Switzerland has reported highly variable changes over the past four years, now slightly above the global average at 37.0 percent and up versus 28.0 percent one year prior. France, the United Kingdom, the Netherlands and Ireland are all up year-over-year but remain below the global average.

Beyond country reporting levels, the survey also details which types of jobs are most difficult to fill. The following lists for the various regions solely focus on jobs directly imperative to life sciences product development and facility maintenance as these functions impact critical operating components of the industry.

Top jobs employers are having difficulty filling (select jobs from top 10 lists)			
Global	Americas	Asia Pacific	EMEA
1. Skilled trade workers	1. Technicians	2. Engineers	1. Skilled trade workers
2. Engineers	3. Engineers	3. Technicians	2. Engineers
4. Technicians	4. Skilled trade workers	7. Skilled trade workers	5. Technicians
	5. Production operators	10. Researchers (R&D)	

Source: ManpowerGroup *Talent Shortage Survey*, 2013

As we can see, several jobs critical to the industry are in the top five in each region and globally overall. Among all regions, the top three reasons noted for difficulty in filling these jobs were identical. The first reason reported was lack of technical competencies (hard skills), second was lack of available applicants and lack of experience rounded out the top three reasons.

If these job shortages remain, industry companies will potentially experience rising costs for these trades and professions and in some cases may not be able to get the job done in time and on budget. As the industry builds more sophisticated and complex facilities, the need for higher skilled workers will only exacerbate the existing problem. The National Association of Manufacturers' (NAM) report on this topic states that there seems to be a big disconnect between what all of the studies have said is needed and the training that is actually being conducted. It goes on to state that "the investment in training is inversely proportional to the investment in automation." From a machine manufacturer's point-of-view, this trend has resulted in less preventative maintenance, more emergency breakdowns and lower skilled workers. All extremely ominous trends for companies whose success hinges upon compliance, efficiency and safety.

As we noted earlier, science and engineering degrees have markedly increased in recent years as global countries work to maintain or build up their capabilities as knowledge-based economies. Countries like China in particular has seen dramatic increases in S&E degrees in recent years. This

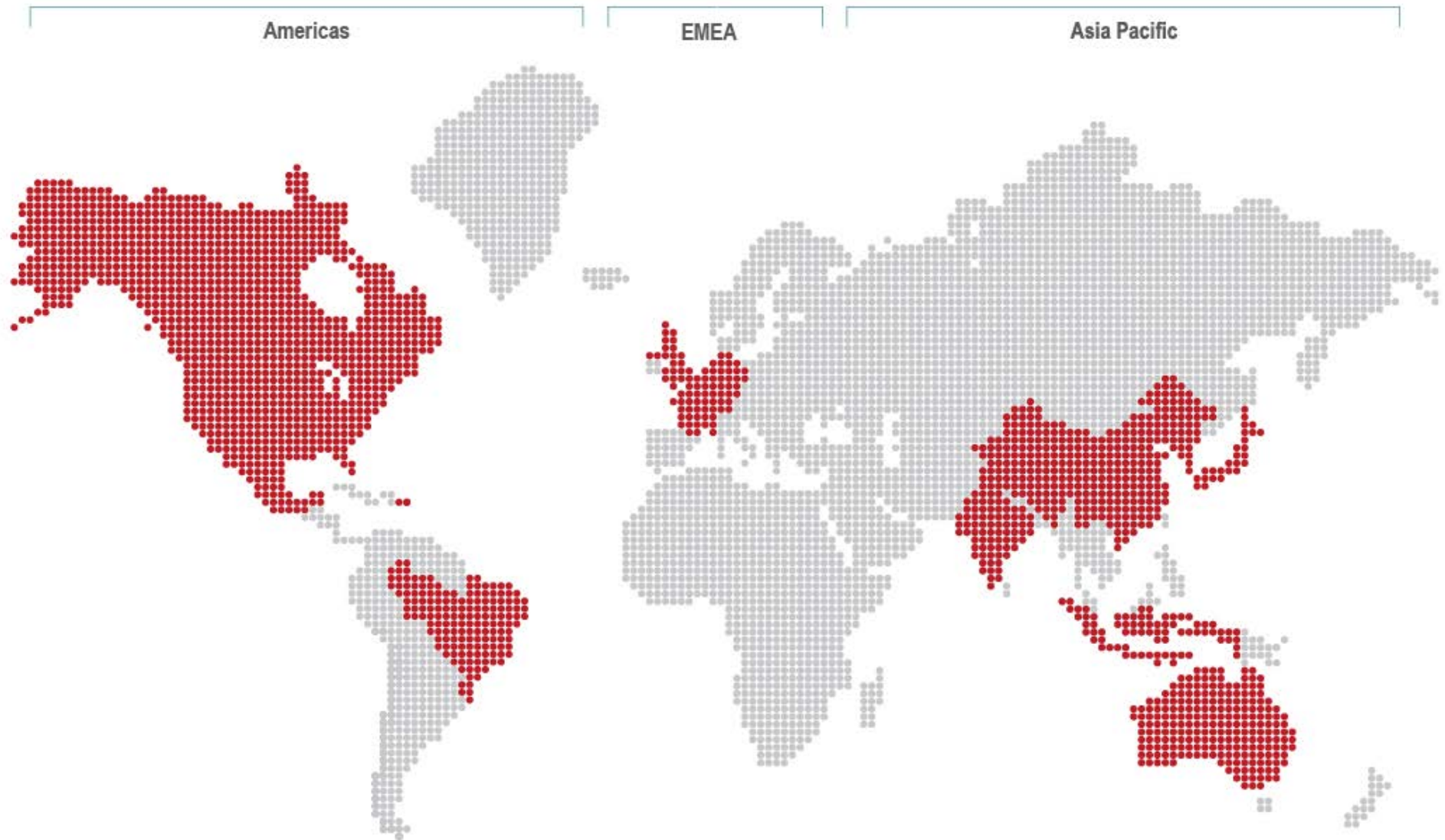
upward trend should help to alleviate some of the current and future shortages in the industry. Overall, the replenished workforce can have both a positive and negative effect. As younger talent enters the workforce, they bring new skills, trades, technical-savviness and energetic blood, leading to increase productivity. Conversely, older talent has irreplaceable knowledge, experience and intuition, and a slight decrease in productivity could be noted as seasoned employees are replaced with novice workers, who require time to learn new systems and skills.

Conclusions

The trends of new S&E degree holders and job shortage reportings should continue to be monitored closely over the next few years. Incentivizing individuals to take on skilled trades will be extremely important to keep new talent entering the workforce. Training centers specific to the industry are also in demand, as the nuances of facility maintenance and regulation compliance are mission critical to company success.

As companies continue to invest in automation, integrated data management and PMO systems, having the right talent in place to manage the systems and the right partners to streamline costs and drive efficiencies will be imperative to preserve margins and focus on critical aspects of the business.

Global life sciences cluster profiles



Americas

The Americas region is unique in that it is comprised of some of the most and least established life sciences clusters across the globe.

While specific cities within the United States and Canada are at various stages of maturity, as a whole the two countries have mature and deep-seated industry presence. Effects of the patent cliff and depleted product pipelines have resulted in right-sizing across the board. Markets with a strong biotechnology and R&D presence are emerging as the new leaders of the industry. Oftentimes these cities tend to be coastal and possess vibrant urban environments that attract the younger generations of the workforce. Universities with highly ranked research programs remain important innovation partners and therefore cities anchored by such institutions also continue to see growth in their biotech industries.

Perhaps the most growth opportunity in the Americas lies in expansion and development of operations in Latin America. Growing middle class populations and ever-increasing access to healthcare have bolstered demand for drugs and treatments. Currently most of the medicines use is in the form of generics, as many countries have established generic manufacturing sites through domestic companies or partnerships with multinationals. However, many governments are focused on growing their knowledge-based economies and are taking measures to improve R&D capabilities at universities and support for small and medium-sized enterprises through incubator centers and targeted funding.

Development of the industry in Latin America is twofold. Improvements to manufacturing practices, regulatory systems and trade agreements are under way in most countries in order to not only grow manufacturing capabilities for domestic use, but also for exportation to other regions. Substantial progress has been made in these areas; however, highly differential laws and employment practices across Latin countries make it difficult to establish regional standards and practices. The biotech industry is very young in the region. Although the various country leads are eager to grow their R&D capacities, limited funds and relatively unstable economic environments prevent the governments from being able to inject funds into the industry at comparable levels to emerging countries from other regions, particularly those in Asia.



United States

Country overview

Life sciences clusters in the United States largely fell into one of two camps during 2013. On the one hand, clusters with a large presence of small start-up and mid-tier biotech and specialty companies flourished, with moderate increases in year-on-year employment and establishments. Conversely, clusters comprised of large headquarter campuses or large manufacturing sites generally experienced declining employment. Effects of the diversification of the industry at large are impacting United States cities in real time.

Across the board a majority of space activity is being driven by small and mid-size companies. Clusters like Boston, Seattle, San Diego and Raleigh-Durham are witnessing lively activity among area tenants. As companies get acquired or move into large spaces, vacancies are filled rather quickly with yet another promising life sciences company. Although markets like New Jersey, Minneapolis and Philadelphia have experienced an influx of space coming to the market as large companies right size and consolidate operations, opportunity exists in parceling off said spaces or redeveloping them into multitenant incubator centers to accommodate the faster growing and more demanding small and mid-size tenants.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	1,412,639	9.4%	N/A
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	8.0%	7.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.8%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	10,324	39.2%	0.6%

Note: Complete R&D employment information not available for the United States. Figures reflect research employment only.

Country outlook

The Greater Boston Area once again tops our list of United States cities on our cluster scorecard. Although the competing Californian cities of San Diego and the San Francisco Bay Area reported higher year-on-year employment growth, Boston's top position in both National Institute of Health and venture capital (VC) funding helped keep it on top. All three cities are expected to lead the United States' life sciences industry in the coming years due to their heavy presence of start-ups and mid-size companies, close ties to leading research institutions, high funding levels and mature VC groups and local economies focused on growing their life sciences industries. For the most part, competition for available space is high in these markets, but new construction and retrofitted lab and office space keep supply levels in flux.

Although the tri-state corridor, namely New Jersey and Philadelphia, has seen overall diminished demand from the industry, strong employment bases and mature industry infrastructure keep these clusters competitive. If these types of clusters can leverage their existing resources with redeveloped space geared toward smaller users, they may be able to continue to compete among the new industry landscape.

United States cluster scorecard definitions & methodology

Life sciences scorecard

Our proprietary life sciences scorecard ranks relevant metro areas along several factors that measure the propensity for new industry growth. Qualitative knowledge of the industry was used to refine the list of clusters. Each cluster is scored against this list and the ranking indicates its position among top life sciences markets.

Life sciences employment concentration

Weighting: 25.0 percent

Measured as the percent of industry employment against total metro private employment. Higher percentages mean the industry has a greater influence on a given metro's economic success. Local policy and economic development groups are behooved to support the industry to keep employment levels high.

Life sciences employment growth

Weighting: 10.0 percent

A broad measure of economic success and job creation.

Life sciences establishments concentration

Weighting: 10.0 percent

Measured as the percent of industry establishments (individual business locations) against total metro private establishments.

Life sciences venture capital funding

Weighting: 20.0 percent

Reports the actual dollars invested during 2013 in life sciences industries. Demonstrates the potential for industry growth through private investment.

Life sciences National Institute of Health funding

Weighting: 20.0 percent

Reports the actual dollars invested during 2013. Measures the potential for industry growth through public investment.

Life sciences patents

Weighting: 15.0 percent

Measures the actual patent approvals awarded by the U.S. Patent and Trademark Office (USPTO) for a given metro area. Demonstrates a cluster's ability to transfer technology into marketable goods.

Cluster	Weighted score	Rank
Greater Boston Area	86.9	1
San Francisco Bay Area	72.4	2
San Diego Metro Area	70.7	3
Raleigh-Durham Metro Area	58.3	4
New Jersey/New York City/Westchester Metro Area	55.4	5
Los Angeles/Orange County Metro Area	51.5	6
Philadelphia Metro Area	50.2	7
Suburban Maryland / Metro DC	47.0	8
Minneapolis – St. Paul Metro Area	44.0	9
Seattle Metro Area	40.4	10
Denver Metro Area	30.4	11
Central & Southern Florida	23.5	12
Chicago Metro Area	18.7	13
Indianapolis Metro Area	12.9	14

United States cluster scorecard

Cluster	Life sciences employment concentration			Life sciences employment growth			Life sciences establishments concentration			Life sciences venture capital funding			National Institute of Health funding			Life sciences patents			Weighting	
	%	Weighted score	Rank	%	Weighted score	Rank	%	Weighted score	Rank	\$ (in millions)	Weighted score	Rank	\$ (in millions)	Weighted score	Rank	#	Weighted score	Rank	Weighted score	Rank
Greater Boston Area	4.5%	20.2	3	1.5%	5.5	3	1.6%	8.2	2	\$1,374.3	20.0	1	\$2,005.4	20.0	1	1,412	13.0	2	86.9	1
San Francisco Bay Area	3.8%	17.6	4	15.2%	10.0	1	0.9%	5.0	7	\$729.1	14.2	2	\$873.0	10.7	6	1,652	15.0	1	72.4	2
San Diego Metro Area	5.8%	25.0	1	2.7%	5.9	2	1.4%	7.3	3	\$640.6	13.4	4	\$785.6	9.8	8	956	9.3	6	70.7	3
Raleigh-Durham Metro Area	4.6%	20.6	2	1.2%	5.4	4	2.0%	10.0	1	\$262.6	9.7	8	\$893.1	10.8	5	303	1.8	13	58.3	4
New Jersey/New York City/Westchester Metro Area	1.8%	7.1	11	-1.2%	3.8	9	0.7%	1.7	12	\$661.1	13.5	3	\$1,648.3	17.0	2	1,325	12.3	3	55.4	5
Los Angeles/Orange County Metro Area	2.5%	12.9	7	-0.1%	5.0	7	0.6%	0.0	13	\$359.3	10.8	6	\$959.7	11.3	4	1,231	11.5	4	51.5	6
Philadelphia Metro Area	2.8%	14.0	6	-1.6%	3.3	12	1.0%	5.5	6	\$245.7	9.1	9	\$809.3	10.1	7	837	8.3	7	50.2	7
Suburban Maryland / Metro DC	2.3%	11.6	8	-4.5%	0.0	14	1.2%	6.4	4	\$407.7	11.2	5	\$989.1	11.6	3	639	6.2	8	47.0	8
Minneapolis - St. Paul Metro Area	3.1%	15.1	5	-1.3%	3.6	10	0.9%	5.0	7	\$174.1	6.4	10	\$297.8	2.8	13	1,180	11.1	5	44.0	9
Seattle Metro Area	2.0%	8.9	10	-1.3%	3.6	10	0.9%	5.0	7	\$275.7	10.0	7	\$773.8	9.6	9	411	3.2	11	40.4	10
Denver Metro Area	2.2%	10.7	9	-0.1%	5.0	7	1.1%	5.9	5	\$99.3	3.6	13	\$312.9	3.0	11	335	2.2	12	30.4	11
Central & Southern Florida	1.4%	3.6	13	0.1%	5.1	6	0.8%	3.3	10	\$133.1	4.9	11	\$304.4	2.9	12	456	3.8	10	23.5	12
Chicago Metro Area	1.0%	0.0	14	-2.8%	1.9	13	0.6%	0.0	13	\$110.0	4.0	12	\$682.7	8.3	10	505	4.4	9	18.7	13
Indianapolis Metro Area	1.5%	4.5	12	0.2%	5.1	5	0.8%	3.3	10	\$3.1	0.0	14	\$106.7	0.0	14	170	0.0	14	12.9	14

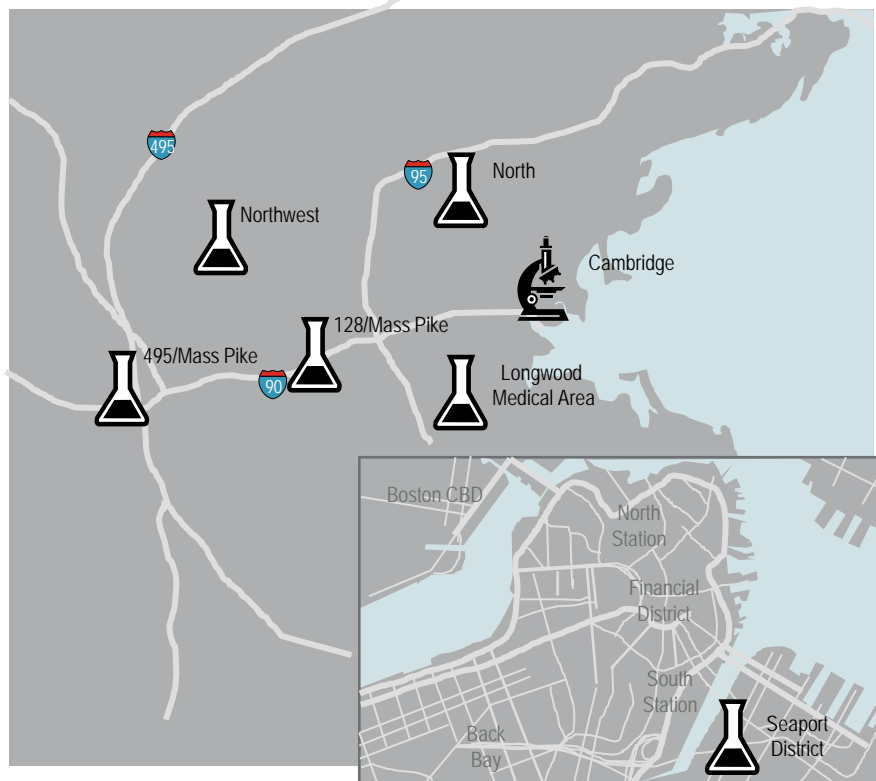
Greater Boston Area



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth

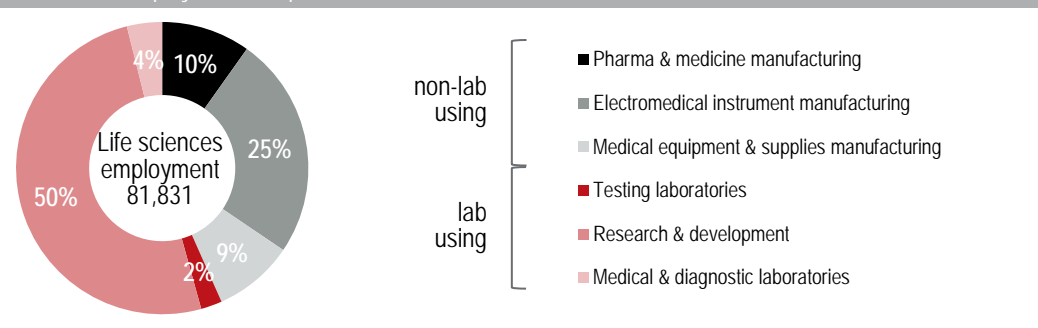


Economic scorecard

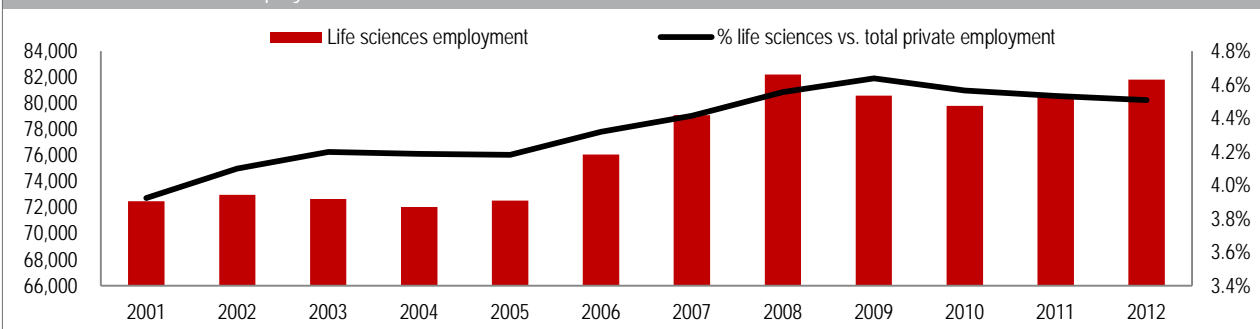
Cluster score:
86.9

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	81,831	4.5%	1.5%
Establishments	1,875	1.6%	0.3%
Funding	Total life sciences	% to total U.S.	
VC funding	\$1,374.3M	16.2%	
NIH funding	\$2,005.4M	9.0%	
Innovation	Total life sciences	% to all patent classes	
Patents	1,412	31.1%	

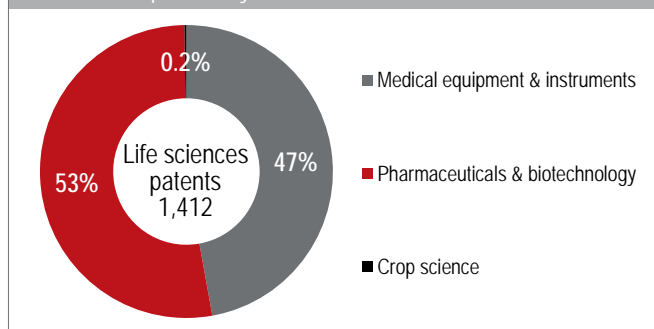
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Cambridge

Cambridge overview

The city of Cambridge acts as a global anchor for the life sciences industry, making it one of the most competitive and resilient markets in the nation. Cambridge maintains a true advantage as it is home to major academic institutions, centers of excellence, venture capital firms, start-ups and mature corporations—all within minutes of each other.

East Cambridge

East Cambridge is home to 87.4 percent of the city's lab space. The submarket had a strong year, recording nearly 800,000 square feet of positive absorption. Over 850,000 square feet of new lab development delivered in the second half of 2013, all of which is fully leased or committed today. With another 1.8 million square feet under construction, the East Cambridge lab and office supply levels will soon be equal—a historical first.

Today, the East Cambridge vacancy rate sits at a cyclical low 7.0 percent, but the availability rate remains at 18.3 percent which is a difference of over 830,000 square feet. What is the cause for this discrepancy? Over the last six quarters, a large influx of future available and sublease options have come to market, comprised primarily of second generation lab space formerly occupied by Vertex and Aveo Pharmaceuticals. So where does demand for this space come from in the near term? Today, there are 44 active Cambridge requirements totaling 1.7 million square feet. The majority of tenants require 10,000 to 30,000 square feet, but are also looking to grow from their existing footprint.

Despite these new options, Class A space is in high demand and tenants are paying premium rents—up to \$60.00 per square foot NNN for new lab space. Recent Class A signings include Novartis and MIT expansions in Technology Square. Moderna Therapeutics expanded into an additional 44,041 square feet at 320 Bent Street, having signed for 43,734 square feet earlier this year at 200 Technology Square. 24M Technologies committed to 36,315 square feet at 130 Brookline Avenue, an office-to-lab conversion in Cambridgeport which is now 70.6 percent leased.

Very few lab buildings have traded in this cycle thus far, however, three major lab buildings have sold in recent months—150 Second Street (123,210 square feet), 245 First Street (296,493 square feet) and One Kendall Square (668,916 square feet)—for a total of \$682.1 million.

West Cambridge

West Cambridge acts as an extension of the East Cambridge life sciences sector and continues to develop its own identity. The area boasts more of a suburban, campus-like feel, compared to the urban East Cambridge.

Today, there is plenty of leasable lab space in West Cambridge as Pfizer sold its three-building portfolio and is consolidating to East Cambridge. Two of the properties are located in West Cambridge—200 and 87 Cambridge Park Drive. This brings over 300,000 square feet of lab product to the market, almost doubling the leasable lab availability in West Cambridge. As West Cambridge continues to form a cohesive identity, the submarket will see greater tenant demand and stronger market fundamentals.

Facilities scorecard

Supply	East Cambridge Major lab	West Cambridge Emerging lab
Rentable lab stock (% of total stock)	7.42M s.f. 81.6%	0.67M s.f. 94.1%
Direct vacancy (Change year-over-year)	7.4% (4.1) ppts	47.1% 43.50 ppts
# of large blocks over 100,000 s.f.	9	2
Under construction (s.f.)	1.6M s.f.	0
Demand		
# of requirements	44	3
Total s.f. requirements	1.71M s.f.	0.12M s.f.
Pricing		
Average asking rent (NNN) (Change year-over-year)	\$51.10 p.s.f. (0.9)%	\$44.13 p.s.f. 55.1%

MODERNA THERAPEUTICS

320 Bent Street
East Cambridge
44,041 s.f.
Term: 6 years

150 SECOND STREET

East Cambridge
123,210 s.f.
Class A
\$94.5M / \$767 p.s.f.

VERTEX SPACE (across 5 properties)

East Cambridge
490,000 s.f.
Class A and B
Sublease and Direct options

ONE KENDALL SQUARE

East Cambridge
668,916 s.f.
Class A and B
\$395.0M / \$591 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Suburbs

Suburbs overview

Developers and tenants alike have recognized that the suburbs provide an important value option. As Cambridge presents an inefficient and undesirable supply of second and third generation laboratories, the suburbs provide a sound alternative where developers are delivering office-to-lab conversions as well as ground-up construction.

128/Mass Pike

The majority of lab space within the 128/Mass Pike submarket sits in Watertown (324,000 square feet) and Waltham (746,000 square feet). Watertown acts as an extension of West Cambridge, where today the average asking rent is \$27.67 per square foot NNN (a 37.3 percent price discount to West Cambridge). Although technically a suburb, Watertown's existing infrastructure and strong accessibility has allowed a lab market to develop in the Arsenal area. Waltham is home to both mid-tier and global organizations, attracting firms to amenities and access provided by Route 128. Most recently, IntelligentMDx relocated to 26,500 square feet at 285 Bear Hill Road and Immunogen expanded by 18,600 square feet at 830 Winter Street. The Waltham average asking rent is slightly lower than its Watertown counterpart at \$23.86 per square foot NNN.

Northwest

The Lexington/Bedford area is arguably the most active life sciences market in the suburbs, where Route 2 provides direct access into the city of Cambridge. With an average asking rent of \$27.55 per square foot NNN, it is the most expensive submarket in the suburbs. In fact, asking rents have grown a respectable 8.7 percent over the year. The Northwest market continues to attract firms from Cambridge but is also home to relocations from other areas of the suburbs as well as organic growth. Uniqure has opened up shop at 113 Hartwell Avenue in Lexington, signing for 53,400 square feet in a 10.5-year lease. GI Dynamics is relocating and expanding from One Maguire Road into 33,000 square feet at 25 Hartwell Avenue. Synageva will have a new headquarters, having signed for 51,556 square feet at 33 Hayden Avenue in Lexington.

Lexington and Bedford present a number of mid-size options (10 spaces available from 25,000 to 75,000 square feet) for stable and growing tenants. As a result, mid-sized lab tenants looking for space in East Cambridge may consider looking up Route 2 for options to accommodate their size range.

North

Demand is spilling out of Lexington and Bedford into Woburn and Beverly, where Cummings Properties has developed a critical mass of lab supply. Asking rents in this market are significantly discounted at \$18.56 per square foot NNN. However, rents do vary across the market where in Woburn the average is \$24.59 NNN and in Beverly it is \$12.00 NNN given the quality of product.

Facilities scorecard

Supply	128/Mass Pike Emerging lab	Northwest Emerging lab	North Emerging lab
Rentable lab stock (% of total stock)	1.07M s.f. 59.6%	1.89M s.f. 56.8%	3.73M s.f. 100%
Direct vacancy (Change year-over-year)	17.3% 7.3 ppts	20.1% (2.1) ppts	10.0% 1.2 ppts
# of large blocks over 100,000 s.f.	0	0	1
Under construction (s.f.)	0	0	0
Demand			
# of requirements	4	18	1
Total s.f. requirements	0.15M s.f.	0.33M s.f.	0.12M s.f.
Pricing			
Average asking rent (NNN) (Change year-over-year)	\$24.24 p.s.f. 0.2%	\$27.55 p.s.f. 8.4%	\$18.56 p.s.f. 2.3%

UNIQUIRE

113 Hartwell Avenue, Lexington
Northwest
53,400 s.f.
Term: 10 years, 6 months

SYNAGEVA

33 Hayden Avenue, Lexington
Northwest
51,566 s.f.
Term: 6 years, 5 months

IMMUNOGEN

830 Winter Street, Waltham
128/Mass Pike
18,600 s.f.
Term: 6 years, 5 months

INTELLIGENT MDX

285 Bear Hill Road, Waltham
128/Mass Pike
26,500 s.f.
Term: 7 years

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Boston CBD

CBD overview

While the suburbs have provided an alternative price point for the incredibly tight Cambridge market, a number of life sciences firms have perused the city for build-to-suit opportunities or possible office-to-lab conversions. Given its prime urban location, the CBD continues to increase its efforts to attract more and more life sciences tenants.

Seaport District

Many users are being drawn to the Seaport District due to its proximity to downtown and the rental savings to be found in contrast to surrounding hubs such as Cambridge. The Seaport is the only CBD submarket with a significant landscape poised for future development. Vertex was the first big pharma name to sign here and the company moved to its new headquarters of 1.1 million square feet at 50 Northern Avenue and 11 Fan Pier Boulevard in the Seaport this spring. The two buildings sit at the heart of the 21-acre Fan Pier master plan development that includes a park, marina and eight buildings with office space, retail space, residences and hotel rooms. The two lab buildings recently traded to Senior Housing Properties Trust at over \$1,000 per square foot, a high watermark for the area. With Vertex finally rooted in the Seaport, more life sciences tenants may gravitate to the area in the coming years. Other leasable lab space exists at 27 Drydock Avenue (280,562 square feet, fully leased) and 13,000 square feet at Seaport Center.

Longwood Medical

Three miles southwest of downtown Boston, the Longwood Medical and Academic Area (LMA) is a world renowned medical and research community. The 215-acre site is mainly dominated by the healthcare industry, but as a result, has attracted a number of pharmaceutical and lab-using companies to the area. While the LMA is home to an existing 18.1 million square feet, the majority of buildings are institutionally owned and there is limited commercial lab space available in this market. Today, only one building exists with leasable lab space: The Center for Life Sciences at 3 Blackfan Circle. The 18-story, 794,000-square-foot building is 99.0 percent leased.

To alleviate the excess demand for leasable lab space in this area, further construction is under way. Longwood Center is being developed by a joint venture comprising Alexandria Real Estate Equities, Charles River Realty Investors, Clarion Partners and National Development. The state-of-the-art research facility is planned to be 414,000 square feet of laboratory, office and clinical space, where Dana-Farber has committed to 154,100 square feet on three floors of the nine-story building with rents between \$80.00 and \$90.00 per square foot NNN.

As for additional construction, Brigham & Women's Hospital is building a 360,000-square-foot medical research building on Emmanuel College's campus. This development would be a part of Emmanuel's "Endowment Campus" (approximately five acres), which is already home to Merck's Longwood Research Facility (466,000 square feet). Similarly, the privately owned Winsor School has also received approval to build a 300,000-square-foot lab facility on the Phase II portion of its endowment campus. These academic institutions can benefit from this endowment campus model, while also helping to alleviate the incredibly tight supply in the LMA.

Facilities scorecard

Supply	Seaport District Emerging lab	Longwood Medical Emerging lab
Rentable lab stock (% of total stock)	1.39M s.f. 100%	1.05M s.f. 67%
Direct vacancy	0.0%	1.1%
# of large blocks over 100,000 s.f.	0	0
Under construction (s.f.)	0	414,000
Pricing		
Average asking rent (NNN)	n/a	\$90.00 p.s.f.

LONGWOOD CENTER

Longwood Medical Area
414,000 s.f.
ARE, Charles River Realty, Clarion
Partners and National Development
Expected delivery: Year end 2014

BUILDING FOR THE FUTURE

(60 FERNWOOD ROAD)
Longwood Medical Area
358,670 s.f.
Brigham and Women's Hospital
Expected delivery: 2016

50 Northern Avenue and 11 Fan Pier
Seaport District
1,100,000 s.f.
Class A
\$1.125B / \$1,022 p.s.f.

DANA FARBER
Longwood Center
Longwood Medical Area
154,100 s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Chicago Metro Area



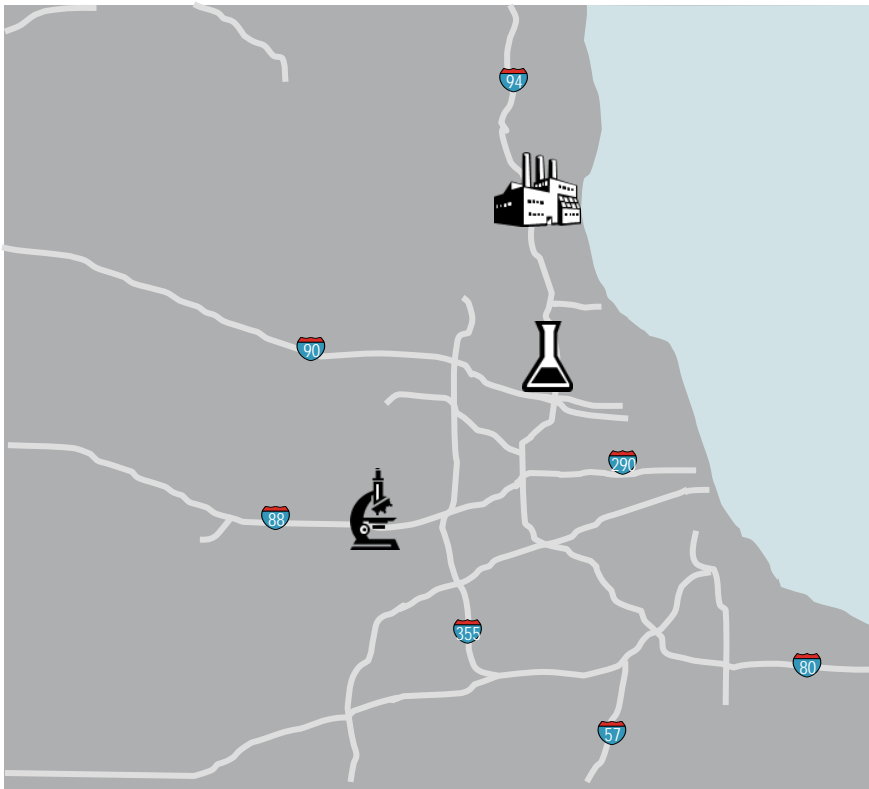
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

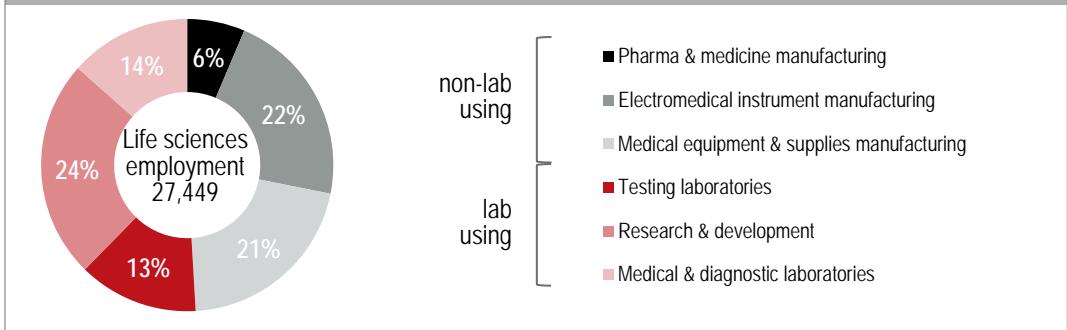
Cluster score:
18.7

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	27,449	1.0%	-2.8%
Establishments	1,227	0.6%	1.0%

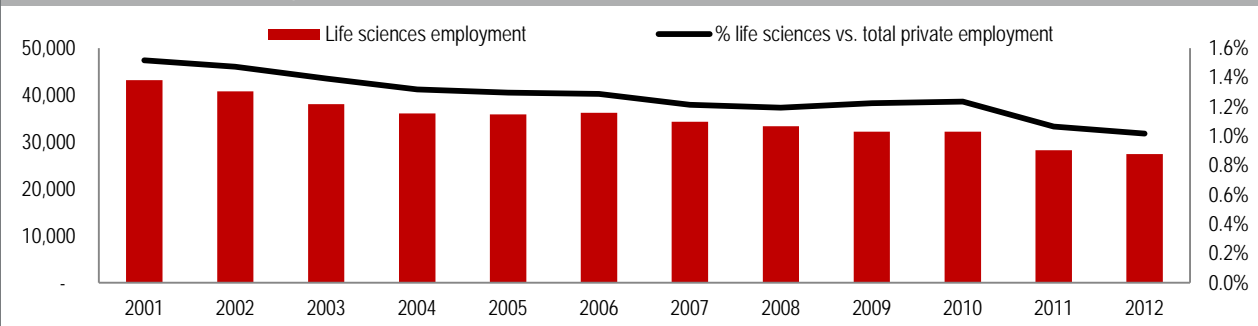
Funding	Total life sciences	% to total U.S.
VC funding	\$110.0M	1.3%
NIH funding	\$682.7M	3.1%

Innovation	Total life sciences	% to all patent classes
Patents	505	16.7%

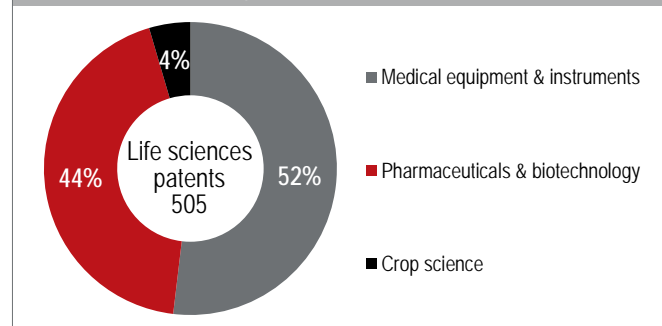
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Chicago Metro Area

Metro overview

Much of the life sciences industry in the Chicago region is dominated by publicly traded multinationals and the federal government. Several large corporate occupiers call the Chicago region home including Baxter International, Abbott Labs and CVS. The federal government also has a large presence in the area with two research sites in the region. Numerous hospitals in the area include Rush Medical, University of Chicago and Northwestern which provide excellent testing grounds for innovative research. The majority of the companies and agencies in this sector occupy owned facilities in suburban campus enclaves. The impact on the local leasing market is minimal with the exception of spinoffs, temporary expansions and overflow space.

Lake County

There are more than 100 biotechnology / pharmaceutical companies in Lake County, including 10 corporate headquarters. These firms employ more than 19,000 people, nearly 6.3 percent of the Lake County workforce. Lake County is home to five full-service hospitals, averaging 228 beds each, as well as to five ambulatory surgical centers.

Healthcare-related entities account for 3.0 percent of the businesses in Lake County. Lake County also has a strong presence from precision manufacturing and medical instruments firms. This targeted industry includes more than 460 companies in Lake County, including more than 50 corporate headquarters.

North Cook

Evanston is home to Northwestern University, which has a top-tier teaching and research hospital and the city is home to both Illinois Institute of Technology and University of Illinois at Chicago. While financial pressures are mounting for both healthy and underperforming hospitals, leaders may look to outsource many support operations such as sampling and diagnostics as well as pharmacy services, which opens up the door for small businesses to provide ancillary services.

Eastern East-West/I-88

The Lisle, Naperville and Aurora areas are some of the premier office submarkets in the western Chicago suburbs. The population and highway access and visibility make this an attractive office location for corporate occupiers. While this is not a major life sciences cluster, it is worth noting that the Argonne National Laboratory is in Woodridge and Fermi National Accelerator Laboratory is in Batavia. These two institutions draw a strong cluster of highly educated and well paid government scientists and staff that attract services and other related businesses.

Facilities scorecard

Supply	Chicago Metro Major lab
Rentable lab stock	1.5M s.f.
Direct vacancy (Change year-over-year)	15.0% -30 bps
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	0
Pricing	
Average asking rent (NNN)	\$10.75 p.s.f.

8025 & 8045 LAMON AVENUE
North Cook
290,000 s.f.
Class A Flex

2359 DIEHL ROAD
I-88
90,000 s.f.
Class B Flex
Direct

Activity key:

Leasing

Sales

Under construction

Large blocks of space

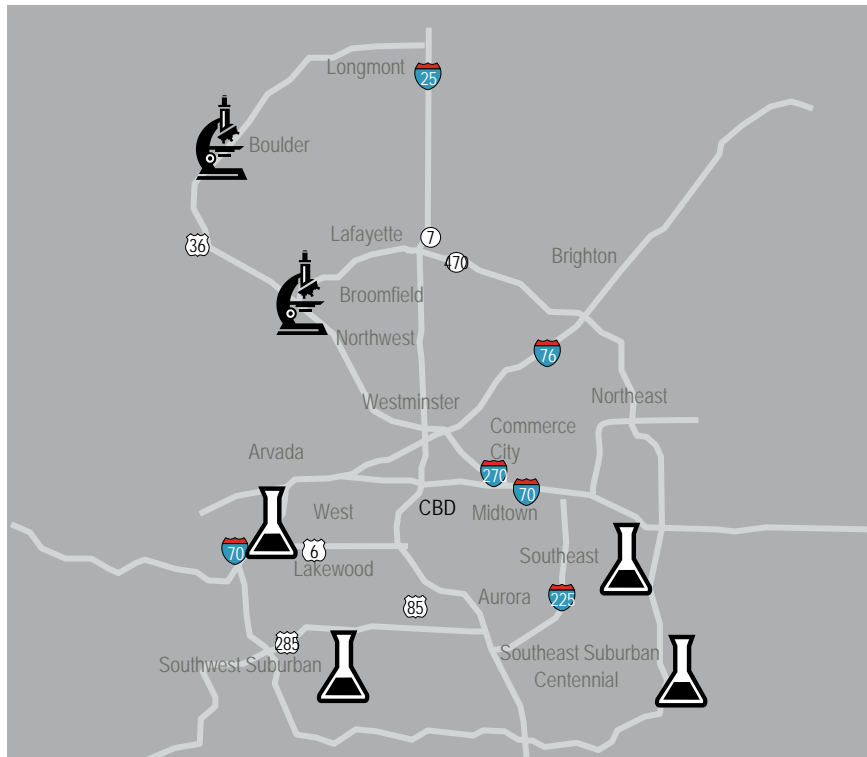
Denver Metro Area



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Economic scorecard

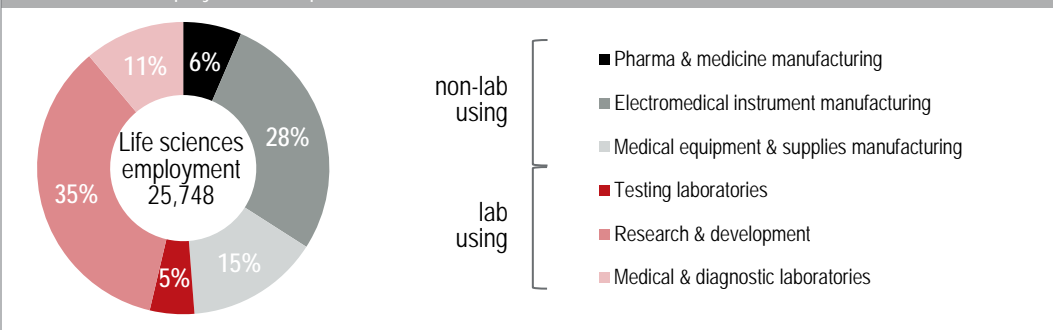
Cluster score:
30.4

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	25,748	2.2%	-0.1%
Establishments	1,076	1.1%	1.9%

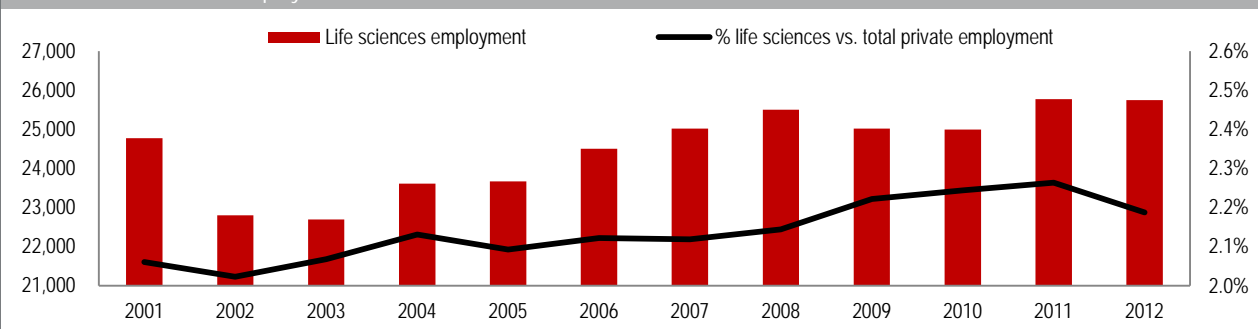
Funding	Total life sciences	% to total U.S.
VC funding	\$99.3M	1.2%
NIH funding	\$312.9M	1.4%

Innovation	Total life sciences	% to all patent classes
Patents	335	20.6%

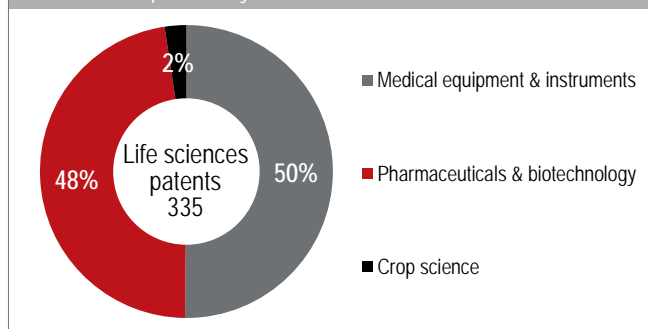
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Denver Metro Area

Metro overview

The Denver market provides an important option for tenants finding space and pricing constraints in other biotech markets as there is available space throughout the market from the northwest to the southeast. The Denver area has a limited supply of existing lab space; however, a number of life sciences firms have toured the market for possible office-to-lab conversions as well as flex space that is able to support required infrastructure.

Boulder/Northwest

The Boulder and Northwest submarkets are home to 51.9 percent of the market's lab space and are considered the main life sciences clusters in the Denver market. Space in these submarkets is comprised primarily of second generation lab space and flex/office-to-lab conversion space. The majority of tenant requirements in this area are smaller and fall in the 5,000 to 15,000 square foot range.

The submarkets recorded negative 69,783 square feet of net absorption during 2013; however, as leasing activity has been dynamic recently, it is expected that this number will increase dramatically in 2014. Vacancy currently sits at 21.9 percent in the submarkets, but as transactions inked over the past quarter occupy, we will see that number go down. Rental rates currently sit at \$14.57 per square foot NNN, a number that has increased 3.9 percent over the last year. As vacancy falls over the near term, we will begin to see a shift to landlord-favorable conditions.

West/Southwest Suburban

The West and Southwest Suburban submarkets are home to 35.5 percent of the market's lab space. Space in these submarkets tends to be both second generation lab space and flex/office-to-lab conversion space. Tenant requirements in these submarkets are smaller in size and typically range from 2,500 to 10,000 square feet.

The submarkets recorded positive 22,143 square feet of net absorption during 2013; however, vacancy in these submarkets is high, currently at 35.4 percent. Activity is lagging, but with plentiful supply, this is expected to increase in the coming quarters. Currently, no plans are in place to develop new lab space in the area. Rental rates in the submarkets are currently \$12.54 per square foot NNN, a dramatic 14.1 percent increase from the previous year. This is due to landlords having the leverage to achieve higher rates as supply is limited.

Southeast/Southeast Suburban

The Southeast and Southeast Suburban submarkets are home to 12.6 percent of the market's lab space. The submarkets recorded negative 12,305 square feet of net absorption during 2013. Likewise, vacancy still remains high at 30.6 percent. Although these submarkets are not the most active within the life sciences industry, the area is home to Fitzsimons Life Science campus where many start-ups are able to use shared creative and incubator space while in growth mode. Rental rates in these submarkets are currently at \$9.75 per square foot NNN, a 5.7 percent decrease year-over-year. With higher vacancy and lackluster leasing activity, tenants have retained leverage in these submarkets. No new development is expected until much of the vacant space is absorbed.

Facilities scorecard

Supply	Boulder/NW Major lab	West/SWS Emerging lab	SE/SES Emerging lab
Rentable lab stock (% of total stock)	1.8M s.f. 51.9%	1.3M s.f. 35.5%	0.4M s.f. 12.6%
Direct vacancy	21.9%	35.4%	30.6%
# of large blocks over 100,000 s.f.	0	0	0
Under construction (s.f.)	0	0	0
Pricing			
Average asking rent (NNN)	\$14.57 p.s.f.	\$12.54 p.s.f.	\$9.75 p.s.f.

MIRAGEN THERAPEUTICS

4909 Nautilus Court N
Boulder
4,973 s.f.
Term: 25 months

325 & 350 INTERLOCKEN / 100 TECHNOLOGY DRIVE

Northwest
156,224 s.f. / 6 buildings
Class B
\$11,960,000 / \$76.56 p.s.f.

AGILENT TECHNOLOGIES

555 Airport Boulevard
Boulder
56,000 s.f.
Term: 120 months

385 INTERLOCKEN CRESCENT

Northwest
98,757 s.f.
Class A
Direct

Activity key:

Leasing

Sales

Under construction

Large blocks of space

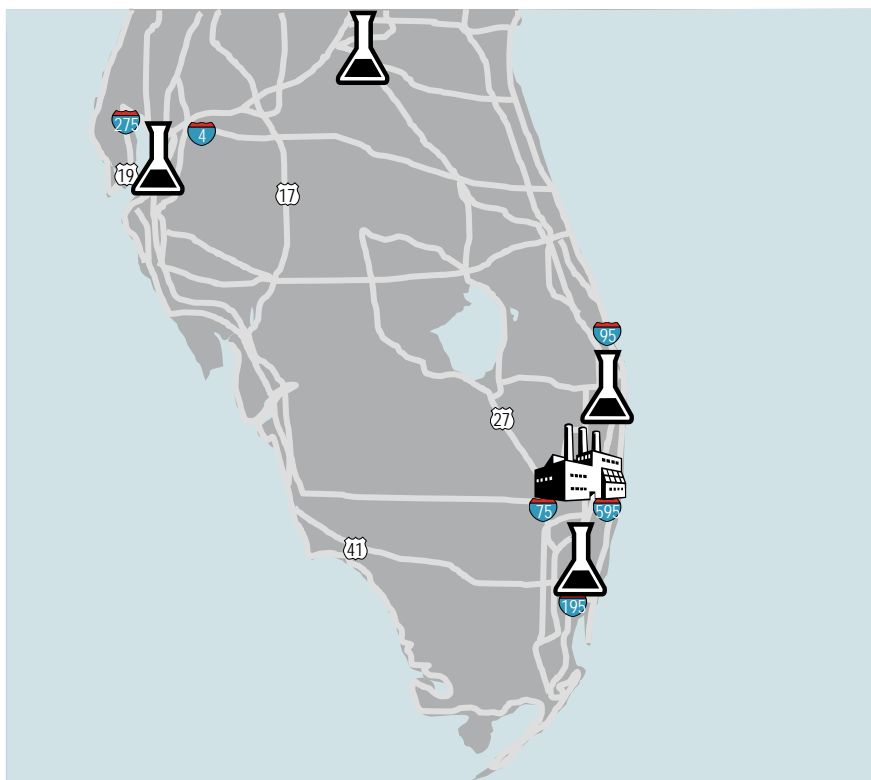
Central & Southern Florida



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

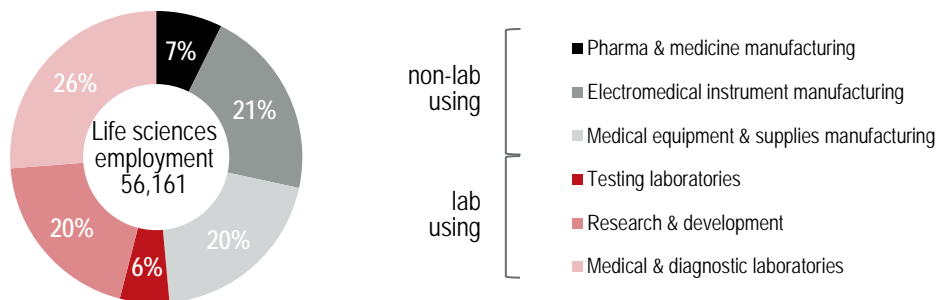
Cluster score:
23.5

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	56,161	1.4%	0.1%
Establishments	2,981	0.8%	3.1%

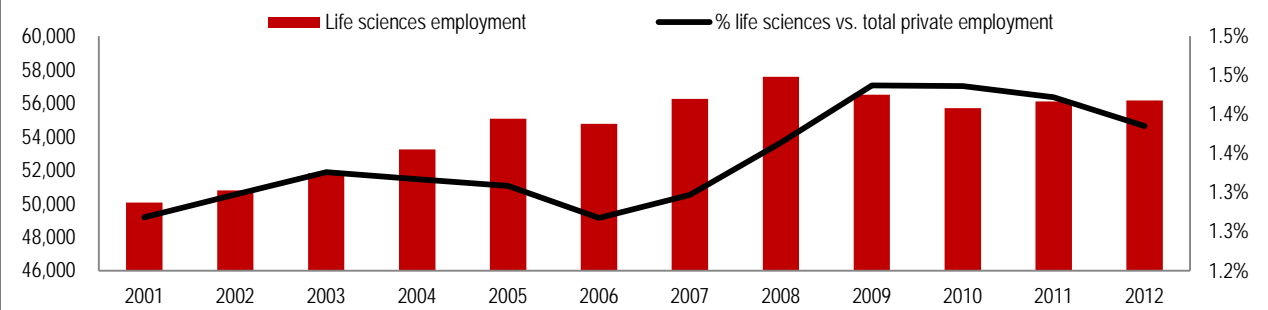
Funding	Total life sciences	% to total U.S.
VC funding	\$133.1M	1.6%
NIH funding	\$304.4M	1.4%

Innovation	Total life sciences	% to all patent classes
Patents	456	21.1%

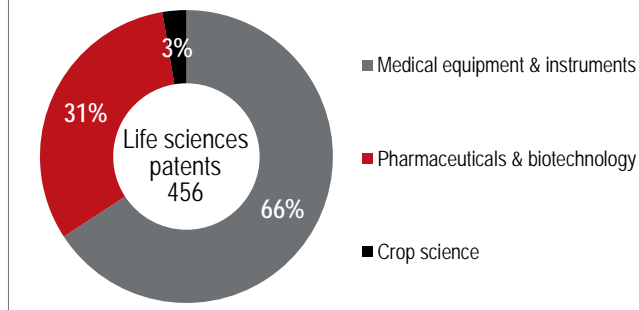
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Central & South Florida

Fostered by legislative priorities to locally grow the industry and principally driven by Florida's world class research universities, Florida's life sciences industry has experienced significant growth and continues contributing to overall economic gains. Historically, the majority of industry growth and research achievements have been the result of public/nonprofit institutions, such as Scripps Research Institute in Jupiter, the Moffett Center in Tampa and the Sanford-Burnham Research institute in Orlando, which laid a life sciences infrastructure framework to service as a catalyst for future investment. On the coattails of these institutions, Florida has begun to see advances in private sector investments over the previous two to three years. Although the industry impacts on the real estate sector remain minimal, particularly in terms of leasable lab space, there has been increased activity among medical device and pharmaceutical manufacturers within industrial space throughout the state.

The state of Florida has increasingly focused economic development goals on the state's emerging life sciences industry, and those efforts began to pay off over the previous 12 months, particularly in South Florida. For example, Apotex Corporation, a Canadian pharmaceutical manufacturer, agreed to remain in Broward County and is planning to purchase a 245,000-square-foot facility after receiving nearly \$1.4 million in state and local incentives. Apotex is rolling out a new product and therefore will be expanding in Coral Springs once they receive FDA approval. Similarly, Unipharma, a Venezuelan pharmaceutical manufacturer, purchased a 135,000-square-foot facility in Broward County to house their U.S. operations and NIPRO Diagnostics, which received state funding when they entered the market in 2007, is expanding their operations within South Florida with their lease of 86,000 square feet in Medley, Florida. In Central Florida, medical device manufacturer Covidien recently signed a new lease for 62,200 square feet just outside of Tampa. In total, excluding NIPRO, these companies received over \$2.5 million in economic incentives from state and local governments.

As mentioned above, while Florida's laboratory and research facilities are primarily associated with public or nonprofit institutions and universities, the state is beginning to see more private investment in leasable laboratory space for private companies doing medical research. The emergence of the University of Miami Life Science and Technology Park, developed privately by Wexford Science + Technology, is a prime example. Delivered in late 2011, the building has 20,000 square feet of pure laboratory space, with the ability to renovate an additional 39,000 square feet for laboratory uses. In just over three years the property is nearly 80.0 percent occupied with life sciences tenants such as Advanced Pharma. Within the facility is the Miami Innovation Center, a co-working facility with 23 biology and chemistry laboratories available for short-term leases. As a result of increased demand, new laboratory space is being constructed throughout the state for private use. Most recently, Nova Southeastern University broke ground on a 215,000-square-foot collaborative research center in Broward County, which will include 60,000 square feet of lab space to be made available for lease to private enterprise. In Orlando's 650-acre Lake Nona Medical City, ground is set to break on a new 90,000-square-foot facility to house life sciences incubators and lab space. The project is being spearheaded by the private investment firm Tavistock Group.

While the life sciences industry has yet to significantly move the needle on commercial real estate, the research infrastructure set in place since 2000 is leading the way for private companies to migrate to this emerging life sciences hub.

Facilities scorecard

Supply

Central & South Florida
Major lab

Rentable lab stock
(% of total stock) **58.6%**
1.7M s.f.

Direct vacancy **9.4%**

of large blocks over 100,000 s.f. **0**

Under construction (s.f.) **356,650**

Pricing

Average asking rent (NNN) **\$22.50 p.s.f.**

NIPRO Diagnostics
10800 NW 106th Street
Medley
86,000 s.f. expansion
66 months

10200 NORTHWEST 67th STREET
West Broward
135,000 s.f.
Class B
\$9.7M / \$71.85 p.s.f.

NOVA SOUTHEASTERN UNIVERSITY
Central Broward
215,000 s.f. (60,000 s.f. of lab space)
Developer: Nova Southeastern University
Expected delivery: 2016

LAKE NONA MEDICAL CITY
Southeast Orange
90,000 s.f.
Developer: Tavistock Group
Expected delivery: 2016

Activity key:

Leasing

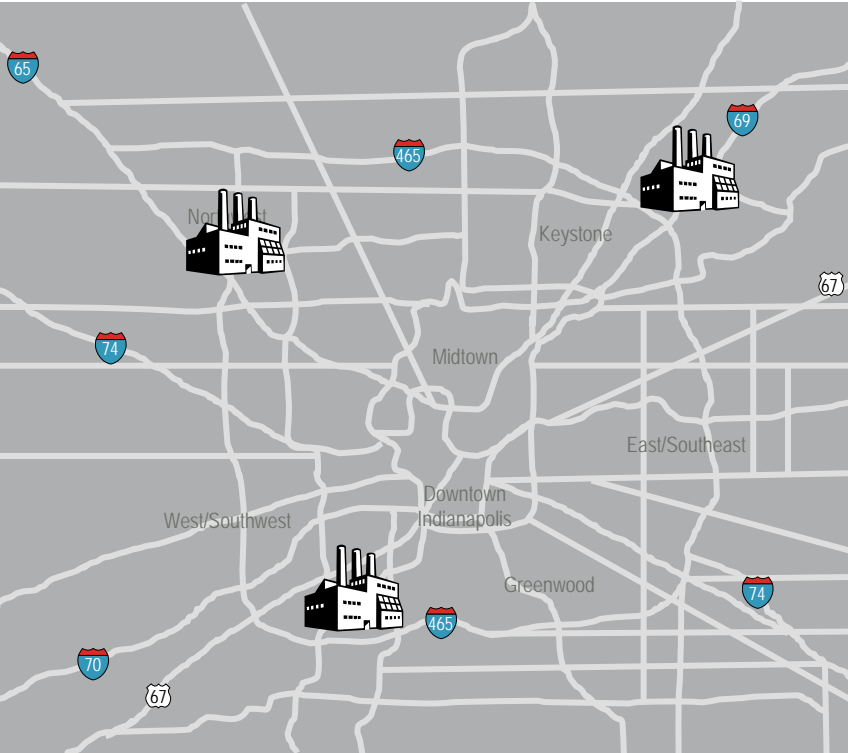
Sales

Under construction

Large blocks of space

Indianapolis Metro Area

Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



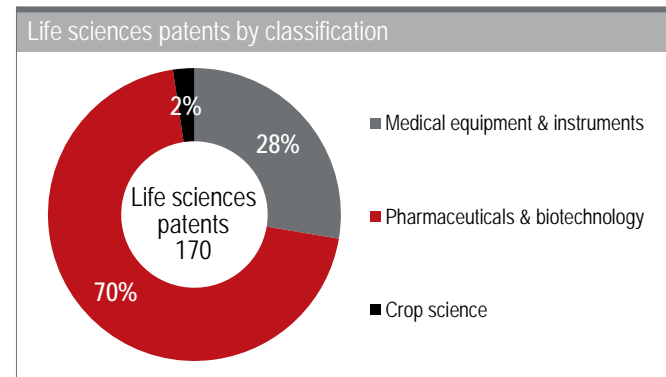
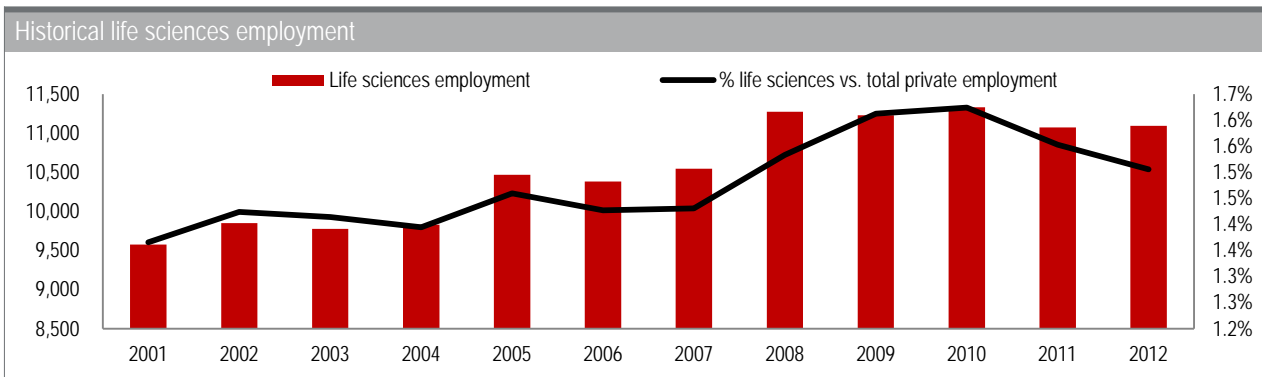
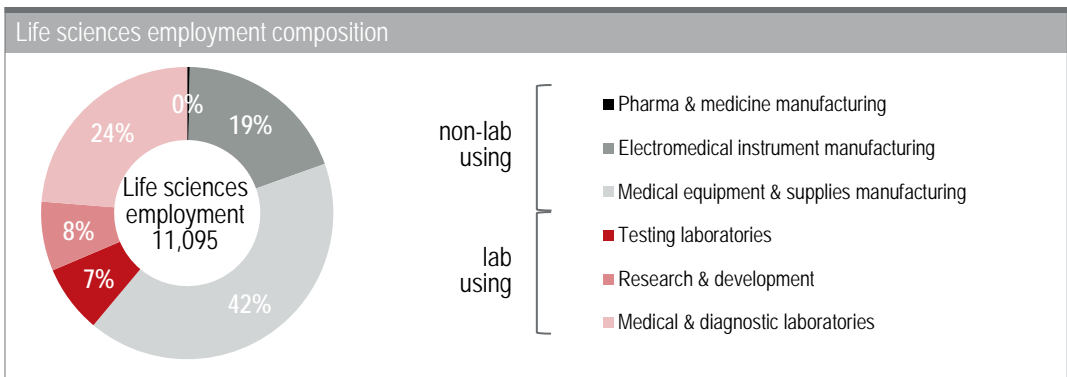
Economic scorecard

Cluster score: 12.9

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	11,095	1.5%	0.2%
Establishments	354	0.8%	-1.7%

Funding	Total life sciences	% to total U.S.
VC funding	\$3.1M	0.0%
NIH funding	\$106.7M	0.5%

Innovation	Total life sciences	% to all patent classes
Patents	170	34.2%



Indianapolis Metro Area

Metro overview

The Indianapolis-Carmel MSA is an expanding life sciences market led by its footprint in pharmaceuticals. Many *Fortune 500* companies such as Eli Lilly and Dow AgroSciences are headquartered in the Indianapolis area. Additionally, Roche, the world's second largest pharmaceutical company by sales, has its North American headquarters in Indianapolis. Since a majority of life sciences facilities are owner occupied, lab supply is difficult to quantify. Research and development at the university level is also growing. IUPUI, IU Health and other university research facilities in the area have been increasing production. For example, Indianapolis' research facilities have increased patent filings and patent issuances by 49.0 and 97.0 percent, respectively, over the last five years.

The life sciences industry is also integral to the state as a whole. It employs 56,000 workers and more than 21.0 percent of Indiana's economic output is tied to life sciences, adding \$55.0 billion to the state's overall economy. Moreover, Indiana is the second largest exporter in the U.S. life science goods, a noticeable growth rate as Indiana was ranked seventh in this category just five years ago.

BioCrossroads has been an integral part of this growth. It is a venture capital initiative between Indiana's universities, its government and major companies in the state that is designed to establish Indiana as a life sciences hub. This partnership has supported the life sciences industry to the tune of \$330.0 million over the last 10 years.

CBD

The CBD submarket is home to some Indianapolis' premier office property, such as Chase Tower and 220 N Meridian. It is also home to Eli Lilly and Company, one of the world's leading pharmaceutical companies and the 11th largest employer in the state. Its 111-acre campus, the Lilly Corporate Center, in downtown Indianapolis consists of 58 buildings and hosts thousands of employees. Researchers at this facility study and develop pharmaceuticals for autoimmunity, cancer and cardiovascular disorders, as well as many others.

In addition to Eli Lilly, the CBD area is home to top research facilities, such as the Indiana University School of Medicine, the second largest medical school in the United States. It is also home to top hospitals. The CBD's IU Health Academic Health Center is nationally ranked in the top 1.0 percent of hospitals by *U.S. News and World Report*.

Facilities scorecard

Supply

Indianapolis
Emerging lab

Rentable lab stock (% of total stock)	20,000 s.f. <0.1%
Direct vacancy (Change year-over-year)	0.0%
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	0

Pricing

Average asking rent (NNN) (Change year-over-year)	\$20.00
--	---------

Helmer, Inc.
14400 Bergan Boulevard
Northeast
137,500 s.f.
Term: 120 months

Polaris Laboratories
7451-7543 Winton Drive
Northwest
61,108 s.f.
Term: 120 months

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Indianapolis Metro Area

Northeast

The Northeast submarket is the site of some of the highest rents in the metropolitan area. It is also home to the North American headquarters of Roche Diagnostics, a subsidiary of Roche Ltd., the world's sixth largest pharmaceutical company by revenue. The 1.3 million-square-foot facility employs more than 4,000 individuals and sits on 155 acres. Large players in laboratory equipment, such as Helmer Scientific, and respiratory devices, such as King Systems, also contribute to the Northeast economy.

Northwest

The Northwest submarket is nurturing innovation due to INTECH, a 210-acre office park that counts Purdue University and TriMedX, among others, as major tenants. Other large companies in the area include Dow AgroSciences, a subsidiary of the Dow Chemical Company. Relative to other life sciences companies in the Indianapolis area, Dow's 192-acre facility is unique in that it specializes in agricultural pesticides and seeds. In 2013, Dow opened a new 175,000-square-foot R&D facility and a 14,000-square-foot greenhouse that is expected to add 550 jobs by 2015. In addition to Dow, the Northwest submarket is also home to clinical diagnostics companies such as Beckman Coulter, a subsidiary of Danaher Corporation. Beckman Coulter employs 550 individuals at its 153,000-square-foot Indianapolis facility.

Los Angeles/Orange County Metro Area

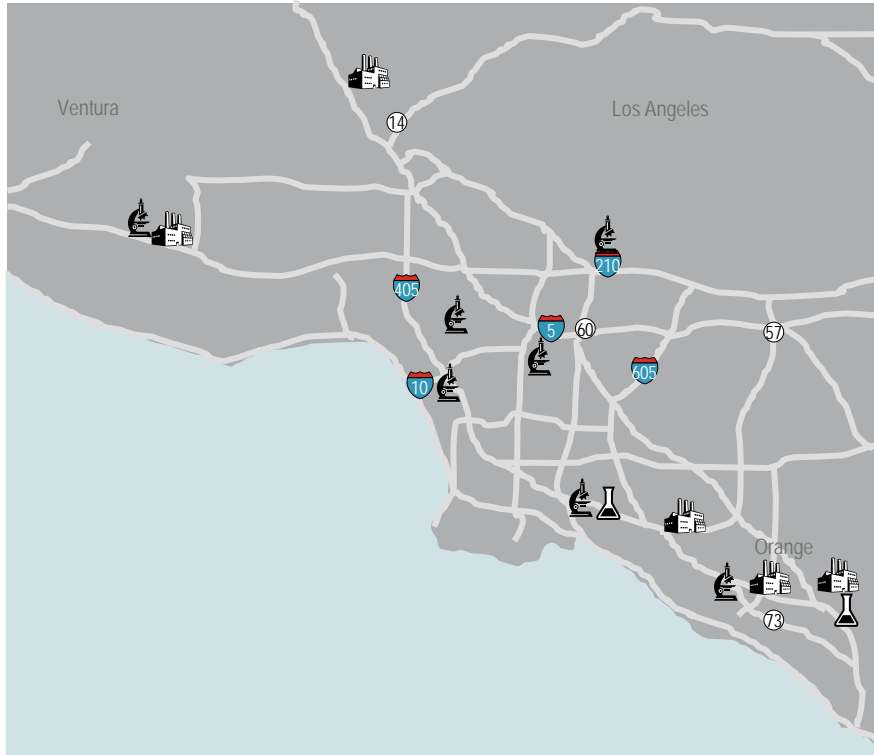
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

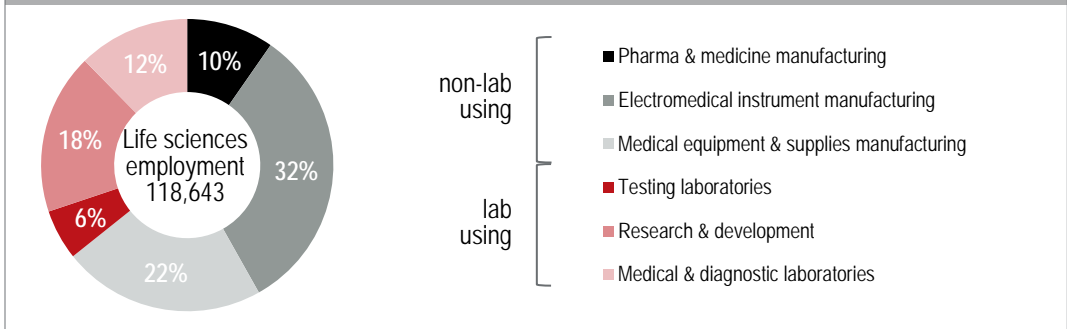
Cluster score:
51.5

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	118,643	2.5%	-0.1%
Establishments	2,956	0.6%	3.5%

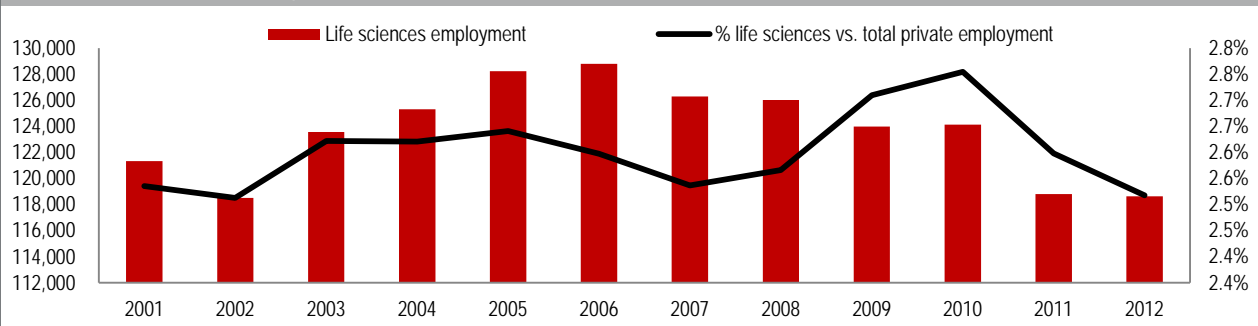
Funding	Total life sciences	% to total U.S.
VC funding	\$359.3M	4.2%
NIH funding	\$959.7M	4.3%

Innovation	Total life sciences	% to all patent classes
Patents	1,231	23.9%

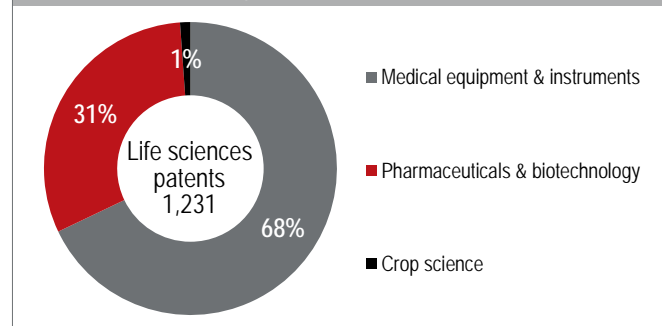
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Los Angeles

Los Angeles overview

Although Los Angeles and Orange County are very different markets in terms of economic drivers, the life sciences sector in both markets share similar advantages with proximity to world class learning and research institutions. Two of the five University of California campuses with medical schools are located in the Los Angeles/Orange County market: University of California, Los Angeles (UCLA) and UC Irvine. In addition, the region is home to major research universities: UC Santa Barbara, Cal Tech and the University of Southern California (USC).

The Los Angeles market is well positioned for future life sciences growth. The region can draw from a deep global talent pool, and the life sciences sector maintains perennial ties to leading regional universities and research centers. Given the size of the Los Angeles market, life sciences clusters are spread throughout the region and can be grouped together as West Los Angeles, South Bay, Los Angeles North, San Gabriel Valley and the Santa Clarita Valley. Leading private research institutions are also located in the Los Angeles basin such as Cedar Sinai Medical Center, the City of Hope National Medical Center, Huntington Medical Research Institute, the Children's Hospital of Los Angeles and Kaiser Foundation Hospital.

The Los Angeles life sciences industry has a general emphasis on medical devices. Although there is not a large number of pharmaceutical companies, Amgen, headquartered in the greater Los Angeles area, is one of the largest biotechnology companies globally and has a significant impact on the local economy. Also, Allergan, Abbott Laboratories, Baxter and Genzyme maintain a sizable presence in Los Angeles.

The Los Angeles life sciences market covers 2.8 million square feet of laboratory space. Every submarket is unique, based on the presence of major university, large research institutes and/or major life science companies anchored in that specific market. Los Angeles life sciences companies typically focus on low-rise/flex, which is more affordable and can be adapted to fit these companies' unique needs (i.e., floor size, loading capabilities, ceiling height, ability to vent and above standard power).

Given the strong market fundamentals, the outlook for the Los Angeles life sciences market is very optimistic. Local universities will continue to incubate early stage life sciences companies. Eventually, as these companies mature into commercial successes, they will outgrow their existing premises, thereby requiring additional space to accommodate growth. Many will choose to be located near universities and other life sciences companies. Current construction of lab space is minimal, suggesting that the supply of wet lab space should remain tight in Los Angeles.

Facilities scorecard

Supply	Los Angeles Major lab
Rentable lab stock (% of total stock)	500,000 s.f. 100.0%
Direct vacancy (Change year-over-year)	2.7% -230.0 ppts
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	0.0M s.f.
Demand	
# of requirements	179
Total s.f. requirements	2.6M s.f.
Pricing	
Average asking rent (NNN) (Change year-over-year)	\$29.24 p.s.f. +9.9%

MOLINA HEALTHCARE

604-650 Pine Avenue
Long Beach
209,702 s.f.
Term: 11.5 years

DAVITA

841 Apollo Street
Long Beach
19,910 s.f.
Term: 10 years

THE OAKS

1 Baxter Way
31,000 s.f.
Class A
Direct options

XENCORE

111 W lemon Avenue
25,000 s.f.
Lab and office
Term: 5 years

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Orange County

Metro overview

Neighboring Los Angeles and San Diego, Orange County is the third most populous county in California and sixth largest in the country with over 3.0 million residents. From the founding of Allergan, Beckman Coulter, and Edwards Life Sciences in the 1950s, Orange County life sciences has grown to be a dominant industry with over 1,100 companies countywide. Although these companies are scattered in all corners, a majority of the firms are clustered in the Airport Area and South County submarkets—both of which have consistently been the most active commercial office, industrial and flex areas in the market since 2008.

Airport Area submarket

Life sciences firms are attracted to Orange County's Airport Area for its high profile location and access to desirable labor demographics. Firms are able to draw from a wide variety of talent pools including those from neighboring markets like the Long Beach/South Bay area, the San Gabriel Valley and Inland Empire. In addition, the proximity to major healthcare providers like the Hoag Medical network, Kaiser Permanente Orange County and UC Irvine Medical Center contribute to the desirability to be located in this region. As such, companies like Edwards Lifesciences and Allergan have made the Airport Area submarket their home.

While Orange County is considered to be a pure suburban market, the Airport Area is often considered its central business district. It holds nearly half of the market's office inventory and is considered one of the most mature of the five main submarket clusters. Because of this, a variety of well-established life sciences firms in the area have become longstanding fixtures in the market. On the other hand, many of the new-age start-up firms have ventured south of the Airport Area in search of more desirable options to occupy space and to attract the younger generations of workers.

South County submarket

South County is becoming one of the fastest growing regions of the market in terms of population, economic growth and real estate development. With an abundance of (relatively) affordable residential neighborhoods, South County continues to attract the new generation of workers and executives. Start-up firms, including those from the life sciences industry, have flocked to the submarket bringing with them millions of dollars in venture capital funding. In fact, over the past five years, the large bulk of healthcare-related venture capital funding has been accounted for by firms in South County and Airport Area. It should come as no surprise then that these areas have truly become the focal points in Orange County for the life sciences industry and continue to be a large driver for leasing activity and job growth.

A key trend to watch for in the coming months is new development in South County. Construction has been reignited in South County over the past 12 months with several projects already under way. Hoag is currently expanding their facilities in the area and the explosion of multifamily product is an indication of the submarket's demand. South County offers the highest concentration of flex space in the market, which many life sciences firms have been attracted to recently.

Facilities scorecard

Supply	Airport Area Major lab	South County Emerging lab
Rentable lab stock (% of total stock)	2.0M s.f. 5.0%	1.5M s.f. 80.0%
Direct vacancy (Change year-over-year)	7.0% 0.0 ppts	7.9% -20.0 ppts
# of large blocks over 100,000 s.f.	0	0
Under construction (s.f.)	0	0
Pricing		
Average asking rent (NNN) (Change year-over-year)	\$11.00 p.s.f. 0.0%	\$9.00 p.s.f. 0.0%

ENDOLOGIX
2 Music & 35 Hammond, Irvine
South County
129,500 s.f.
Term: 180 months

AFFINITY MEDICAL TECHNOLOGIES
3545 Harbor Boulevard, Costa Mesa
Airport Area
42,000 s.f.
Term: 120 months

DAVITA HEALTHCARE PARTNERS
600 City Parkway, Orange
Central County
41,800 s.f.
Term: 84 months

17330-17390 Brookhurst Street,
Fountain Valley
West County
300,200 s.f.
Class B
\$67.0M / \$223 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

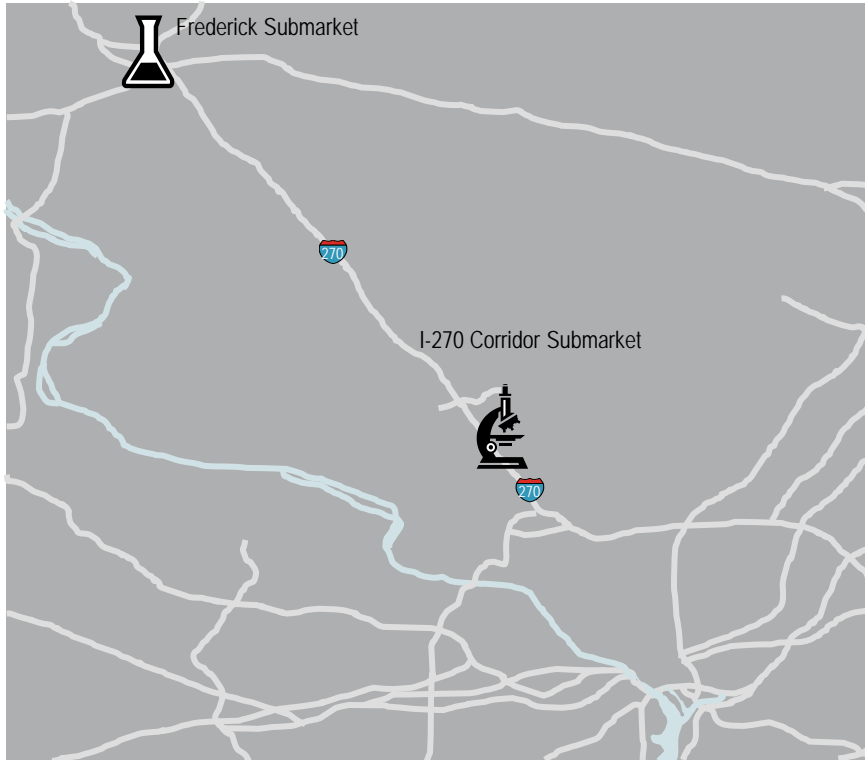
Suburban Maryland/Metro DC



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth

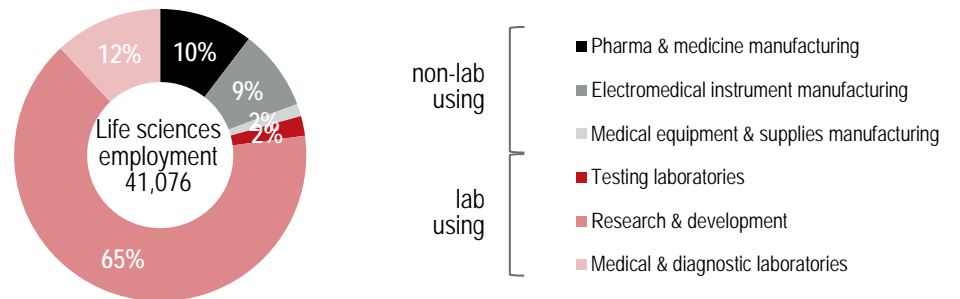


Economic scorecard

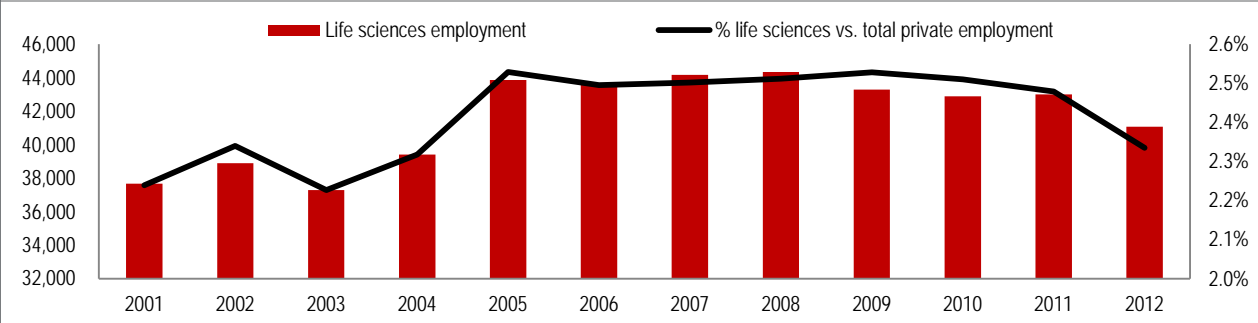
Cluster score:
47.0

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	41,076	2.3%	-4.5%
Establishments	1,572	1.2%	-0.3%
Funding	Total life sciences	% to total U.S.	
VC funding	\$407.7M	4.8%	
NIH funding	\$989.1M	4.4%	
Innovation	Total life sciences	% to all patent classes	
Patents	639	26.0%	

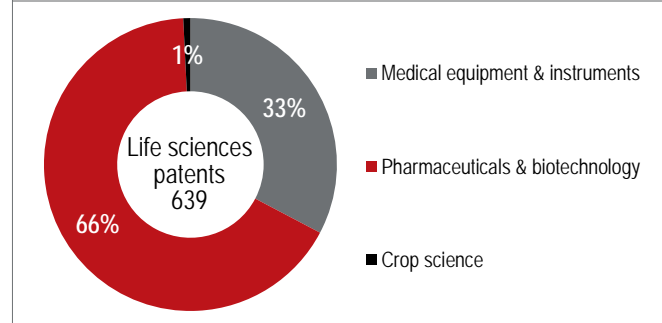
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



I-270 Corridor

I-270 Corridor

Within the I-270 corridor, a heavy concentration of life science companies are found in Rockville and Gaithersburg, particularly along the I-270 corridor which is known locally as "DNA alley." Life science companies experienced a volatile marketplace in 2013 which included mergers, relocations, purchases, investments and new opportunities to raise funds.

Equus Capital Partners paid a reported \$41.4 million for 25/35/45 West Watkins Mill Road, 1201 Clopper Road and an I-3 zoned 4.9-acre plot of land, 2 West Watkins Mill Road. Equus purchased the property from life science landlord Alexandria Real Estate Equities. Emergent Biosolutions also made a purchase in 2013. The sole manufacturer of the FDA-approved anthrax vaccine announced it will move over 100 employees from Rockville to Gaithersburg and consume approximately 50,000 square feet, starting in 2015. On the sales front, Emergent purchased 400 Professional Drive, next to their current Gaithersburg location at 300 Professional Drive, for a rumored \$10.5 million.

In the second quarter the merger between BioMed Realty Trust and Wexford Science and Technology Trust made headlines. The merger was completed for approximately \$672.0 million. The completed merger enhanced BioMed Realty's portfolio by an estimated 1.6 million square feet and 935,000 square feet of development projects. Earlier in the second quarter, an announcement was made that AstraZeneca had decided to create a research and development center in Gaithersburg that would add an estimated 300 jobs at MedImmune's current location by the end of 2015. GlaxoSmithKline (GSK) announced the launch of a new strategic venture capital fund named Action Potential Venture Capital Limited in the summer of 2013. The fund will invest \$50.0 million in the bioelectronic medicines and technologies market. GSK's space in Rockville, 14200 Shady Grove Road, was still available at the end of 2013. Another company looking to invest in the life sciences is Brace Pharmaceuticals, which announced it had opened its U.S. headquarters at the Rockville Innovation Center. The company plans to invest \$200.0 million into the new operation across the United States. The company is reportedly focused on the late stage clinical development of pharmaceutical products.

Montgomery County, where the I-270 corridor resides, has plans to continue supporting life sciences while putting a strong emphasis on cybersecurity. The county is discontinuing its Rockville biotech incubator and replacing it with a cybersecurity center for the National Cybersecurity Center of Excellence (NCCoE). The Shady Grove incubator is estimated to contain 38 biotech start-ups. The county declared that it is ending its leases with the life science companies in June 2014 in order to renovate the property into a cybersecurity building. Time will tell if the county's plans work. In the long term, two major priorities for President Obama are to further implement national healthcare, under the Patient Protection and Affordable Care Act, and the recent announcement of the BRAIN Initiative. These two initiatives should bode well for I-270 landlords in the future with the U.S. Department of Health and Human Services likely to expand. State and local government incentives, venture capital investments in the life sciences space and technological innovations could produce significant long-term gains for the industry in the years ahead but does not have enough influence to be an immediate effect.

Facilities scorecard

Supply

I-270 Corridor
Major lab

Rentable lab stock
(% of total stock)

10.2M s.f.
82.7%

Direct vacancy

11.3%

of large blocks over 100,000 s.f.

6

Under construction (s.f.)

0

Pricing

Average asking rent (NNN)

\$24.30 p.s.f.

NIH NCATS
9800 Medical Center Drive
I-270 Corridor
29,579 s.f.
Term: 15 years

25/35/45 W WATKINS MILL & 1201 CLOPPER ROAD
I-270 Corridor
\$41.4M

GREAT SENECA SCIENCE CORRIDOR
I-270 Corridor
17.5M s.f.

14200 SHADY GROVE ROAD
I-270
657,414 s.f.
Sublease by GSK

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Frederick

Frederick

The emerging Frederick County lab market continues to find its own niche north of the heavily concentration lab facilities of the I-270 corridor. There were a few relocations in 2013 which included the X-Gen relocation of 4,961 square feet to 5330 Spectrum Drive. Other relocation news included Medigen—the company relocated to 8420 Gas House Pike. The biomedical company signed the 3,041-square-foot lease in the first quarter of 2013. Demand has continued on a soft path for the Frederick market as SeraCare reported one of only a handful of lease expirations in the near term. The company currently leases 65,119 square feet at 8425 Progress Drive. On the sales front, First Potomac Realty Trust sold 15 Wormans Mill Court, home to Charles River laboratories, for \$3.5 million.

Joint-venture partners Manhattan Construction and Torcon of Red Bank made progress on the \$510 million U.S. Army Medical Research Institute of Infectious Diseases building. The 865,000-square-foot facility will feature the latest in bio-containment technology in order to examine threatening bacteria and viruses such as the Ebola virus. This six-story laboratory facility will contain the largest block of Biosafety Level (BSL) 3 and BSL 4 laboratory suites in the world.

In September 2013, Science Applications International Corporation split into two different components: SAIC and Leidos Holdings Inc. SAIC will remain dedicated to the government IT service industries and Leidos is set to take on national security, health and engineering service industries. This change has affected SAIC-Frederick which is now Leidos Biomedical Research Inc. Most of the changes take place on the outside (new name, logo, business cards, signs, etc.) and the goal of the organization will remain the same. Leidos Biomedical Research, Inc is stated as a wholly owned subsidiary of Leidos and is dedicated to a single contract, the Frederick National Laboratory for Cancer Research, which is a federally funded research center dedicated to cancer and AIDS research.

Many price-conscious tenants are drawn to the Frederick market due to its proximity to I-270 and the Shady Grove micromarket. In general, as space in the Rockville-Gaithersburg area, including Shady Grove, is absorbed this could cause tenants to venture farther north on I-270 into Frederick. Strong ties to the Shady Grove micromarket should bode well for the emerging market.

Facilities scorecard

Supply

Frederick
Emerging lab

Rentable lab stock
(% of total stock)

914,731 s.f.
100.0%

Direct vacancy

6.0%

of large blocks over 100,000 s.f.

0

Under construction (s.f.)

865,000

Pricing

Average asking rent (NNN)

\$14.76 p.s.f.

X-GENE

5330 Spectrum Drive
Frederick
4,961 s.f.
\$11.50 NNN p.s.f.

15 WORMANS MILL COURT

Frederick
40,051 s.f.
Class B
\$3.5M / \$87.39 p.s.f.

U.S. ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASE

Fort Detrick, Frederick
865,000 s.f.
Developer: Manhattan Construction
Estimated delivery: 2014

1003 W 7th STREET

Frederick
52,218 s.f.
Class A
Direct options

Activity key:

Leasing

Sales

Under construction

Large blocks of space

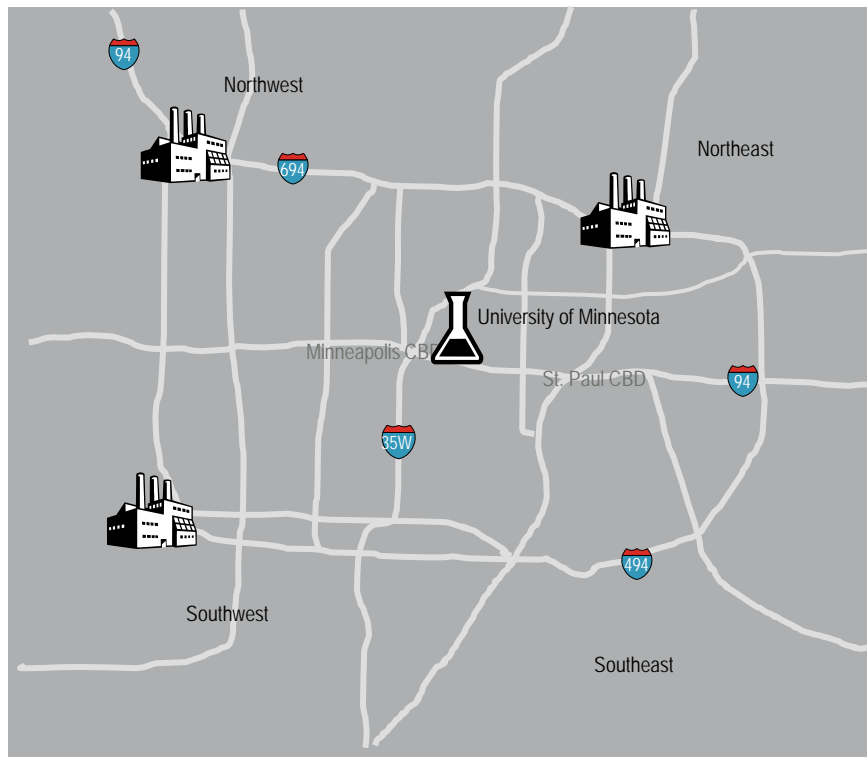
Minneapolis - St. Paul Metro Area



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing

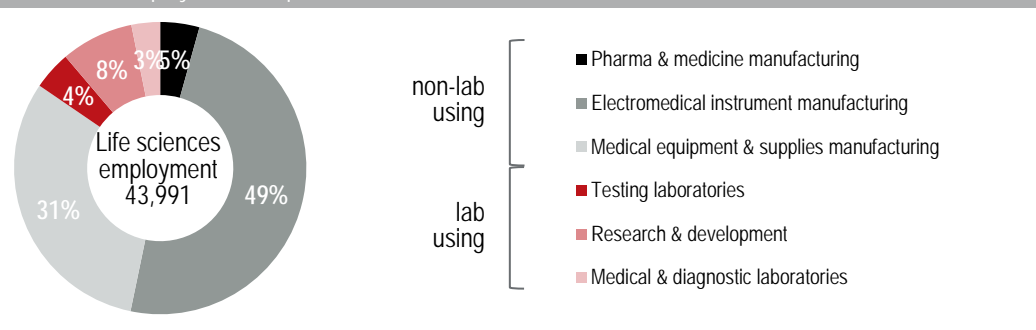


Economic scorecard

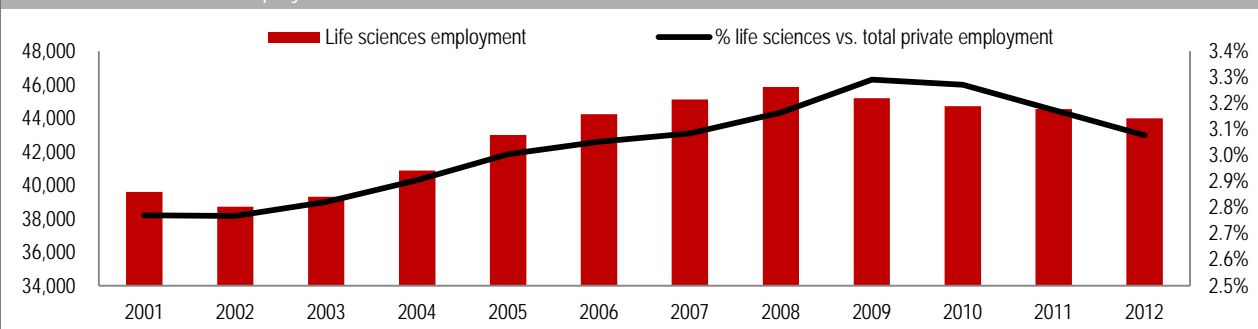
Cluster score:
44.0

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	43,991	3.1%	-1.3%
Establishments	753	0.9%	-1.1%
Funding	Total life sciences	% to total U.S.	
VC funding	\$174.1M	2.0%	
NIH funding	\$297.8M	1.3%	
Innovation	Total life sciences	% to all patent classes	
Patents	1,180	37.9%	

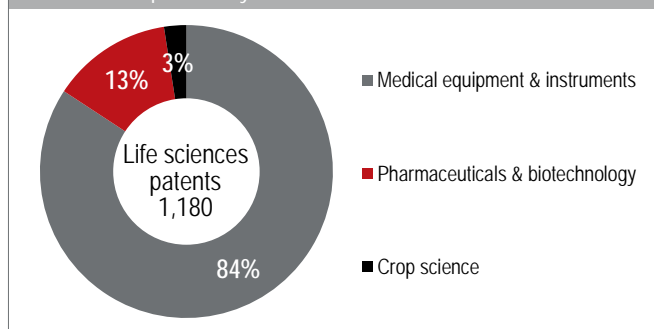
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Northeast

Metro overview

The Minneapolis-St. Paul MSA, an established leader in the life sciences industry with a particular strength in medical device manufacturing, has experienced a significant resurgence from the downturn despite regulatory and policy challenges, including implementation of the medical device tax. While these challenges have impacted the investment environment, Minnesota life sciences start-ups raised \$339.0 million in 2013 (including venture capital, angel investments, public financings and corporate investments), the largest investment total in five years according to a report by *LifeScience Alley*. Of this total, 88.0 percent was raised by medical device companies, 8.0 percent by health IT companies and 4.0 percent by pharmaceutical and biotechnology companies.

The region's experienced and talented workforce, strong educational system, innovative spirit and extensive research capabilities continue to be key drivers for the local life sciences industry. Data analyzed by *LifeScience Alley* via the EvaluateMedtech database shows that Minnesota has filed the most premarket approvals (PMAs) of any state all time, as well as the most in the last five years. Premarket approval is the FDA process for regulating and evaluating Class III medical devices, and thus the prominence of PMA filings in Minnesota speaks to the strength and vibrancy of the local medical device manufacturing cluster.

Two growing nonprofits focused on organ donations are building headquarters on the outskirts of the Minneapolis CBD. LifeSource is under construction on a 40,000-square-foot building on West River Road and Be The Match announced plans to lease a newly constructed 240,000-square-foot office in the North Loop neighborhood which is scheduled to break ground in spring 2014. However, life sciences companies in the Twin Cities typically occupy space in the suburbs as either owner-occupiers or as tenants in high-finish industrial flex properties. The large prevalence of clean, well-powered, high-finish flex space in the Twin Cities makes it relatively easy for life sciences companies to retrofit lab space, particularly via the use of portable and demountable clean rooms. Flex properties make the most sense locally due to the unique requirements of each company. Because of this, purpose-built multitenant lab facilities are not a significant component of the local life sciences landscape. In fact, the only multitenant lab building in the Twin Cities is the University Enterprise Laboratory (UEL). The collaborative nonprofit research center is located in close proximity to the University of Minnesota and has 31,000 square feet of lab space tailored toward start-up companies specializing in biotech, medical devices, medical diagnostics and nanotech.

Northeast

The existence of large established life sciences companies and a strong pool of skilled workers make the Northeast submarket a key component of the Twin Cities life sciences sector. Life sciences companies occupy more than 4.9 million square feet of office, lab and manufacturing space in the Northeast submarket and more than 80.0 percent of this space is owner-occupied. Prominent global corporations such as 3M, Medtronic and St. Jude Medical are all headquartered here. The University of Minnesota's Biomedical Discovery District also lies within the Northeast submarket as does the aforementioned University Enterprise Laboratory (UEL). The UEL has generally operated at full occupancy and as a result is pursuing state funding for the potential expansion of 30,000 square feet.

Facilities scorecard

	Northeast (University of Minnesota) Emerging lab / Manufacturing	Northwest Manufacturing	Southwest Manufacturing
Supply			
Rentable lab stock	31,000 s.f.	0M s.f.	0M s.f.
Direct vacancy	3.0%	N/A	N/A
# of large blocks over 100,000 s.f.	0	0	0
Under construction (s.f.)	0	0	0
Demand			
# of requirements	4	5	3
Total s.f. requirements	505,000 s.f.	450,000 s.f.	180,000 s.f.
Pricing			
Average asking rent (NNN)	\$25.00 p.s.f.	N/A	N/A

SYNOVIS LIFE TECHNOLOGIES

2575 University Avenue West
Northeast
76,300 s.f.
Term: 10 years

BAXTER INTERNATIONAL

9450 Winnetka Avenue N
Northwest
215,000 s.f.
Class B manufacturing
\$10.0M / \$46.00 p.s.f.

OLYMPUS SURGICAL TECHNOLOGIES AMERICA

Build-to-suit
Northwest
180,000 s.f.
Developer: Ryan Companies
Expected delivery: Fall 2014

BECKMAN COULTER, INC.

316 Lake Hazeltine Drive
Southwest
60,500 s.f.
Class B manufacturing
\$2.65M / \$44.00 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Northwest, Southwest

Life sciences companies have recently been active within the Northeast submarket. St. Jude Medical signed a 185,000-square-foot lease at Midtown Business Center in Roseville, a newly constructed bulk distribution facility. The company is working to sublease 40,000 square feet until it needs the additional space for future expansion. Synovis Life Technologies, a subsidiary of Baxter International, renewed its 76,300-square-foot lease at 2575 University West in St. Paul. Also of note, *The Minneapolis-St. Paul Business Journal* has reported that Cardiovascular Solutions plans to construct a new 115,000-square-foot headquarters building at New Brighton Exchange in New Brighton. The facility would be expandable by 30,000 square feet and include 80,000 square feet of office, with the remaining space a mix of clean room, lab, manufacturing and storage.

Other notable activity includes the delivery of the Cancer and Cardiovascular Research Building in the University of Minnesota's Biomedical Discovery District and ongoing construction of 3M's new 400,000-square-foot R&D center in Maplewood.

Northwest

The Northwest submarket plays a prominent role in the Twin Cities' life sciences sector. More than 4.0 million square feet of office, lab and manufacturing space is occupied by life sciences companies, roughly 43.0 percent of which is leased, and 57.0 percent of which is owner-occupied by companies such as Coloplast, Baxter and Boston Scientific. A number of smaller emerging companies also call the Northwest submarket home, including CVRx, a maker of implantable therapy for the treatment of hypertension which raised roughly \$42.0 million in private equity financing in 2013. The established cluster of life sciences companies and talent throughout the Northwest submarket has helped attract life sciences companies from outside of the Twin Cities. DiaMedica Inc., Holaira Inc. and Rapid Diagnostics have each recently relocated to Plymouth from out of state.

Activity has been strong in the Northwest, particularly along the Highway 610 corridor. Olympus Surgical Technologies America is under construction on a 180,000-square-foot facility which will incorporate research, design and manufacturing operations. The company will create 100 new jobs and move its existing 265 Maple Grove employees into the new property, which is expected to deliver in Fall 2014. Less than half a mile west on 610, Baxter International purchased a 215,000-square-foot manufacturing facility from Genmab for \$10.0 million. The company plans to make upgrades to the facility and bring 60 high-paying jobs to Brooklyn Park by 2015, 190 jobs by 2023.

Other notable activity includes Medafor Inc.'s 31,000-square-foot lease at a newly constructed industrial building at 4001 Lakebreeze Avenue N in Brooklyn Center and the nearly completed 120,000-square-foot expansion of Upsher-Smith's headquarters in Maple Grove (80,000 square feet will be made up of office and lab while 40,000 square feet will be warehouse space). In addition, Vascular Solutions is working on a deal to purchase its 80,000-square-foot headquarters building in Maple Grove. The company currently leases the flex property from IRET.

Southwest

Life sciences companies occupy more than 2.2 million square feet of office, lab and manufacturing space in the Southwest market, roughly 60.0 percent of which is leased and 40.0 percent of which is owner-occupied. Notable companies with a presence in the Southwest include Starkey Hearing Technologies, Beckman Coulter, Bayer and American Medical Systems. The Southwest is also home to emerging companies such as Sunshine Heart, a developer of implantable, non-blood contacting heart assist therapy which was able to raise \$42.0 million in funding last year.

One of the more significant stories of 2013 was the arrival of Imris Inc., a manufacturer of MRI machines which moved its headquarters from Winnipeg, Canada, to take advantage of the deep pool of talent in the Twin Cities. The company signed a 170,000-square-foot lease at Shady Oak Lake Corporate Center, a high-finish property in Minnetonka, and has added more than 100 jobs to the local economy. Also of significance, Beckman Coulter Inc. purchased a 60,500-square-foot industrial facility at 316 Hazeltine Drive for \$2.7 million in order to expand its manufacturing capabilities locally. The building is the sixth on its Chaska campus.

IMRIS
5101 Shady Oak Road
Southwest
170,000 s.f.
Term: 10 years

GN RESOUND
8001 E Bloomington Freeway
Southwest
122,000 s.f.

BE THE MATCH
Build-to-suit
Northwest (Minneapolis CBD)
240,000 s.f.
Developer: United Properties
Expected delivery: Late 2015

MEDAFOR, INC.
4101 Lakebreeze Avenue N
Northwest
31,000 s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

New Jersey/New York City/Westchester Metro Area



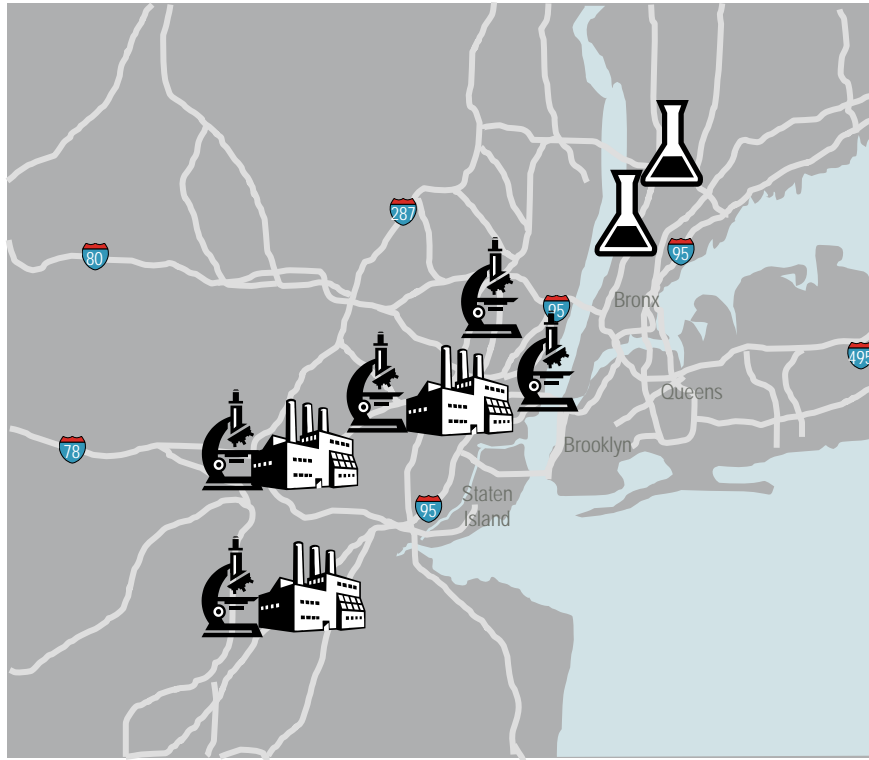
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

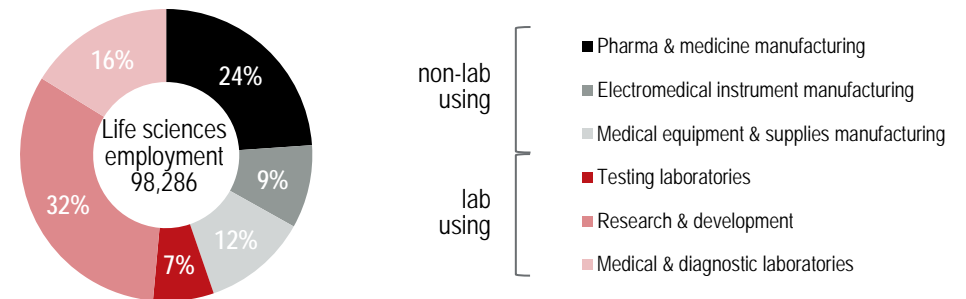
Cluster score:
55.4

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	98,286	1.8%	-1.2%
Establishments	2,827	0.7%	-2.0%

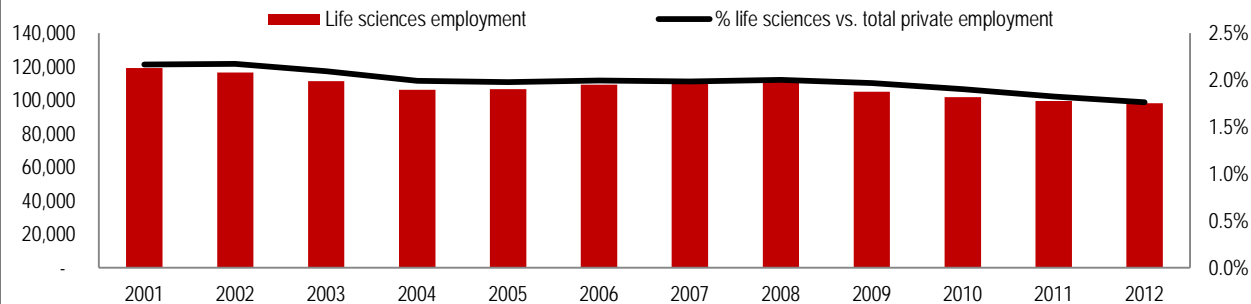
Funding	Total life sciences	% to total U.S.
VC funding	\$661.1M	7.8%
NIH funding	\$1,648.3M	7.4%

Innovation	Total life sciences	% to all patent classes
Patents	1,325	21.2%

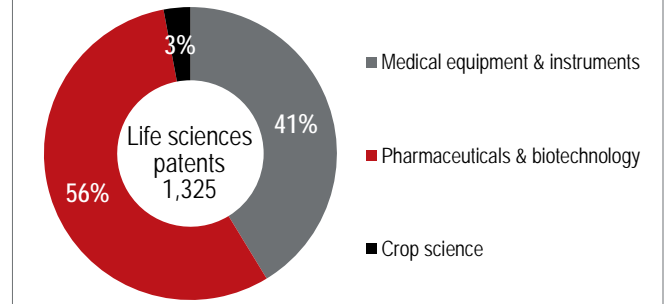
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



New Jersey

Metro overview

New Jersey's life sciences industry can trace its innovative roots back to 1886 when three brothers founded Johnson & Johnson in New Brunswick and the company became the first commercial manufacturer of sterile surgical dressings. The life sciences industry has since developed into one of the state's leading economic engines. Bayer HealthCare, Bristol-Myers Squibb, Celgene, Johnson & Johnson, Novartis Pharmaceuticals, Novo Nordisk, Merck and Pfizer are among the companies with a large presence in New Jersey. The large amount of peer companies located here as well as a highly skilled workforce continually replenished by a pipeline of graduates from colleges and universities have kept the state on industry companies' radar screens. Furthermore, close proximity to Manhattan and a mature transportation system that includes access to Newark Liberty International Airport have helped Garden State companies reach the global marketplace.

The Northern and Central New Jersey R&D/lab inventory totals more than 16.0 million square feet. The market is nearly equally split between leased product and owner-occupied facilities utilized for R&D/lab, manufacturing and support operations. The three primary geographic markets housing the largest concentration of life sciences companies are adjacent to the Route 1 corridor from North Brunswick south to Princeton, Morris/Somerset/Union counties and parts of Bergen County.

Northern & Central New Jersey

A variety of forces from the challenging economic climate to the patent cliff have prompted pharmaceutical companies to reduce operating expenses and shuffle local real estate holdings. Merck has placed its 1.0 million-square-foot global headquarters in Whitehouse Station and 1.5 million-square-foot R&D campus in Summit on the market for sale as the pharmaceutical giant consolidates operations to its Kenilworth property. After acquiring Genentech and relocating its U.S. headquarters to San Francisco in 2009, Roche ceased operations at its Clifton/Nutley research campus in 2013. The Swiss pharmaceutical company is marketing five buildings totaling 2.0 million square feet on the 119-acre campus for sale, while the remainder of the site is positioned for redevelopment. Roche also opened a new research center in Lower Manhattan. As part of a reorganization effort in response to the patent expiration of Diovan in 2012, Novartis will be closing its Suffern, New York, manufacturing plant, resulting in the loss of 525 jobs. Novartis is also consolidating operations into three new buildings totalling nearly 600,000 square feet developed on its U.S. headquarters campus in East Hanover.

On the sales front, a joint venture between Advance Realty Group and CrossHarbor Capital Partners acquired Sanofi's former R&D campus in Bridgewater for \$45.0 million. Ashland Specialty Ingredients and Amneal Pharmaceuticals recently leased approximately 341,000 square feet of office and laboratory space within the 1.2 million-square-foot complex now identified as the New Jersey Center of Excellence at Bridgewater.

Facilities scorecard

Supply

Northern New Jersey
Major lab

Rentable lab stock
(leased and owner-occupied)

8.6M s.f.

Direct vacancy

38.5%

of large blocks over 100,000 s.f.

9

Under construction (s.f.)

0

Pricing

Average asking rent (NNN)

\$13.64 p.s.f.

MERCK & COMPANY

11 Waterview Boulevard
Northern NJ/Parsippany
122,680 s.f.
Office lease

ZOETIS

100 Campus Drive
Northern NJ/Route 24
98,100 s.f.
Office lease

MERCK R&D CAMPUS- SUMMIT

Northern NJ/Route 78
1.5M s.f.
For Sale

ROCHE NUTLEY CAMPUS

Northern NJ/Route 80/23/46
2.0M s.f.
For Sale

Activity key:

Leasing

Sales

Under construction

Large blocks of space

New Jersey

The life sciences sector accounted for one-quarter of the leases signed in the Northern and Central New Jersey office market during 2013. Mirroring national trends, the New Jersey life sciences industry is transitioning to one whose growth was formerly driven by large pharmaceutical companies to one where demand is driven by mid-sized pharmaceutical, biotechnology and generic drug companies. Novo Nordisk began moving more than 1,100 employees from 100 College Road West to its new headquarters at 800 Scudders Mill Road in Plainsboro following the completion of an extensive \$215.0 million renovation of the 770,000-square-foot former Merrill Lynch building. Spurred by a \$39.5 million state economic assistance grant, Valeant Pharmaceuticals leased a 310,000-square-foot office building at 400 Somerset Corporate Boulevard in Bridgewater for its new U.S. headquarters. The Canadian pharmaceutical company, which acquired Bausch & Lomb, announced plans in mid-2013 to relocate Bausch & Lomb's headquarters from Rochester, New York, to New Jersey. Zoetis, the animal health company recently spun off from Pfizer, received a \$14.2 million incentive grant as it relocated from Madison to Florham Park. In addition, Dr. Reddy's Laboratories moved from Bridgewater and leased approximately 110,000 square feet of office and lab space in Princeton. Amneal Pharmaceuticals, Celgene, Covance, Insmed, Otsuka Pharmaceutical and Spectra Laboratories were also active in the state during the past year.

With more of the life sciences industry's innovative research generated by biotech firms, this sector will continue to expand its footprint. While the state's pharmaceutical cluster registered a 17.5 percent decline in employment from 2006 through 2011, the biotech industry reported a nearly 5.0 percent increase in payrolls according to the Quarterly Census of Employment and Wages. Furthermore, consolidations among the larger pharmaceutical players have led to workforce downsizings and excess space released to the market. Growing biotech companies have been able to tap this pool of highly skilled employees, while also locating suitable space for their operations.

Mergers and acquisitions will continue to reshape the state's life sciences industry as companies look to diversify their business lines, increase revenue and gain market share. According to Bloomberg data, recent acquisitions have represented the busiest 12-month period in the life sciences industry since 2009. Generic drug company Actavis, which operates from Parsippany, has been among the most active players in this field. Since merging with Watson Pharmaceuticals in late 2012, Actavis acquired Rockaway-based Warner Chilcott one year later and is in talks to purchase rival drug maker Forest Laboratories for an estimated \$25.0 billion. Forest itself acquired Bridgewater-based Aptalis for \$2.9 billion in early 2014.

As a growing number of today's life sciences companies seek collaborative partnerships with universities and renowned research hospitals, New Jersey is pursuing an education restructuring strategy designed to make the state more competitive in receiving more grants, world class instructors and researchers. The state completed one of the largest higher education mergers in U.S. history after the University of Medicine and Dentistry of New Jersey (UMDNJ) became part of Rutgers University in mid-2013. Following this merger, Rutgers became a 65,000-student school ranked among the top 25 research universities in the nation.

Facilities scorecard

Supply

Central New Jersey
Major lab

Rentable lab stock
(leased and owner-occupied)

7.6M s.f.

Direct vacancy

23.5%

of large blocks over 100,000 s.f.

8

Under construction (s.f.)

0

Pricing

Average asking rent (NNN)

\$18.74 p.s.f.

VALEANT PHARMACEUTICALS

400 Somerset Corporate Boulevard
Central NJ/Route 78
310,000 s.f.
Office lease

AMNEAL PHARMACEUTICALS

1041 Route 202/206
Central NJ/Route 78
142,780 s.f.
R&D/office/warehouse lease

DR. REDDY'S LABORATORIES

107 and 303 College Road E
Central NJ/Princeton
110,000 s.f.
Office/R&D lease

FORMER SANOFI U.S. R&D CAMPUS

1041 Route 202/206
Central NJ/Route 78
1.2M s.f.
\$45.0M

Activity key:

Leasing

Sales

Under construction

Large blocks of space

New York City

Metro overview

New York City is emerging as the next hub for the growing life sciences industry. The New York City Economic Development Corporation (NYCEDC) has continued its recent efforts to establish New York City as an innovation center and a viable destination for life science companies with its December 2013 announcement of three new biotech initiatives launching in the city.

First, NYCEDC has established the Early-Stage Life Sciences Funding Initiative, a public-private partnership among industry leaders, renowned academic institutions, top investors, and the philanthropic community. NYCEDC will invest \$10.0 million to the Life Sciences Fund and global private partners Celgene, General Electric and Eli Lilly will co-invest \$40.0 million. Venture capital partners will then match this \$50.0 million investment, bringing the total amount to \$100.0 million. The Life Sciences Fund will use the raised capital to propel 15 to 20 cutting edge life science projects by 2020. Overall, NYCEDC hopes this initiative will spur collaboration across leading life sciences stakeholders in the city and attract top talent to the industry.

The Mount Sinai Institute of Technology (MSIT) is the second new initiative and was created through a \$5.0 million grant by NYCEDC. MSIT is a partnership between Mount Sinai's Icahn School of Medicine and Rensselaer Polytechnic Institute (RPI). MSIT will strengthen the city's talent base and lead the way in creating new academic tracks in the life sciences. Importantly, MSIT will also provide ample opportunity for tackling emergent life science challenges through unique, state-of-the-art technology-based solutions. Construction is now under way for the new campus on the Upper East Side and in East Harlem.

The Harlem Biospace is the city's third major life sciences initiative. It joins a growing list of incubators throughout the city that are adeptly providing affordable lab space to evolving life science companies. More than 600 startups utilize city-funded incubators like the Harlem Biospace, leading to an increase in economic activity and new job creation. To date, more than \$125.0 million in venture capital funding has been raised by these companies. The Harlem Biospace, however, is the first of its kind; as a biotech incubator, it provides a wet lab retrofitted with modern biotech equipment and offers a range of classes to spur the inception of new ideas. Twenty companies are currently being supported through the Harlem Biospace and have become crucial to the surrounding area's resurgence.

As New York City's primary vehicle for the promotion of sustained economic growth, NYCEDC ultimately aims to encourage investment, generate prosperity and boost the city's competitive position through its latest initiatives. The anticipated outlook for the vibrant, emerging life sciences industry is bright and the city is well on its way as the next novel hub. In the future, to keep up with demand and address capacity needs, it must look to the development of new lab space and the redevelopment of existing buildings.

Facilities scorecard

Supply

New York City
Major lab

Rentable lab stock (% of total lab stock)	1.3M s.f. 99.7%
Direct vacancy	45.3%
# of large blocks over 100,000 s.f.	1
Under construction (s.f.)	2.5M s.f.

Pricing

Average asking rent (NNN)	\$33.99 p.s.f.
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INTERCEPT PHARMACEUTICALS

450 W 15th Street
Chelsea, Midtown South
4Q 2013
11,124 s.f.
Term: 10 years

BIOBAT

Brooklyn Army Terminal Bldg. A
140 58th Street
South Brooklyn
569,500 s.f.

CORNELL UNIVERSITY

Tech & Applied Sciences Campus
Roosevelt Island
2,100,000 s.f.
Expected delivery: first phase, 2017; full project, 2043

ALEXANDRIA CENTER FOR LIFE SCIENCES

450 E 29th Street
West Tower
420,000 s.f.
Expected delivery: 2014-2015

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Westchester

Metro overview

The start of life sciences investment in Westchester began a decade ago, when the sector was just gaining national attention as a high-growth opportunity. Life sciences as a market force in Westchester, however, did not truly emerge until about five years ago when Regeneron and OSI Pharmaceuticals made major occupancy and investment commitments to the area. Regeneron, already a Westchester tenant, increased its presence by taking an additional 220,000 square feet. Out-of-market tenant OSI purchased Ardsley Park in Westchester to be repositioned as its headquarter campus. While the OSI Pharmaceuticals relocation never materialized because of a merger, the initial commitment spurred a development that offered an opportunistic play for another Westchester life sciences player, developer BioMed Realty. Following BioMed's acquisition, Westchester tenant, Acorda, relocated and consolidated its operations to Ardsley Park. Since these events between 2009 and 2012, the life sciences arena in Westchester has maintained momentum. The sector benefits from a disproportionate amount of public and private investment, simply due to the fact that there are few other investment targets in the market that offer as much long-term positive impact. Life sciences was one of the only growth sectors in the Westchester market through the recession, and during the subsequent recovery.

In terms of how the Westchester commercial real estate market has evolved, lab and life sciences suitable stock totals just more than 3.0 million square feet in the market. Vacancy sits at 14.6 percent, down slightly from one year earlier, and substantially lower than the 20.2 percent office market vacancy rate. Rental rates are on the upswing, increasing 1.8 percent in the last year to \$18.50 per square foot on a triple net basis. It is also one of the few commercial real estate segments actively growing in the market. Currently, there are four development projects under way by developer BioMed Realty, all slated for 2014 deliveries. Two new buildings are under construction at The Landmark at Eastview and are build-to-suits for current tenant Regeneron. Regeneron will expand its presence at the complex into another 297,000 square feet. There are also two buildings totaling more than 100,000 square feet under renovation at Ardsley Park. Although the additional renovation space could add two to three points to vacancy, with few large life science suitable blocks on the market, the space will be high quality and could attract major life science tenants to the area.

Looking ahead, there are several initiatives in place that will continue to work to make life sciences a fixture in the Westchester marketplace. One recent statewide initiative is Start-Up NY, which is breeding opportunities for new and expanding businesses in the state by allowing tax-free operation for 10 years on or near college and university campuses. With nearly 10,000 biomedical professionals, and competitive real estate opportunities, Westchester offers a strategic location with direct proximity to major research institutions. Major pipeline projects include the North 60 and a recent transit-oriented development study for a portion of Southern Westchester. The planned North 60 encompasses 60 acres of biotech development including New York Medical College's \$12.6 million biotechnology incubator and Fareri Associates' \$500.0 million, 2.0 million-square-foot biotech and medical park. The TOD study proposed Southern Westchester developments would include 1.4 million square feet of research and development space while repositioning more than 1.0 million square feet of functionally obsolete office space, helping stabilize the office market and cultivating the market as a life science hub.

Facilities scorecard

Supply

Westchester
Major Lab

Rentable lab stock	3.1M s.f.
Direct vacancy (Change year-over-year)	14.6% -0.3 ppts
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	297,000

Pricing

Average asking rent (NNN) (Change year-over-year)	\$18.50 p.s.f. 1.8%
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REGENERON

777-A Old Saw Mill River Road
The Landmark at Eastview
I-287 West Corridor
28,837 s.f.
Term: 16 years

767 OLD SAW MILL RIVER ROAD

The Landmark at Eastview
I-287 West Corridor
76,046 s.f.
Class A
Direct

777-B OLD SAW MILL RIVER ROAD

The Landmark at Eastview
I-287 West Corridor
157,500 s.f.
Developer: BioMed Realty
Expected delivery: October 2014

777-C OLD SAW MILL RIVER ROAD

The Landmark at Eastview
I-287 West Corridor
139,500 s.f.
Developer: BioMed Realty
Expected delivery: October 2014

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Philadelphia Metro Area



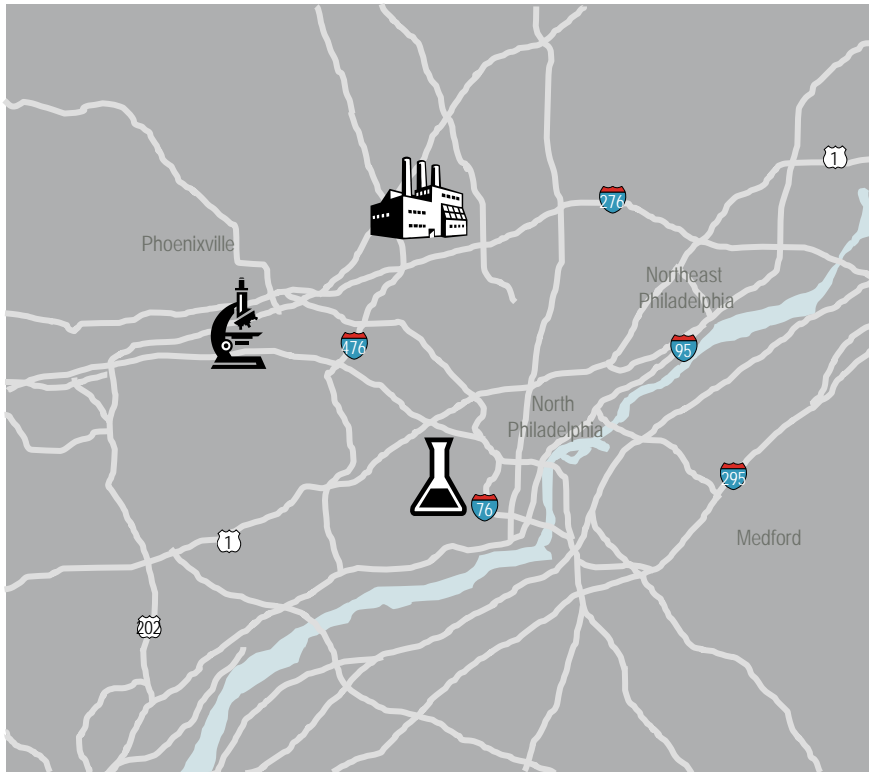
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

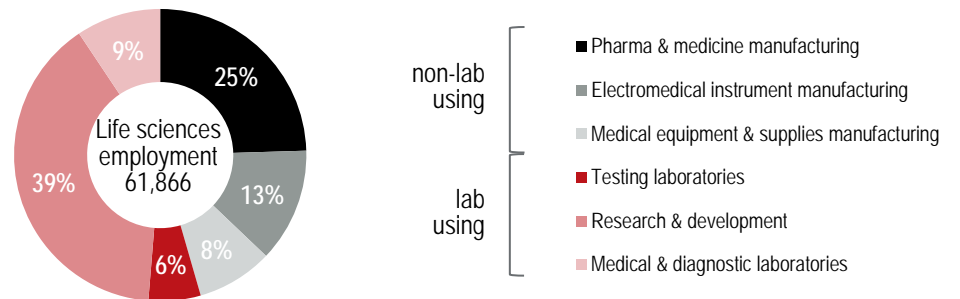
Cluster score:
50.2

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	61,866	2.8%	-1.6%
Establishments	1,559	1.0%	0.9%

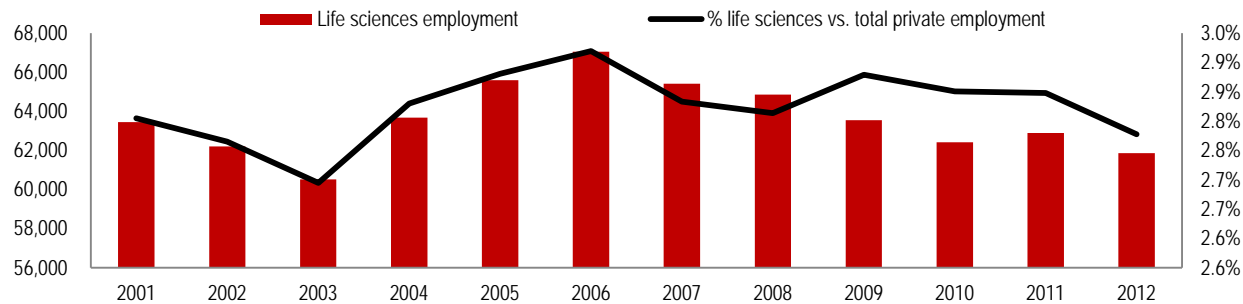
Funding	Total life sciences	% to total U.S.
VC funding	\$245.7M	2.9%
NIH funding	\$809.3M	3.6%

Innovation	Total life sciences	% to all patent classes
Patents	837	40.5%

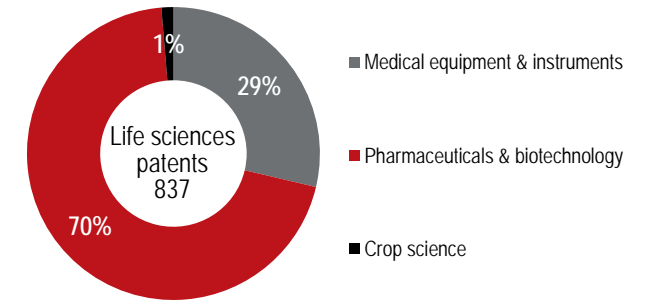
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



University City

University City overview

Located due west of the Schuylkill River in the Philadelphia Central Business District (CBD), University City plays host to the University City Science Center, one of the oldest and largest urban research parks in the United States. The Science Center is strategically located proximate to several major universities and research institutions including The Children's Hospital of Philadelphia (CHOP), Drexel University, the University of Pennsylvania, University of the Sciences in Philadelphia and The Wistar Institute.

As institutions continue to expand and enhance internal research capabilities within the submarket, developers have responded to the uptick in demand. Spurred by a lease with Penn Presbyterian Medical Center (Presby), Wexford Science & Technology broke ground on 3737 Market Street as part of a joint venture with the University City Science Center in May 2013. Original plans called for 272,700 square feet of office and lab space. However, continued strong demand spurred Wexford to add two additional floors mid-development, expanding its footprint to 322,820 square feet. Continued growth from the institutions was evidenced in Presby's recent expansion by an additional 55,900 square feet at 3737 Market Street prior to its June 2014 completion. The tenant will now occupy 63.6 percent of the asset. On the east bank of the Schuylkill River, CHOP is finalizing plans for Phase I of its Schuylkill Avenue development. This will include a 559,000-square-foot office tower to host its growing research functions. Phase I is expected to deliver by mid-2017 with subsequent phases bringing a total of 1,562,000 square feet of space.

As a result of high demand for space in the Science Center's incubators and the proven success of its graduate companies, the Science Center's state-of-the-art laboratory facilities have transformed the growing submarket into the tightest, most expensive submarket in the CBD. Life sciences companies have provided sources of growth to the submarket with expansionary activity over the past 12 months. Invisible Sentinel, a manufacturer of next generation technologies for safe foods supply, expanded from incubator space into 9,000 square feet of space at 3711 Market Street. An innovator of gene therapy products, Spark Therapeutics also recently released 28,075 square feet at 3737 Market Street.

Outlook

With no current availabilities greater than 15,000 square feet, the Science Center corridor continues to be the tightest rental market in the Philadelphia CBD, enabling landlords to maintain high rental rates. While 3737 Market Street is 79.8 percent preleased and will bring new office and lab space to University City, continued predelivery expansionary activity is absorbing the new Class A space. As a result, its largest block currently sits at 56,150 square feet. As University City's institutions develop external strategic research partnerships, the submarket's demand pool will continue to expand outside of the concentrated institutional core, bringing new tenancies to its office and lab inventories. Previous success stories of Avid Radiopharmaceuticals and Integral Molecular as well as recent growth from Spark Therapeutics and Invisible Sentinel are representative of this trend.

Facilities scorecard

Supply

University City
Emerging lab

Rentable lab stock (% of total stock)	1.38M s.f. 100%
Direct vacancy	6.7%
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	332,820

Pricing

Average asking rent (NNN) (Change year over year)	\$18.34 p.s.f. 8.8%
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3737 MARKET STREET
332,820 s.f.
Wexford Science & Technology
Expected delivery: June 2014

INVISIBLE SENTINEL, INC.
3711 Market Street
9,000 s.f.
Relocation with Expansion

SPARK THERAPEUTICS
3737 Market Street
28,075 s.f.
Term: 10 years, 8 months
New Location

PENN PRESBYTERIAN MEDICAL CENTER
3737 Market Street
55,900 s.f.
Term: 20 years
Expansion

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Philadelphia Suburbs

Suburbs overview

Historically the Philadelphia Metro Statistical Area (MSA) has been strong in the “Eds and Meds” sector as suburban Philadelphia is home to hundreds of life sciences companies ranging from small start-up companies to large life sciences like: Dow Chemicals, Endo Health Solutions, GlaxoSmithKline, Merck and Company and Shire Pharmaceuticals. The Philadelphia suburbs is comprised of two major submarkets: the Route 202 Corridor and Bucks / Montgomery Counties which represent 79.2 percent of the market's total lab stock.

Route 202 Corridor

Representing 56.6 percent of the total lab stock, the Route 202 Corridor is the largest lab submarket in the Philadelphia MSA. This market extends from Exton (726,000 square feet) heading east through Malvern (1,369,000 square feet) finally ending in King of Prussia (836,000 square feet) where today the average asking rent is \$10.45 per square foot NNN. The Corridor's existing infrastructure has been going through major transformation starting with the recently completed all-electronic interchange to the Pennsylvania Turnpike through Route 29 which indirectly connects Route 202 to the Turnpike. Meanwhile the Corridor is still in the midst of a 6.5-mile road widening project that will set the market up for even stronger accessibility in the future. The Route 202 Corridor is home to both mid-tier, local firms as well as large, global organizations who were attracted by area's amenities, talented workforce and regional access provided by Route 202, I-76 and the Pennsylvania Turnpike. Recent activity includes CSL Behring renewing 192,000 square feet at the Maschellmac Office Complex in King of Prussia and CardioNet signing a 47,000-square-foot sublease at 1000 N. Cedar Hollow Road in Malvern. In Exton, West Pharmaceuticals bought 530 Herman O. West Drive, their 171,000-square-foot facility that had been constructed for them in 2012 by the Hankin Group for \$35.5 million or \$207 per square foot.

Bucks / Montgomery Counties

Bucks / Montgomery Counties comprise the largest submarket geographically in the Philadelphia MSA. In 2013, Dow Chemicals moved into 835,000 square feet at the former Pfizer campus in Collegeville. Following their occupancy, the lab market has a 2.6 percent direct vacancy rate with no large blocks available over 45,000 square feet. Despite the lack of large blocks and a 2.6 percent vacancy, average asking rental rates have remained flat at \$7.56 per square foot NNN for six consecutive quarters. In Fort Washington, Honeywell renewed and contracted their space at 500 Virginia Drive to 75,000 square feet. Other notable deals include: Bristol-Myers Squibb relocating 45,000 square feet of space to 601 Office Center Drive in Fort Washington and Epicor relocating to 43,000 square feet at 3800 Horizon Drive in Trevoese.

Outlook

Demand has slowed after several years of large tenant activity (i.e., Dow Chemicals and Endo Health Solutions in 2012 and 2013). Currently there are only five suburban requirements totaling 115,000 square feet, an average of 23,000 square feet. Although tenant demand is down, the market is relatively healthy. With only two large blocks over 100,000 square feet and almost all the existing stock being second or third generation lab space, larger tenant demands for 2016 and 2017 will have to examine build-to-suit options.

Facilities scorecard

Supply	Route 202 Corridor Major Lab Supply	Bucks / Montgomery Counties Emerging lab
Rentable lab stock (% of total stock)	3.75M s.f. 56.6%	1.49M s.f. 22.6%
Direct vacancy (Change year over year)	12.6% 2.2 ppts	2.6% 0.0 ppts
# of large blocks over 100,000 s.f.	2	0
Under construction (s.f.)	0	0
Demand		
# of requirements	2	3
Total s.f. requirements	55,000 s.f.	60,000 s.f.
Pricing		
Average asking rent (NNN) (Change year over year)	\$10.45 p.s.f. 3.4%	\$7.56 p.s.f. 0.0%

CSL Behring
Maschellmac Office
1000-1060 1st Avenue, King of Prussia
Route 202 Corridor
191,654 s.f.
Renewal

Honeywell
500 Virginia Drive, Fort Washington PA
Bucks and Montgomery Counties
75,000 s.f.
Renewal with Contraction

530 Herman O. West Drive, Exton PA
Route 202 Corridor
171,000 s.f.
Class A
\$35.5M / \$207 p.s.f.

3700 Horizon Drive, King of Prussia PA
Route 202 Corridor
21,810 s.f.
Class A
\$2.3M / \$105 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Raleigh-Durham Metro Area



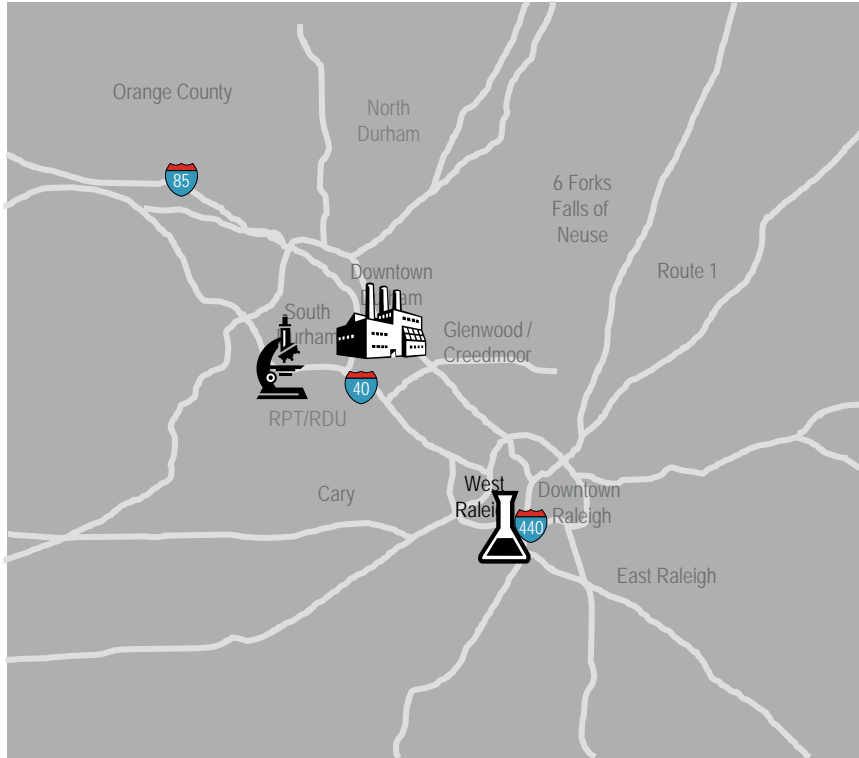
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

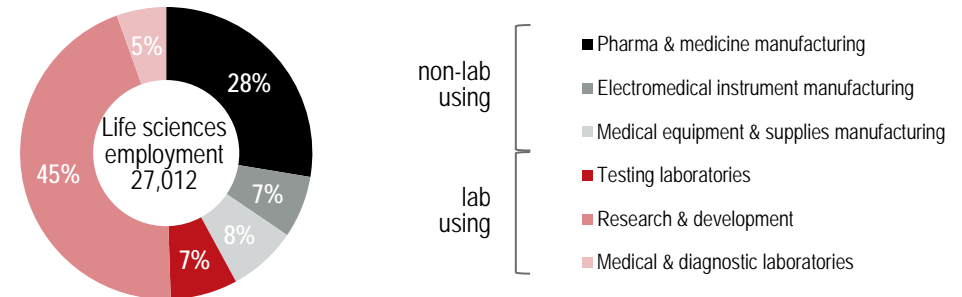
Cluster score:
58.3

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	27,012	4.6%	1.2%
Establishments	813	2.0%	5.2%

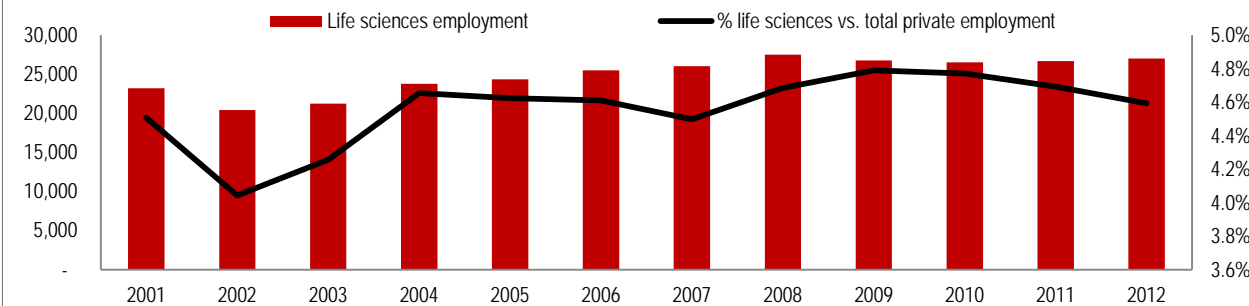
Funding	Total life sciences	% to total U.S.
VC funding	\$262.6M	3.1%
NIH funding	\$893.1M	4.0%

Innovation	Total life sciences	% to all patent classes
Patents	303	17.6%

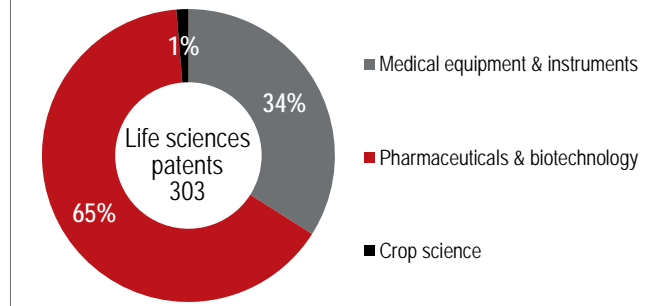
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Raleigh-Durham Metro Area

Market overview

The Raleigh-Durham life sciences cluster is familiarly called the Research Triangle Region due to the geographic nexus of the area's three leading research institutions: Duke University, North Carolina State University and The University of North Carolina at Chapel Hill. Squarely in the center of the region is the Research Triangle Park (RTP), a 7,000-acre center of research created by the state to help bring R&D talent to the region.

The Triangle's rich talent pool, stable socioeconomic structure, proximity to universities and high quality of life has attracted some of the big names from the life sciences sector to the region. Agro-biotech firms have displayed strong growth in the past few years. The region is already home to four of the top five ag tech companies including Syngenta, Bayer CropScience, BASF and Monsanto. Agro-biotech being one of the strongest industries in North Carolina, the state has the natural resources to support the research and development of these firms. Bayer CropScience recently completed a greenhouse laboratory on its campus and plans to double its investment in biotechnology operations over the next 5 to 10 years. Switzerland-based firm Syngenta announced plans to expand its campus in RTP by \$94.0 million, which will bring 150 new jobs by 2018. Syngenta is also expanding its crop protection and seed development operations which will bring new laboratory and office facilities to its campus.

Research Triangle Park

A majority of the lab spaces tracked in the Triangle are owner-occupied and include manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing. There is a two-tier lab market with modern lab facilities leasing in the \$17.00 to \$20.00 (NNN) per square foot range and dated lab facilities, roughly 10 to 25 years in age, leasing in the \$12.00 to \$16.00 (NNN) per square foot range. The existing pipeline supply of quality lab spaces is fast diminishing, as there is a strong demand of technologically advanced lab buildings. Firms looking for lab spaces will most likely need to approach local developers to create a build-to-suit facility.

Leasing and sales activity has been stable in the past 12 months. Early last year, Bayer CropScience signed a lease to occupy a vacant 82,000-square-foot laboratory office building at Keystone Technology Park in RTP. Following this announcement in October, Alexandria Real Estate Equities purchased the same property for \$19.4 million (\$237.00 per square foot). In the second quarter of 2013, life sciences consulting firm Compliance Implementation Services (CIS) committed to leasing 23,100 square feet at the new Perimeter Park Two office building in RTP. By relocating to the new space, CIS will nearly triple its office square footage in the market.

The biggest challenge that this industry continues to face is the lack of funding for research and development for start-up firms. The economic recession has by and large not affected the big firms located in the Triangle; however, the funding environment has suffered a major setback. In the private sector, this has forced local companies to look for creative solutions to secure funding, crowd funding being one of them. In the past few months, multiple firms announced their decision to go public by filing for IPOs. Triangle firms have taken advantage of the improving stock market conditions, and have raised money via IPOs to support long-stalled projects. As the economy improves, investors are also looking to

Facilities scorecard

Supply	Raleigh-Durham
Rentable lab stock	6.64M s.f.
Direct vacancy (Change year-over-year)	7.1% (2.3)%
Under construction (s.f.)	0 s.f.
Demand	
# of requirements	5
Total s.f. requirements	105,000 s.f.
Pricing	
Average asking rent (NNN) (Change year-over-year)	\$16.86 p.s.f. (1.3)%

***Supply includes some office, flex and manufacturing space from mixed-use buildings*

BAYER CROPSCIENCE
407 Davis Drive
RTP / RDU
82,000 s.f.
Relocation

407 DAVIS DRIVE
RTP / RDU
82,000 s.f.
Class A
\$19.4M / \$237 p.s.f.

PFIZER
4222 Emperor Boulevard
RTP / RDU
12,764 s.f.
Renewal

IMPERIAL CENTER BUSINESS PARK
(portfolio of four buildings)
RTP / RDU
187,758 s.f.
Class A and B
\$23.6M / \$125 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Raleigh-Durham Metro Area

invest in firms that have strong growth potential. Chimerix, LipoScience and Quintiles are some of the Triangle firms that filed for IPOs recently.

In October, the federal government awarded grants to Triangle's educational institutions. UNC Chapel Hill and Duke University together received close to \$100.0 million from the National Institutes of Health. Funding will help provide more resources to the research and development division of these institutions and expedite the process of converting ideas to usable products.

Overall the Research Triangle region is expected to remain fairly stable during the coming quarters with fluctuations of expansions and contractions among the area's many tenants. In February, The Research Triangle Foundation announced its acquisition of nearly 100 acres for approximately \$17.0 million. Known as Park Center, this site could attract close to \$3.0 billion in private investment and lead to the creation of 100,000 jobs.

Going forward as the landscape of the life sciences industry changes, we expect firms directly and indirectly connected to this sector to grow. We expect to see more mergers and acquisitions, which will likely lead to real estate consolidations. As a mature, established cluster, the Raleigh-Durham area has the necessary infrastructure in place to support the life sciences industry.

From a pure numbers standpoint, the region lags marginally behind other established clusters in the area of science and engineering graduates and research and development capital as a percent of state GDP. However, given the deep rooted presence of top industry companies, a favorable living environment that attracts out-of-state professionals and ample public / private interest groups in the area, the market has more than enough resources to sustain and grow the needs of the industry.

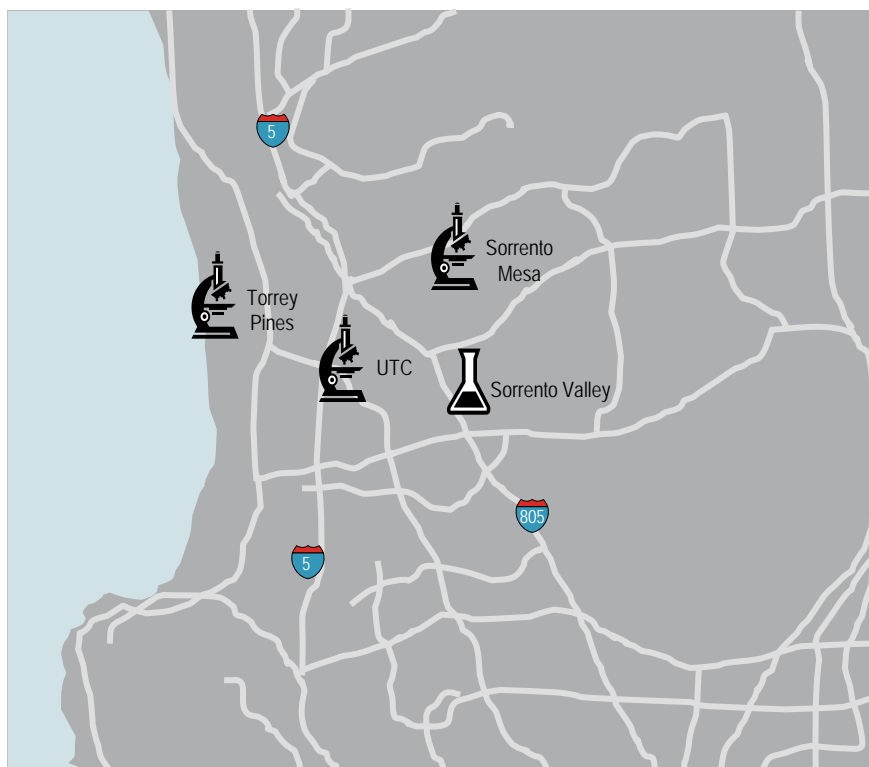
San Diego Metro Area



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Economic scorecard

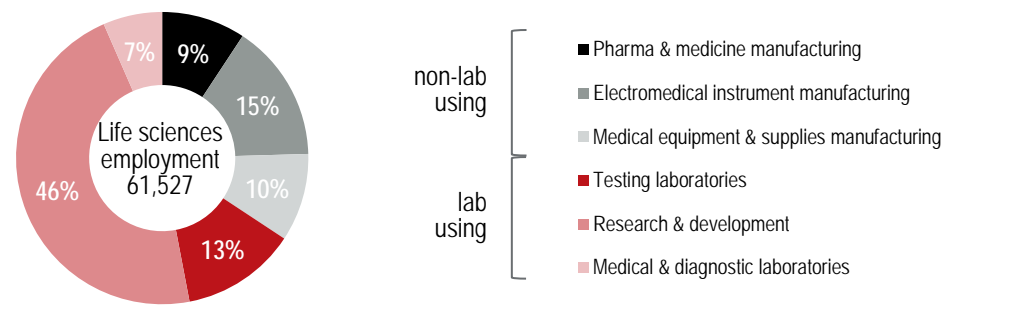
Cluster score:
70.7

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	61,527	5.8%	2.7%
Establishments	1,335	1.4%	6.1%

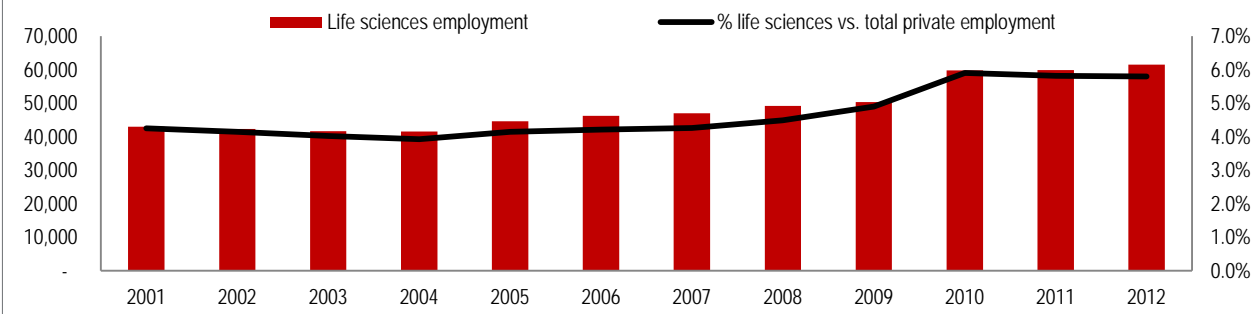
Funding	Total life sciences	% to total U.S.
VC funding	\$640.6M	7.5%
NIH funding	\$785.6M	3.5%

Innovation	Total life sciences	% to all patent classes
Patents	956	29.0%

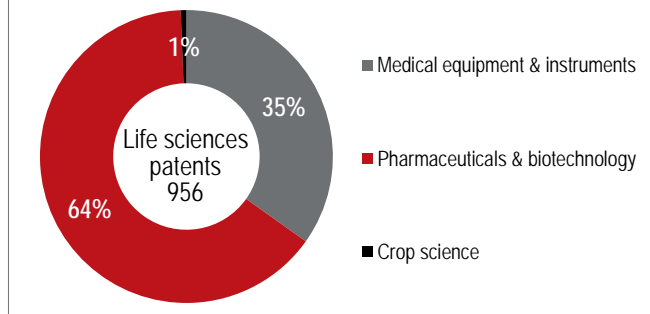
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Torrey Pines

Metro overview

Leasing activity was sluggish through the first three quarters of 2013. However, the fourth quarter saw a significant increase in leasing velocity with 314,000 square feet of total activity, resulting in 134,000 square feet of positive net absorption. Leasing activity was concentrated among smaller tenants. The lack of large tenant activity was a key driver behind the total vacancy rate continuing to hover around 20.0 percent. This strong activity among smaller tenants was consistent with San Diego's highly entrepreneurial environment, but the lack of activity and growth among the region's more mature life science companies has been noticeable. Average asking rent was \$23.57 per square foot, an 8.5 percent increase year-over-year. Moving in to 2014, the San Diego market is expected to tighten as already seen with markedly increased leasing velocity in the Torrey Pines and UTC submarkets.

Worth noting was the surge in the life sciences initial public offering (IPO) market in 2013. In San Diego there were eight life sciences IPOs completed in 2013, compared to only one in 2012. San Diego activity included Ambit Biosciences, which raised \$65.0 million; Receptos, which raised \$73.0 million; Conatus Pharmaceuticals, which secured \$66.0 million; and Intrexon, which raised a notable \$160.0 million. Cumulatively, these four companies raised \$364.0 million and have all seen their share prices increase from the IPO price.

Torrey Pines

Torrey Pines is home to San Diego's largest concentration of lab space with over five million square feet. The submarket is adjacent to the UC San Diego campus and acts as the epicenter of San Diego's life sciences market. It boasts occupancy by a number of acclaimed research institutes, some of the world's largest pharmaceutical companies and a number of successful biotech companies that range from start-ups to mature corporations.

Torrey Pines had a relatively flat year. The submarket, which is comprised of a number of prominent life science companies, recorded no growth from these large users. Pacira Pharmaceuticals and Becton Dickinson were the only two large users to complete transactions in 2013—each renewed with no expansion. The largest new transaction of the year occurred during the first quarter when Wellspring Biosciences leased 17,100 square feet. Otherwise, 47.0 percent of the leases completed during the year were with companies that had space needs under 10,000 square feet. During the fourth quarter, only three transactions were completed which together produced a meager 11,000 square feet of net growth.

The tide has shifted as 2014 begins and tenant demand in Torrey Pines hasn't been this strong in years. By March, four transactions have already been completed, totaling 30,000 square feet of positive net growth. Active negotiations are even stronger, with 10 transactions currently under negotiation, totaling approximately 412,000 square feet of gross leasing activity and a projected net absorption of over 320,000 square feet. Highlighting the activity is the Sanford-Burnham Institute, which was recently given a \$275.0 million gift and is negotiating to expand its current 425,000-square-foot campus by approximately 160,000 square feet.

Facilities scorecard

Supply

Torrey Pines
Major lab

Rentable lab stock (% of total stock)	3.0M s.f. 55.1%
Direct vacancy (Change year-over-year)	24.3% 2 pts
# of large blocks over 100,000 s.f.	3
Under construction (s.f.)	247,000

Demand

# of requirements	7
Total s.f. requirements	374,000 s.f.

Pricing

Average asking rent (NNN)	\$27.00 p.s.f.
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FATE THERAPEUTICS
3535 General Atomic Ct
Torrey Pines
23,684 s.f.
Term: 24 months

3545 CRAY CT
Torrey Pines
116,556 s.f.
Class B
\$64.1M / \$550 p.s.f.

SOVA PHARMACEUTICALS
11099 Torreyana Rd
Torrey Pines
16,409 s.f.
Term: 60 months

3033 SCIENCE PARK RD
Torrey Pines
166,699 s.f.
Alexandria Real Estate
Expected delivery: Q3 2015

Activity key:

Leasing

Sales

Under construction

Large blocks of space

UTC/Eastgate, Sorrento Mesa, Sorrento Valley

University Town Center (UTC)/Eastgate

The UTC/Eastgate submarket is comprised of mature, publicly traded companies with advanced product development. This submarket has 2.3 million square feet of lab space and is located in San Diego's "Golden Triangle." Celgene, Genomatica and Senomyx are the submarket's largest users. Leasing activity throughout 2013 was notably depressed with only three wet lab transactions completed, totaling only 11,000 square feet of total leasing activity. UTC has been plagued by excessive sublease availability. At the beginning of 2013, Bristol-Myers Squibb, Pfizer and Illumina had a total of 531,000 square feet of space on the market for sublease. At year-end, only Illumina was able to dispose of a portion of its campus, subleasing 138,000 square feet. Adding to the already saturated inventory, Cubist Pharmaceuticals put its 46,000-square-foot facility on the market for sublease. However, with two new transactions already completed in 2014, the year has already begun on a positive note with significant positive absorption expected over the first half of the year.

Sorrento Mesa

Sorrento Mesa is comprised of four million square feet of lab space and caters to all tiers of San Diego life sciences companies. The largest companies include BP Biofuels, AstraZeneca (Ardea) and Hologic (Gen-Probe). Sorrento Mesa was formed as developers saw opportunities for greater returns through the conversion of industrial and flex buildings into wet lab facilities. Sorrento Mesa ended the year with a 8.4 percent total vacancy rate, which was the lowest rate among San Diego's life science submarkets. However, leasing activity was relatively stagnant throughout the year. Average asking rent decreased year-over-year and was \$16.74 per square foot at year-end 2013. Total annual leasing activity was a meager 132,000 square feet, well below the three-year average of 347,000 square feet. As the San Diego life sciences market is expected to tighten during the first half of 2014, Sorrento Mesa will benefit and see increased activity.

Sorrento Valley

Sorrento Valley was developed as an ancillary market to Torrey Pines and today continues to be home to many of San Diego's start-up life sciences companies. With a base of converted former industrial and flex buildings, this submarket provides an economical alternative for early-stage companies. Prominent tenants include Halozyme Therapeutics and Tandem Diabetes. Sorrento Valley ended the year on a high note. Leasing activity was mediocre the first three quarters of 2013, but picked up strength in the fourth quarter with year-end total vacancy at 17.8 percent. Historically the region's "low rent" submarket, Sorrento Valley's asking rent increased sharply from 2012 and was \$25.90 per square foot at year-end 2013. The submarket continues to attract smaller users, with 71.0 percent of the leases completed in 2013 for space needs under 5,000 square feet. Total vacancy is expected to decrease during the first half of 2014, sustaining the momentum built in the fourth quarter of 2013. Major landlords will also continue to reposition older vacancies—incorporating modern finishes and new building systems.

Facilities scorecard

Supply	UTC/Eastgate Major lab	Sorrento Mesa Major lab	Sorrento Valley Emerging lab
Rentable lab stock (% of total stock)	2.2M s.f. 93.2%	3.1M s.f. 75.8%	1.2M s.f. 94.4%
Direct vacancy (Change year-over-year)	8.9% 1.4 ppts	8.1% 0.2 ppts	17.8% 7.5 ppts
# of large blocks over 100,000 s.f.	1	0	0
Under construction (s.f.)	0	0	0
Demand			
# of requirements	4	2	5
Total s.f. requirements	132,000 s.f.	69,000 s.f.	84,000 s.f.
Pricing			
Average asking rent (NNN) (Change year-over-year)	\$33.75 p.s.f. -0.1%	\$16.74 p.s.f. -12%	\$25.90 p.s.f. 48%

NUVASIVE, INC.
4545 Towne Centre Ct
UTC
62,367 s.f.
Term: 17 months

11055 ROSELLE ST
Sorrento Valley
63,391
Class C
\$8.3M / \$131 p.s.f.

THERMO FISHER SCIENTIFIC, INC
9389 Waples St
Sorrento Mesa
102,211 s.f.
Term: 78 months

NEXUS DX
6459 Mesa Ridge Rd
Sorrento Mesa
84,000 s.f.
Term: 77 months

Activity key:

Leasing

Sales

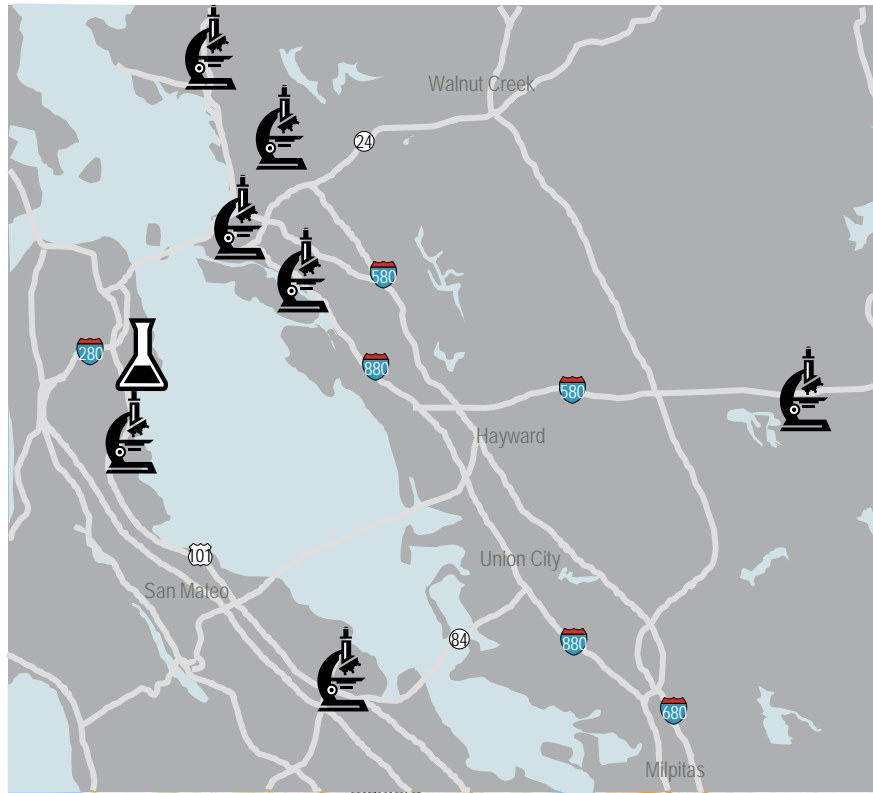
Under construction

Large blocks of space

San Francisco Bay Area

Major lab supply:
Clusters of established lab stock with long-time industry presence

Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Economic scorecard

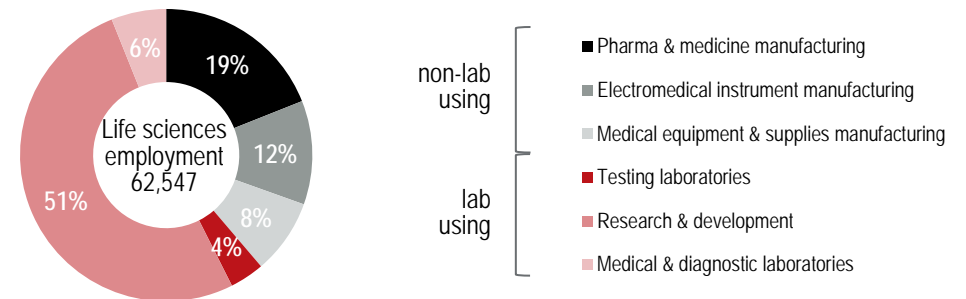
Cluster score:
72.4

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	62,547	3.8%	15.2%
Establishments	1,466	0.9%	7.2%

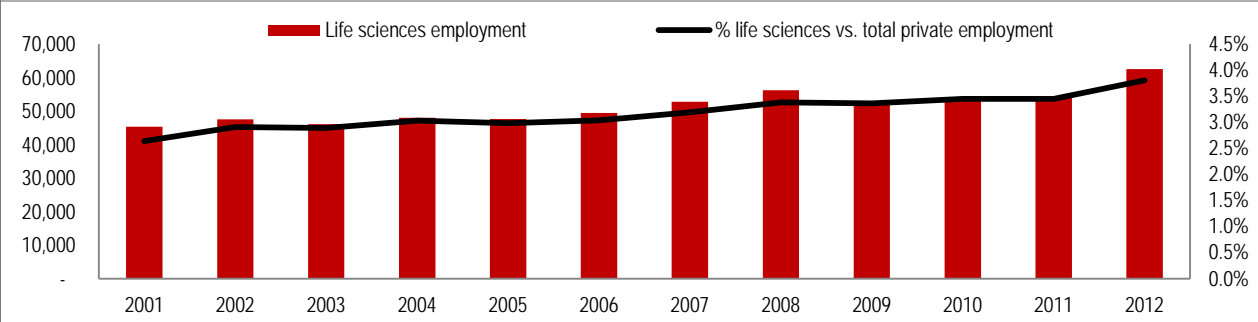
Funding	Total life sciences	% to total U.S.
VC funding	\$729.1M	8.6%
NIH funding	\$873.0M	3.9%

Innovation	Total life sciences	% to all patent classes
Patents	1,652	25.5%

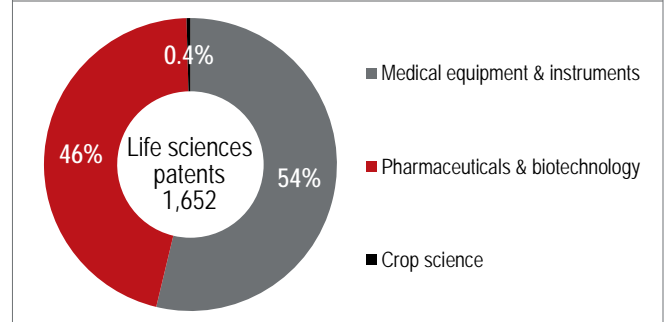
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Bay Area

Metro overview

The San Francisco Bay area has long been a major hub of innovation in the life sciences sector as it home to not only several well-renowned life science companies, but a multitude of smaller firms looking to innovate the industry. For this reason, the Bay Area continues to draw talent from around the world while local universities that boast some of the nation's top science programs further add to a well-educated talent pool. Its reputation of being one of the top urban centers of the world continues to attract people of different cultures, and for this reason San Francisco has become one of the most diverse cities in the entire Bay Area.

Neighboring San Francisco is the San Francisco Mid-Peninsula, which incorporates all cities within San Mateo County. The Mid-Peninsula fosters a highly educated workforce while its central location and established transportation network offer excellent access to the entire Bay Area, including the East Bay. Although the area is better known for being an innovation center for the high-tech sector, there are several major pockets of life science clusters, including South San Francisco, which became a Genentech headquarters location upon their 2009 acquisition of Roche Pharmaceuticals.

Mission Bay/China Basin

The San Francisco life science inventory, concentrated in the Mission Bay/China Basin submarket, has remained relatively stagnant until recently. 499 Illinois Street, a building that sat vacant since the completion of its construction in 2008, is now almost fully leased by Illumina, Medivation and UCSF. Kaiser Permanente also recently agreed to purchase the parcel of land at 1600 Owens Street, a property that is entitled for a 264,000-square-foot building with a laboratory component.

While vacancy within the life science inventory has remained relatively stable at 18.1 percent throughout 2013, it is due to the fact that 499 Illinois Street is currently 100.0 percent vacant. However, once tenants take occupancy later this year, vacancy within the life science inventory is expected to decrease by 2.6 percent. Rental rates within the area have also remained steady at more than \$60.00 per square foot on a full service basis due to the current lack of available space.

Mission Bay and the surrounding area is poised for substantial growth with future developments including parks and open space, housing, retail, and over 2.5 million square feet of commercial office, research, and biotechnology lab space. Additionally, UCSF has 57 acres with 2.7 million square feet of new development planned, including a 550-bed hospital.

Facilities scorecard

Supply	North County Major lab	South County Major Lab	Mission Bay/China Basin Emerging lab
Rentable lab stock (% of total stock)	6.1M s.f. 98.4%	2.5M s.f. 47.4%	1.16M s.f. 47.0%
Direct vacancy (Change year-over-year)	1.8% (1.7) ppts	9.3% 0.3 ppts	18.1% (1.4) ppts
# of large blocks over 100,000 s.f.	0	0	0
Under construction (s.f.)	0	0	246,138
Pricing			
Average asking rent (NNN) (Change year-over-year)	\$33.00 p.s.f. 7.4 %	\$35.04 p.s.f. 15.9 %	\$40.00 p.s.f. 5.6%

ILLUMINA

499 Illinois Street
Mission Bay/China Basin
97,702 s.f.
Term: 10 years

MEDIVATION

499 Illinois Street
Mission Bay/China Basin
51,632 s.f.
Term: 10 years

UCSF-REI

499 Illinois Street
Mission Bay/China Basin
30,660 s.f.
Term: 15 years

CLOVIS ONCOLOGY

1700 Owens Street
Mission Bay/China Basin
19,234 s.f.
Term: 21 months

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Bay Area

North San Mateo County

North San Mateo County has long been one of the Bay Area's major life sciences and biotechnology hubs as it houses several well-known companies such as Genentech, Life Technologies, Onyx Pharmaceuticals, Amgen and Gilead Sciences. Given that Genentech dominates the area from an occupancy standpoint, other life science companies clustered around the campus over time, and have continued to do so. This has created a diverse mix of both experience and young innovation that South San Francisco is known for in the life sciences community.

From a real estate perspective the vast majority of life sciences product is located in the South San Francisco area. This has long been the epicenter of the life sciences community for San Mateo County and continually draws in talent from all around the Bay Area and from nearby UC San Francisco. Two of the most active landlords in South San Francisco are Biomed Realty and Alexandria Real estate, who over the past 24 months have been able to weather stagnant leasing conditions. However, vacancy rates have been on a downward trend since 2012 thanks to the overall growth in the life sciences sector as well as the growing trend of successful life sciences IPOs. This has led to the steady growth in asking prices, as quality lab product has become scarce, while start-up life sciences firms have been actively targeting sublease space with lab improvements already in place. Despite the consistent trend in leasing activity, it has not been enough for developers to build brand new lab product. Conditions will likely remain the same as there are other submarkets with enough available supply to satisfy most tenant requirements.

South San Mateo County

Despite having a much smaller inventory of lab product, South San Mateo County is another life sciences hub for the San Francisco Mid-Peninsula market and is comprised of Palo Alto, Menlo Park, Redwood City and San Carlos. Like the North County, the region is known for having a highly educated workforce while access to Stanford University makes it an ideal location for companies looking to tap into young, innovative talent. Despite the fact that the South County's tenant base is predominantly tech firms, life sciences companies such as Natera, CardioDx, Abbott, Genomic Health and Alvine Pharmaceuticals have all established laboratories in the area, primarily in the Redwood City submarket.

Leasing activity for in the Redwood City area has remained consistent over the past 12 months as a majority of the transactions have been within the 15,000 to 25,000 square foot range. However, there were some notable leases that signed in 2013, including Relypsa's deal at 700 Saginaw Drive. Meanwhile CardioDX will occupy space in an adjacent set of buildings at 500-600 Saginaw Drive. With available lab space slowing coming off the market, overall conditions in Redwood City and surrounding areas have begun to tighten, following a similar trend in demand for office space in the South County. As a result, asking rents will continue to grow until a significant amount of large block supply is added to the market.

Facilities scorecard

Supply	North County Major lab	South County Major Lab	Mission Bay/China Basin Emerging lab
Rentable lab stock (% of total stock)	6.1M s.f. 98.4%	2.5M s.f. 47.4%	1.16M s.f. 47.0%
Direct vacancy (Change year-over-year)	1.8% (1.7) ppts	9.3% 0.3 ppts	18.1% (1.4) ppts
# of large blocks over 100,000 s.f.	0	0	0
Under construction (s.f.)	0	0	246,138
Pricing			
Average asking rent (NNN) (Change year-over-year)	\$33.00 p.s.f. 7.4%	\$35.04 p.s.f. 15.9%	\$40.00 p.s.f. 5.6%

Crescendo Bio
341 Oyster Point Boulevard
South San Francisco
53,950 s.f.
Term: 36 months

Relypsa
700 Saginaw Drive
Redwood City
39,915 s.f.
Term: 84 months

CardioDX
500-600 Saginaw Drive
Redwood City
69,449 s.f.
Term: 72 months

323-393 Vintage Park Drive
San Mateo
162,000 s.f.
Class B
\$59.7M / \$369 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Oakland Metro

Oakland Metro Overview

The Oakland metro area is the center for the life sciences industry in the San Francisco Bay Area, making it one of the most robust markets in the nation. With anchored research institutions including the University of California at Berkeley, Lawrence Berkeley National Laboratories, California State University East Bay, and Children's Hospital Oakland Research Institute and major companies including Novartis, Bayer HealthCare, Dynavax Technologies, Santen and Amgen, the Oakland Metro area maintains an advantage over other life sciences clusters in California.

The creation of the Oakland Enterprise Zone in 1993 gave businesses located within the zone a variety of tax incentives to promote hiring, which include two major life sciences submarkets of Berkeley and Emeryville. Though venture capital funding has increased over the past year, the Oakland metro area has seen little occupancy growth due to the lingering impact of the patent cliff on big pharma.

Alameda

The concentration of medical device manufacturing occurs in the Alameda submarket and concentration along Harbor Bay Parkway in the Alameda-South submarket. Many life sciences tenants occupy space for their manufacturing or lab research facilities here. For example, Girl Scouts of America Northern California LLC leased 20,688 square feet in 1650 Harbor Bay Parkway for 10 years. This location is where they utilize a lab component to research and test new cookie flavors.

Berkeley/Emeryville

The Berkeley/Emeryville area is arguably the most active life sciences market out of both the Oakland Metro and greater East Bay market. With the average asking rent of \$33.12 per square foot NNN, it is the most expensive submarket for space. Major anchor tenants include Novartis, who alone occupies over 600,000 square feet in Emeryville. Lawrence Berkeley National Laboratory (LBNL) occupies over 1.8 million square feet in the Berkeley submarket; most of the lab space being on the UC Berkeley campus and above in the Berkeley Hills. However, due to lack of available space and high rental rates in Berkeley, LBNL, with the partnership of UC Berkeley, is expanding and moving some research into the Richmond submarket.

The Berkeley/Emeryville area continues to attract a majority of life science tenants due to the creation of the Oakland Enterprise Zone, which gives tax incentives to promote hiring in the life sciences industry. Amryis Biotechnologies Inc. renewed 113,384 square feet at 5885 Hollis Street for 10 years and 1 month. KineMed Inc. signed a 9,985-square-foot lease at 5980 Horton Street for four years and five months.

Richmond

With the purchase of the JOINN Innovation Park and the Richmond Bay Campus under construction, Richmond is benefitting from life sciences tenant demand spillover from UC Berkeley, LBNL and other major life science tenants. Asking rents in this market are discounted at \$16.80 per square foot NNN as well as there is ample amount of large available space and land for tenants looking to expand and build their own research facilities.

Facilities scorecard

Supply	Alameda Emerging lab	Berkeley/Emeryville Major lab	Richmond Emerging lab
Rentable lab stock (% of total stock)	285,356 s.f. 100.0%	688,500 s.f. 25.0%	159,000 s.f. 31.0%
Direct vacancy	20.0%	20.0%	20.0%
# of large blocks over 100,000 s.f.	0	2	0
Under construction (s.f.)	0	0	0
Demand			
# of requirements	2	3	0
Total s.f. requirements	85,000 s.f.	136,000 s.f.	
Pricing			
Average asking rent (NNN)	\$21.00 p.s.f.	\$33.12 p.s.f.	\$16.80 p.s.f.

AMYRIS BIOTECHNOLOGIES, INC.
5885 Hollis Street
Emeryville
113,384 s.f.
Term: 10 years, 1 month

JOINN INNOVATION PARK (7 buildings)
Richmond
355,000 s.f.; 53.0-acre site
Lab, office, & manufacturing facility
\$10.6M

RICHMOND BAY CAMPUS
Richmond
5.4M s.f. research facilities
Developer: Lawrence Berkeley National
Lab & UC Berkeley
Expected delivery: complete environment
process in 2016 & phase-in buildings until
2050

5353 HORTON STREET(5 buildings)
Emeryville
470,905 s.f.
Mix of lab, office & flex
\$1.675M / \$3.56 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

East Bay Suburbs

East Bay Suburbs

The greater East Bay area consists of one major life sciences market, Livermore, which is anchored by Lawrence Livermore National Laboratory, a national research institution. In addition, the greater East Bay is home to Astex Pharmaceuticals, which is located in the Dublin as well as the Department of Energy Joint Genome Institute (JGI) in the Walnut Creek-Shadelands submarket. The DOE JGI, which specializes in research on clean energy is run by UC Berkeley.

Livermore

Livermore is home to Lawrence Livermore National Laboratory (LLNL), which is a federally funded research and development center for science and technology applied to national security. LLNL has over 2.75 million square feet of known lab space on the one-square-mile campus that is continuing to grow and expand its footprint in the Livermore area. In 2011, the city of Livermore expanded its city boundaries to include LLNL in the city limits and allow for them to expand its footprint.

Facilities scorecard

Supply	Livermore Major lab
Rentable lab stock (% of total stock)	2.76M s.f. 100%
Direct vacancy	0%
# of large blocks over 100,000 s.f.	0
Under construction (s.f.)	0
Demand	
# of requirements	2
Total s.f. requirements	145,000 s.f.
Pricing	
Average asking rent (NNN)	N/A

*Livermore's rentable lab stock is all owner-occupy due to it being a national research lab and has two requirements out.

Seattle Metro Area



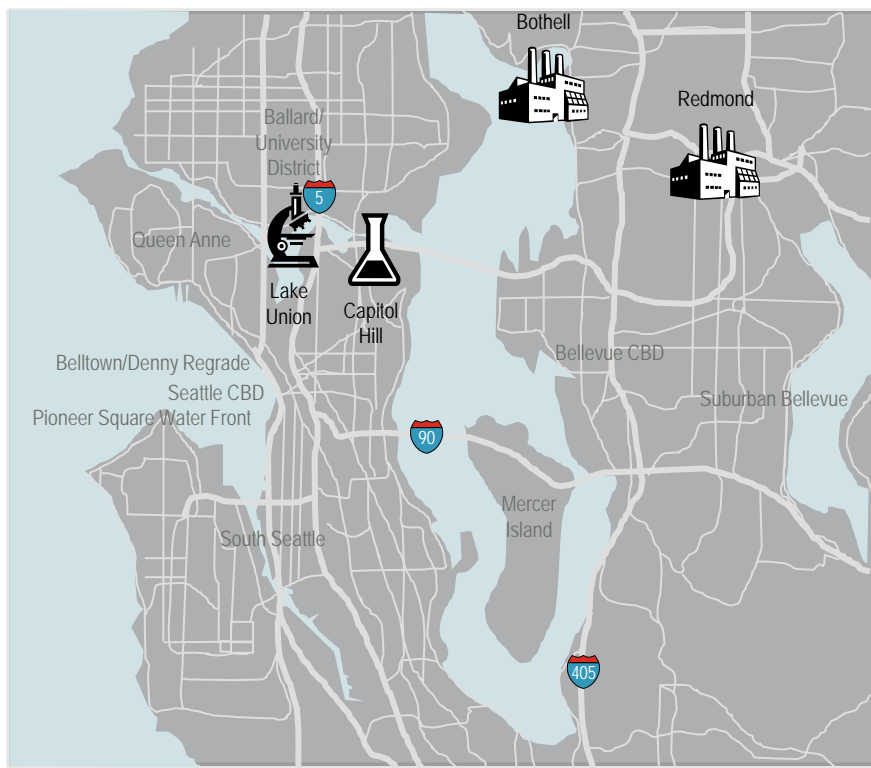
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Economic scorecard

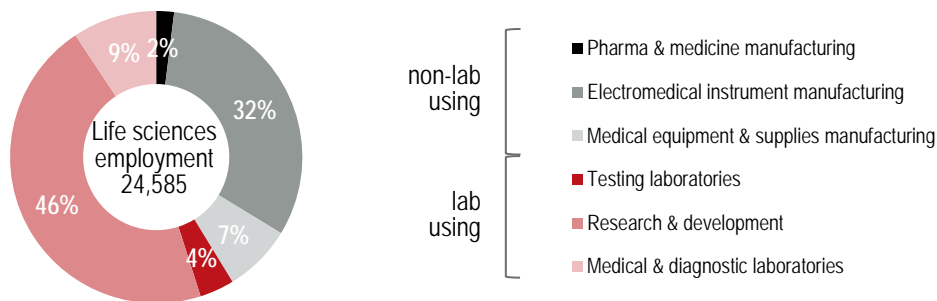
Cluster score:
40.4

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	24,585	2.0%	-1.3%
Establishments	875	0.9%	1.9%

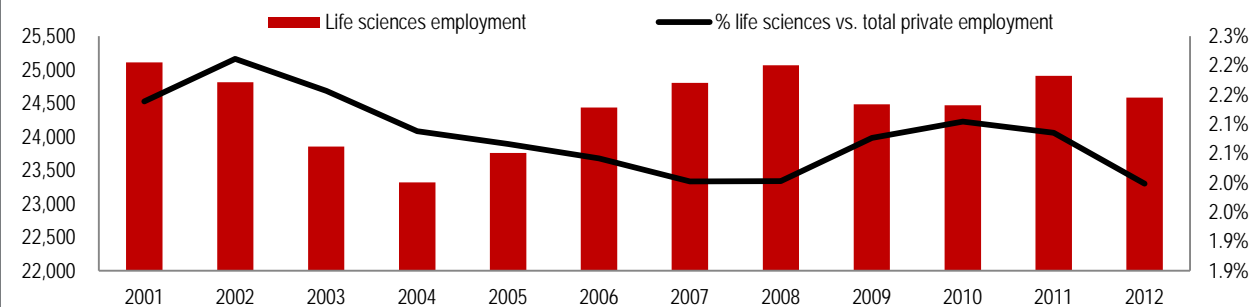
Funding	Total life sciences	% to total U.S.
VC funding	\$275.7M	3.2%
NIH funding	\$773.8M	3.5%

Innovation	Total life sciences	% to all patent classes
Patents	411	11.4%

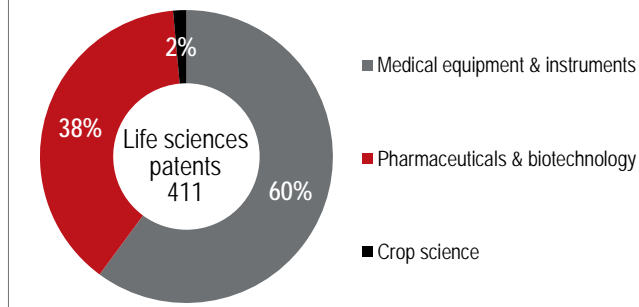
Life sciences employment composition



Historical life sciences employment



Life sciences patents by classification



Seattle

Seattle overview

Seattle is one of the nation's premier life sciences markets, due primarily to its strength in research and development. In fact, nearly half of all life sciences jobs in the area are based in research and development. This can be strongly attributed to the presence and generous funding of some of the world's largest philanthropic organizations, such as the Bill & Melinda Gates Foundation, which has funded several major grants to Seattle-based research institutes. Additionally, the University of Washington consistently ranks in the top five of institutions receiving NIH funding. Seattle's major research institutes include the Allen Brain Institute, Benaroya Research Institute, Seattle Biomedical Research Institute, the Infectious Disease Research Institute and the Institute for Systems Biology which focuses on global health and third world infectious diseases.

Lake Union

The Lake Union area is Seattle's life sciences epicenter—with nearly 3.2 million square feet of life sciences space, it makes up a significant portion of Seattle's overall life sciences market. Lake Union is situated just north of Seattle's CBD and offers a more urban campus feel to its buildings than its traditional CBD brethren to the South. This market is dominated by life sciences and tech companies who thrive on an amenity-rich environment to maintain and increase employment retention and company growth. Washington state's national acclaim as a hub for biotechnology research can be traced directly to Lake Union, as the aforementioned Allen Brain Institute, Seattle Biomedical Research Institute, the Infectious Disease Research Institute and the Institute for Systems Biology all have headquarters in the submarket. Additionally, the Fred Hutchinson Cancer Research Center, which employs more than 2,700 people and occupies more than 1.4 million square feet in Lake Union, has been funding new biotech companies. Juno Therapeutics, a biotech start-up focused on cancer immunotherapy, recently expanded its Series A venture financing to \$145.0 million. The company, already one of the richest biotech start-ups in history, has the potential to grow into one of Lake Union's major industry players.

South Lake Union is a robust and stable market, which has seen a continual downward trend in vacancy over the last two years and currently is nearing 2.0 percent. There are several proposed life sciences buildings in various stages of development; however, the only project currently under construction is Vulcan's build-to-suit for the Allen Brain Institute. With limited supply to satisfy the demand, tenants may look to traditional office space for life sciences conversion. The downward pressure on vacancy has escalated lab rents, with some spaces achieving as high as \$55.00 per square foot NNN. Rental rates should continue to rise as space demand remains constrained.

Capitol Hill

Capitol Hill is a densely populated residential neighborhood situated just east of the Seattle CBD. The area features a thriving retail and restaurant scene which caters to its eclectic mix of residents, but is perhaps best known for housing several major health care facilities: Harborview Medical Center, Swedish Medical Center and Virginia Mason Medical Center. While its life sciences inventory is just a fraction of the size of Lake Union, Capitol Hill is worth mentioning as it is home to the Benaroya Research Institute, Theraclone Sciences, CellNetix Pathology & Laboratories and PharmaIN, among others.

Facilities scorecard

Supply	Lake Union Major lab	Capitol Hill Emerging lab
Rentable lab stock (% of total stock)	1.8M s.f. 55.7%	0.8M s.f. 62.5%
Direct vacancy (Change year-over-year)	2.6% 2.2 ppts	33.0% 0 ppts
# of large blocks over 100,000 s.f.	0	0
Under construction (s.f.)	0	0
Pricing		
Average asking rent (FS) (Change year-over-year)	\$32.87 p.s.f. 3.3%	\$41.38 p.s.f. 12.2%

SEATTLE REPRODUCTIVE MEDICINE

1505 Westlake Avenue N
Lake Union
26,660 s.f.
Term: 10 years

SEATTLE LIFE SCIENCE CENTER

1100-1124 Columbia Street
Capitol Hill
164,345 s.f.
Class B
\$42.6M / \$259 p.s.f.

FAIRVIEW RESEARCH CENTER II

500 Fairview Avenue N
Lake Union
140,000 s.f.
BioMed Realty Trust
Expected delivery: TBD

INSTITUTE FOR SYSTEMS BIOLOGY

401 Terry Avenue N
Lake Union
140,605 s.f.
Class A
\$106.1M / \$755 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Suburbs

Suburbs overview

The suburban market to the northeast of downtown Seattle offers quality low cost alternatives to the more expensive Lake Union and Capitol Hill submarkets. This area is unique in that while it is extremely close to the Bellevue CBD, its buildings, tenants and overall feel are quite different. Its office parks and low rise office buildings are embedded amongst evergreen trees, wetlands and parks which make this submarket feel like a detachment from the bustling metropolitan lifestyle just minutes away in the CBD. This allows companies to attract talent with access to nearby amenities, at a significantly discounted cost of living. Major firms such as Seattle Genetics, Amgen, HaloSource, SonoSite and Alder Biopharmaceuticals occupy this market which has become a viable second option for Seattle-area life science users.

Bothell

While the Bothell submarket is geographically located in the Northend, its close proximity to Redmond and high-tech/biomedical tenancy makes Bothell direct competition to the Eastside's suburban submarkets. Bothell is one of the most diverse and fastest growing submarkets in the I-405 corridor area. Bothell's market consists of nearly 6.3 million square feet of office and flex product, much of which has a significant amount of lab/wet lab space. Bothell is the second largest life sciences market in Puget Sound at 1.9 million square feet spread between its two core areas of Canyon Park and North Creek. With a suburban campus feel, higher parking ratios and larger floor plates, it offers life sciences tenants the ability to maximize efficiency by not splitting up researchers onto multiple floors and also taking advantage of significantly discounted rental rates as compared to Lake Union.

Bothell's multitude of life sciences companies offer a cohesive symbiotic tenancy amongst life sciences users who all benefit from more economic rents, state-of-the-art product, efficient floor plates and well designed infrastructure. With a lack of premier space in Capitol Hill and limited availability in the Lake Union area—currently no blocks of space available larger than 50,000 square feet—Bothell should see significant spillover demand in the coming quarters as expansion space is readily available. Vacancy has been trending down in Bothell and currently stands at 17.3 percent; however, there is a sizable amount of sublease space available.

Redmond

Redmond tends to share life sciences tenant demand with Bothell, and as such has experienced elevated vacancy for the last three years. However, the submarket performed well in 2013, as direct vacancy dropped 220 basis points, and Bio-Rad, one of the major users, renewed its lease of 54,952 square feet.

Redmond is a strong and vibrant market that boasts excellent infrastructure, amenities as well as a highly educated in-place workforce. As the home to Microsoft, Nintendo and other blue chip companies, Redmond will continue to attract top talent to the area. While the inventory of leased life sciences space in Redmond is small, just 500,000 square feet, companies seeking a suburban atmosphere and substantially discounted cost of business will increasingly consider Redmond.

Facilities scorecard

Supply	Bothell Manufacturing	Redmond Manufacturing
Rentable lab stock (% of total stock)	1.5M s.f. 79.2%	0.5M s.f. 100%
Direct vacancy (Change year-over-year)	17.3% 1.8 ppts	18.1% 2.2 ppts
# of large blocks over 100,000 s.f.	1	0
Under construction (s.f.)	0	0
Pricing		
Average asking rent (NNN) (Change year-over-year)	\$18.16 p.s.f. (2.1)%	\$14.26 p.s.f. 0.2%

ALDER BIOPHARMACEUTICALS

11804 North Creek Parkway S
Bothell
36,654 s.f.
Term: 37 months

SEATTLE GENETICS CAMPUS

21717 & 21823 30th Drive SE
Bothell
144,900 s.f.
Class A
\$38.0M / \$262 p.s.f.

BIO-RAD

6565 185th Avenue NE
Redmond
54,952 s.f.
Term: 67 months

HIGHLANDS CORPORATE CENTER

22011 30th Drive SE
Bothell
173,254 s.f.
Class A
\$38.8M / \$224 p.s.f.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Brazil

Country overview

For the past several years, Brazil has been categorized as one of five growing “BRICK” nations expected to have lasting effects on the global economy. Each of these countries is making strides to increase its influence over global innovation and to create an economy that is friendly to global business practices. While Brazil’s innovative contributions are still new and growing, its political stability for nearly two decades and greatly improved economic situation has truly set it apart from other Latin American countries. The growing purchasing power of the middle class has dramatically increased domestic demand for technology and healthcare. According to APEX-Brazil, Brazil’s per capita healthcare expenditures grew 14.0 percent from 2001-2011, in comparison to 6.0 percent worldwide and 10.0 percent for Latin America.

With solid roots in manufacturing and agricultural capabilities, Brazil is poised to further develop its reach in the life sciences industry. Brazil ranks second among global nations for production of biotech crops (according to the International Service for the Acquisition of Agri-Biotech Applications) and has the largest medical equipment market in the South America. Until recently, a majority of drugs for human use manufactured in Brazil have remained in the domestic market, as good manufacturing practices (GMP), quality control measures and export policies were not attractive to companies wishing to produce drugs for foreign consumption. Recently, however, the National Health Surveillance Agency (ANVISA) has instituted national standards for good manufacturing and laboratory practices, following OECD standards, making medicines eligible for export without adaptation.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	266,709	2.8%	52.0%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	5.0%	6.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	1.2%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year over year growth
PCT applications	114	0.4%	5.6%

Brazil’s life sciences industry is made up of over 1,200 companies, with over 75.0 percent of companies located in São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul. Recently, however, movements toward more central states, such as Goiás, have been observed due to tax incentives. According to APEX-Brazil, pharmaceutical revenues reached BRL 36.9 billion (\$17.2 billion)¹ and medical device sales were BRL 7.3 billion (\$3.4 billion)¹ in 2011, representing a year-over-year increase of 8.4 percent and 10.3 percent, respectively.

Country outlook

Improvements to manufacturing capabilities and processes and related multinational partnerships are well under way across Brazil. Probably the biggest area of opportunity exists in local research and development and, further, the transfer of technology from research bench to marketplace. Currently most R&D activity occurs in universities and public research centers, and the amount of privately funded research remains low. A majority of the investment and plans by the Brazilian government are targeted toward encouraging foreign direct investment and multinational partnerships, improving intellectual protection and technology transfer and creating research parks and incubators to bolster small and medium Brazilian private research companies.

¹ Twelve-month average conversion rate of BRL 2.15 per U.S. dollar, from 1/1/2013 to 12/31/2013.

São Paulo, Minas Gerais, Rio de Janeiro, Rio Grande do Sul

Metro overviews

Life sciences companies are primarily located among the four major states of São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul, clustered around the country's leading universities, most populous and most affluent cities. The industry is supported by capital sources, access to talent and existing manufacturing and research infrastructure to support necessary operations. Multinational companies tend to congregate in these regions, and since over half of medical device and pharmaceutical investments are from foreign sources, clustering along the southern and southeastern coasts self perpetuates.

Overall, the industry is heavily tied to the country's national healthcare system, Sistema Único de Saúde (SUS) or Unified Health System. SUS cares for over 80.0 percent of the population and makes up nearly 50.0 percent of healthcare spending in the country. The impact is twofold. First, since healthcare expenditures make up a large amount of public spending, advancing the industry and growing domestic companies are top of mind for the Brazilian government. This benefits the industry tremendously via development investments and a business-friendly mindset to increase the ease of doing business and intellectual property protection for both domestic and multinational companies. Secondly, the programs and policies created by the SUS heavily influence what type of businesses perform well in the market. For example, SUS recently established a program to increase the spending cap allowance on medical equipment for public sector entities, like hospitals, providing the equipment was manufactured locally.

Brazil's pharmaceutical industry is made up of over 600 companies, comprised of both large multinational players locally manufacturing products and large national companies. Nearly 40.0 percent of the pharmaceutical market resides in São Paulo, while Rio Grande do Sul, Rio de Janeiro and Goiás represent a 18.0 percent, 12.0 percent and 6.0 percent share, respectively. Brazil's pharmaceutical market is heavily comprised by generics, with EMS Pharma and Medley, both national companies, accounting for 50.0 percent of the market. EMS and Medley are also in the top five brand name retail players, joined by fellow national companies Ache and Eurofarma and U.S. subsidiary Sanofi-Aventis. The wholesale market is dominated by foreign multinationals with Roche, Novartis and AstraZeneca comprising the top three by market share.

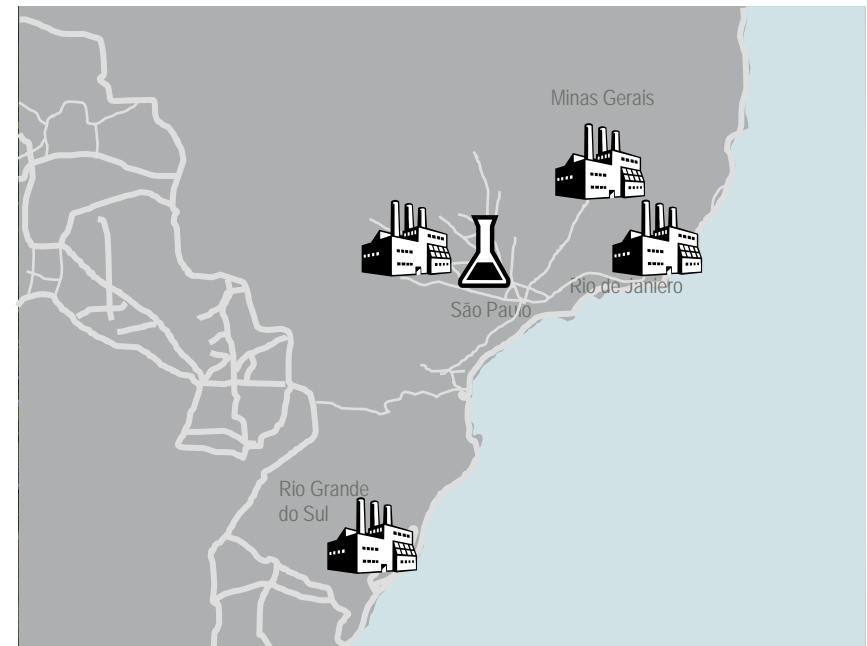
Related to biotechnology, Brazil's successes to date have been primarily in the area of crop science, as it is now the number two global producer of biotech crops. While growth is expected to continue in this area, efforts by the government are also targeted toward growing research and development efforts for human and animal use biologics. While Brazil has over 200 biotech companies, more than half employ less than 10 people and nearly all are funded publicly via universities and the like. Similar to pharmaceuticals, nearly all biotech companies are located in these four states, with the majority (40.0 percent) in São Paulo. The government hopes the creation of technology parks and incubators will ignite growth of a private biotechnology sector, encouraging both the establishment of domestic firms and attracting foreign multinationals to partner and invest in private entities in Brazil.



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Roughly 450 medical device manufacturers are located in Brazil with nearly 94.0 percent located in the south and southeast regions; roughly 68.0 percent in São Paulo and an additional 17.0 percent in Rio Grande do Sul and 6.0 percent in Rio de Janeiro. Nearly 70.0 percent of medical device companies are small to medium sized family businesses that manufacture hospital furniture, dental equipment and other less technical equipment for domestic use. While large multinational corporations, like Siemens, GE, Baxter and Becton Dickinson, have a minority stake of roughly 12.0 percent, they supply a large amount of equipment for the highly technical equipment and devices needed by hospitals.

SANOFI-AVENTIS*

America Business Park
São Paulo – Chucuri Zaidan
7,900 sqm

*Office product

PFIZER

Alexandre Duma, 1860
São Paulo – Chucuri Zaidan
6,043 sqm

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Canada

Country overview

The life sciences sector is a pillar of Canada's economy as it currently represents about 7.0 percent of the country's GDP, and employs a total of 400,000 people nationally. A main contributor to the industry is the research and development (R&D) expenditures by big pharma firms such as Pfizer, GlaxoSmithKline, Merck, Novartis, Sanofi, AstraZeneca and Roche.

The Canadian government, both at the federal and provincial level, provides some highly attractive R&D incentives. The main federal incentive is the Scientific Research and Experimental Development Program which is a tax credit that varies depending on R&D spending totals, with a CAD 30.0 million (\$29.1 million)¹ threshold. The federal government also recently committed a total of CAD 25.0 million (\$24.3 million)¹ to two Canadian venture capital (VC) funds focused on the life sciences sector, as part of its Venture Capital Action Plan. To put that into perspective, CAD 250.0 million (\$242.6 million)¹ was invested across 63 Canadian life sciences deals by VC in 2013. Due to the government's increasing efforts to boost R&D in Canada, we expect the country will continue to attract leading life sciences researchers, investments and companies.

In October, 2013 Canada signed the Comprehensive Economic and Trade Agreement (CETA) with the European Union. One of the many benefits this will allow is the integration between the two regions' intellectual property (IP) procedures; specifically, the introduction of patent term restoration and right of appeal. We expect this to have substantial implications for the Canadian life sciences sector, as more effective IP protection, combined with Canada's abundant talent and competitive costs, will make the country more attractive for R&D and clinical trials.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	221,360	12.7%	67.3%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	11.0%	10.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	1.7%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	418	1.6%	-2.3%

Similar to the United States, Canadian companies and operations have been heavily impacted by revenue declines as a result of the "patent cliff." In 2012, arguably the height of the patent cliff, Pfizer cut 300 Canadian jobs, a year after one of its blockbuster drugs, Lipitor, lost its patent. More recently, Novartis announced that its plant in Mississauga, Ontario, will be fully shut down by the end of 2014, resulting in a loss of 300 jobs. As the patent cliff phenomenon continues through to 2016, we expect big pharmas to continue right-sizing as they balance diminished product demand and new product opportunities via partnerships or acquisitions of smaller firms. It is important to note, however, that rightsizing does not necessarily mean downsizing; Roche Canada recently moved into new headquarters in Mississauga, Ontario, and will invest CAD 200.0 million (\$194.2 million)¹ over the next five years to add 200 jobs.

Country outlook

Moving forward, we expect investment capital to remain a challenge for Canadian life sciences firms. Although VC activity returned in 2011, the amount invested continues to remain stagnant and pales in comparison to the CAD 1.13 billion (\$1.09 billion)¹ invested across 2,758 life sciences deals in the United States in 2013. With the increasing trend of big pharmas looking to rightsize, partner or acquire smaller R&D firms, we can also expect the industry to start demanding smaller, more flexible space rather than large, multimillion dollar facilities.

¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Greater Toronto Area (GTA)

Metro overview

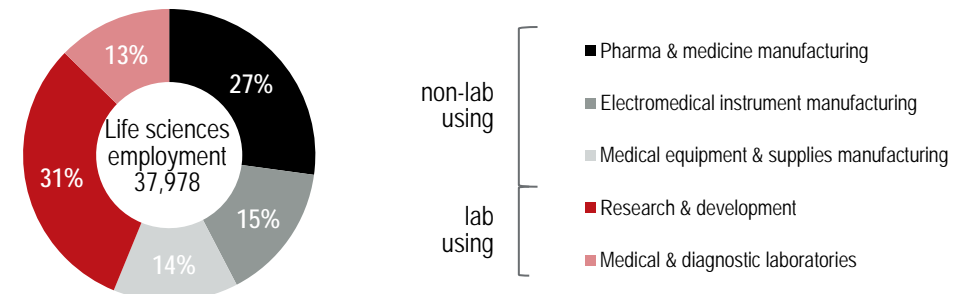
The Greater Toronto Area (GTA) is positioned in the middle of the second largest life sciences cluster in North America: the Québec-Ontario Life Sciences Corridor. Supported by the lowest business environment costs among the G7 countries and representing one of the most favorable tax environments in the world for innovation partnerships, the Corridor is a leading jurisdiction for life sciences patents. Spanning both provinces, the Corridor provides new opportunities for investment in the industry and plays a major role in the advancement of life sciences discovery and its corresponding commercialization. Currently, the Corridor hosts more than 1,100 companies, 66,000 qualified professionals and 490 educational programs in the biological and biomedicine sciences. In 2013, GTA's life sciences industry alone saw over CAD 36.0 million (\$34.9 million)¹ in investment funds.

Similar to the global life sciences industry, Toronto has felt the effects of the biggest wave of patent expiration in the pharmaceutical industry's history. The patent cliff has resulted in decreased demand for branded pharmaceuticals in the mature North American and European markets, and therefore depleted revenue. As a result, the large pharmaceutical companies at the core of markets like Toronto are needing to cut costs elsewhere to offset such revenue losses. The market has witnessed manufacturing jobs moving overseas to countries with lower labor and manufacturing costs, and the centralization of research and development around areas with the best access to resources. Examples include Boston's life sciences cluster, and Toronto's Discovery District. This shift of manufacturing and research and development (R&D) has been particularly noticeable in the suburban areas where GTA's primary manufacturing hubs are located as companies right-size to primarily administration and sales/marketing divisions. This, however, is only a bump in the road; with Canada's economic recovery, the life sciences sector in the GTA has already begun its rehabilitation.

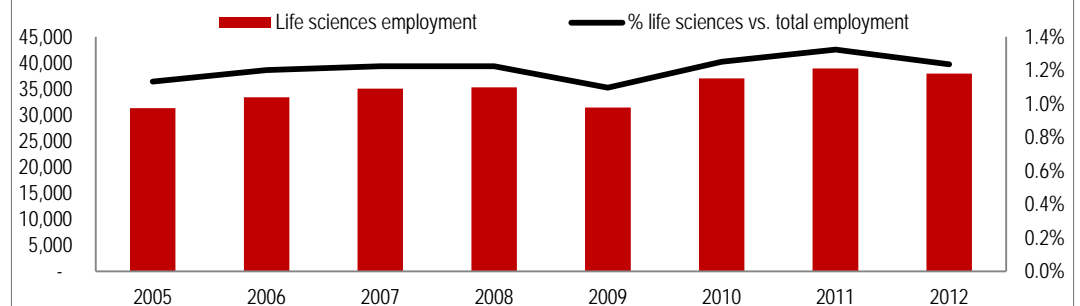
Economic scorecard

Workforce		Total life sciences	% life sciences to private employment	Year-over-year growth
Employment		37,978	1.2%	-2.5%
Funding		Total life sciences	% to total Canada	
VC funding		CAD 36.2 M (\$35.1 M) ¹	14.5%	

Life sciences employment composition



Historical life sciences employment



¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Greater Toronto Area (GTA)

Downtown Toronto

Located in the heart of downtown Toronto, the Discovery District holds one of North America's largest cluster of research institutes, related business incubators and support services. With over 7.0 million square feet of facilities including the University of Toronto, affiliated teaching and research hospitals, over 30 medical and related research centers and a mix of biomedical companies, the district has a reputation for medical and technological breakthroughs, notably in areas such as breast cancer, cardiovascular diseases, Alzheimer's and cystic fibrosis research. The Discovery District is expanding as highlighted by the 2013 completion of the MaRS Discovery Centre Phase II, a 700,000-square-foot advanced sciences center, expected to draw new companies into Toronto. A state of the art building in the heart of Toronto, MaRS represents an ideal environment for scientific advancement, but has the high real estate costs associated with it. Gross asking rates are CAD 53.00 to 56.00 per square foot (\$51.40 to \$54.30 p.s.f.)¹ and with only 350,000 square feet currently leased, MaRS appears to be awaiting a full industry recovery rather than lowering its rates to accommodate smaller, less profitable companies. Downtown Toronto houses a wide spectrum of industry sectors that have collectively seen an employment growth of over 2,000 jobs over the past four years. These gains have primarily been driven by growth in medical equipment & supplies manufacturing, research & development services and medical & diagnostic laboratories. Overall, the industry's prosperity in Downtown Toronto has been driven by employment growth, interprovincial cooperation, a state-of-the-art research cluster and the benefits of a reputation as one of the top global environments for discovery, innovation and success.

Mississauga / Meadowvale

The largest cluster of life sciences companies in the suburban GTA is found in the city of Mississauga in the node of Meadowvale, since nicknamed "pill hill." Meadowvale is a clear indication of the continued success of the life sciences sector in the GTA, boasting positive absorption of over 100,000 square feet almost every quarter over the last five years. The best performing life sciences sector in Mississauga is research and development which has more than doubled the number of companies over the past 10 years. Testing laboratories and pharmaceutical wholesalers/distributors have also seen growth with 79.0 percent and 51.0 percent increases in employment, respectively, since 2001. As a result of the patent cliff, the pharmaceutical and medicine manufacturing sectors have proven to be the weakest, illustrated by AstraZeneca's recent sale-leaseback of its 1004 Middlegate Road manufacturing and office location for CAD 24.0 million (\$23.3 million)¹ to Crown Realty Partners. This sale is part of a rightsizing trend seen in the past five years and the company is now leasing back 100,000 square feet of office space. Other significant movements include: Bayer Pharmaceuticals, which recently committed to a 134,558-square-foot lease at 2920 Matheson Boulevard after selling its existing multiuse property at 77 Belfield Road for CAD 15.5 million (\$15.0 million)¹; Roche Canada's recent move to its brand new space at 7070 Mississauga Road, leaving 2455 Meadowpine Boulevard; Novartis, who is closing its 6515 Kitimat Road location in late 2014; and Pfizer, which cut 300 jobs and is currently subletting its former 5975 Whittle Road location. While manufacturing companies have notably been shedding space, Mississauga has seen a 24.0 percent increase overall in the number of life sciences companies and a 10.4 percent increase in employment since 2001. These positive trends are expected to continue as industry confidence and investment flows to the GTA and the Quebec-Ontario Life Sciences Corridor.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



MERCK
6755 Mississauga Road
Meadowvale
10,000 s.f.
Term: 10 years

1004 MIDDLEGATE ROAD
Mississauga
529,178 s.f.
Class B
CAD 24,000,000 / CAD 45.35 p.s.f.

661 UNIVERSITY AVENUE
Downtown North
402,080 s.f.
Class A
For Lease

7150 MISSISSAUGA ROAD
Meadowvale
79,406 s.f.
Class A
For Lease

¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Greater Montreal Area (GMA)

Metro overview

The Greater Montreal Area (GMA) life sciences industry ranks among the largest in North America with over 35,000 jobs across 630 organizations, of which 15.0 percent are foreign-owned companies. In comparison to other Canadian cities, Montreal is the metropolitan area with the highest number of pharmaceutical company headquarters in the country. Employment is divided in four subsectors: pharmaceuticals, health technologies, biotechnology and contract manufacturing/research. In real estate terms, this translates to over 18.0 million square feet of office, industrial and lab space.

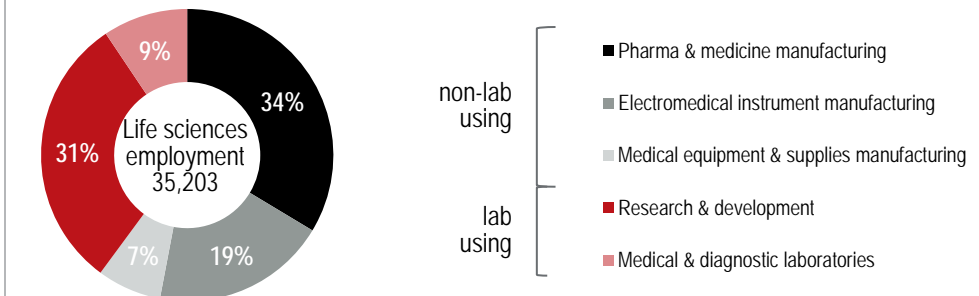
Montreal leadership in the life sciences industry is also demonstrated by its world class research capabilities. In fact, Montreal is the number one city in North America in terms of the number of university students per capita. There are three major hospitals and research and development (R&D) facilities currently under construction in and around downtown Montreal. The sites represent over CAD 5.0 billion (\$4.8 billion)¹ in investments and are scheduled for completion over the next five years.

Although Montreal continues to be a leader in the life sciences industry across Canada, equity investments lagged in comparison to Vancouver in 2013. The CAD 52.0 million (\$50.4 million)¹ invested in Montreal's life science industry this year accounted for just over 20.0 percent of total Canadian equity investments. As large organizations continue to reduce operating costs, the life sciences industry is expected to undergo major changes in the GMA with a strong push toward rightsizing and space adjusting as opposed to expanding. The good news is that the city of Montreal still offers one of the lowest corporate tax rates for companies and attractive fiscal incentives for businesses with a strong emphasis on R&D.

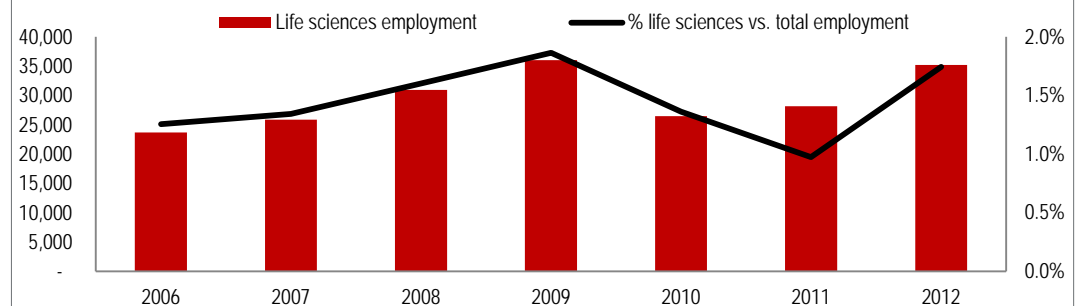
Economic scorecard

Workforce		Total life sciences	% life sciences to private employment	Year-over-year growth
Employment		35,203	1.7%	25.0%
Funding		Total life sciences	% to total Canada	
VC funding		CAD 52.0 M (\$50.4 M) ¹	20.8%	

Life sciences employment composition



Historical life sciences employment



¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Greater Montreal Area

West Island*

The West Island submarket remained the largest and most active GMA life sciences cluster in 2013. There are approximately 9.0 million square feet of office, industrial and lab space occupied by companies in the life sciences industry in the West Island, of which 29.0 percent are owner-occupied and 71.0 percent are leased tenants.

The acquisition of Paladin Labs by the American pharmaceutical company Endo Health Solutions has sparked an expansion and the organization now occupies over 25,000 square feet at 100 Alexis-Nihon in Saint-Laurent. On a smaller scale, Targanta Therapeutics, a biopharmaceutical company, has renewed its 10,000-square-foot lease at 7170 Frederick-Banting. Merck Canada has moved into its new 300,000-square-foot facility located along Trans-Canada Highway in Kirkland. The building still has 90,000 square feet of space available for lease. On the new construction front, Hospira, a U.S. global pharmaceutical and medical device company, will be expanding out of its current location at 1111 Dr. Frederick-Philips and into 48,650 square feet of a 136,000-square-foot, build-to-suit facility developed by Broccolini in the Montréal Technoparc. In terms of sublease space, one new large block of space offered by IMS Health Canada has been added to the market this year. Up to 74,000 square feet of space is available on the first two floors of 16720-16740 Trans-Canada Highway in Kirkland. The sublease term extends five years until May 2019.

Laval

Laval's life sciences cluster continues to attract organizations looking for newer buildings. Within Laval, the "Biotech City" is the submarket's primary biotechnology cluster, employing over 5,000 people across 90 organizations.

Activity in Montreal's second largest life sciences cluster has been characterized by consolidation and relocations during 2013. Servier Canada Inc. invested CAD 16.3 million (\$15.8 million)¹ in a new 30,000-square-foot clinical research center located at 235 Armand-Frappier in Laval. Sanofi-Aventis' new 100,000-square-foot, LEED-certified head office at 2905 Place Louis-R. Renaud is now complete. Montoni Group was the developer in charge of this new build-to-suit project. Valeant Pharmaceuticals acquired Sanofi's old 220,000-square-foot property located at 2150 Saint-Elzéar. The purchase comes in the midst of a global acquisition spread by Valeant Pharmaceuticals who also purchased contact lens maker Bausch & Lomb in August 2013. The Institut National de la Recherche Scientifique (INRS) purchased a 118,300-square-foot building from le Centre de Développement des Biotechnologies de Laval in May 2013. The building acts as an incubator for many small companies in the industry.

Downtown

There has been one major 70,000-square-foot lease renewal by the Institut de recherche Robert-Sauvé en Santé et en Sécurité du Travail at 505 de Maisonneuve West. The organization has made a strong commitment to the building by extending their lease for another 20 years.



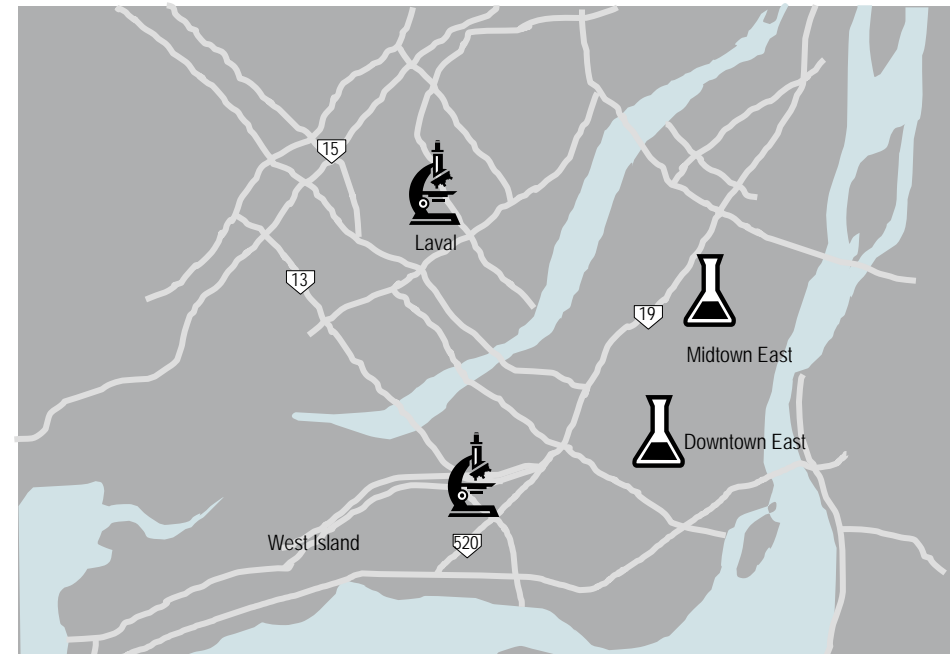
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



IRSST ROBERT-SAUVÉ

505 de Maisonneuve W.
Downtown Core
70,000 s.f.
Term: 20 years

500 CARTIER WEST

Laval
118,300 s.f.
CAD 11,500,000 / CAD 97.21 p.s.f.

TECHNOPARC MONTREAL

Saint-Laurent
136,000 s.f.
48,650 s.f.
Expected delivery: Q2 2015

16720-16740 TRANS-CANADA HIGHWAY

West Island
74,000 s.f.
Class A
Sublease

¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

*In this report, West Island includes Lachine and Saint-Laurent.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Vancouver Metro Area

Overview

Vancouver's life sciences industry is built on a foundation of world class institutions, researchers and companies forming one of the most innovative life sciences clusters in Canada. Industry leading organizations like the BC Cancer Agency, STEMCELL Technologies Inc., Amgen Inc., Zymeworks Inc. and Genome British Columbia draw top level talent and global recognition to the region. The life sciences sector is estimated to contribute approximately CAD 482.0 million (\$468.0 million)¹ to British Columbia's annual GDP.

The provincial government offers tax credits and incentives for research, development, training and international transactions making British Columbia an ideal environment for investment in the life sciences sector. Versant Ventures, the California-based venture capital firm specializing in life sciences, utilized these incentives and existing infrastructure to open an office in Vancouver and invest an additional CAD 10.0 million (\$9.7 million)¹ in a "build to buy" operation with Bayer Healthcare focusing on the treatment of retinal eye disease.

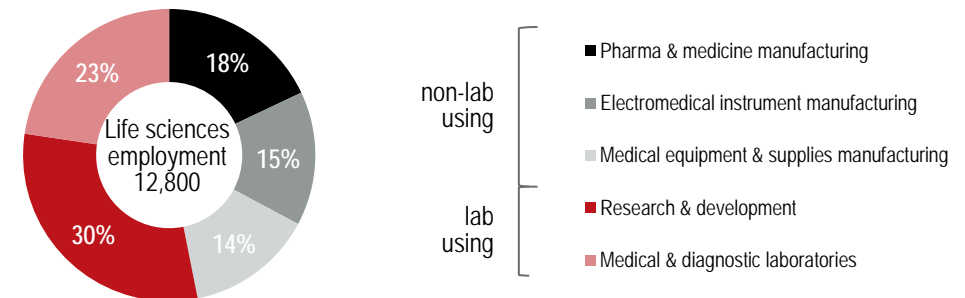
The combination of British Columbia's favorable tax regime, stable banking system and AAA+ credit rating has historically helped attract notable investment and strengthen the life sciences sector. However, activity by companies such as Versant Ventures has been scarce in recent years. The lack of market activity relative to 2001 and 2002 indicates an overall slowdown in the sector. Several laboratory buildings in the traditional life sciences submarkets of UBC-Broadway Corridor and Burnaby have either converted to office space or are available for lease.

As the Vancouver Economic Commission (VEC) notes, Vancouver's competitive advantage in the life sciences sector stems from a talented workforce, government investment and high quality university R&D and education programs. Despite the current lack of demand for laboratory space compared to past cycles, Vancouver's high quality of life, unique surroundings, flexible immigration policies and strong R&D infrastructure will continue to allow the region to attract and retain first class life sciences talent.

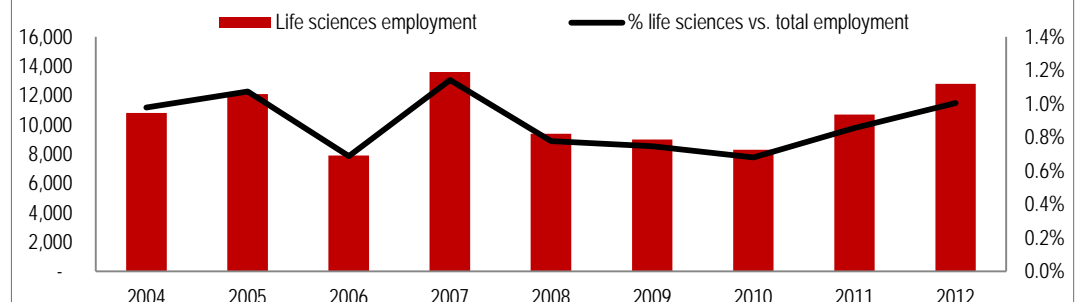
Economic scorecard

Workforce	Total life sciences	% life sciences to private employment	Year-over-year growth
Employment	12,800	1.0%	19.6%
Funding	Total life sciences	% to total Canada	
VC funding	CAD 108.7 M (\$105.4 M) ¹	43.5%	

Life sciences employment composition



Historical life sciences employment



¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Vancouver Metro Area

UBC-Broadway Corridor

The UBC-Broadway Corridor is the second largest business and innovation hub in British Columbia behind downtown Vancouver. The Broadway Corridor stretches between the downtown core and the University of British Columbia (UBC), the province's largest and most globally recognized educational institution. Companies in the life sciences sector located in this submarket fall within two distinct geographical concentrations: the vicinity of Vancouver General Hospital and the UBC campus.

In 2004 The Michael Smith Foundation for Health Research, headquartered near Vancouver General Hospital, chose to construct an 80,000-square-foot laboratory in the heart of UBC. This laboratory features a collaborative working environment for all areas of life sciences, but has a specific focus on genetic and molecular biology. Surrounding the laboratory is an abundance of research institutes, interdisciplinary organizations and four national Centres of Excellence for Commercialization and Research that support the province's life sciences operations and the UBC-Broadway Corridor in general. Approximately 70.0 percent, or CAD 538.0 million (\$522.3 million),¹ of all sponsored research funding coming to British Columbia is directed to UBC. This funding has a significant impact on employment, median salary and GDP growth throughout the UBC-Broadway Corridor.

The second life sciences cluster in the Broadway Corridor and the most notable in Greater Vancouver is centered around Vancouver General Hospital. The largest tenant in the area is the BC Cancer Agency, which occupies a combined 250,000 square feet of office and laboratory space at 600 West 10th Avenue and 570 West 7th Avenue. Another multibuilding occupier in the area is STEMCELL Technologies Inc., a privately owned biotechnology company occupying approximately 110,000 square feet at 570 West 7th Avenue and 1618 Station Street. Two kilometers west of 1618 Station Street is 887 Great Northern Way. This 164,000-square-foot, mixed-use office and laboratory building was sold in May 2013 by Discovery Parks Inc. to Dundee REIT for CAD 66.1 million (\$64.1 million).¹ At the time of the sale the building was fully leased to some notable life sciences tenants including QLT Inc. Since then, Vancouver-based QLT Inc. has downsized by approximately 30,000 square feet in the wake of the sale of its Visudyne product line.

Burnaby

Similar to the UBC-Broadway Corridor region, the life sciences community within the Burnaby submarket is located near a significant educational institution, the British Columbia Institute of Technology (BCIT). As the single largest provider of nursing graduates in British Columbia, BCIT provides the Burnaby submarket with health and technology professionals specializing in anatomy, behavioral science, microbiology, immunology and communicable diseases control. There is currently 165,000 square feet of laboratory space within three kilometers of the BCIT main campus. This figure reflects a 10.6 percent decrease since 2006, including the 19,000-square-foot biotechnology lab in Discovery Place (3480 Gilmour Way) that has been converted into purely office space. The largest tenants in this suburban life science cluster are Maxxam Analytics, Amgen and Xenon Pharmaceuticals.

The Amgen facility is a 61,000-square-foot research facility located on Enterprise Street. It is comprised of 60.0 percent usable lab space that serves as a biomedical research facility to support the company's Canadian head office operations in Mississauga, Ontario.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



BC CANCER FOUNDATION

550 West 7th Avenue
Broadway Corridor
31,489 s.f.
Term: 60 months

887 GREAT NORTHERN WAY

Broadway Corridor
164,364 s.f.
Class A
CAD 66,135,000 / CAD 402.36 p.s.f.

2215 WESBROOK MALL

UBC
12,500 s.f.
Class A
For Lease

887 GREAT NORTHERN WAY

Broadway Corridor
32,600 s.f.
Class A
For Sublease

Activity key:

Leasing

Sales

Under construction

Large blocks of space

¹ Twelve-month average conversion rate of CAD 1.03 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Mexico

Country overview

Mexico's life sciences presence has grown out of it being a cost effective and geographically convenient manufacturing location given its central positioning between Asian, North American and European markets. Several of the largest industry players have moved a portion of drug production to Mexico, usually operated under a Mexico subsidiary. Companies such as Merck, Boehringer Ingelheim, Bayer, AstraZeneca, Pfizer, GlaxoSmithKline, Baxter, Eli Lilly and Novartis are among the more notable multinational companies with operations in Mexico.

Outside of government-run production of power and utilities, pharmaceutical manufacturing is among the country's top three manufacturing industries, based off of total gross production. Therefore, efforts to facilitate and aid manufacturing, distribution and exportation are top of mind for the country. Mexico currently has free trade agreements with 44 countries, helping to further bolster its capabilities as an import / export platform. Additionally, improvements to Mexico's regulatory framework have helped to ensure good manufacturing practices and boost confidence levels of North American and European companies operating in the country.

From an investment standpoint, 28 APPRIS (Agreements for the Promotion and Reciprocal Protection of Investments) and agreements to avoid double taxation with 40 countries are in place to make Mexico a safe country for foreign investment. Additionally, Mexico allows foreign companies to operate under a Mexican "shelter" corporation. In essence, a company operating under a shelter company does not have any legal presence in Mexico, allowing a company to avoid any liability with doing business in Mexico, but still benefit from government tax and duty abatement programs.

Outlook

The improvement of Mexico's regulatory framework and certifications has enabled it to become one of the most competitive countries in Latin America in regard to the quality of its products. With quality standards in place, foreign companies can take full advantage of the cost-effective manufacturing environment. A study in 2012 reported that Mexico offered U.S. companies savings over 18.6 percent and its production costs were lower than Canada, Brazil and Germany, among others.

Greater attention to intellectual property (IP) protection laws and significant funding for research & development (R&D) facilities and programs will need to happen before Mexico can branch out beyond the manufacturing and distribution aspects of the production cycle.

Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	79,256	1.6%	58.2%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	6.0%	21.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	0.5%	10.5%	
Innovation	Total life sciences	% to total PCT applications	Year over year growth
PCT applications	45	0.2%	7.1%

Mexico

Overview

Mexico is the second largest pharmaceutical market in Latin America and 12th worldwide with an annual turnover of MXN 172.1 billion (\$13.5 billion)¹ as of 2012. The industry has grown out of its history as a go-to destination for the manufacture of drugs and treatments. In fact, Mexico was the leading exporter in Latin America for pharmaceutical goods. A large majority of exports stay within the Americas region, with roughly 20.0 percent destined for the United States.

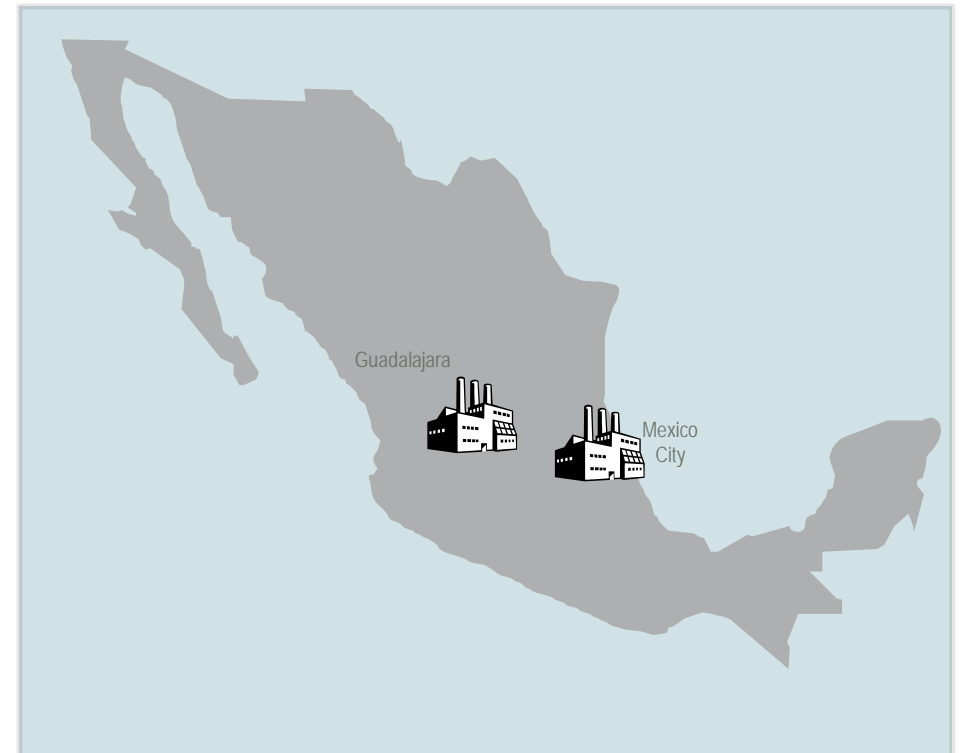
Improvements to Mexico's national healthcare system is driving much of the domestic demand for pharmaceuticals. Millions of citizens now have access to prescription drugs, largely in the form of generics and generic drug sales now account for about 15.0 percent of annual turnover. In recent years the government has also broadened the public healthcare system to include treatments for chronic illnesses like cancer, hepatitis and genetic disorders. As a result, greater attention is being paid to biologic drugs and domestic R&D programs.

More than 400 life sciences companies are located throughout Mexico, a large majority of which are multinational companies or local subsidiaries of some of the world's largest drug manufacturers. Improvements to IP protection laws and good manufacturing practices have been received favorably by the industry with several companies making new commitments to the area. Boehringer Ingelheim opened a new plant in Guadalajara to develop and produce biological veterinary products. Apotex recently invested in a new plant and a new distribution center, which will be used to serve the Latin American market, and Daiichi Sankyo Company made its first investment in the country through the opening of a sales office.

A majority (over 200) of life sciences companies are located in Mexico City and the surrounding vicinity including major players like Pfizer, P&G, Sanofi, MSD and Bayer. Guadalajara and the surrounding area is home to just over 120 companies including Boehringer Ingelheim and Novartis. The industry is also scattered among outlying states like Puebla, Michoacan and Morelos.



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



¹ Twelve-month average conversion rate of MXN 12.75 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Puerto Rico

Commonwealth overview

The Commonwealth of Puerto Rico has been a go-to manufacturing destination for life sciences industry players for more than 50 years. As a United States' territory, the island offers the same intellectual property protection laws and is eligible for funding opportunities from government programs, like the National Institutes of Health. What makes the island territory unique, however, is that it has its own tax systems, which allow for business-friendly incentives and rebates.

Puerto Rico has healthy representation from all sectors of the industry. Forty-nine FDA-approved pharmaceutical plants and 70 medical device manufacturing plants are situated across the island. Pharmaceutical and biotechnology companies, such as Merck, Pfizer, AbbVie and Amgen, tend to cluster along the north and east sides of the island in the North, Metro Northeast and East/Southeast submarkets. Medical device and agricultural biotechnology companies, such as Bayer Cropscience, Medtronic, Baxter and Covidien, are located geographically opposite on the island in the Southwest and South submarkets.

Commonwealth outlook

In February 2014, the Department of Economic Development & Commerce (DEDC) announced that new investments and expansions of existing businesses are helping Puerto Rico to meet its Five-Year Economic Roadmap targets of directly creating new jobs in priority sectors, of which life sciences is a major component. The plan calls for 25,000 new jobs by the end of 2014 and nearly 60,000 new jobs by 2017. February estimates of 21,000 new jobs in 2014 were due in part to commitments from Eli Lilly, Covidien and CooperVision.



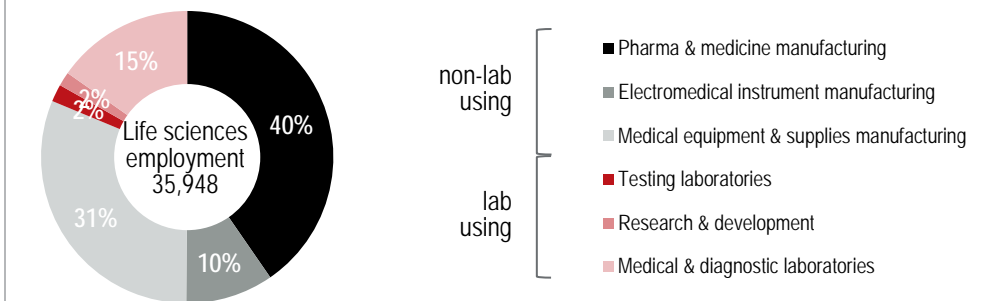
Economic scorecard

Workforce	Total life sciences	% life sciences to private employment	Growth
Employment	35,948	5.3%	-2.3%
Establishments	940	2.0%	-1.7%

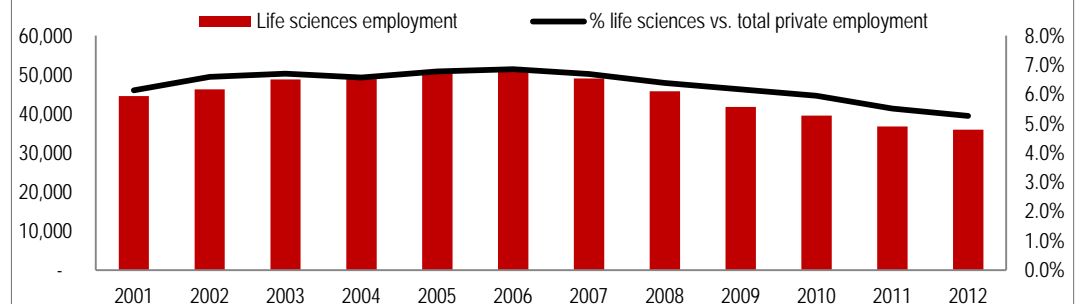
Funding	Total life sciences	% to total U.S.
VC funding	\$0.0 M	0%
NIH funding	\$52.0 M	0.2%

Innovation	Total life sciences	% to all patent classes
Patents	34	23.5%

Life sciences employment composition



Historical life sciences employment



Puerto Rico

North, Metro Northeast, East/Southeast metro overviews

Puerto Rico's submarkets along the northeastern side of the island are comprised primarily of pharmaceutical and biotechnology manufacturing operations. Biotechnology manufacturing is a growing segment of the local life sciences economy. Companies like Amgen, Eli Lilly, Abbott and Becton Dickinson Bioscience have invested over \$65.0 million in their biotech plants over the past decade.

The North submarket is comprised of operations in Barceloneta, Arecibo, Manatí and Vega Baja while the Metro Northeast submarket spans the larger San Juan and Carolina metropolitan area. In late 2011, Governor Luis Fortuño signed a law to progress development plans for a science, technology and research district in San Juan that had been in the making for over five years, led by the Puerto Rico Science, Technology and Research Trust. Plans for the Science District include 1.0 million square feet of laboratory space, nearly 400,000 square feet of office space and 60,000 square feet of conference and convention space.

Large name companies like Novartis, Amgen, Bristol-Myers Squibb, Merck and Mylan all have operations in the East/Southeast submarket, which includes the major cities of Caguas, Juncos, Las Piedras, Gurabo and Humacao. Although the submarket is largely known as a hub for pharmaceutical and biotech activity, several medical device manufacturers are also situated in the area including Medtronic and Becton Dickinson.

Late in 2013 Merck Pharmaceuticals also announced plans to consolidate operations at its Arecibo site in the North submarket into its current facility in Las Piedras located in the East/Southeast submarket. Merck was quick to note that the consolidation decision is not related to performance or compliance issues, but rather is the result of a strategic overhaul of all global manufacturing sites. The company plans to expand the capabilities at its Las Piedras site in order to launch three new products in the coming years. Additionally, Medtronic announced expansion plans at two of its facilities in the East/Southeast in mid-December. The company plans to invest \$6.0 million in technological improvements at its Juncos and Humacao facilities, a commitment that is expected to create 150 jobs.

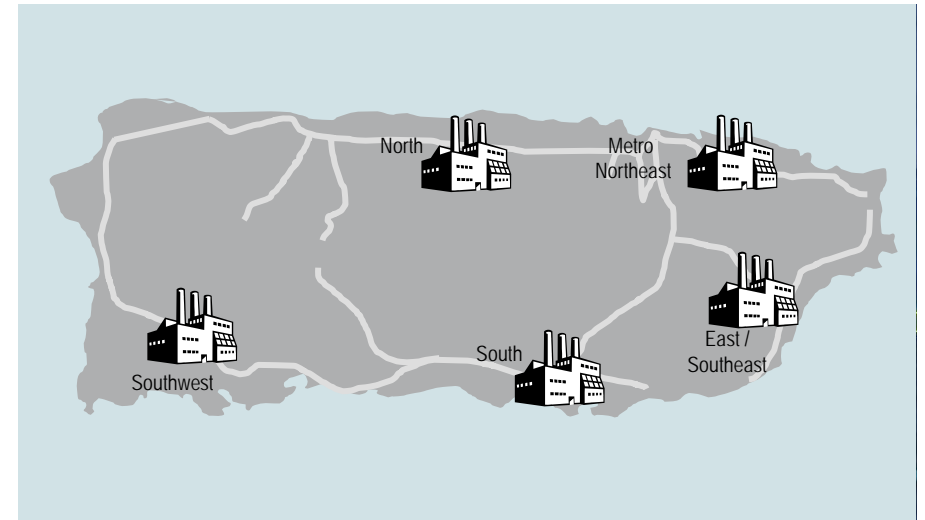
South, Southwest metro overviews

Submarkets along the south and southwestern coasts are home to a majority of the island territory's medical device manufacturing and crop science operations. In 2012, nearly 15,000 Puerto Ricans were employed in medical device and instrument manufacturing. Although employment in these subsectors has been steadily decreasing in recent years, strategic efforts by the local government and economic development group, the Puerto Rico Industrial Development Company (PRIDCO), are under way to reverse this trend and improve Puerto Rico's position as a global leader in medical device and instrument manufacturing.

Life sciences operations in the cities of Mayaguez, Cabo Rojo, Yauco and San German make up the Southwest submarket. The South submarket includes the cities of Ponce, Santa Isabel, Guayama and Juana Diaz and is comprised of large medical device and instrument manufacturers such as Baxter,



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



Covidien, Zimmer, Medtronic, Becton Dickinson and Roche Diagnostics, among others. It is also home to several large crop science players including Dow Agrosciences and Monsanto.

In Juana Diaz, contact lens maker CooperVision is under way on expanding its facilities to accommodate 15 new product lines. The improvement project is estimated at \$250.0 million and is expected to create more than 350 new jobs. Similarly, Covidien has also announced investment plans for new product development. The company is expected to commit \$3.0 million to expand production at its plant in Ponce and generate more than 200 new jobs over the next five years.

EMEA

In 2013, the EMEA region, like other mature life sciences markets, continued to witness strong competition from the emerging markets across the globe. However, increasing expenditures on R&D, rising healthcare spending and development of European clusters is expected to sustain growth of the sector in the near future.

Europe continues to offer a conducive environment for life sciences companies mainly due to its technological leadership, manufacturing know-how, laws toward protection of intellectual property (IP) and availability of skilled workforce.

Demand for complex asset disposal and partnerships with real estate service providers to ensure optimal outcomes has increased among the key life sciences companies in Europe. Consolidation in the form of partnerships and acquisitions among key players has given an opportunity to the larger life sciences companies to optimize their global portfolios, eliminate excess real estate costs and enhance productivity and efficiency. Detailed analysis and understanding of government policies, grants and incentives continue to remain the key factor for relocation and development.

Among all of these real estate trends, workforce optimization and optimizing relocation expenses continues to remain the most significant challenge for life sciences organizations – a trend that is expected to continue in 2014.



France

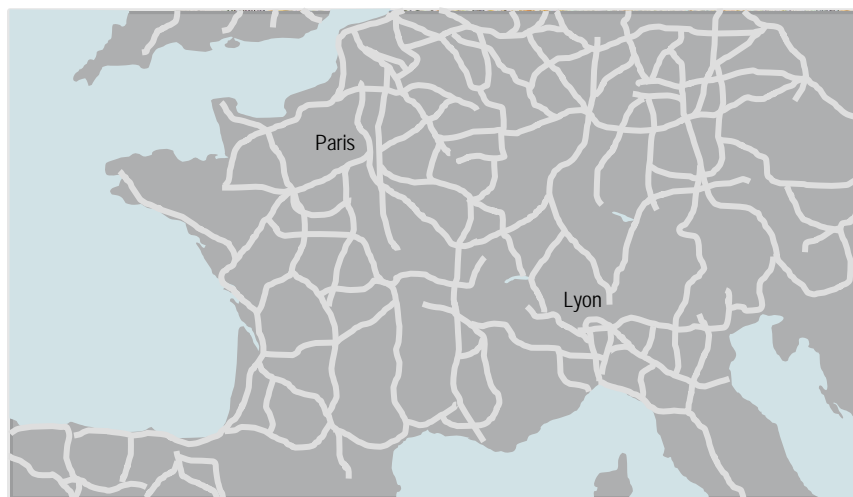
Country overview

France maintained its leading role in Europe over 2013, in terms of medicine production volumes and pharmaceutical revenues. The overall French healthcare sector stood at around EUR 243.1 billion (\$324.1 billion)¹; with the pharmaceutical segment being EUR 33.8 billion (\$45.1 billion).¹

The French life sciences sector is a mature market with roughly 60.0 percent of life sciences companies undertaking R&D activities in-house. Key areas driving the growth of the sector in the country fall outside of the traditional pharmaceuticals and biotechnology sector and include food science, nutraceuticals and other related consumer goods.

Driven by a cluster development objective of Europe's Competitiveness Council, France has developed many life sciences clusters of research and development across the country. Dominant life sciences clusters are the Paris Region, which hosts almost all of the largest pharmaceutical headquarters for companies both domestic and international and the Lyon Region (largely centered around Lyon Gerland) in the southeast. Prominent industry campuses and concentrations include: Alsace BioValley (AlsaceRegion); Atlanpole Biotherapies (Nantes); Cancer Bio-Sante (Toulouse); Nutrition Sante Longevite (Lille); and Eurobiomed (Marseille).

In 2013, the total number of life sciences companies stood at around 848. A majority of companies, around 500, are involved in biotechnology; related therapeutics and diagnostics companies and medical technology companies each accounted for roughly 140 companies and pharmaceutical companies for roughly 68.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	392,875	14.9%	61.0%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	11.0%	15.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.2%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	935	3.6%	-2.5%

Country outlook

The life sciences market in France, like many mature life sciences markets globally, remains in the midst of significant change, accelerated in recent months due to the reinforced politics of healthcare expenditures control. In France, many companies are confronted with their patents coming to an end and a subsequent expansion of generic drugs, which translates into a drop in fiscal resources available for innovation.

Restructuring of operations, consolidation, mergers and acquisitions are therefore impacting the overall shape and geography of the sector, leading many industry participants to challenge and rethink the way they structure and coordinate their activities. Identifying ways and means to reduce excess cost via the rationalization of real estate portfolios remains an important concern for life science companies. Many large organizations are looking at options to consolidate across multiple sites and renegotiate existing leases. Sale-lease back transactions have also been favored by some companies keen to release capital.

New questions are also being raised with regard to internalized R&D capabilities. There is an emerging trend toward opening offices and laboratories to the ecosystem of R&D partners ("cafeteria effect"), in order to facilitate joint R&D projects and partnerships around the development of new medicines.

¹ Twelve-month average conversion rate of EUR 0.75 per U.S. dollar, from 1/1/2013 to 12/31/2013.

The Paris Region

Metro overview

Paris and its suburbs is one of the largest centers for biotechnology companies in France, benefitting from its strategic location, presence of high-tech research capacities and high concentration of hospitals. All of the largest pharmaceutical headquarters for companies, both domestic and international, have a presence in the Paris Region.

These headquarters are mainly located in the western and southern inner suburbs, with companies clearly taking advantage of the favorable local market conditions. There is an opportunity to benefit from rationalized real estate options, on highly competitive sites in terms of rents, accessibility and modernity / flexibility. Popular locations include Boulogne, Suresnes, Puteaux, Courbevoie, Rueil Malmaison and Gentilly, where most of Paris's 26 major life sciences corporations are situated. Additionally, roughly 300 public research institutions, three universities and 20 Grandes Écoles make up the backbone of Paris's public research network.

The ambitious plan of "Grand Paris" and the competitive cluster strategy of the French government should favor this concentration, putting the emphasis on an already highly dynamic area: the Saclay Plateau, located west of Paris, some 20 kilometers away from the capital. With unparalleled concentration of higher education establishments and R&D centers, the Saclay Plateau cluster is dedicated to academic and scientific excellence. It will undoubtedly help bring together pharmaceutical capacities, research centers and training bodies to develop strategies and execute collaborative and innovative projects, in the face of increased global competition.

Metro outlook

The real estate market in the Paris Region is expected to remain tenant-favorable with operational and financial constraints continuing to be key components in the real estate decisions of life sciences companies. Rationalization of real estate portfolios which began almost 10 years ago in many pharmaceutical organizations (including BMS, Servier, Johnson & Johnson, Ipsen, and AstraZeneca), is motivating the current Sanofi and Novartis real estate projects, and will continue. However, the sector is estimated to grow in the near future; primarily due to the strong presence of biotechnology companies in the region, the existence of regional bio-parks, and a large amount of project subsidies.



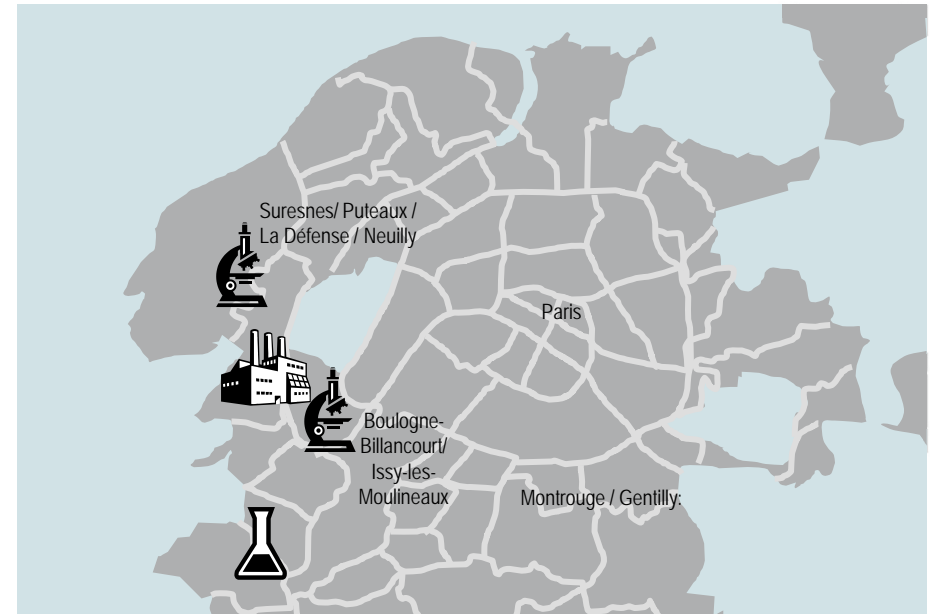
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



SANOFI VAL DE BIEVRE
Gentilly
50,000 sqm
Headquarter campus for Sanofi France
Expected delivery: 2015

BAXTER
Guyancourt
5,500 sqm
Headquarters for France
Expected delivery: 2015

NOVARTIS
Rueil Malmaison
40,000 sqm
Headquarters
Expected delivery: 2016-2017

The Lyon Region

Metro overview

The Lyon Region is the second most important regional center of excellence for the life sciences sector in France. The sector is characterized by a historically strong regional life science community, made up of research and training centers, clusters, hospitals, international companies and innovative SMEs. Over the past 30 years, Lyon, in particular the Gerland district, has been the location of major international laboratories and research centers, first as a location for R&D and production, and then for developing purely service facilities. Today the region benefits from a worldwide reputation; the presence of sector leaders such as Sanofi, PMSD, Meril, Carso, Genoway, Genzyme, BASF, Aguetant and Episkin is recognition of this international prominence.

At a local level, the industry serves as an important factor in the wider economic development in the Lyon Region. The biotechnology and pharmaceuticals cluster currently employs more than 100,000 people in the region.

The economic development of the Lyon Region's life sciences sector has been driven by clusters that have grown within the region. The primary therapeutic areas covered by these clusters include: infectiology, cancerology, neurosciences, vaccines and diagnostics. "Lyonbiopole" is the key life sciences cluster. Created in 2005, it comprises four major pharmaceutical groups, 102 SMEs and 20 research and training institutes. It has accredited roughly 130 multipartner R&D projects for a total R&D investment of EUR 667.0 million (\$889.3 million)¹ (2005-2011). In 2013, it benefited from the launch of the new innovation platform Accinov (6,000 square meters dedicated to hosting start-ups and SMEs providing services in the field of biological analysis and bioproduction) and the new Technological Research Institute Bioaster.

Public-private partnership is one of the central strategies for innovation and regional development of the region. Lyon also provides a stimulating environment that acts as a fertile ground for innovative businesses, including support services such as the Lyon Bioinformatics Centre, a diagnostic testing platform.

The real estate market in Lyon remains strong, supported by key factors including market transparency and rental stability which has fed through to rising demand (roughly 225,000 square meters in last seven years) and resulted in one of the lowest vacancy rates in Europe.

Metro outlook

The real estate market in the Lyon Region is expected to continue witnessing an upward trend largely due to upcoming facilities including the 5,500-square-meter facility of Technological Research Institute for Infectious Diseases, which will strengthen the position of Lyon Gerland in terms of scientific and technological innovation for biomedical purposes. The market will also benefit from possible partnerships between the traditional pharmaceutical industry as well as other specialties including clever textiles, mechatronics or platurgy, which are also well implanted in the region.



Major lab supply:
Clusters of established lab stock with long-time industry presence



SANOPI PASTEUR MSD
170 avenue Jean-Jaurès
Lyon
European Headquarters
6,000 sqm
2013

SANOPI PASTEUR & MERIAL
Lyon Gerland
18,000 sqm and 15,500 sqm
Common World Headquarters for Sanofi
Pasteur and Meril France
Expected Delivery: 2014 and 2016

¹ Twelve-month average conversion rate of EUR 0.75 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Germany

Country overview

Germany's life sciences sector is the largest in Europe and third largest globally; the sector encompasses a majority of life sciences activity including biotechnology, pharmaceutical and medical devices. Oncology is the strongest area of development in Germany, accounting for about 34.0 percent of the total product development in the biotechnology therapeutics and pharmaceutical industries. Germany's life sciences industry is further strengthened by its demanding healthcare market, one driven by a dense and aging population. Moreover, the country continues to be ranked very highly among innovation indexes, typically ranking behind only Switzerland in Europe.

The total number of dedicated and other biotechnology-active companies in Germany increased by 1.0 percent from 2012 to 2013, while the number of employees rose by 0.6 percent, reaching 35,400. Although R&D expenditures in the life sciences business dropped by 3.7 percent, the financing situation improved considerably with approximately EUR 400.0 million (\$533.3 million)¹ of capital raised (up 16.3 percent year-over-year). Although the overall financing environment has stabilized following the recession, a lack of sufficient funding from classic venture capitalists has led to a prominence of venture funds being run by major biotechnology service companies.

Life sciences operations in Germany are centered in two major clusters: Berlin-Brandenburg Capital Region and the Munich/Bavaria Biotech Cluster. The Berlin-Brandenburg Capital Region has nine technology parks for the life sciences industry, the highest in Germany. The Munich/Bavaria Biotech Cluster is distinguished by its strong focus on human-use biologics, and accounts for around 90.0 percent of the biotechnology market in Germany.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	562,600	13.8%	59.8%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	13.0%	14.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.8%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	1,952	7.4%	7.8%

¹ Twelve-month average conversion rate of EUR 0.75 per U.S. dollar, from 1/1/2013 to 12/31/2013

Berlin-Brandenburg

Metro overview

Being a centrally located federal capital, the Berlin-Brandenburg Capital Region is one of the key life sciences destinations in Germany. The region is home to nine technology parks and over 50 institutions of higher education with a life sciences focus. This provides a conducive business environment to over 500 life sciences companies based in the cluster.

The concentration of large research facilities and life sciences industry associations, such as the German Association of Research-based Pharmaceutical Companies (VFA), Branchenverband der Biotechnologie-Industrie (BIO Germany), Federal Association of Managed Care (BMC) and German Medical Technology Association (BV Med), has been the key driving factor for attracting renowned scientists and highly qualified managers from across the world.

Among all industries and property types, nearly 125 companies acquired space in the region during 2013, either by establishing new locations or expanding their existing Berlin-based locations. Specific to the life sciences industry, some of these companies included Scienion AG, Capsulation Pharma AG, Pfizer Pharma GmbH, LS Shire Deutschland and Wyeth.

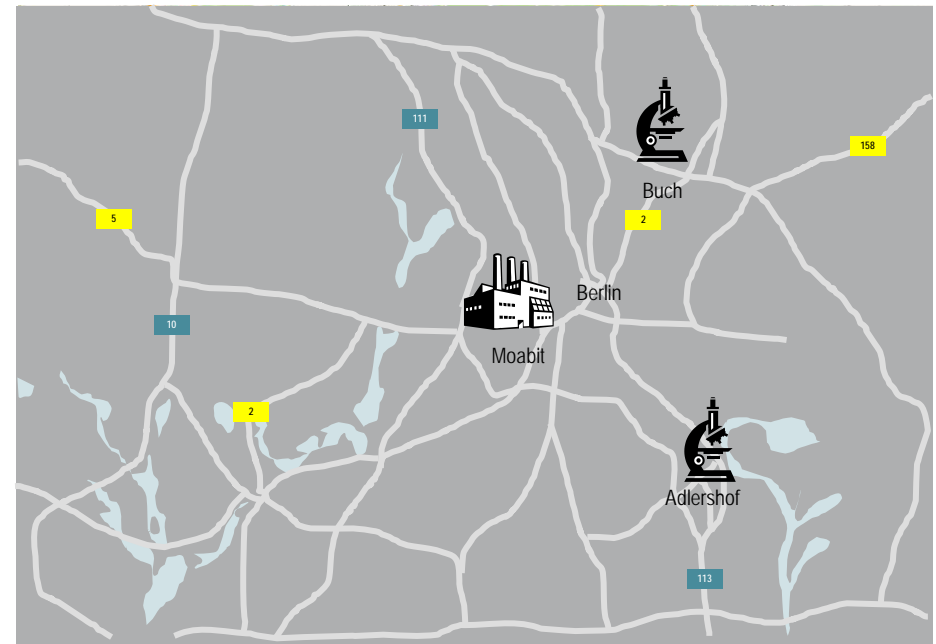
Berlin-Brandenburg Capital Region's commercial spaces are expected to witness an increase in demand, primarily due to the improving economic climate, increasing economic diversity and increasing tenant base. Consistent public funding toward research (3.4 percent of GDP) is also expected to result in a positive outlook for the life sciences industry in the region.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



TEVA DEUTSCHLAND, GMBH
The Q, Friedrichstraße 67-70
Mitte 1A, Berlin
3,700 sqm

FRAUNHOFER-GESELLSCHAFT
Gustav-Meyer-Allee 25
Mitte, Berlin
2,800 sqm

PAREXEL
Am Bahnhof Westend
Charlottenburg-Tiergarten, Berlin
1,400 sqm

AM STUDIO 16
Adlershof
9,100 sqm
Class B
For Lease

Munich/Bavaria

Metro Overview

The life sciences industry in the Munich/Bavaria biotech cluster is centered on biotechnology and pharmaceuticals, employing 30,000 people in industry and research. The region is home to roughly 260 life sciences companies, including the Roche Diagnostics, GE Healthcare, Daichii Sankyo and Bavarian Nordic. Small and medium enterprises (SMEs) are a key segment in the life sciences industry in the region, accounting for 48.5 percent of the total number of companies in the cluster and over 30.0 percent of total German biotech SMEs.

The life sciences industry in the region is known for its strength in human-use, or "red," biotechnology. A major portion of the work undertaken in the region is focused on therapies for cancer, autoimmune and inflammatory diseases.

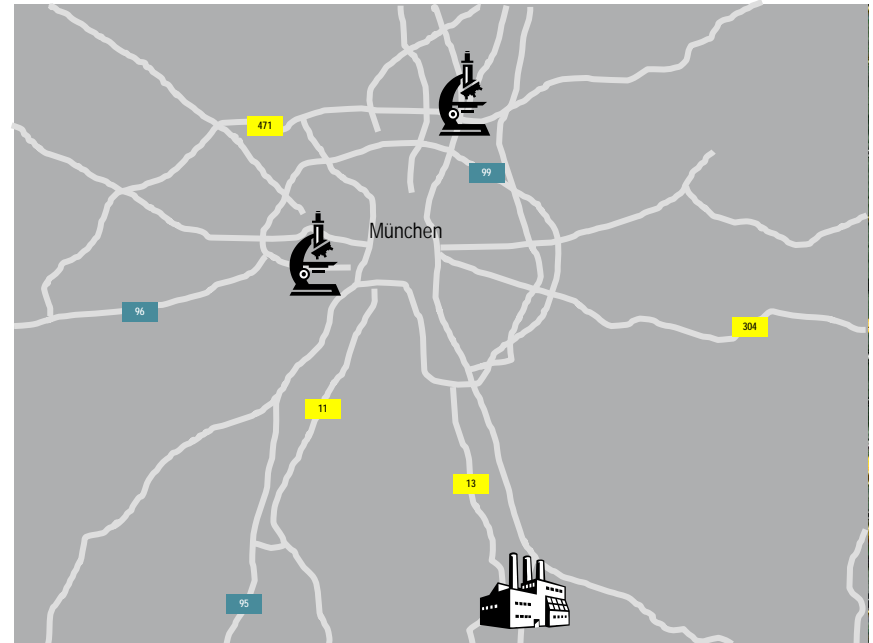
The Munich/Bavaria Cluster gets business management support from BioM, a not-for-profit cluster management agency supported by the Bavarian Ministry of Economic Affairs, Infrastructure, Transport, and Technology, to foster development of the cluster. Munich, Germany's third largest office real estate market, has the highest turnover rate and lowest vacancy rate of all German cities. Low unemployment rates and restrained development volumes has kept the supply tight. Increasing life sciences activities, such as the opening of the Biomedical Center of the Ludwig Maximilian University of Munich (LMU) in 2014, are expected to result in a rise in demand for real estate. However, limited supply of commercial space in the region is expected to keep the prime rents in the region at a higher level.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



CLARIANT

WAVE (Sommelweisstraße)
Planegg (western surroundings)
7,400 sqm
10-year lease

LINDE GAS THERAPEUTICS

Mittenheimer Straße
Oberschleißheim (northern surroundings)
5,300 sqm

ROBERT-KOCH-STRASSE 1C

Planegg (western surroundings)
5,000 sqm
Developer Wander Immobilienmanagement
Expected delivery: July 2014

COVANCE

AVIVA (Carl-Wery-Straße)
Munich / Neuperlach
2,200 sqm
5-year lease

Activity key:

Leasing

Sales

Under construction

Large blocks of space

The Netherlands

Country Overview

High-tech industries, including life sciences, have continued to grow in the Netherlands in recent years. Currently about 450 life sciences companies operate in the region, with over 55,000 people employed by the industry, a majority of which are involved in medical device technology and biotechnology. The Netherlands is host to a wide variety of life sciences orientated occupiers, of which their geographical orientation is strongly influenced by the presence of knowledge campuses. This wide variety of life sciences occupiers provides a strong contribution to the Dutch gross domestic product. Impacts of the global economic recession, increased competition, pricing pressure, depleted new product pipelines and heightened regulatory processes continue to strain profitability and influence the industry's facility and location decisions. They produce an environment of change and the opportunity that comes with it for all market clusters.

In the southern part of the Provence Limburg and the areas in close proximity of the Randstad conurbation, the vast majority of life sciences companies are related to the medical sector. This is due largely to a high presence of medical related knowledge institutes. The Agro-Food sector is largely concentrated in the Wageningen (Food Valley) and the region Kop van Noord-Holland. More broadly, the life sciences sector as a whole is mainly focused on Eindhoven and Groningen. Eindhoven has a



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	112,545	13.3%	47.7%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	6.0%	8.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.0%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	773	2.9%	6.2%

concentration of R&D Activities, including Philips, which is the largest life sciences campus in the Netherlands, namely the High Tech Campus Eindhoven.

Country outlook

The life sciences industry in the Netherlands is growing due to an aging population, higher occurrence of certain diseases and medical innovations. Subsequently, the Dutch government has indicated that the life sciences sector is a key priority and has indicated that it is one of the "top sectors." These are the sectors in which the Netherlands excels globally and are a government priority. The action plan provides the government, industry and science with the opportunity to target investment in this sector.

As life sciences companies determine which aspects of the business are vital to drug discovery and innovation, they are optimizing their location strategies. Established life sciences clusters within the United States and Europe remain destinations of choice for core aspects of drug discovery. Emerging global clusters, however, offer cost-advantageous manufacturing sites that provide both revenue and margin opportunities. Additionally, emerging clusters are becoming more competitive in high-tech aspects of the value chain due to significant capital investments and improved political policies.

Amsterdam, Eindhoven

Amsterdam metro overview

The Amsterdam Region has the largest concentration of research and education with regard to the medical sector. There are more than 4,000 researchers employed within the life sciences sector and approximately 6,000 students are currently getting their degree within the life sciences sector or medical sector. The largest life sciences cluster in Amsterdam is the Science Park Amsterdam. Science Park Amsterdam is located on the east side of Amsterdam. It covers an area of 70 hectares and is home to the UvA Faculty of Science. The Faculty accommodates some 2,500 students, studying subjects such as Biology, Computer Sciences, Astronomy, Chemistry, Mathematics, Physics and Physical Geography.

A residential tower with room for 152 apartments is being built at Amsterdam Science Park. Syntus Achmea has bought the building which is expected to be delivered in 2016. In addition to that, there are plans for a new scientific research institute called the Sarphati Institute for New Epidemics. The Amsterdam College of Mayor and Alderpersons has made EUR 8.0 million (\$10.7 million)¹ available for the project. Specifics of the project will now be elaborated before the city council makes a final decision in fall 2014. On the longer term a business accommodation and laboratories (phased building work on 25,000 square meters) is planned as well.

Eindhoven metro overview

Eindhoven is generally seen as the “Brainport” of the Netherlands. This is underlined by the level of R&D investments made in the Netherlands, 45.0 percent of which is focused on the Eindhoven Region and especially the High Tech Campus in Eindhoven (HTCE). The Campus serves as a magnet to high-tech companies and research institutes and this in turn helps to strengthen the image of Brainport.

The HTCE is a business campus of over 100 hectares and currently holds more than 100 companies and institutes with over more than 8,000 employees. Campus companies (i.e., Philips, NXP, IBM, Intel) strategically decide what knowledge, skills and R&D facilities they share in order to achieve faster, better and more customer-oriented innovation in the application fields of health, experience and energy. Located at the heart of Brainport Campus, companies are responsible for nearly 50.0 percent of all Dutch patent applications.

There is a new office villa of 1,500 square meters under construction which is pre-let to Brunel. There is room for further development because the HTCE performs well and has no vacancy. The partners of the High Tech Campus want to develop Eindhoven as an international hub for technological development and patents. There are 125,000 square meters (GFA) left for future developments and companies have the opportunity to participate in the development of the HTCE.



Major lab supply:
Clusters of established lab stock with long-time industry presence



ASML NETHERLANDS

Eindhoven
High Tech Campus 61
6,660 sqm
HTC 52 building

VARIOUS INVESTORS

Eindhoven
High Tech Campus Eindhoven
250,000 sqm
Price: EUR 425.0 million

VANCIS

Amsterdam
Science Park 408
985 sqm
Matrix Innovation Center VI

EINDHOVEN HIGH TECH CAMPUS

Eindhoven
125,000 sqm
Direct

¹ Twelve-month average conversion rate of EUR 0.75 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Leiden, Utrecht

Leiden metro overview

Leiden Bio Science Park is one of Europe's top five science parks and is primarily focused on biomedical and biomolecular life sciences. The science park is home to over 85 life sciences companies with more than 3,500 employees. BioPartner Leiden, a foundation aimed at supporting burdening industry entrepreneurs, is also located on the campus. The foundation has four incubator/accelerator buildings comprising of approximately 10,000 square meters. Leading academic institutions also have a presence in the science park, including Leiden University of Applied Sciences and Leiden University Medical Center. With all of this supportive infrastructure and collocation opportunities, it's not surprising that Leiden Bio Science Park enjoys the largest number of bioscience start-ups in the Netherlands.

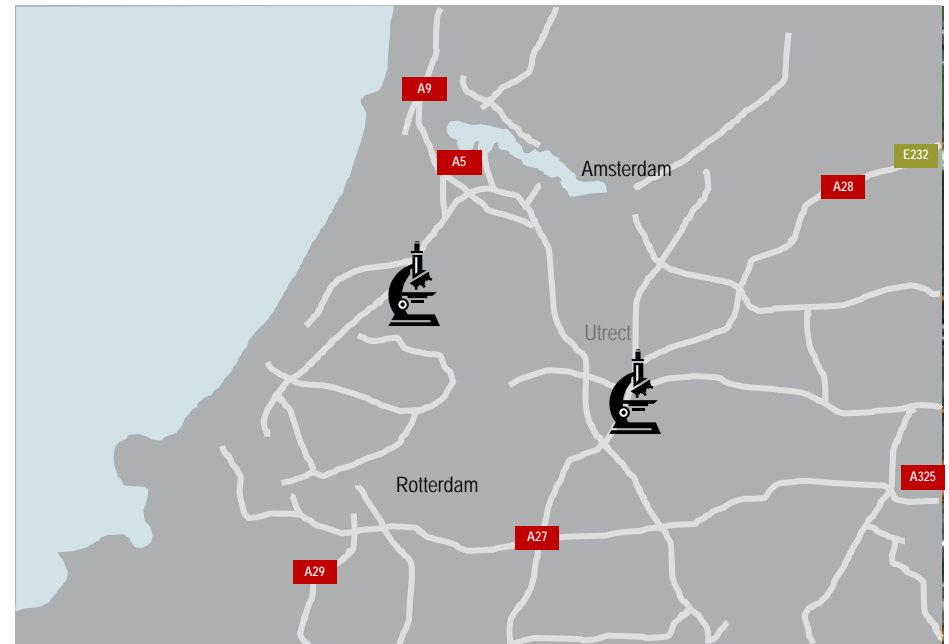
In March 2014, a new center of excellence in the area of genomics for life, Generade, was launched at the Leiden Bio Science Park. One of the primary goals of the center is to increase the speed of technology to the marketplace via collaboration of academic, business and research experts. One of the more exciting development projects under way is the 2,400-square-meter Biotech Training Facility within the science park. Globally, there is a noticeable shortage of properly trained staff for production facilities; with older generations retiring, fewer and fewer individuals have gone through comparable GMP training programs. This facility will offer GMP training for industry employees from across the globe. Other development highlights include the construction of the new Beta Campus of Leiden University which is expected to be completed by 2023 and the expansion of Naturalis Biodiversity Center by 2016.

Medical diagnostic equipment manufacturer Welch Allyn announced early in 2013 its plans to consolidate European operations into a single site in Leiden. Beyond noting the Netherlands business-friendly environment, the diagnostic maker also cited the new medical device tax in the United States as a trigger to streamline operations and cut costs. The regional headquarters and an operations center in Tilburg were successfully up and running in April 2014.

Utrecht metro overview

The Utrecht life science industry is concentrated within the Utrecht Science Parkt (USP). Top institutes include Hubrecht institute, TNO, Deltares and SRON, all of which have their offices in the USP. In addition to the top research institutes, USP hosts a numerous R&D companies including Merus Biopharmaceuticals and Genmab.

USP is over 300 hectares and employs over 20,000 people at more than 60 companies, of which 30 are life sciences related. There are also a few expansion plans and developments within the USP. For example, a second life sciences incubator with a total area of 6,200 square meters is expected to be delivered in 2015. The first incubator named UtrechtInc. already houses 20 start-ups. Next to that there are expansion plans for the Hubrecht Institute, the Utrecht University of Applied Sciences, University Utrecht and the University Medical Center.



NATURALIS BIODIVERSITY CENTER
 Nieuwenhuizenweg 19
 5,400 sqm

LEIDEN BIO SCIENCE PARK
 Leiden
 400,000 sqm
 Additional 17 hectares available at municipality Oegstgeest; plots between A44 and the Rijn river

BIOTECH TRAINING FACILITY
 Leiden Bio Science Park
 2,400 sqm
 BAM Utiliteitsbouw
 Expected delivery: mid-2015

LIFE SCIENCE INCUBATOR
 Utrecht Science Park
 6,200 sqm
 Bouwcombinatie Giesbert Mecanoo V.O.F.
 Expected delivery: 2015

Switzerland

Country overview

Switzerland features strong life sciences clusters and is home to large number of global headquarters of domestic companies and has attracted regional HQs of many non-domestic industry companies such as Biogen Idec, Amgen, Celgene, Medtronic and Onyx Pharmaceuticals. Switzerland was again rated first in the World Economic Forum's 2013-2014 Global Competitiveness Report, reflecting its advantages for the life sciences industry and other research, production and service companies.

Of the more than 730 life sciences companies in Switzerland, about 300 are focused on medical devices and technologies and roughly 250 are involved in biotechnology. Further, the country enjoys a fairly even split between research and production functions, with 40.0 percent of companies performing R&D activities and about 45.0 percent with manufacturing operations in the country. In terms of workforce, Switzerland has the more than 95,000 people employed in the life sciences industry.

A majority of life sciences occurs within three major metropolitan areas: Basel, Zurich and Geneva. Industry minded groups and business parks and premier educational institutions drive much of the activity. Partnerships between universities and private companies are common and many start-up companies begin via such partnerships due to favorable conditions such as low-cost rental space available at university labs. Companies also benefit from attractive statutory effective tax rates in Switzerland.

In the Swiss real estate community life science companies such as Novartis, Roche, Syngenta or also Nestle are traditionally owners and occupiers of their real estate



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	62,065	14.5%	40.5%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	8.0%	12.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.9%	3.6%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	986	3.7%	20.8%

properties. Also large developments as for example the “Novartis Campus” in Basel are built-to-suit projects. JLL estimates that about 75.0 percent of all properties used by life sciences companies in Switzerland are built-to-suit by their occupiers.

Country outlook

Switzerland is likely to remain one of the world leaders in life sciences innovations. Switzerland has around nine life sciences clusters, one of the largest when compared to other key European countries. The country's strong position is due to a balanced mix of academia, concentration of private life sciences companies and optimal infrastructure. The recovering eurozone economy and the fading negative impact of the Swiss Franc appreciation should additionally support the industry in the short term. The biggest risk is coming from the political side, in particular, the immigration policy. While there are unlikely to be major restrictions on hiring foreign nationals in the life science industry going forward, this uncertainty weighs on expansion plans.

Basel

Metro overview

The Basel Region is one of the world's most successful regions for life sciences, grown largely out its strategic location in the border triangle of Germany, France and Switzerland. The area around the city of Basel is a major center of the life sciences industry, with representation from roughly 40.0 percent of the world's pharmaceutical companies. The region is home to more than 900 life sciences companies with an annual global turnover of over CHF 107.0 billion (\$115.0 billion)¹ and workforce of about 36,000. Established pharmaceutical companies such as Roche and Novartis have their R&D facilities and production sites in the region. Further, the region is also home to many other leading life science companies and related branches like BASF, Syngenta, DSM, etc.

Basel is part of the "BioValley" cluster. Being one of the first European initiatives for the promotion and development of life sciences, BioValley has grown to become one of the leading life science clusters in the world. It is a cross-border enterprise with presence in the Basel Region, Alsace in France and Southern Baden in Germany. In total, BioValley encompasses 40 scientific institutions, 100,000 students, 50,000 jobs devoted the life sciences sector and 11 life sciences parks.

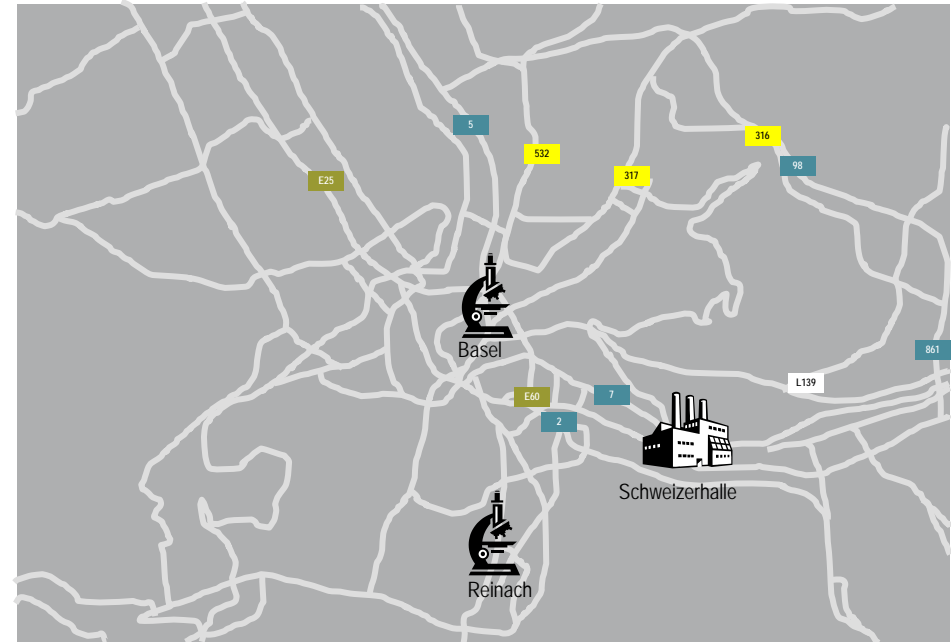
Currently several large life science companies in Basel are reorganizing their work space resulting in several long-term development projects. Novartis is developing its campus on a former production site with construction work projected to continue out to 2030. It will provide office space for up to 10,000 employees. Next to the R&D and headquarter facilities the company plans to consolidate several smaller sites in Basel and to offer optimal surroundings for the transfer and sharing of knowledge. Roche is also currently building a new office tower, which will provide 2,000 workplaces across 41 floors. The Roche tower will be the highest building in Switzerland and is scheduled to complete in 2015.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



NOVARTIS HEADQUARTERS
Basel
Multiple buildings; office space for up to 10,000 employees
Expected delivery: 2030

ROCHE TOWER
Basel
71,900 sqm
Expected delivery: 2015

¹ Twelve-month average conversion rate of CHF 0.93 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Zurich, Geneva

Zurich metro overview

The life sciences market in the Zurich Region is heavily influenced by “Life Science Zurich”—an academic joint venture initiated by the University of Zurich and the Swiss Federal Institute of Technology Zurich (ETH) to promote Zurich as an international center for cutting-edge research, first class education and economic innovation in the field of life sciences. The region has a high density of universities, hospitals and research labs.

The greater Zurich area is one of the key clusters for life sciences in Zurich. Over the years, the cluster has become an attractive location for life sciences companies owing to highly attractive tax structures, liberal labor laws and a highly qualified and specialized workforce. Life sciences companies in the cluster generate an annual revenue of CHF 46.1 billion (\$49.6 billion)¹ and employ over 21,000 employees.

Geneva metro overview

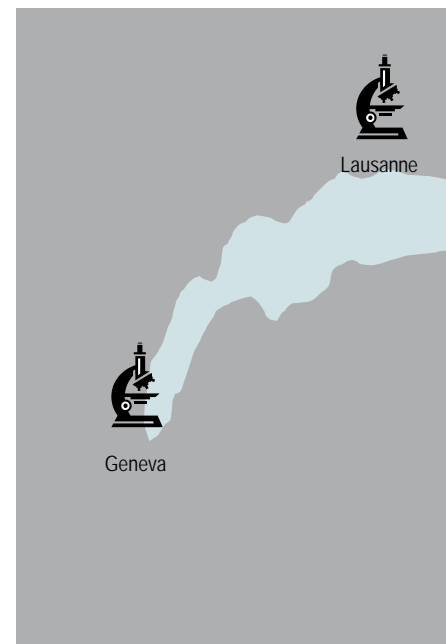
The Geneva area has become a location of major importance for the life sciences sector in Switzerland, due largely to an extensive network of research and academic institutions. The region is home to over 570 multinational companies and benefits from strong infrastructure in the region.

BioAlps is one of the key life sciences clusters located in western Switzerland. A number of life sciences parks and incubators in the BioAlps cluster promote the development of highly innovative start-up companies, providing access to state-of-the-art laboratory equipment, facilities and resources. One of the life sciences parks, Biopôle, developed through a public-private partnership, offers over 80,000 square meters of space, thereby making Biopôle one of the largest parks in Switzerland dedicated solely to the life sciences.

BioAlps has a workforce of roughly 25,000 highly trained life sciences employees working in the cluster with more than 500 research facilities in the cluster’s universities.

In terms of real estate, the region has limited availability of supply. Consequently, large life sciences companies looking to relocate to this area are often forced to focus on build-to-suit options.

 Major lab supply:
Clusters of established lab stock with long-time industry presence



BIO-TECHNOPARK®
Wagistrasse 23
Schlieren / Zürich
55,000 sqm

BIOPÔLE
Route de la Corniche 4
Epalinges / Lausanne
80,000 sqm

CAMPUS BIOTECH
Chemin des Mines 9
Geneva
40,000 sqm

¹ Twelve-month average conversion rate of CHF 0.93 per U.S. dollar, from 1/1/2013 to 12/31/2013.

United Kingdom

Country overview

In 2013, the United Kingdom remained the largest country in Europe with regard to life sciences turnover at GBP 50.0 billion (\$78.1 billion).¹ Roughly 165,000 people are directly employed by the industry, and the life sciences industry is one of the largest contributors to the United Kingdom's economic growth, primarily due to its strong R&D base and large life sciences workforce.

When compared with other European countries covered in this report, the United Kingdom has the highest share of researchers as part of its full time R&D workforce, at 73.1 percent. Additionally nearly 77.0 percent of biotechnology companies in the United Kingdom perform R&D activities, one of the highest shares in the region.

Building off of a long history of innovation and recognizing the future of the industry, the government is working hard to further bolster research activities and improve the translation of innovation from workbench to marketplace. One such initiative is the creation of a dedicated industry unit by U.K. Trade and Investment (UKTI) to support investment from overseas, from early stage development through product commercialization. Additionally, the group helps companies maximize government tax breaks and incentives. Small and medium enterprises (SMEs) can claim relief worth approximately 25 pence per every pound of qualifying expenditure, one of the most generous tax breaks in the world. Larger companies can benefit from the Regional Growth Fund (RGF), a GBP 2.4 billion (\$3.8 billion)¹ fund that supports private capital projects that contribute to economic growth. Other programs and funds, like the UK Research Partnership Investment Fund (UK RPIF), Invest Northern Ireland, Life



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	358,582	12.3%	73.1%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	13.0%	9.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	1.8%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	845	3.2%	-0.6%

Sciences Investment Fund (Wales), BioMedical Catalyst and Scottish Enterprise, offer over GBP 500.0 million (\$781.3 million)¹ in funds and additional economic development incentives solely for life sciences companies across the United Kingdom.

Country outlook

We are likely to see an expansion of the UK life sciences sector over the next few years. The government is giving the sector strong backing through MedCity, a new body modelled on the immensely successful Tech City Investment Organization. It is hoped the life sciences sector in the South East will come to match the crucial position of financial services in the national economy. The new organization is tasked with attracting life sciences corporations large and small to the "golden triangle" formed by the three UK cities of London-Oxford-Cambridge, facilitating collaboration between them and the UK academic research base, and reinforcing specialist infrastructure so that the region becomes one of the premier, interconnected clusters for life science research, development, manufacturing and commercialization.

The mayor of London, Boris Johnson, announced in April that GBP 2.9 million (\$4.5 million)¹ is being invested in the project by England's university funding body – the Higher Education Funding Council for England (HEFCE). This is on top of GBP 1.2 million (\$1.9 million)¹ funding already confirmed. This should attract billions of pounds of investment and help spur the discovery of new treatments to tackle disease, propelling the sector to become a key contributor to the capital's growth and health.

¹ Twelve-month average conversion rate of GBP 0.64 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Greater South East Region

Region overview

In April 2014 the mayor of London launched MedCity, a partnership between UCL Partners, King's Health Partners, Imperial College AHSC, Oxford, Cambridge and the Greater London Authority. The hope is to establish the Greater South East as a world-leading cluster for life sciences, rivaling areas like Boston/Cambridge and San Diego. A GBP 4.1 million (\$6.4 million)¹ investment aims to create a "golden triangle" of innovation formed by London, Cambridge and Oxford. Local governments feel that opportunities for British companies have been missed due to lack of funding and commercialization support. This initiative is expected to help bridge those gaps.

London metro overview

The London area is home to UCL Partners, one of Europe's largest academic health science partnerships of hospitals and medical research centers, and is home to 28 universities, over 1,500 biomedical researchers, and 15 hospital sites. The London Region has developed particular strengths in the field of stem cells, oncology, neurology, cardiovascular, infection and drug delivery.

Life sciences companies are not commonly found in Central London, one of the most expensive office locations in the world. Some are located in submarkets such as Paddington and Kings Cross and more still along the M4 corridor which stretches from Heathrow Airport in the east to Bath and Bristol in the west. Land along the M4 corridor is often cheaper than more central locations and provides good connectivity through Heathrow Airport, the motorway links and railways connections which offers easy access to professionals from different parts of the world. These areas offer proximity to universities with expertise and research facilities and skilled labor supply. The corridor is home to a wealth of Pharma companies such as GSK and Allergan and many clinical research organizations such as Parexel and Quintiles. Companies can acquire good quality grade A space at relatively low prices. Average prime rents for Paddington are GBP 55.00 per square foot (\$85.94 p.s.f.),¹ Chiswick and Hammersmith around GBP 50.00 per square foot (\$78.13 p.s.f.),¹ Stockley Park, Heathrow GBP 32.50 per square foot (\$50.78 p.s.f.),¹ Slough GBP 27.50 per square foot (\$42.97 p.s.f.)¹ and Reading GBP 30.00 per square foot (\$46.88 p.s.f.)¹

There are currently no available combined office/lab buildings of any size. Developers have not traditionally speculatively developed this kind of stock. However, this situation may change going forward with the new government funding going into the life sciences sector. It is our view that the land around Heathrow and along the M4 corridor might attract science park money—due to its location and potential to build on a larger scale and we may see some pre-lets here in the short to medium term.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



OTSUKA

Gallions, Wexham Springs Office Park
Equidistant from Slough and Uxbridge
2,044 sqm
10 year term with 6th year break

ALMIRALL

1 The Square, Stockley Park
Heathrow
836 sqm

3 & 4 ROUNDWOOD AVENUE, STOCKLEY PARK

Heathrow
2,000 sqm and 12,100 sqm
Expected Delivery: 2014 and 2015

STOCKLEY PARK

Heathrow
Total stock: 158,401 sqm
Total available supply: 29,820 sqm

¹ Twelve-month average conversion rate of GBP 0.64 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Greater South East Region

Cambridge metro overview

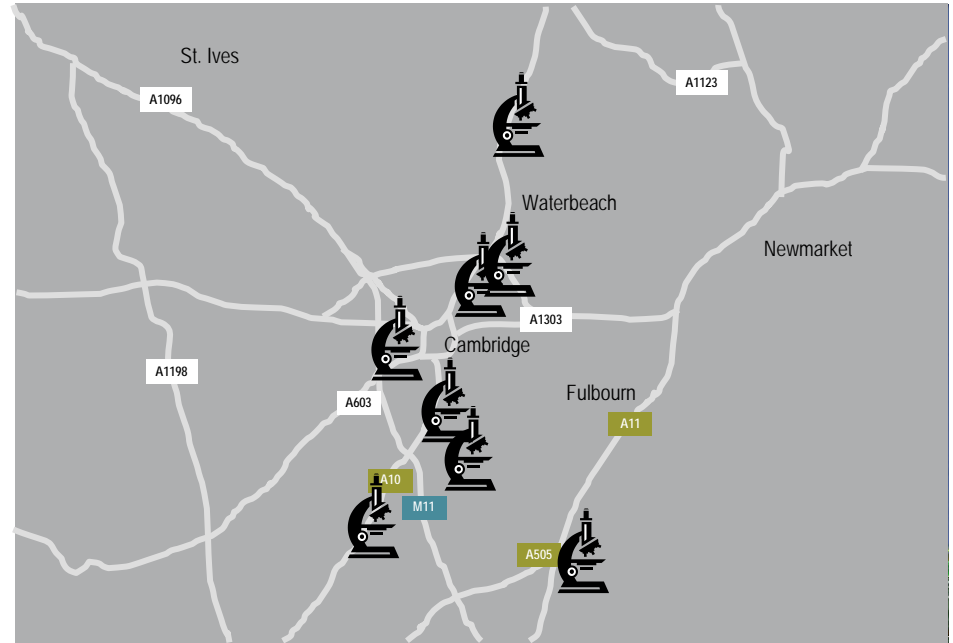
The Cambridge Region is a mature market, with over 180 biotech companies and the presence of some world-leading centers of research such as the Sanger Centre (a genomic research institute), the John Innes Centre for Plant Research, the Babraham Institute for immunology research and the Laboratory for Molecular Biology. The university, frequently ranked as one of the top five in the world, has cemented Cambridge's position as one of the leading locations in the world for research and development and the region is expected to remain a key location for the life sciences sector in the United Kingdom. Real estate development activity in Cambridge and surrounding markets is expected to remain limited, which may lead to lower levels of space availability. The market is particularly constrained for companies intending to acquire space in the center of Cambridge as opposed to the science parks located in peripheral areas.

Life sciences companies generally choose to locate out of town, at the numerous business and science parks that provide the high specification office and laboratory space they require. Key parks include Cambridge Science Park, West Cambridge Research & Development Park, St Johns innovation Park, Cambridge Research Park, Chesterford Research Park, Melbourn Science Park, Granta Park and Cambridge Biomedical Campus.

Of these parks, Cambridge Biomedical Campus is particularly well placed in terms of its location—adjacent to Addenbrookes Hospital and its relative proximity to the city center and train station. It is a 70-acre scheme with planning permission for biomedical research use. Two schemes have completed here so far, a 114,000-square-foot facility for Cancer Research UK in 2005 and a 203,000-square-foot facility for the Laboratory of Molecular Biology in 2012. More recently, pharmaceutical firm AstraZeneca announced plans to construct a new GBP 330.0 million (\$515.6 million)¹ R&D facility at the campus where they plan to relocate to in 2016.

Due to consistently high demand for lab and office space in Cambridge, the availability of large or self-contained units can be limited, although pockets of smaller space are more widely available. Rents range from low GBP 20.00 per square foot (\$31.25 p.s.f.)¹ for shell and core lab space, to circa GBP 32.00 per square foot (\$50.00 p.s.f.)¹ for fully fitted space depending on the level of fit-out.

Major lab supply:
Clusters of established lab stock with long-time industry presence



TAKEDA CAMBRIDGE
Bldg 430, Cambridge Science Park, Milton Road
Cambridge
3,902 sqm

ANGLIA RUSKIN UNIVERSITY
Compass House, Vision Park
Cambridge
3,158 sqm

TWI, GRANTA PARK
Cambridge
24,990 sqm
BioMed Realty/TWI
This is an extension of TWI's existing facility
Expected Delivery: 2014

CAMBRIDGE BIOMEDICAL CAMPUS
Cambridge
215,000 sqm
Astra Zeneca have announced plans for new global R&D facility (60,386 sqm) at this location

¹ Twelve-month average conversion rate of GBP 0.64 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Greater South East Region

Oxford metro overview

Oxford is home to more than 160 biopharmaceutical/healthcare companies. The cluster has four science parks, of which two are linked to the university. Since 2007, the Oxford cluster has added more than 28 new companies and over GBP 700.0 million (\$1.1 billion)¹ in investment from the private sector.

As a leading center for scientific research, Oxford and the surrounding area has a significant cluster of biotechnology and research-based businesses. Prime examples include Oxford Instruments, Penlon and Agilent Technologies. Whilst very important to the economy of the area, these firms are generally small in size. Many require laboratories as well as traditional office space. Principal locations include Oxford Science Park, Oxford Business Park, Milton Park and Harwell Science and Innovation Park. Conventional prime Grade A office space is available at GBP 22.50 per square foot (\$35.16 p.s.f.)¹ with fitted lab space available at GBP 19.00 / 22.50 per square foot (\$29.69 / 35.16 p.s.f.)¹

The majority of schemes in Oxford's pipeline comprise the remaining phases of development at the existing business parks. The largest of these can be found at Milton Park where permission exists for just under 450,000 square feet. However, so far, only MEPC's 165,000-square-foot Site 1 has been cleared. Permission also exists at Oxford Business Park for over 300,000 square feet and Oxford Science Park for a total of 244,900 square feet.

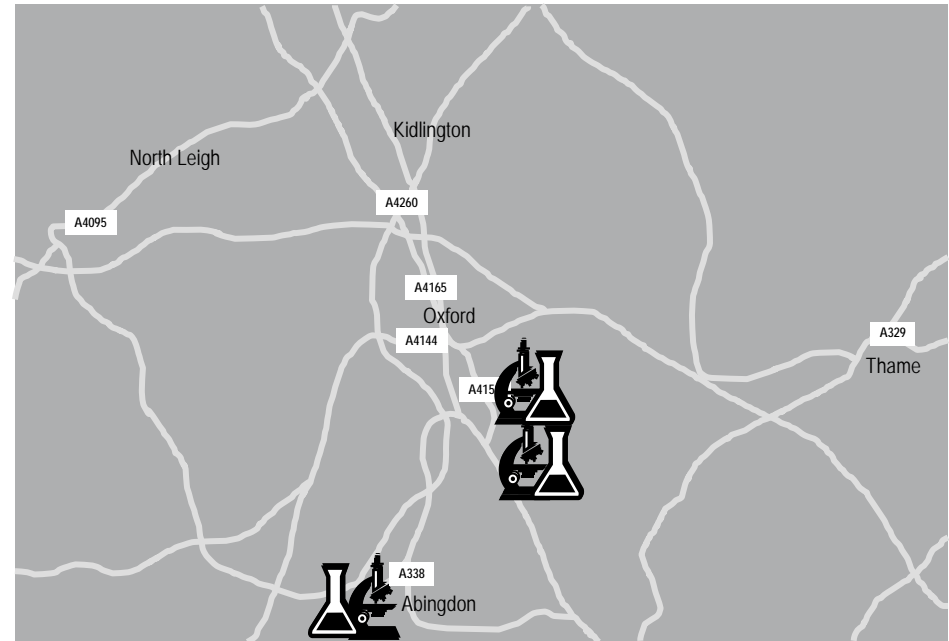
It is important to highlight that at mid-2011 the government confirmed that the Science Vale area of Oxfordshire had been awarded Enterprise Zone status. The area features both Harwell and Milton Park and it is hoped that reduced business rates, super fast Internet access and a simplified planning regime will encourage development here, providing a boost to the biotech and science and technology sector in the area.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



ELEMENT 6
Harwell Sci & Innov Campus, Fermi Avenue
Didcot
Pre-let
3,874 sqm

102 PARK DRIVE, MILTON PARK, A34
Didcot
2,564 sqm
MEPC
Expected Delivery: 2014

101 PARK DRIVE, MILTON PARK, A34
Didcot
2,601 sqm
MEPC
Expected Delivery: 2014

¹ Twelve-month average conversion rate of GBP 0.64 per U.S. dollar, from 1/1/2013 to 12/31/2013

North West England, Scotland

North West England overview

Being home to seven global pharma companies, North West England is the third largest bioscience cluster in the United Kingdom. AstraZeneca is one of the global pharmaceutical companies with a large base in the area. Strong academic research capabilities at the universities of Liverpool and Manchester along with partner hospitals and locally based national support facilities also help to anchor the cluster. In 2014, as investors become priced out of London and the South East, the region is expected to witness increasing interest from investors in the regional office market.

Scotland overview

Scotland is the second largest life sciences cluster in the United Kingdom and one of the most sizable clusters in Europe. The region houses roughly 650 organizations and encompasses biotechnology and pharmaceutical companies, contract research organizations (CROs) and medical device and diagnostic companies along with specialist suppliers and support organizations.

Edinburgh City Region is a very strong location for life sciences, supported by the critical mass of world-leading research excellence in a number of life science fields and a focus on collaboration as a means to advance R&D and commercialization. The region boasts access to nine research organizations which include four universities and three university teaching hospitals that together house a further 11 institutes dedicated to the life sciences, in addition to the numerous centers of excellence.

The supply of prime office space in Edinburgh is limited. Life sciences companies tend to locate in the out-of-town science parks where rents for Grade A space typically range from GBP 10.00 to 15.00 per square foot (\$15.63 to \$23.44 p.s.f.)¹ with 15 to 18 months rent free on a five-year term certain. However, higher rents have been secured in purpose built, publicly funded premises with restricted user clauses to target research led occupiers.

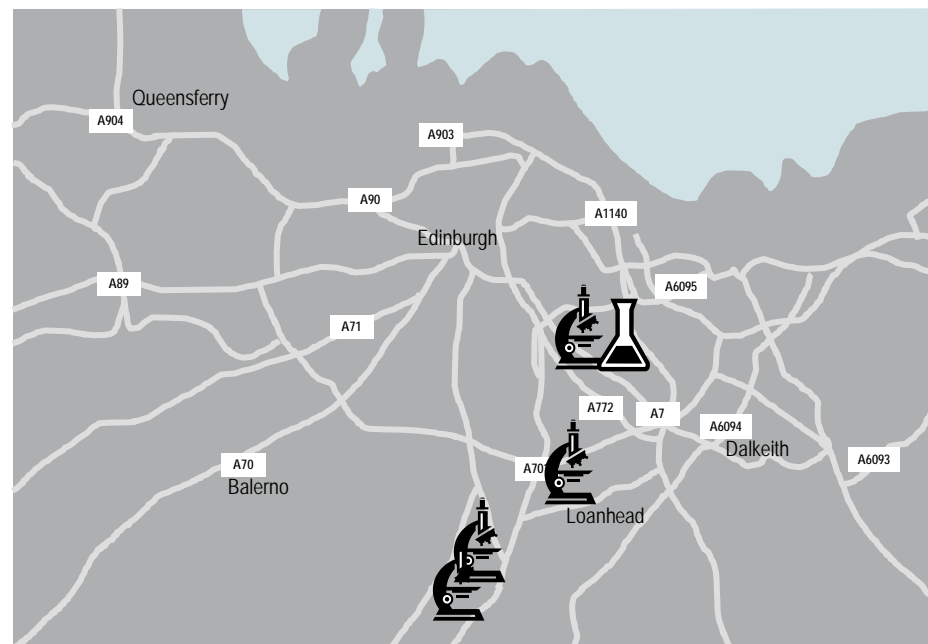
Edinburgh BioQuarter, one of the key locations for life sciences, offers access to a combination of preclinical and clinical excellence in the Edinburgh Region. It is the only location in the United Kingdom, and one of only a few in Europe, to offer a world renowned medical school, a state of the art teaching hospital and bespoke biomedical research and development facilities. There has been some publicly funded development here recently and further sites are available for development. Other key science parks include: Alba Innovation Centre, BioCampus, Edinburgh Technopole, Heriot Watt Research Park, Pentlands Science Park and Roslin BioCentre.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



EDINBURGH NAPIER UNIVERSITY
36 & 38 South Gyle Crescent
South Gyle
2,415 sqm
(owner occupied)

CANONGATE / HOLYROOD ROAD
Edinburgh
827 sqm
University of Edinburgh / Balfour Beatty
Expected Delivery: 2014

¹ Twelve-month average conversion rate of GBP 0.64 per U.S. dollar, from 1/1/2013 to 12/31/2013

Asia Pacific

The life sciences industry continues to experience strong growth in most of the Asia Pacific region. According to the latest IMS *Market Prognosis*, pharmaceutical sales in Asia are expected to reach \$350.0 billion in 2016, accounting for nearly one third of global market volume. The remarkable growth is facilitated by strong demographic trends, such as increasing urbanization, changing lifestyles, an aging population and a global increase in chronic illness, as well as an overall increase in wealth and improvements to medical infrastructure.

The improvement of public health coverage in a number of markets has been a particularly strong driver of growth. For example, the Indonesian government has stepped up its commitment in recent years, with healthcare expenditure expected to double to around 5.0 to 6.0 percent of GDP by the end of 2014. Nonetheless, in most of the region, many people in rural areas continue to have little to no access to healthcare. In the case of Indonesia, around one-third of the population still has no health insurance coverage.

Asia's robust market potential has attracted major international players to the region and, more recently, spurred on a flurry of M&A activity as companies desperately look for growth in the wake of major patent expiries and declining sales elsewhere. Multinational companies such as Pfizer, Bayer and GlaxoSmithKline have increased their presence in the region, largely through structured partnerships with local manufacturers. Additionally, many companies are diversifying their portfolios to fully exploit Asia Pacific's market potential by adding generic brands, crop and animal science and even consumer products, primarily through mergers and acquisitions.

The Asian pharmaceutical market continues to be exceptionally varied in terms of its opportunities. Patent expiries pose huge upside for Asian generic manufacturers, who seek to exploit this for significant sales growth. Branded generics are particularly popular due to their attractive pricing and favorable reputations and account for the majority of pharmaceutical sales in countries such as the Philippines, Indonesia and India. Furthermore, niche markets of incremental innovation such as biosimilars have thrived in the region and are the source of strong business growth in China, Korea and India in particular.

Innovation and R&D also continue to gain momentum outside of the well-established Japanese hubs. Singapore is quickly becoming an important R&D hub, while China is putting a strong emphasis on developing the next wave of drugs and treatments (with a specific focus on biotechnology), heavily supported by government funds and other incentives. Biotechnology was selected as one of the seven strategic emerging industries in China's 12th Five-Year Plan, which calls for government R&D spending of over \$1.9 billion on new drugs through to 2015.



Australia

Country overview

The Australian life sciences sector has a long history, based on many large pharmaceutical companies having set up national or regional hubs in the cities of Sydney and Melbourne for their manufacturing, distribution and sales operations. Due to the need for large tracts of land to house manufacturing and warehousing facilities, companies tended to create campus style facilities outside the traditional office locations.

In the past decade, a shift has occurred as many companies have started to move their manufacturing facilities offshore, seeking lower cost markets, repositioning their Australian focus to the sales and marketing of products. The need for large-scale industrial sites to house research, development and manufacturing operations has been greatly reduced. A number of life sciences companies have also outsourced their distribution to third-party logistics providers, reducing or eliminating their requirement for warehouse space. New leased premises in locations closer to employment markets, such as business parks, are now being used.

However, despite these general trends of offshoring and outsourcing, medical engineering companies, in particular biotech, still have requirements for secure and specialized manufacturing and warehouse facilities in Australia. There remains a reduced manufacturing presence for specific high-margin drugs and over-the-counter natural health style products. For example, Blackmores works on just-in-time delivery for its customers.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	137,488	12.5%	67.4%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	9.0%	8.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	2.4%	15.2%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	315	1.2%	-4.0%

Country outlook

The pharmaceutical industry in Australia faces a watershed amid extensive government reform centered on the AUD 6.0 to 7.0 billion (\$5.8 to \$6.7 billion)¹ per year Pharmaceutical Benefits Scheme (a program of the Australian government that provides subsidized prescription drugs to residents), and the impact of global concerns such as depleted drug development pipelines and patent expirations.

Current and planned price disclosure rules are likely to strongly affect the industry's fortunes. To improve business certainty, companies will need to develop a better understanding of the reforms and respond decisively. While regulatory compliance is improving, compliance costs are also expected to rise going forward. The emerging global trend toward E-health is likely to radically change Australian healthcare; companies will need to adapt to advances such as the greater use of mobile technology. With the growth in personalized medicine, collaboration is critical for the future success of pharmaceutical companies.

Despite its numerous challenges, there are signs that the industry is making inroads in adapting its business model. Emerging markets have become a renewed focus, as evidenced by AstraZeneca's recent expansion of its Sydney factory to supply asthma drugs to China. Big pharma companies are also increasingly seeking collaborations with public research and development agencies and universities. With successful adaptations of their business models, companies' losses in sales due to patent expiry are expected to lessen in the coming years, with new product sales likely to pick up.

¹ Twelve-month average conversion rate of AUD 1.04 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Sydney

Metro overview

In the developmental stages of the Australian life sciences market in the 1950s and 1960s, the initial focus was on buying land to establish purpose-built facilities encompassing the manufacturing, distribution and administration operations on one secure site. This gave rise to the development of campus style facilities which were dispersed throughout the greater Sydney area including small clusters around West Ryde and Macquarie Park.

As the market matured and the operational focus of many companies shifted from the manufacturing to the sales and marketing of their products, the relevance of these campus style properties has diminished. Companies have been looking to downsize their footprint, consolidate their real estate holdings, and secure office space in locations that will attract and retain the best staff. Recent examples of this include MSD and Abbott. The days of large scale life sciences property developments have diminished, with the last major development undertaken by Blackmores in Warriewood.

In Sydney, Macquarie Park has benefited the most from this transition. Today, Macquarie Park, also known as "Pill Hill," is on the verge of a major transformation into the life sciences hub of Sydney. The pharmaceutical sales model is evolving with the development of technology, which facilitates a more agile and flexible workforce. This structural change in the sector means companies are progressively adopting more flexible workplace formats to match their operational drivers.

The development of improved public transport infrastructure in Macquarie Park has been one of the key drivers in attracting a range of industries including life sciences, electronics, communications and technology. Macquarie University, Macquarie University Hospital and Macquarie Shopping Centre are also key drawcards and employers in the area.

A new Local Environmental Plan (LEP), providing for improved plot ratios, was announced in 2010, which could result in the development of 15- to 20-story office buildings, as compared to the traditional five-story buildings that many pharmaceutical companies occupy. This opens the market up to a wider pool of potential tenants and allows it to compete more closely with the North Sydney and Chatswood areas where there are further development opportunities.

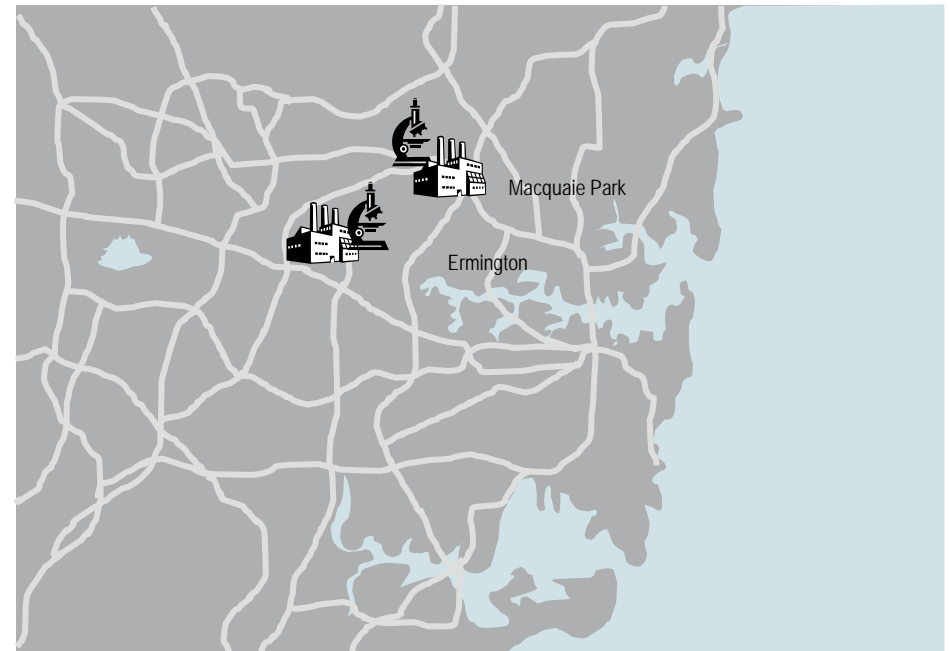
The shift in workplace conditions in Macquarie Park and upgrades in public infrastructure, coupled with a low vacancy rate, have raised rental rates to levels that have the potential to change the tenancy mix in the long term. Currently the vacancy rate for Macquarie Park is approximately at 9.0 percent, circa 3.0 percentage points lower than the historic average, highlighting the current change in the market. However, this vacancy is spread across the market, with few large areas of space available in-one-line.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



MSD
26 Talavera Rd
Macquarie Park
5,500 sqm
Term: 10 years

ASTRAZENECA
66-82 Talavera Rd
Macquarie Park
Class: Commercial
AUD 500 / sqm

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Melbourne

Metro overview

The Melbourne life sciences and pharmaceuticals market is an established market with many companies still located near or in the same premises that they set up in when they first entered the Australian market in the 1950s and 1960s. There is no one major life sciences cluster in Melbourne and thus companies are dispersed throughout the greater Melbourne area. As a result of this, company "legacy" locations are still very prevalent, as moving to a central location is not a priority. An example of this is Bristol-Myers Squibb (BMS), who established its Melbourne operations in 1957 and has moved in the same South Eastern Suburbs region.

Many companies have changed their operating structure, with the closure of the majority of manufacturing operations and a greater focus on sales and marketing. This trend has resulted in companies relinquishing manufacturing and warehouse space they once occupied, decreasing their real estate footprint. For example, BMS once occupied over 8,000 square meters of office space along with a large manufacturing warehouse, staff facilities and associated car parking at their Melbourne location. After moving manufacturing offshore, it has downsized to occupy approximately 3,000 square meters of office in a business park. GlaxoSmithKline and Johnson & Johnson have also consolidated their Melbourne office space requirements.

Exceptions to this trend include companies that are maintaining their manufacturing operations to produce over-the-counter drugs and vitamins. For example, Sigma Pharmaceuticals purchased warehouse space from BMS to maintain its manufacturing operations in Melbourne, producing generic and contract drugs for BMS. CSL continues to have manufacturing operations in the Australian market as well.

The Melbourne life sciences market is similar to the rest of the Australian market, with primary operations being the sales and marketing of products. Companies will look to change their real estate usage as their space needs shift from both industrial/warehouse and office space to purely office accommodation.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



MESOBLAST LTD.

55 Collins St
Melbourne CBD
1,035 sqm
Term: 6 years

Activity key:

Leasing

Sales

Under construction

Large blocks of space

China

Country overview

China's pharmaceutical industry has enjoyed rapid growth over the past decade, now accounting for 5.6 percent of the global market. With the world's largest population, second largest economy and a growing middle class, China's prospective consumer base is unmatched by any country worldwide. In the past, one of the primary reasons for interest in China was its low-cost manufacturing capabilities, but this advantage is gradually diminishing. Today, efforts are shifting toward expanding capabilities beyond manufacturing into more high-tech R&D functions.

The industry is characterized by a highly fragmented structure. The top players occupy only a small share of the overall pie, indicating that the market is still in the early stages of development. There is also a high degree of regional differentiation and segregation, with minor players operating in their own small markets. Also, a large proportion of output continues to be flooded with low priced, lower quality products.

The drug distribution system in China remains highly fragmented, with multiple channels, decision makers and regulations adding complexity to the market. The three largest distributors only account for about 20.0 percent of the market share. The fragmentation and layers of distribution make it difficult to build visibility across the pharmaceutical supply chain, and to determine the volume of supplies and where it is flowing. With no system in place to effectively monitor stock across channels, there can be a gap between ex-factory (factory to distributor) and in-market sales. However, the "12th Five-Year Plan" emphasizes consolidation of distributors and aims to significantly improve the distribution network for pharmaceutical products.

Traditional Chinese medicine (TCM) is receiving unprecedented government support and funding to develop drugs and TCM diagnostic tools targeting chronic illnesses. Although domestic institutions are likely to be the main recipients of government support, foreign firms and universities with industry expertise or proprietary technology can partner with Chinese companies and thus access this attractive funding and large domestic market.

Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	2,882,903	3.6%	45.7%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	N/A	N/A	
Funding	% of GDP	% in medical & health sciences	
GERD	1.8%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	1,141	4.3%	42.8%

Country outlook

As a production base, China's cost advantage has been eroded by inflation, rising wages, currency appreciation and challenges to the many tax reductions and rebates that China has traditionally offered to its own exporters. These various pressures will certainly reduce China's ability to undercut foreign markets over the medium to long term. Additional challenges include China's weak, but improving, intellectual property protection and GMP (Good Manufacturing Practices) compliance, navigating the legislative environment and ensuring market access comparable to domestic companies.

The outlook for the life sciences sector remains positive. Improving talent availability, funding environment and quality facilities will all change the manner in which China competes in the industry going forward. China's pharmaceutical market is projected to become one of the world's largest. By 2020, the market volume is expected to grow to CNY 1.4 trillion (\$220.0 billion),¹ with China becoming the second largest market after the United States.

Some business analysts are estimating 18.0 to 20.0 percent annual growth in Chinese drug spending through 2015. A rising middle class, enhancements to the national healthcare systems and a rapidly aging population are some of the factors noted to support such growth.

¹ Twelve-month average conversion rate of CNY 6.19 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Beijing Daxing District

Cluster overview

Compared to other science parks, Daxing District's most competitive advantages are the level of industrialization and the efficient public service platform for the life sciences industry. The government provides strong support for innovation and new drug approvals.

The Daxing District hosts two life sciences orientated parks : the Beijing Economic and Technological Development Zone (BDA) and the Daxing Biomedicine Industrial Base (CBP).

BDA is the only area that enjoys the preferential policies of both state economic & technological development areas and state high-tech industrial parks. Known as "medical valley," BDA is one of the three national biological pharmaceutical innovation incubator bases. Since its integration in Daxing District in 2010, BDA has counted life sciences among its six leading industries. The area offers many advantages in terms of fiscal incentives, tax concessions, innovation, talent and distribution.

CBP is a biotechnology industrialization base, built by the Beijing municipal government to revitalize its modern manufacturing industry. It holds industrial functions such as biotechnology indigenous innovation, product R&D, industrialization of technical achievements and producer services. Founded in 2002, the CBP merged with the Zhongguancun Science and Technology Park in 2006. It is conveniently located in the core region of Daxing New Town in Beijing, with easy access to the airport and railway lines.

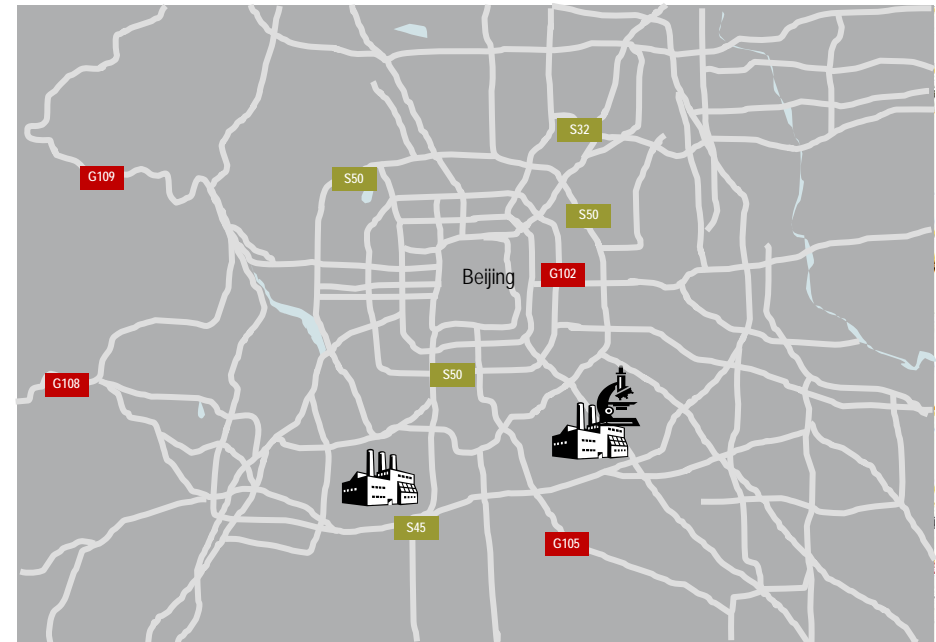
CBP has taken full advantage of Beijing's industrial resources in terms of scientific research and administration, providing a "one-stop-shop" for R&D, manufacturing, sales and additional services. It enjoys policies related to industrial support, financial support and intellectual resources from China's ministries and commissions.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



YIZHAN
13,128 sqm
Turnover of CNY 14.3M
CNY1,089 per sqm

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Shanghai Zhangjiang Hi-Tech Park

Cluster overview

The Zhangjiang Hi-Tech Park, established in 1992, is situated in the Pudong New Area with a total area of 6,178 acres. The park is made up of the following areas: the Technical Innovation Zone, the Hi-Tech Industry Zone, the Scientific Research and Education Zone and the Residential Zone.

Major companies that have a presence in the park include life sciences firms GSK, Roche, Eli Lilly, Pfizer, Novartis, Boehringer Ingelheim, GE and AstraZeneca, Internet technology firms, software firms, chemical companies and semiconductor firms. There are also a multitude of biotech firms, over a hundred of them being domestically owned companies.

According to the 12th "Five-Year Plan," Zhangjiang Hi-Tech Park will maintain its investment in industrial fixed assets at CNY 20.0 billion (\$3.2 billion)¹ a year to total CNY 100.0 billion (\$16.2 billion)¹ by year-end 2015.



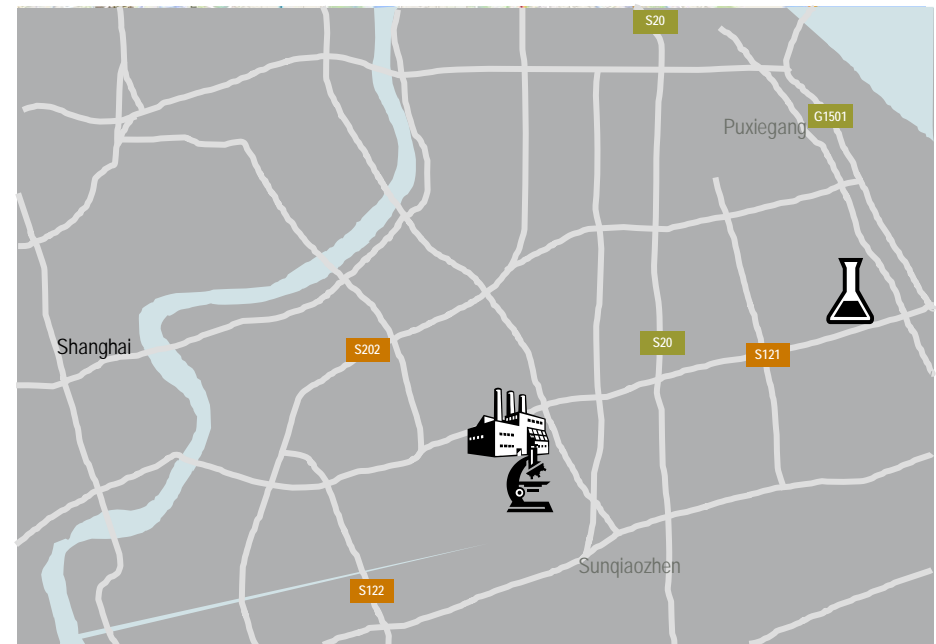
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



ASTRA ZENECA
Zhangjiang
80,000 sqm

MEDTRONICS
CNY 24,000 per sqm

NOVARTIS
100,000 sqm
Expected completion: 2014-15

PLOT 9-6 MID-ZHANGJIANG ZONE
50,000 sqm

¹ Twelve-month average conversion rate of CNY 6.19 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Beijing Zhongguancun (ZGC) Life Science Park

Cluster overview

Developed by the Beijing municipal government, Zhongguancun is one of the most dense scientific, educational and talent resource bases in China. It is home to around 40 colleges and universities including Peking University and Tsinghua University, in addition to numerous national scientific institutions, state-level laboratories, national engineering research centers, national engineering and technological research centers.

On March 13, 2009, the State Council approved the construction of the Zhongguancun National Demonstration Zone, and developed a plan to build a Science and Technology innovation center with global influence. In the past two decades, Zhongguancun has gathered nearly 20,000 high tech enterprises, including Lenovo and Baidu, to form an industrial cluster featuring companies specializing in electronic information, biomedicine, energy and environmental protection, new materials, advanced manufacturing aerospace, and R&D.

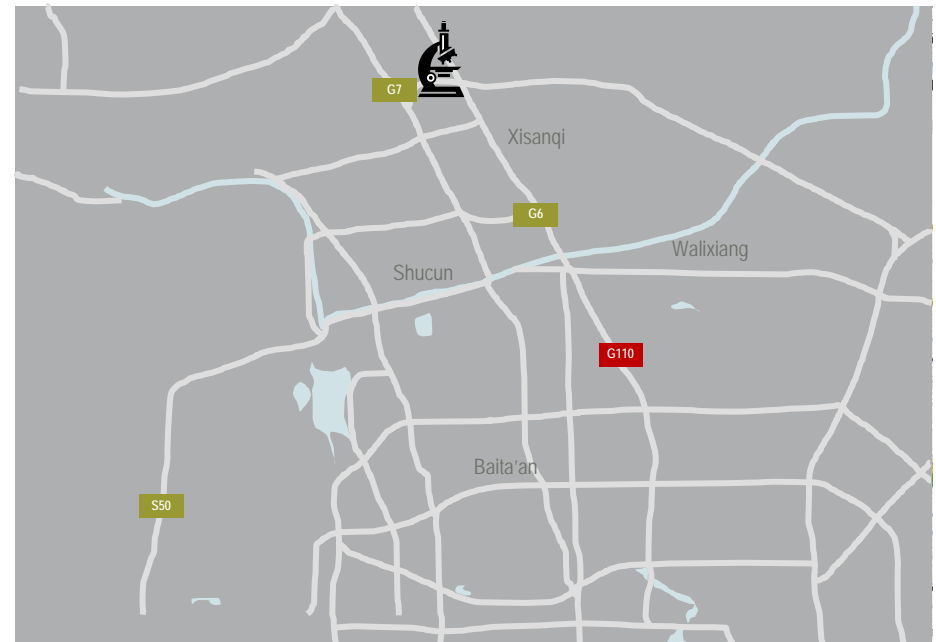
Zhongguancun's venture capital cases and yearly investment account for about a third of the country's total. To meet the national strategic requirements and Beijing's needs for socioeconomic development, Zhongguancun has obtained a large number of key technical breakthroughs, innovation results and critical science and technology innovations, including the super computer and vaccines against SARS and bird flu.

Cluster outlook

During the 12th Five-Year Plan period (2011-2015), Zhongguancun will further improve its Science & Technology Cities, promote the development of the northern R&D and industrial belt (located in North Haidian, South Changping), as well as the southern high-tech manufacturing and emerging industrial belt (consisting of the Beijing Economic-Technological Development Area and the Daxing, Tongzhou and Fangshan districts). The Zhongguancun Demonstration Zone will further open up and serve Beijing as it develops into a global city. Plans for the Demonstration Zone include developing an international science and technology innovation center, which is likely to be built within the next decade.



Major lab supply:
Clusters of established lab stock with long-time industry presence



BOYA C-CENTER
4,300 sqm
CNY 25,000 per sqm

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Suzhou Industrial Park's BioBay

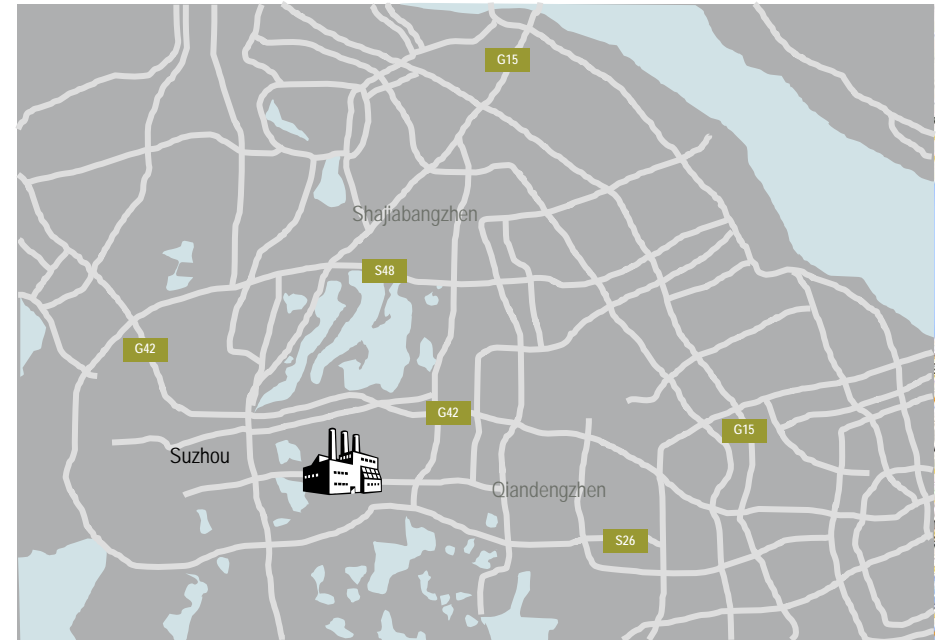
Cluster overview

Located in the Dushu Lake Science and Education Innovation District, BioBay spans an area of 213 acres. It is an innovative science and technology carrier for the development of the emerging biological industry and the Nano technology industry. Since it opened in June 2007, BioBay has been awarded titles including "China International Nano-tech Innovation Cluster," "Chinese Service Outsourcing Pilot Base," "High Level Overseas Talent Innovation and Venture Base," "Jiangsu Bio-medical Industrial Park," and "Jiangsu Nano Technology Industrial Park".

Suzhou BioBay includes an industrialized area, an administrative office and several residential facilities. The Suzhou Institute of Nano-tech and Nano-bionics and the Chinese Academy of Sciences are present here. The region has developed capabilities for gene technology and nanotechnology with the most complete industrial chain and the highest industrial agglomeration level in China. The gene technology cluster covers the complete industrial value chain consisting of gene reagent development, gene detection services, gene diagnostics and gene therapeutic drug R&D, gene engineering drug and vaccine R&D. BioBay's nanotechnology cluster focuses on developing six major nanotechnology applications: new nano materials, nano-photoelectronics, nano-biopharmaceutical, micro/nano system manufacturing, nano energy saving and environment protection.



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



SUZHOU INT'L SCIENCE PARK VIII
Expected completion: 2014

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Chengdu's TLSP and CIHC Parks

Cluster overview

Tianfu Life Science Park (TLSP) in High-Tech Zone and Chengdu International Health City (CIHC) in Wenjiang Zone are Chengdu's two life sciences oriented parks.

As the gateway for the life sciences industry in Western China, TLSP is supported by the Chengdu municipal government and the Chengdu High-Tech Zone. Foreign and domestic companies located in TLSP include Renhe Pharmaceutical Group, Jiangsu Hengrui Medicine, ChemPartner and West China Hospital.

Approved in 2008 by the Chengdu municipal government, the CIHC project is a professional, international, diversified medical rehabilitation and health service platform covering a total area of 30.0 square kilometers. CIHC is a pioneer as a Chinese modern medical industry cluster that integrates health interventions, health services, medical tourism, education and research and business support.

The Singapore-Sichuan Hi-Tech Innovation Park (SSCIP) is an innovation cluster for high tech enterprises that is jointly developed by Singapore and Sichuan. It represents a major milestone in the collaboration between the two parties. The SSCIP covers an area of about 2,555 acres and the project aims to attract a residential population of 120,000 and an employed population of 120,000 to 150,000. It will be completed by 2020 with a total investment of around CNY 100.0 billion (\$16.2 billion).¹

The biomedicine and health sector is included in Chengdu's 12th "Five-Year Plan" as a major developing industry, and benefits from fiscal incentives, tax concessions and other supporting policies for innovation, talent and distribution.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



RUIHUA MEDICINE CO.
Chengdu Hi-tech Zone
43,355 sqm

WEST CHINA HOSPITAL, SICHUAN UNIVERSITY
Chengdu Hi-tech Zone
17,516 sqm

SSCIP BIOMEDICAL CLUSTER
2,555 acres
Expected completion: 2020

TLSP
18,746 sqm

¹ Twelve-month average conversion rate of CNY 6.19 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

India

Country overview

The Indian pharmaceutical market was valued at INR 720.7 billion (\$12.3 billion)¹ in 2013 (according to PricewaterhouseCoopers). The strong growth in the life sciences industry in India can be attributed to a number of socioeconomic factors, including improving health awareness, increasing affluence, changing lifestyles, increasing government expenditure on healthcare and a nascent, yet fast growing, health insurance industry. In 2013, the Indian pharmaceutical market registered a slowdown in overall growth to 9.8 percent, from 16.6 percent in 2012. This slowdown can be primarily attributed to the National Pharmaceutical Pricing Policy (NPPP), announced and approved late 2012, which led to new drug pricing policies and regulatory interventions being introduced.

Although the life sciences industry is widely spread across the country, the most dense concentrations are to be found in Western and Southern India. The top three clusters are Ahmedabad, in the state of Gujarat, "Genome Valley" in the state of Andhra Pradesh and Bangalore in the state of Karnataka.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	391,149	0.9%	39.6%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	N/A	N/A	
Funding	% of GDP	% in medical & health sciences	
GERD	0.8%	7.1%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	407	1.5%	-2.2%

Country outlook

In the last decade (2002 to 2012), India's life sciences sector tripled in size. The pharmaceutical sector is expected to reach a market size of INR 2.3 trillion (\$45.0 billion)¹ by 2020, making it the world's sixth largest pharmaceutical market (McKinsey & Company, 'India Pharma 2020,' 2012).

India currently exports drug intermediates, Active Pharmaceutical Ingredients (APIs), Finished Dosage Formulations (FDFs), Bio-Pharmaceuticals, and Clinical Services across the globe. Pharmaceuticals export grew by an average of 24.0 percent per year between 2006 and 2012 to INR 853.2 billion (\$14.6 billion).¹ The Ministry of Commerce has set a target export of INR 1.5 trillion (\$25.0 billion)¹ by 2016, representing annual growth rate of 25.0 percent. In addition to this, the latest five-year government plan outlines significant R&D investment plans to further support the development of the Indian life sciences industry.

The economic environment in India is tougher now than ever before. While pharma companies focus their attention on measures to combat the growth slowdown, they will also need to work with the government and other stakeholders to resolve regulatory challenges. For example, resolving the impasse with clinical trials will help companies continue their R&D efforts, which eventually will form the most crucial pillar of their growth strategy.

¹ Twelve-month average conversion rate of INR 58.44 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Submarkets

Ahmedabad, Gujarat

Hosting a strong infrastructure, pro-active policies, a research and innovation driven environment as well as easy access to a large talent pool through the high number of educational institutions, Gujarat has taken a leading position in the pharmaceutical and biotechnology sector in India. The state contributed around 40.0 percent to India's pharmaceutical turnover and around 22.0 percent of total pharma exports in 2012. Large numbers of clinical research organizations have established themselves in Gujarat, many of which have World Health Organization-compliant manufacturing units.

The Gujarat government provides a range of incentives related to research and development activities and sales license issuance. This has attracted a significant number of pharmaceutical companies including Sun Pharma, Bayer Cropscience, Quintiles, Zydus, Claris, Teva Pharmaceuticals, Claris Lifescience and Dishman.

Changodar – Bavla Corridor

The Changodar – Bavla Corridor is an established pharmaceutical hub, located southwest of Ahmedabad city along the national highway 8A. The Pharma Special Economic Zone is spread over 500 acres and houses the manufacturing units of around 30 healthcare, API and formulations companies.

Kalol

Kalol, situated 30 kilometers northwest of Ahmedabad city, is an established pharma manufacturing hub. Torrent Pharmaceutical has established both a manufacturing and a R&D unit on their 84-acre site.

Sanand

Sanand is an emerging industrial estate located to the west of Ahmedabad. Its strong infrastructure and incumbent industrial ecosystem is gradually attracting more and more domestic pharma players.



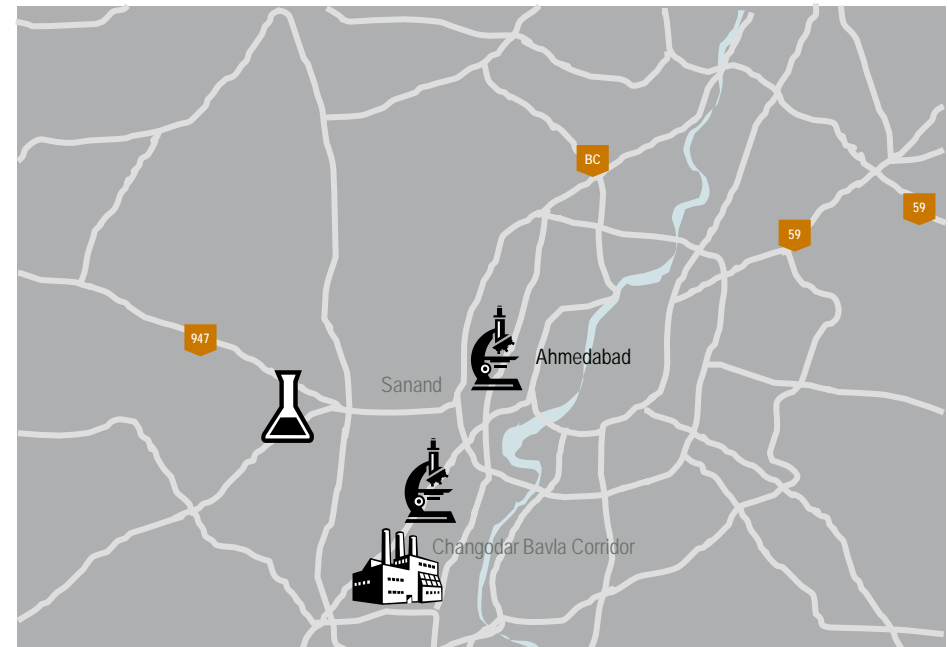
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



TEVA PHARMACEUTICAL*
Sanand
10 hectares (long lease)
INR 2,850 per sqm

INTAS PHARMACEUTICALS
Ahmedabad
Developer: Ganesh Housing Corporation Ltd.
18,580 sqm
INR 800 million

EMNIL PHARMACEUTICALS
Changodar Bavla Corridor
Developer: Zydus SEZ
12000 – 15,000 sqm
INR 2700 – 3,000 per sqm

ALEXANDRIA® GUJARAT TECH PARK
Sanand
94,607 sqm

Activity key: Leasing* Sales Under construction Large blocks of space

*In India, manufacturing industries typically buy (outright or long lease) the land instead of leasing (short term) ready-built spaces. Deals quoted here are recent land deals.

Submarkets

Genome Valley, Andhra Pradesh

The state of Andhra Pradesh became a domestic life sciences pioneer when it created "Genome Valley" in 1999 in order to attract R&D companies and synergize existing life science companies in Hyderabad. Genome Valley was developed in three phases by the public-private partnership (PPP) model.

Phase 1: ICICI Knowledge Park (now IKP Knowledge Park) spread over 200 acres and Shapoorji Pallonji Biotech Park (now Alexandria® Knowledge Park) spread over 145 acres.

Phase 2: A further 162 acres were developed in a similar model within Shapoorji Pallonji Biotech Park (now Alexandria® Knowledge Park).

Phase 3: 600 acres, of which 100 acres form a part of APIIC (Andhra Pradesh Industrial Infrastructure Corporation) Biomedical Sciences Special Economic Zone.

The Genome Valley has a blend of knowledge parks and special economic zones, housing multitenanted lab space buildings, incubation facilities, office spaces and support facilities. Around 100 companies in the field of pharma, agricultural & biomedical sciences, contract research, vaccine manufacturing, regulatory and testing have established themselves in Genome Valley.

Major corporates present include:

- United States Pharmacopeia – its only state-of-the-art research & development center in India
- Novartis – R&D facility
- Bharat Biotech – one of its largest vaccine manufacturing facilities, along with a R&D center
- DuPont – DuPont Knowledge Center, one of the company's seven global research centers houses, which conducts research in agriculture and industrial biotechnology
- AMRI – Hyderabad Research Centre conducts advanced research and development activities
- Vimta Labs – a leading contract research organization (CRO) which has its life sciences campus in Genome Valley

In order to further enhance synergy between companies in the Genome Valley, the government has proposed the development of "MedTech Valley," an additional medical devices hub.



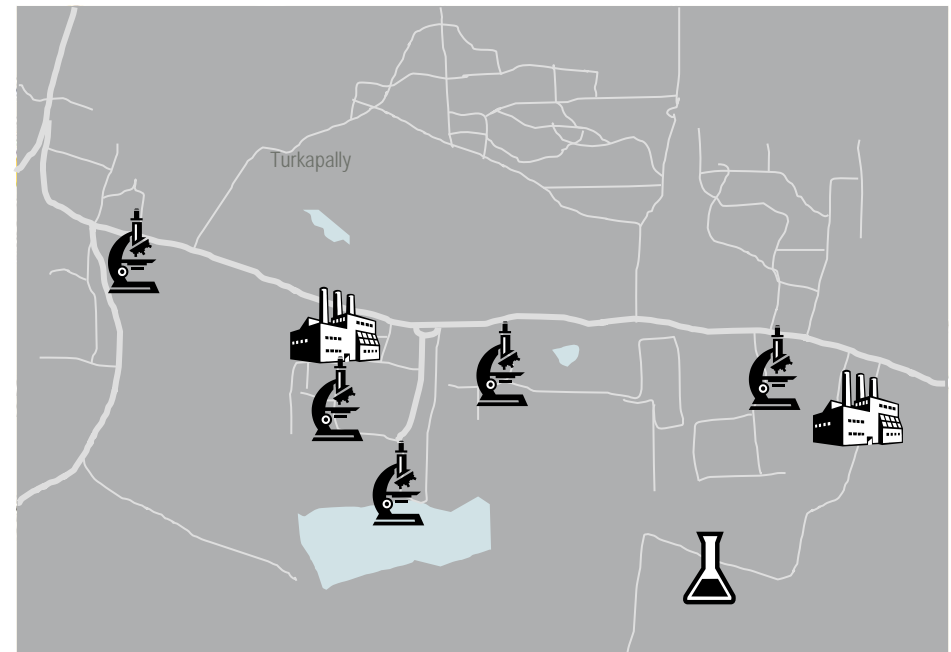
Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



ASHLAND INC.
Alexandria® Knowledge Park
Genome Valley
2,323 sqm

SANZYME
Genome Valley Phase 2
2 hectares (land area)
INR 12.9 million / hectare

GLOBION
Genome Valley Phase 3
6 hectares (land area)

ALEXANDRIA® CENTER
Genome Valley, Phase 2
9,290 sqm (Operational)
9,290 sqm (Phase 2)
Built-to-suit R&D Facility
Direct

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Submarkets

Bangalore, Karnataka

Known as the Biotech Capital of India, the state's 195 biotechnology firms established here constitute 60.0 percent of all biotechnology companies in India. Karnataka ranks 10th in the number of pharma manufacturing units in the country and hosts 221 formulation units and 74 bulk drug units, as of 2012. Major international companies present in the state include GlaxoSmithKline, AstraZeneca, Novo Nordisk and Biocon.

The state government, in partnership with the private sector, has played an important role in the development of the local infrastructure. The 52-acre "Bangalore Helix"—one of the largest biotechnology parks in India—is being developed by the government on the back of an investment of around INR 81.8 billion (\$1.4 billion)¹. Bangalore also has a large pool of skilled human resources which attracts premier biotech and pharmaceutical institutes to the region. The government is also developing specific industrial zones for biotechnology in various districts.

Bommasandra Industrial Estate

Located in the southeast of Bangalore, next to the Hosur Road (National Highway 44), Bommasandra industrial estate offers many advantages in terms of general infrastructure, talent availability and logistics. Foreign and domestic companies based here include Biocon, Sigma- Aldrich, Cipla, Strides Arcolab and Richcore Lifesciences

Peenya Industrial Estate

Peenya industrial estate, located northwest of Bangalore city, has a well maintained road network to other parts of the city. The first stage of the industrial estate sprawls over an area of 125 acres, while the second stage, established in the year 1979, covers 141.5 acres. The soon to be operational Metro Rail Phase I will connect Peenya Industrial Estate to other parts of the city, further improving connectivity.

Tumkur Road

Tumkur Road is an important destination for industrial and warehousing activities. Major players like Kemwell Biopharma and Himalayan Drug Company are present here. The proposed Mumbai-Bangalore Industrial Corridor is expected to boost the growth of the residential, commercial and industrial infrastructure in the area.

Old Madras Road

Old Madras Road corridor is the fastest developing area in Bangalore, housing companies such as Cipla, GlaxoSmithKline, Medrich, Ranbaxy and Novo Nordisk. The government is also developing new industrial parks along this corridor to attract investments.



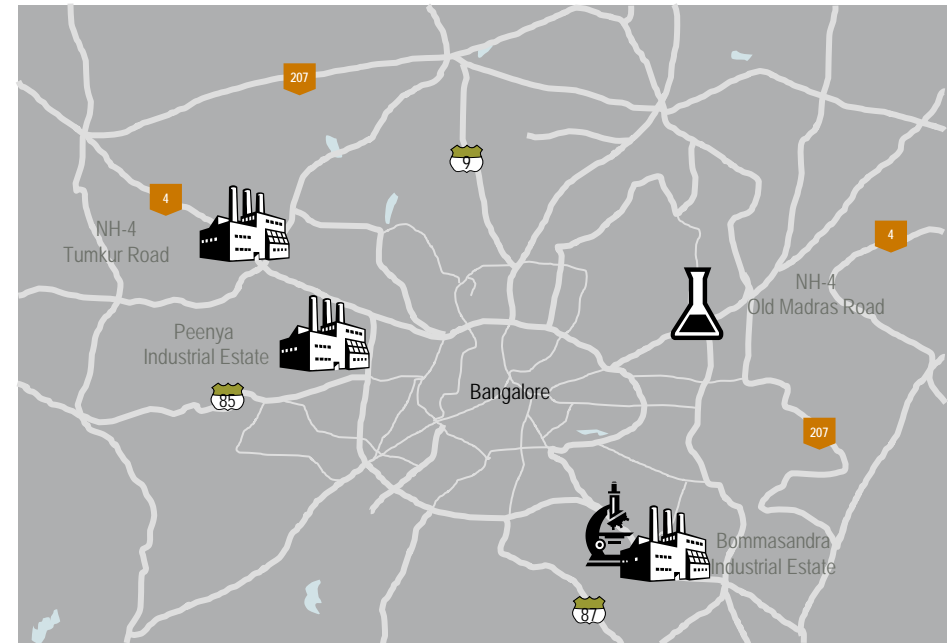
Major lab supply:
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Areas with limited lab stock today that are poised for growth



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



L'OREAL

Bearys Global Research Triangle,
Whitefield
Off Old Madras Road
2,011 sqm

GLOBAL PHARMA COMPANY

(confidential)
Vemgal Industrial Area
Old Madras Road
20 hectares

MEDRICH LIMITED

Poojaramanahalli, Bangalore
Old Madras Road

HOSUR ROAD

32,516 sqm (built up)
Developer: Alexandria
Direct

¹ Twelve-month average conversion rate of INR 58.44 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Indonesia

Country overview

The pharmaceutical market in Indonesia is expanding quickly. It is valued at IDR 67.6 trillion (\$6.5 billion),¹ with an annual growth rate of 12.5 percent, expected to continue through 2018. Although the Indonesian pharmaceutical market has experienced significant growth of around 85.0 percent between 2007 and 2013, it remains relatively small for a market with 240.0 million people. This is partly due to the low drug consumption per capita, with many Indonesians having to pay out-of-pocket for a majority of their medical bills. According to a Ministry of Health source, just 3.0 to 5.0 percent of the population takes medicines.

Industry growth has been held back by a number of factors, including lack of local raw materials, the lack of intellectual property protection, regulatory barriers against international investment and high distribution costs. However, these deterrents are offset by inexpensive production and labor, an increasingly attractive attribute for foreign investors. Furthermore, the Indonesian government treats healthcare as a top priority and intends to double its healthcare expenditure to around 5.0 to 6.0 percent of GDP by 2014.

Domestic pharmaceutical firms account for about 70.0 percent of Indonesia's drug market share. Almost 60 foreign pharmaceutical companies control the remaining 30.0 percent of the market, the largest being Bayer, Pfizer and GlaxoSmithKline. Kalbe Pharma is the largest domestic pharmaceutical company. With a market capitalization of IDR 72.8 trillion (\$7.0 billion),¹ it is the largest listed drug company in ASEAN. The market is quite concentrated, with the top 20 companies accounting for 80.0 percent of the total production.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	51,544	0.6%	82.9%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	6.0%	17.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	0.8%	N/A	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	4	0.0%	300.0%

It is estimated that Indonesian companies import about 90.0 percent of the pharmaceutical raw materials needed, mainly from China. Both the government and industry players aim to reduce the dependence on imports to about 20.0 percent, by encouraging and boosting domestic production. The country's exports are also limited, with roughly 70.0 percent of locally produced drugs being consumed domestically.

Country outlook

With increased spending on healthcare, a growing population and a rising incidence of chronic diseases, Indonesia is among the 17 "pharmerging markets" where IMS Health expects double-digit increases through 2015. The country's huge generic drugs sector is likely to see consolidation, but will remain challenging as long as part of it is cannibalized by counterfeit drugs. The steady growth of health supplements and over-the-counter medication is expected to continue, primarily due to increased self-medication, more affordable drugs and the roll-out of a new health insurance plan. The new health insurance plan in Indonesia will target citizens and foreigners residing in Indonesia for more than six months, covering about 120.0 million people. An additional 10.0 million to 20.0 million people are likely to enroll during 2014. Steady projected sales growth provides substantial incentives for companies to operate in the country, and the main challenges to investment are easing. Manufacturing standards are improving and government reforms are under way. Changes to legislation will provide the industry with renewed growth, and allowing 100.0 percent foreign direct investment in the country will attract more foreign pharmaceutical companies. As companies become increasingly aware of Indonesia's potential, the sector is likely to undergo more positive transformation in the near future.

¹ Twelve-month average conversion rate of IDR 10,397.60 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Indonesia

Greater Jakarta Industrial Estate overview

Although Indonesia has around 55 industrial parks hosting life sciences operations, however none are fully dedicated to the sector. However, Java is seen as the choice destination and accounts for 75.0 percent of the country's industrial estates. The highest concentration of industrial estates is found in West Java, including Bekasi and Karawang, located within the Jakarta metropolitan area. The area that covers Tangerang, Bogor, Bekasi and Karawang, called the Greater Jakarta Industrial Estate, is home to most of the biggest pharmaceutical companies.

Many big pharmaceutical companies are located at Jababeka Industrial Estate, Pulo Gadung Industrial Estate (JIEP) and Bogor industrial zoning area. In Bogor, for example, PT Bayer Indonesia has a pharmaceutical products plant in Cibubur and is investing IDR 200.0 billion (\$19.2 million)¹ to enhance another production capacity of OTC pharmaceuticals in Cimanggis. Both plants market products in the country and also export to other Asia Pacific countries.

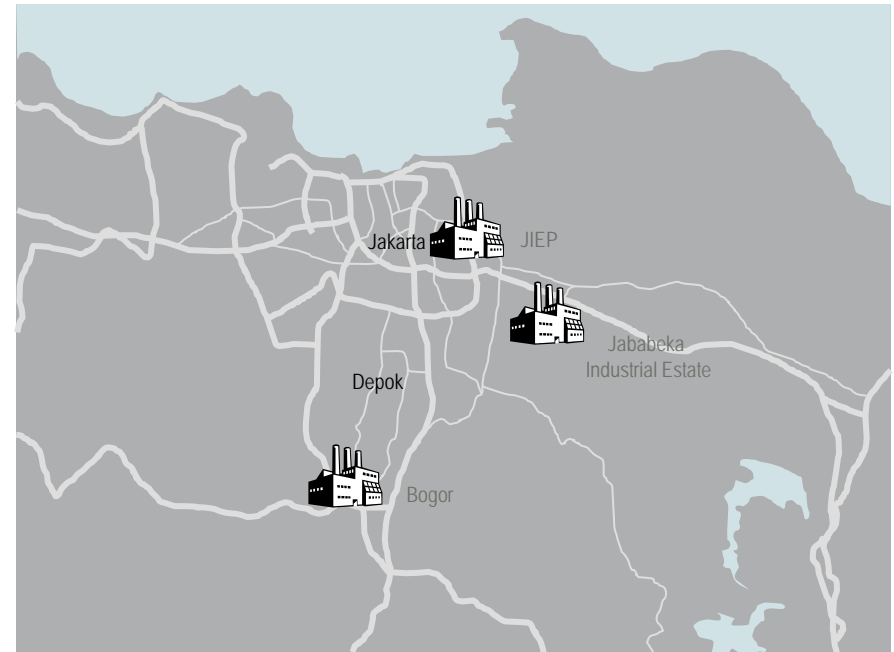
Jababeka Industrial Estate overview

Spanning 1,570 hectares of land, the Jababeka Industrial Estate is located at Cikarang, Bekasi Regency, 31.0 kilometres away from Jakarta City. Described as the first modern Indonesian eco-industrial estate, it was jointly developed with ProLH GTZ under a technical cooperation program between Indonesia and Germany. Jababeka Industrial Estate is meant to be a comprehensive, one-stop industrial development solution, offering industrial land as well as build-to-suit factory buildings. Its Cikarang Dry Port provides cargo handling and logistics for international export and import. Jababeka has its own medical city and is home to many renowned international and domestic enterprises such as Dexa Medica and AstraZeneca.

As demand surges, Jababeka also plans for further expansion. New developments scheduled for the near future include, for example, the nearby Medical City, which aims to become the premier location for scientific research in Indonesia.



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



¹ Twelve-month average conversion rate of IDR 10,397.60 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Japan

Country overview

Japan is Asia's largest life sciences market and ranks second globally in the consumption of prescription drugs, after the United States. The country has developed a number of strategic R&D locations and bio-clusters across the country that cultivate innovation and support the development of a large range of new drugs. The large middle class, high standard of living and an aging population make Japan an attractive long-term destination for pharmaceutical firms. Medical expenses in 2011 reached JPY 38.6 trillion (\$395.0 billion),¹ which equates to 8.2 percent of GDP. Since 2001, medical expenses have shown an annual growth of approximately 2.0 percent, primarily due to the increase in the proportion of elderly people and the prevalence of lifestyle diseases.

At JPY 9.5 trillion (\$97.2 billion)¹ (2012 figures), Japan's pharmaceutical industry is one of the world's largest, with prescription drugs accounting for more than 90.0 percent of this. The production of generic drugs has been growing in recent years on the back of government plans to increase the share of generics by more than 60.0 percent by 2018. There are a number of foreign pharmaceutical firms that have secured a foothold in the Japanese market. MSD is the industry leader, and firms such as Novartis, Pfizer and GlaxoSmithKline are in the top 10. All these firms are poised to take advantage of the dynamism of the market and more attractive profit margins compared to many other Asian countries.

Japanese pharmaceutical companies have increasingly been involved in cross-border mergers and acquisitions in their attempts to acquire pipeline and develop overseas markets. As a result of these efforts, sales of large pharmaceutical companies in Japan



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	877,928	13.9%	74.7%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	3.0%	17.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	3.3%	15.2%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	3,271	12.4%	11.2%

have been consistently on the rise, although patent expirations have dampened this growth somewhat. Takeda is by far the largest domestic pharmaceutical firm by sales, with other including Astellas, Daiichi Sankyo and Mitsubishi Tanabe Pharma. The development of the national strategic special zone is part of the third arrow of "Abenomics," the main goals of which include the creation of international medical innovation centers and the implementation of bold regulatory reforms.

Country outlook

The Ministry of Health, Labor and Welfare (MHLW) estimates medical benefit expenses to be around JPY 39.5 trillion (\$404.3 billion)¹ by FY 2015 and JPY 46.9 trillion (\$480.0 billion)¹ by FY 2020. To contain these increasing expenses and to address other issues including stable supply, the MHLW has addressed the promotion of generic drugs. In November 2013, they proposed to lower the price of generics to around 50.0 percent of that of new drugs with expired patents. This measure could have an adverse impact on new drugs with expired patents by slowing down sales growth.

Japan is one of the few countries in the world that is involved with the discovery of new drugs at a large scale, making the pharmaceutical sector a strategic industry. Government support for innovation is strong, which has resulted in the Japan Revitalization Strategy and the Healthcare and Medical Strategy, formulated in June 2013. The strategy supports companies' efforts in strengthening R&D capacity, streamlining approval processes and commercializing regenerative medicine.

¹ Twelve-month average conversion rate of JPY 97.71 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Kobe Biomedical Innovation Cluster (KBIC)

Cluster overview

Kobe launched the Medical Industry Development Project in 1998 by constructing a base of R&D activities for advanced medicine on the city's Port Island. It is a location where players from the government, academic world and the industry interact and collaborate.

At present, there are 17 core research facilities that operate from KBIC, while new facilities, including Kobe Minimally Invasive Cancer Center and Nishi Memorial Port Island Rehabilitation Hospital are being introduced. The Daiippon Sumitomo Pharma, a pharmaceutical company which focuses on clinical research and development of iPS cells, is also located in KBIC.

A wide range of highly accredited companies and research facilities have established themselves in KBIC over time. As of the end of 2013, over 200 companies have set up shop, engaging in energetic collaborations such as translational research for regenerative medicine, new scientific discoveries for therapeutic agents and the development of new medical instruments.

Cluster outlook

Kobe Biomedical City is known for its excellent transport connections and social welfare provisions. The city offers a sound environment for both domestic and foreign companies to operate in. KBIC has granted tax exemptions, provided allowances for initial investments and given financial support to invite prospects to the cluster.

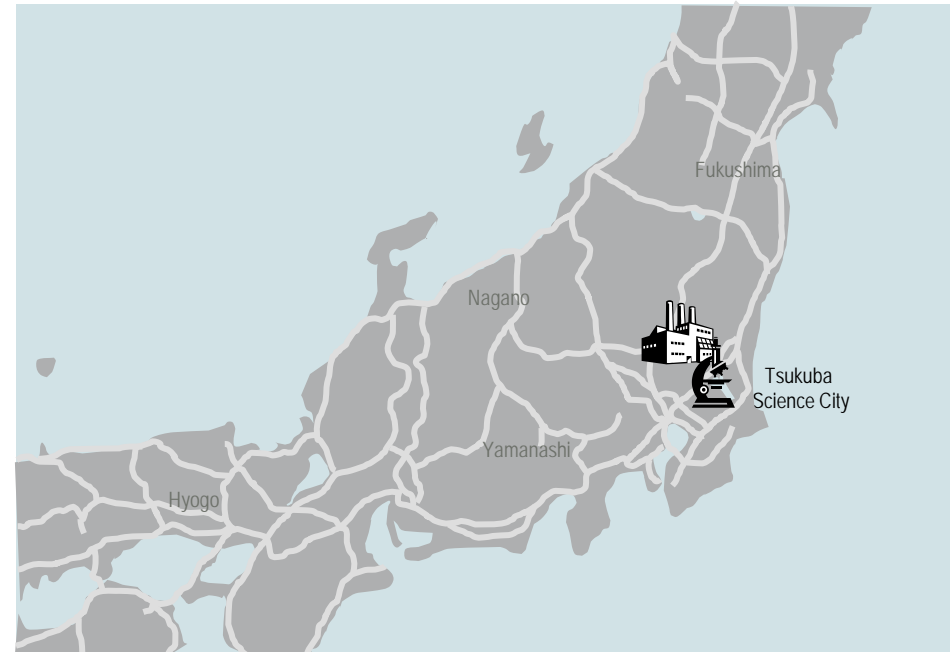
The Kobe government forecasts continued employment creation and higher tax income as more large enterprises and public R&D institutions set up at this location. Kobe University has also initiated an incubation center to provide human resources support. However, rental levels can be high and not always in keeping with the market rates, which could act as a deterrent for companies looking to set up operations here.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



DAINIPPON SUMITOMO PHARMA

Minatojima Minami Machi
Business Center for Biomedical Research Activities, Kobe KIMEC Center Building, Translational Research Informatics Center, Institute of Biomedical Research and Innovation Hospital
April 2014

BAXTER

Minatojima Minami Machi
Institute of Biomedical Research and Innovation Hospital
April 2013

KOBE INTERNATIONAL FRONTIER MEDICAL CENTER

Minatojima Minami Machi
GFA 13,000 sqm
Expected Delivery: July 2014

MINATOJIMA MINAMI MACHI

Port Island Phase 2
55,000 sqm
JPY 106,000 – 115,600 per sqm
Incentive items include green coverage ratio, specified business and environmental consideration

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Tsukuba Science City

Cluster overview

Tsukuba Science City is located in Ibaraki Prefecture, 50 kilometers from Akihabara in Tokyo and 40 kilometers from Narita International Airport. A high-speed line (Tsukuba Express, or TX) carries over 230,000 passengers a day from central Tsukuba to Akihabara (Downtown Tokyo) in just 45 minutes. Founded by the merger of three towns and a village, this purpose-built city was inspired by planned metropolises such as Brasilia, Bethesda and Palo Alto, with the goal of stimulating scientific discovery in an international environment.

Today, Tsukuba Science City offers one of the highest concentrations of cutting-edge research centers and high-tech companies in the world, with an estimated 3.0 percent of the population holding doctoral degrees. Dozens of national research institutes and the two universities are grouped into five specialized zones (higher education and training, construction research, physical science and engineering research, biological & agricultural research and public facilities), and surrounded by hundreds of private research facilities, hosting over 22,000 researchers belonging to 131 nationalities.

Spanning an area of around 2,700 hectares, Tsukuba Science City is home to nearly a third of Japan's public research institutions. The most prominent of these include the University of Tsukuba, the High Energy Accelerator Research Organization (KEK), the Electro-technical Laboratory, the Mechanical Engineering Laboratory and the National Institute of Materials and Chemical Research.

Aiming to become Japan's flagship science and technology hub, the government has supported Tsukuba to be one of the world's key sites for public-private partnerships in basic research in areas such as microbiology, next-generation cancer therapy and plant genetics. Tsukuba Center, Inc. (TCI) provides various rental laboratories and offices, promotes industry-academia-government collaboration and fosters the development of entrepreneurial ventures (more than 205 existing venture companies have initiated in Tsukuba).

Cluster outlook

In 2011, the city was designated as one of the seven national "Comprehensive Special Zones for International Competitiveness Development," strengthening its status as an industrial base and as a platform for science and technology based innovation. Leading projects include the establishment of a global nanotechnology research and education complex.

Tsukuba Global Innovation Promotion Agency continues to support Tsukuba's International Strategic Zone in order to transform the city into an international hub of research institutes. One of its major challenges is to transition from pure or "seed" research, to "needs" research that can be commercialized. Tsukuba is also applying for "Strategic Global Innovation Center" status to secure tax benefits for small and medium sized businesses, infrastructure development and training for overseas personnel.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



**JASCO INTERNATIONAL
TSUKUBA SERVICE CENTER**
Tsukuba Center
50 sqm

TSUKUBA RESEARCH CENTER
Wadai
183,200 sqm

**NATIONAL INSTITUTE FOR MATERIALS
SCIENCE
STRUCTURAL MATERIALS RESEARCH
BUILDING**
Sengen
Expected Delivery: FY 2014

WADAI
Tsukuba Hokubu Industrial Park
38,000 sqm
JPY 39,800 per sqm

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Korea

Country overview

The Korean pharmaceutical market is the 10th largest pharmaceutical market globally. It is a significant market for over-the-counter as well as prescription drugs, which has attracted a healthy number of local and foreign drug manufacturers and healthcare companies.

The industry is highly fragmented, with almost all of the domestic companies having a strong portfolio of generic products rather than branded drugs with high manufacturing costs. Major Korean conglomerates such as Samsung and LG are key players in the Korean life sciences industry. Korea has also proved to be a lucrative market for foreign companies, a number of which have entered into R&D collaborations and licensing agreements with local companies.

Annually, around KRW 938.4 billion (\$860.0 million)¹ is invested in the Korean pharmaceutical industry, which is provided for through government support, venture capital and reinvestment of profits by private companies. With an investment of approximately KRW 5.5 trillion (\$5.0 billion),¹ the government has shaped the cities of Osong and Daegu to act as production hubs with high technical expertise.

Over the past decade, global recognition of Korea's life sciences industry potential has heightened, primarily due to improved intellectual property rights protection and strong government support toward R&D efforts. Major R&D companies have also been able to invest up to 90.0 percent of their annual net profits back into research efforts. Going forward, Korean pharmaceutical companies are also planning to expand their investment through attracting more foreign and private capital.



Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	335,228	14.2%	78.8%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	7.0%	24.0%	
Funding	% of GDP	% in medical & health sciences	
GERD	3.7%	10.8%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	1,168	4.4%	2.9%

Country outlook

The Korean pharmaceutical industry is expected to grow at an annual rate of 10.0 percent per annum. Current R&D investment plans show an annual average growth rate of about 13.0 percent, estimated to reach a cumulative total of KRW 23.5 trillion (\$21.5 billion)¹ from 2012 to 2020.

The Korean government put forward a strategic industry plan in 2012 entitled "Pharma Korea 2020," aimed at helping the country grow into one of the global top seven drug powerhouses by 2020. Among other things, the government plans to provide tax breaks to local drug manufacturers that invest in R&D. The designated "innovative pharmaceutical firms" will benefit from up to 30.0 percent tax cuts in R&D, expansion of loan programs, and subsidies of about KRW 150.4 billion (\$137.8 million).¹

The government has signed free trade agreements (FTAs) with the United States, Europe and India that are aimed at generally making the pharmaceutical industry more attractive for foreign investment. The FTAs are also expected to bolster the industry by increasing transparency in government policies and enforcement, as well as stimulating price competition in the private sector. Overall, prospects for the Korean life sciences industry are bright, with the pharmaceutical and biotech industry likely to become one of the fastest growing industry sectors in Korea over the next few years.

¹ Twelve-month average conversion rate of KRW 1,091.14 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Osong Bio Valley

Cluster overview

Osong Bio Valley is situated in north Chungcheong Province (Chungbuk), about 120 kilometres south of Seoul, and is the focus of national government efforts to establish a life sciences hub in Korea.

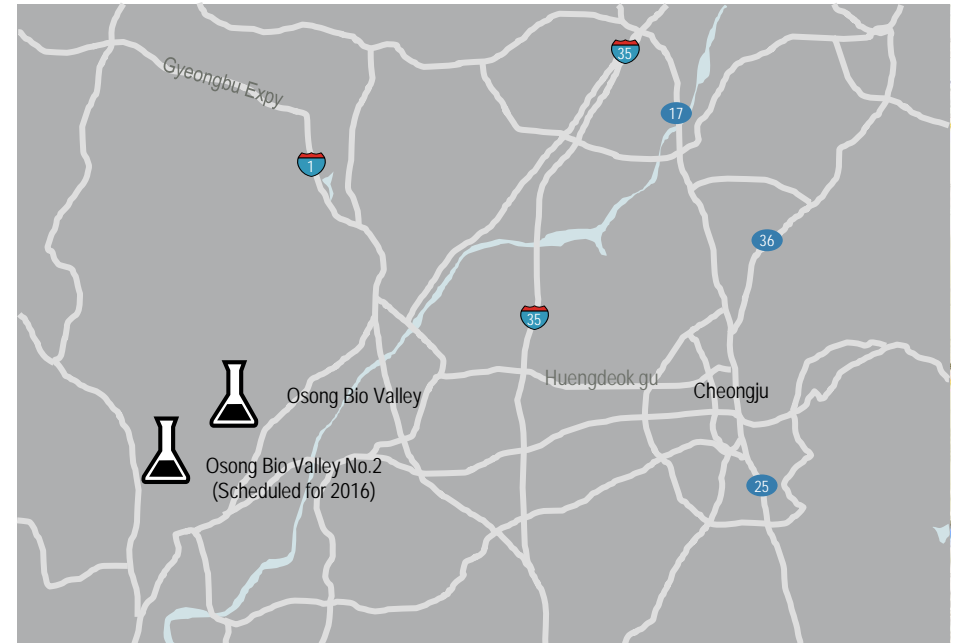
Development of the Osong Bio Valley commenced in 2009 with the designation of a 1.1 million-square-metre site by Korea Industrial Complex Corporation and an investment of KRW 233.3 billion (\$213.8 million)¹ by the government. In total, the government plans to invest approximately KRW 5.8 trillion (\$5.3 billion)¹ in its development over the next 30 years, to create Korea's largest bio research town.

In addition to this, various incentives are provided for foreign investment in the Bio Valley, including a reduction in corporate and income taxes, waiver of local real estate taxes and a waiver of rent for businesses involved in cutting-edge technologies.

As at the end of 2013, 34 companies had relocated to the Bio Valley including major domestic firms such as LG Life Sciences and CJ Cheiljedang. A further 19 companies have facilities under construction and seven more are reportedly preparing to build.

Six governmental institutions have also confirmed plans to relocate to the Bio Valley, including the Ministry of Food and Drug Safety, Korea National Institute of Health and Korea Center for Disease Control and Prevention. A number of universities and research centers have committed to the development, including Korea University.

 Emerging lab supply:
Areas with limited lab stock today that are poised for growth



OSONG BIO VALLEY
17,633 sqm (Land area)
Developer: Medytox
Expected delivery: 2014

OSONG BIO VALLEY
29,935 sqm (Land area)
Developer: Komipharm
Expected delivery: 2014

OSONG BIO VALLEY
5,553 sqm (Land area), 1,362 sqm (GFA)
Developer: Seoul Prosthesis
Expected delivery: 2014

OSONG BIO VALLEY
20,619 sqm (Land area)
Developer: Optipharm Medipig
Expected delivery: 2014

¹ Twelve-month average conversion rate of KRW 1,091.14 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Singapore

Country overview

Singapore's pharmaceutical industry has been guided by a top-down approach, a strategy that has worked favorably for the nation's information technology (IT) and electronics sectors. In a real estate context, this has been carried out through the designation of land parcels for specific uses, as evidenced in the case of Tuas Biomedical Park, a 50 hectare site that was set aside as a pharmaceutical and biotechnology zone back in the mid-1990s.

As a pilot cluster project, it proved successful in attracting an agglomeration of industry leaders including GlaxoSmithKline, Merck and Roche to relocate regional production plants to Singapore. This move allowed the state to diversify its industrial output growth, which had traditionally been more reliant on other high-tech manufacturing. It also allowed the country's industry to move up the value chain, which was reflected in the higher capital intensity and scale of such pharmaceutical operations.

From 2000 to 2006 the government allocated SGD 1.25 billion (\$1.0 billion)¹ as part of the Singapore Biomedical Sciences (BMS) initiative to boost public investment. These funds were used to invest in several life sciences research institutes to encourage new R&D projects, as well as to initiate the building of a new life sciences R&D complex, now known as the Biopolis. This initiative, together with the Economic Development Board's (EDB) efforts to attract key industry players to set up manufacturing and R&D operations in Singapore, saw an influx of big pharmaceutical R&D centers into the country, including prominent players such as Novartis and Eli Lilly.

Ultimately, the government's vision is to turn Singapore into a premier hub for biomedical research and development in Asia, providing world class services across the entire value chain, from basic research to clinical trials, product development, full-scale manufacturing and healthcare delivery. A thriving sector in the Singapore economy, the biopharmaceutical sector contributed about SGD 22.5 billion (\$18.0 billion)¹ in output (a fourfold increase from 2000) and over 6,000 jobs in 2011. According to Datamonitor, this ranks Singapore as the third fastest growing market globally in the export of pharmaceutical goods, between 2000 and 2010.

Economic scorecard

Workforce	Full time R&D personnel	% per thousand total employment	% researchers
R&D employment	37,012	13.6%	86.5%
Education	% in science	% in engineering & manufacturing	
Tertiary graduates	N/A	N/A	
Funding	% of GDP	% in medical & health sciences	
GERD	2.1%	21.0%	
Innovation	Total life sciences	% to total PCT applications	Year-over-year growth
PCT applications	98	0.4%	-29.5%

Country outlook

Strong intellectual property laws, excellent logistics connections with key markets, world class infrastructure and a highly skilled 13,000-strong biomedical workforce have contributed to Singapore becoming a key global pharmaceutical manufacturing site. To date, 30 of the world's top pharmaceutical, biotechnology and medical technology companies have located their regional and international headquarters in Singapore, creating an effective ecosystem that harnesses the benefits of economies of scale and knowledge transfer.

Singapore is also now in the third and final phase of the BMS initiative (ending 2015), in which efforts and resources (capital commitment of SGD 16.1 billion [\$12.9 billion]¹) are channelled into breakthrough research programs. These programs are led by various government agencies working together, including EDB and A*star, which will serve as a central conduit to facilitate partnerships with industry and create synergistic technology platforms to facilitate research translation. It is believed that this will continue to spur growth in this sector, and will continue to be supported by a growing pool of scientists who are being groomed to drive specific mission-oriented programs, such as biologics, medtech and nutraceuticals/ cosmeceuticals. Key challenges ahead for Singapore are reflective of other mature markets worldwide, including increasing cost pressures brought on by upcoming patent expiry of blockbuster drugs and higher labor costs, increased government scrutiny of healthcare spending, increasing cost of R&D and the need for more environmentally sustainable manufacturing practices

¹ Twelve-month average conversion rate of SGD 1.25 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Tuas Biomedical Park

Cluster overview

Located at the western tip of Singapore, the 183-hectare Tuas Biomedical Park (TBP) 1 and the 188-hectare TBP 2 were conceived as locations for manufacturing activities in the biomedical sciences sector. They were part of the nation's plan to build up an entire value chain for biomedical sciences, from R&D to manufacturing and healthcare delivery.

The parks are strategically located to provide pharmaceutical manufacturers with access to a skilled labor force, research expertise and air and sea logistics, which has attracted investments from leading global biomedical companies such as Pfizer, MSD GmbH and Novartis. Overall, these companies have invested in approximately 20 commercial-scale facilities in Singapore, housing operations such as process development and the manufacturing of active pharmaceutical ingredients and novel medicines.

Upcoming developments within TBP include BioMed One (expected completion Q1 2015), a new SGD 62.0 million (\$49.6 million)¹ biomedical hub which will cater to small and medium enterprises (SMEs) to complement the global industry giants already based here. The SMEs are expected to provide support services such as plant fabrication, and maintenance and equipment calibration.



Life Sciences manufacturing supply:
Clusters of manufacturing space devoted to pharmaceutical, biological or medical device & instrument manufacturing



AMGEN

Tuas
Tuas Biomedical Park
SGD 200 million
Over the next few years

3 TUAS SOUTH AVENUE 4

Tuas Biomedical Park
29,357 sqm GFA
SGD 15.0 million

BIOMED ONE @ TUAS BIOMEDICAL PARK

Tuas Biomedical Park
29,000 sqm GFA
Jurong Town Corporation
Expected delivery: Q1 2015

GLAXOSMITHKLINE

Tuas Biomedical Park
85,006 sqm GFA
Direct

¹ Twelve-month average conversion rate of SGD 1.25 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

Leasing

Sales

Under construction

Large blocks of space

Biopolis

Cluster overview

Located at One-North and pioneered by JTC at a cost of SGD 500.0 million (\$400.0 million),¹ Biopolis is a purpose-built biomedical R&D hub for both public and private research agencies. Facilities-wise, Biopolis offers researchers cutting-edge shared facilities such as laboratories for DNA sequencing, flow cytometry, mass spectrometry and nuclear magnetic resonance. It is staffed by trained technicians, allowing for biomedical companies to reduce R&D expenditure and focus investments on accelerating drug discovery and development.

The government also hopes that the creation of this cluster will generate informal networks to benefit from knowledge spill-over and speed up the growth of a critical mass of biomedical expertise in Singapore, facilitating its development as the biomedical R&D hub of the Asian region. It also hopes that public and private partnerships with seven of Singapore's biomedical public research institutes (which all have a presence in Biopolis) will attract MNCs, start-ups and other complementary services such as lawyers and patent agents to locate there.

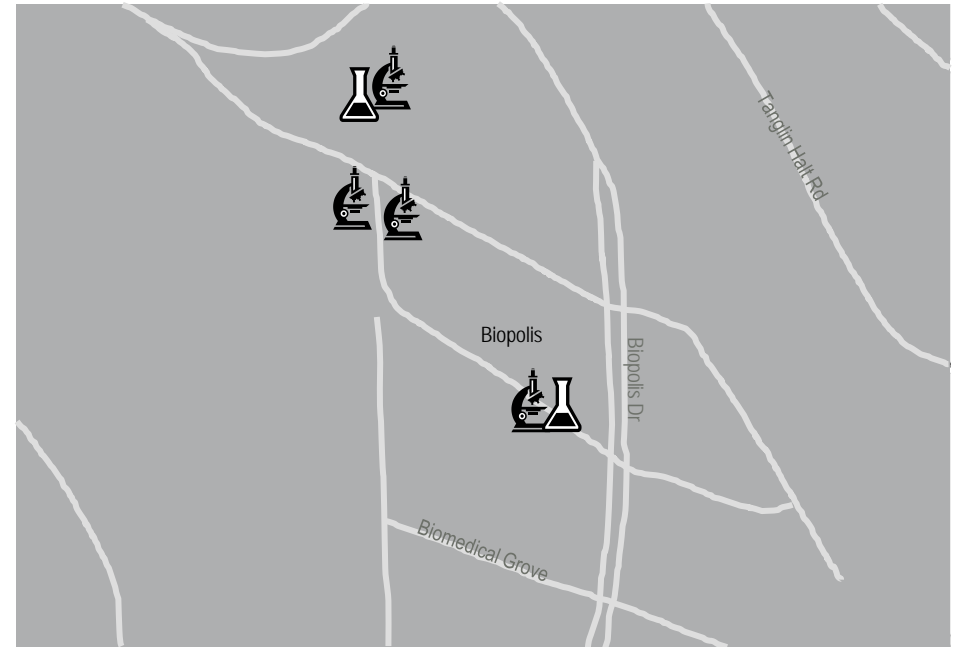
Upcoming developments include Phase V of Biopolis (known as Nucleos), which is expected to be completed in 2014, will have a GFA of 45,610 square meters. This phase is intended to improve lab design for clinical trial support and cater to the increased demand for biomedical research.



Major lab supply:
Clusters of established lab stock with long-time industry presence



Emerging lab supply:
Areas with limited lab stock today that are poised for growth



CHUGAI PHARMABODY RESEARCH

Biopolis
3 Biopolis Drive, Synapse
SGD 16 million over 5 years
Term: 5 years

NEUROS & IMMUNOS at 8/8A BIOMEDICAL GROVE

Biopolis
36,931 sqm GFA
SGD 125.6 million

NUCLEOS (BIOPOLIS PHASE V)

Biopolis
36,488 sqm NLA
Ascendas Venture Pte Limited
Expected Delivery: Within 2014

8A BIOMEDICAL GROVE

Biopolis
32,000 sqm
Direct

¹ Twelve-month average conversion rate of SGD 1.25 per U.S. dollar, from 1/1/2013 to 12/31/2013.

Activity key:

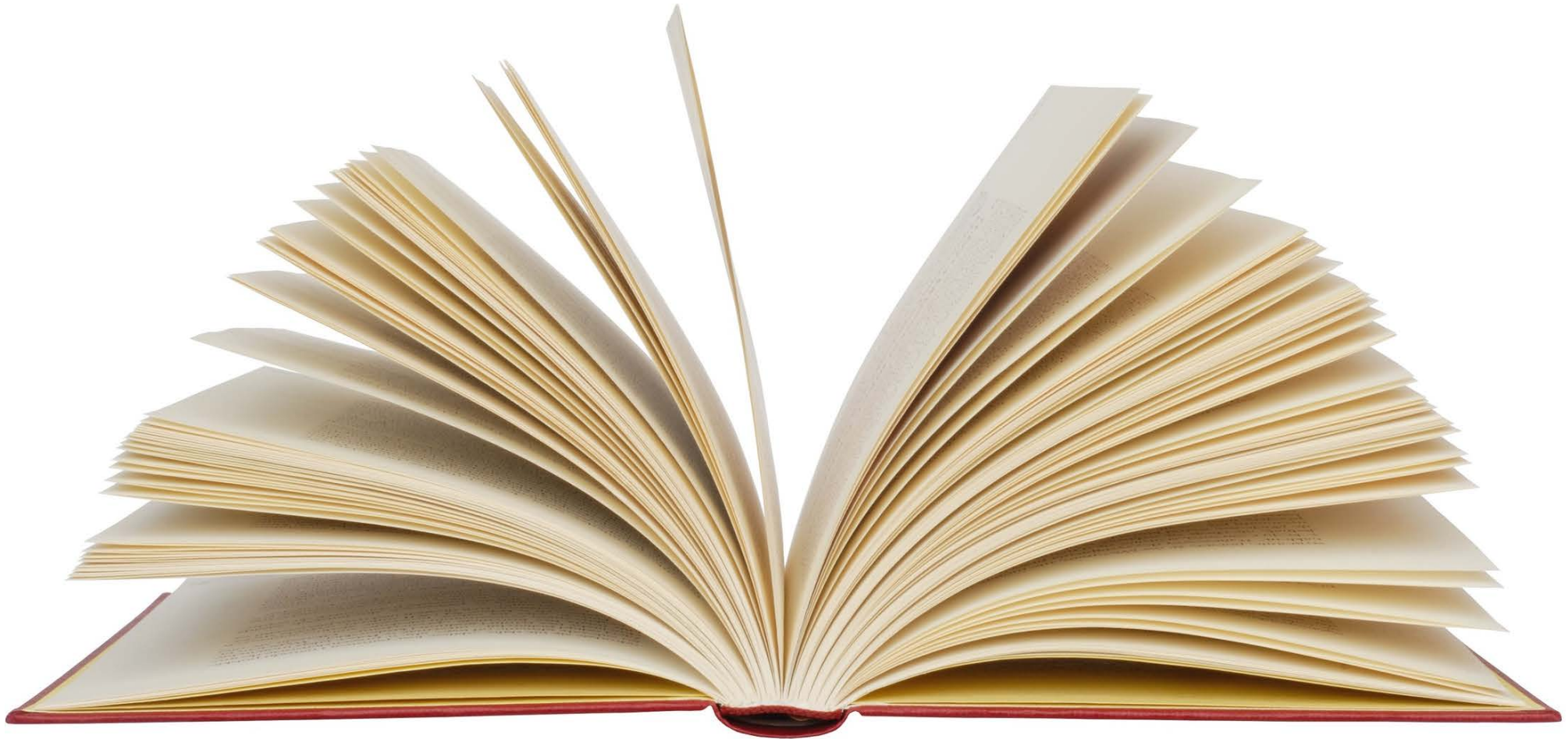
Leasing

Sales

Under construction

Large blocks of space

Appendix



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