December 2, 2020

REAL ESTATE

Opportunities in Life Science Real Estate Investing

- Technological advances and an aging U.S. demographic are boosting demand for medical research and life science real estate space.
- We estimate the investable life science universe to be $73 billion, and will likely rise to $165 billion by 2030, or 6% as large as the $2.6 trillion office investable universe today.
- Life science employment has exhibited significant growth–particularly in existing “Research Clusters”–and the industry has been resilient during downturns (Exhibit 4).
- Investment in the life science sector may offer attractive relative value, but we believe there are also important risks to consider.

MetLife Investment Management

Introduction

Even before the onset of COVID-19, the life science real estate sector was gaining traction amongst institutional investors. The rise in demand for research and development of COVID-19 treatments has further increased investor interest in the sector and, in this report, we will outline what life science investments are, the factors that may drive future demand for life science space, and how we think about relative value of investments in the sector today.

Life science employment encompasses a wide range of fields. While some of the more commonly known branches of life sciences include genetics (study of human DNA and genome) or epidemiology, there are in fact dozens of additional fields of study that fall under the umbrella of life sciences, and therefore use life science real estate.[1] Since 2000, employment in this sector has increased by 41%, well above the 14% increase for the U.S. as a whole.[2] This has contributed to both fast and steady leasing demand growth.

In terms of physical characteristics, life science properties are often mistakenly assumed to be a category of office properties, similar to medical offices. Although life science properties look like offices and are often referred to as "life science offices", they are physically often quite different. As measured by square feet, life science properties are often around half office space and half lab space, but also include unique characteristics such as 10–20% higher ceilings (relative to traditional office), 50–100% excess floor load capacity, over 2x the cooling and heating capacity, and 75–100% increased electrical capacity, among others.[3] These additional infrastructure requirements contribute to higher average $/SF rents for life science properties, and also limit conversions from existing office buildings into life science properties.

Life science laboratory space is generally categorized as either a "wet lab" or a "dry lab"[4], and wet labs are slightly more common than dry labs.

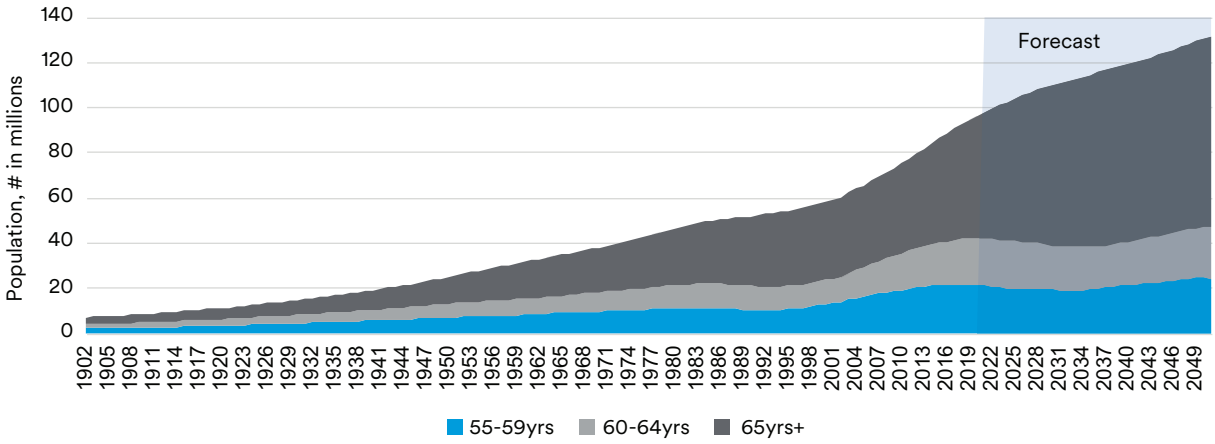
Wet laboratory space includes the use of chemicals, drugs, or other biological matter which is tested and analyzed. Building needs for wet lab space may include safety components (ex: fume hoods, water stations) as well as separate building ventilation and utility connections. Dry laboratory spaces typically include space for materials, electronics, and instruments which need precision temperature and humidity control.

A number of secular trends have been driving demand for life science space, and we believe these are likely to continue.

Long-Term Demand Tailwinds

An aging population in the U.S.–coupled with longer life expectancies–is creating a larger market for therapies that enhance the quality of life for seniors (Exhibit 1).[5] With an average age of 66 years old, the Baby Boomer generation is expected to buoy demand for the types of drugs being researched and developed in life science assets.

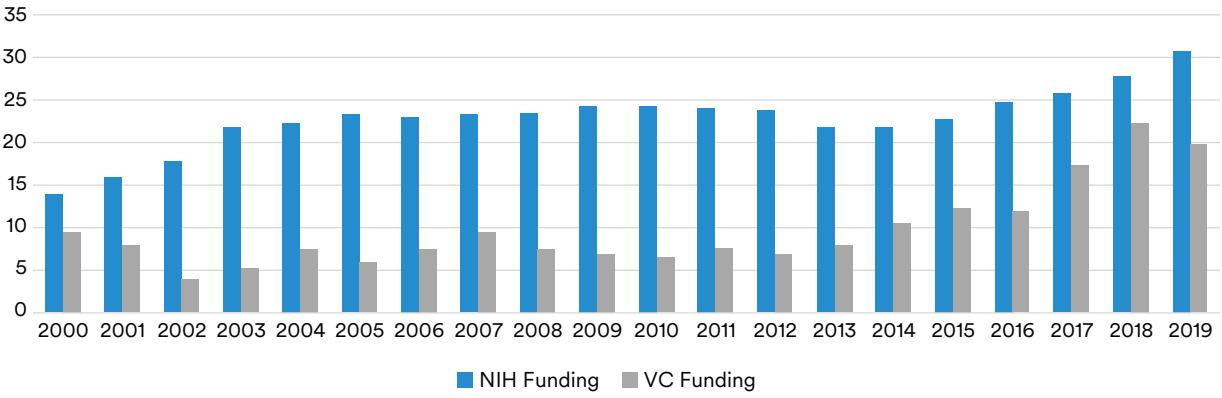
Exhibit 1 | An Aging U.S. Population



Additionally, over the last few years, technological advancements such as machine learning have led to novel discoveries and improvements in gene and cell therapies. These software advancements have driven down research expenses for life science companies, therefore allowing for increased innovation in the space.

In recent years, the perceived commercial viability of the life science sector has materialized as significant capital has flowed to biomedical companies and startups. Venture capital investment, for example, stood at approximately $23 billion at the end of 2019, which compares to around $8 billion 10 years prior.[6] The life sciences sector also receives research grants from the National Institute of Health (NIH), which budgeted in excess of $30 billion to medical research in 2019[7] (Exhibit 2).

Exhibit 2 | Historical Life Science Funding ($ billions)[8]



But these amounts are dwarfed by the capital provided by the R&D divisions of larger, private companies. Largely comprised of pharmaceutical firms, total R&D spending reached $155 billion in 2019, representing an average annual increase of 5% since 2012.[9]

The increased investment amongst life science companies has naturally translated into a burgeoning need for Research & Development (R&D) and manufacturing space. Additionally, there's an increasing demand for numerous small-volume medicines that represent a departure from bulk R&D in a single location,[10] which we believe is partially supporting demand for life science space.

Now that we understand the sector's primary drivers, we'll focus on where demand is increasing.

Research Clusters/Fundamentals

The preference for networking amongst industry professionals–as well as access to the talent and resources associated with higher education institutions–has focused life science demand into research "clusters". For example, from 2010 to 2018, 63% of total life science venture capital funding went to companies located in the Boston and San Francisco markets.[11] By comparison, these two markets have accounted for approximately 30% of total venture capital funding in recent years.[12]

Exhibit 3 | Life Science Clusters[13]

Market	Inventory (Million SF)	Vacancy Rate (%)	Asking Rent ($/SF Annual)	Market Cap ($ Billion)
Boston	21.8	1%	$87	$27.8
San Francisco	21.9	7%	$50	$21.7
San Diego	19.6	9%	$55	$9.5
Seattle	11.3	5%	$40	$4.6
Suburban Maryland	10.7	4%	$29	$4.1
Philadelphia	9.7	11%	$34	$3.4
Raleigh-Durham	10.2	16%	$22	$2.6

In our view, there are seven major life science research clusters across the U.S. San Francisco, Boston, and San Diego lead the pack in terms of total life science inventory; however, San Francisco and Boston have much higher market values, which we believe could be attributed to the relatively limited land availability in those markets.

From a vacancy perspective, life science availability rates stand in the low 7% range on average, with certain research clusters such as Boston having near-zero vacancy rates.[14] This has translated into 6% or greater annual rent growth in most of the research clusters in recent years,[15] although going forward we expect rental growth to eventually slow to around the rate of inflation.

Although these seven markets make up the majority of the U.S. life science market, there are emerging clusters in other areas. New York City, for example, has the third largest pipeline of life sciences office development, has exhibited strong life science employment growth and has the second highest amount of research grants out of all U.S. metros.[16]

Life science demand has historically been less cyclical, and may modestly benefit from the COVID-19 recession.

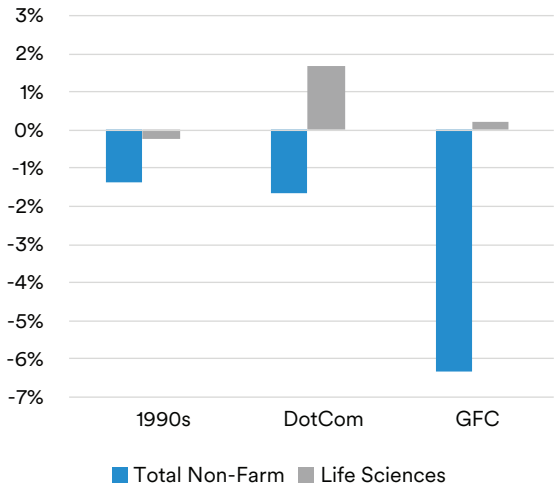
Although we are still too early in the COVID-19 recession to know for sure, during the prior three recessions the life science sector had stronger demand than the broader economy.

Looking forward, the World Economic Forum suggests COVID-19 will likely not be the last pandemic, and that better preparation is needed to fight future disease outbreaks.[17] As a result, we believe that life science research funding could increase both to fight the current COVID-19 pandemic, and to build a better infrastructure for future diseases. At around $15 billion through the second quarter of 2020, life sciences VC funding is well on pace to eclipse its prior-year record of $23 billion.

In our view, life science employment is well positioned from both a near-term and long-term perspective. While most companies within the industry have experienced supply chain related headwinds, history suggests the sector's employment base is resilient during recessionary periods (Exhibit 4). So far in the 2020 recession, the need to use specialized lab equipment has generally contributed to spaces both remaining leased, and being physically used, unlike other real estate sectors that have struggled due to social distancing and shelter-in-place orders.

While we expect the life sciences to benefit from strong demand drivers and the current market environment, there are important investment characteristics and considerations worth noting.

Exhibit 4 | Life Sciences Employment During Past Recessions[18]



Investment considerations

Over the next decade, we estimate the institutional life science real estate universe to approximately triple in size, from about $73 billion today to $165 billion by 2030. If true, this could provide institutional investors with ample opportunity to increase allocations to the sector, especially in the development space.

In our view, one of the key considerations for investing in life science real estate is the value of the location, versus the value of the improvements. On a per square foot basis, life science buildings in major research clusters often trade for a higher price than traditional office due to generally higher market rents (Exhibit 5), as well as the typical "triple net" (NNN) lease structure, which typically translates into better profit margins as the landlord is reimbursed for insurance, maintenance, and taxes.

Similarly, market rent growth within life science research clusters is a relative value factor worth understanding. Life science cap rates are typically similar or slightly tighter than similar-quality office cap rates, reflecting both greater contractual rent increases, and expectations for better market rent growth.

Exhibit 5 | Life Science vs. Traditional Office (MIM Estimates, as of December 2020)

Metric	Life Science	Traditional Office
Market Rent	$65 - $100 NNN	$50 - $75 Gross
Cap Rate	4.25% - 5.00%	4.50% - 5.50%
Price PSF	$1,000 - $1,500	$750 - $1,000

We believe greater rent growth expectations are justified as occupiers of life science space rely heavily on the surrounding network a typical research cluster has to offer, such as peer research groups or higher education institutions. Tenants are therefore increasingly willing to pay high rents for these resources. This location premium represents both a risk and an opportunity and should be carefully considered.

The best parallel we are aware of may be the growth of the San Francisco and San Jose office sector over the last 30 years, as the technology industry grew and concentrated in Silicon Valley. Office investments in this area have achieved some of the strongest returns of any market in the country, but also illustrate the need to understand the underlying business model (such as what

occurred when VC firms propped up many local area "dot com" companies without tangible business models in the late 1990s). So far, we have seen very few signs of excessive VC funding or unrealistic business model expectations in life science businesses, but recommend investors remain sensitive to this dynamic going forward.

Another investment consideration includes the initial buildout of R&D lab space in life science buildings. As mentioned previously, unique characteristics related to life science buildings typically makes the buildout more expensive relative to traditional office space. However, these represent one-time additional costs given the universal infrastructure for most life science tenants, which could lead to lower capital expenditures over the hold period relative to traditional office. This is primarily due to the lower additional investment required to re-lease office space when a tenant rolls over. Historically, these types of capital expenditures have amounted to 15% of NOI for life science properties, which compares to nearly 30% for the overall office sector.[20]

While we expect the broader sector to be largely resilient to COVID-19, life science companies that rely on VC funding tend to carry higher levels of credit risk. The probability of a drug failing to reach FDA approval is 85%, and this can give some company business models a binary potential outcome.[21] One potential method to reduce credit risk is attaining a Letter of Credit that guarantees payment, regardless of a failure to meet lease obligations by the occupier, through a specified time period. The limited effort and capital required to backfill vacant space that was mentioned previously could also serve as an additional mitigating factor to higher credit risks.

A final key risk in our view is the regulatory risks associated with the broader health care industry. More specifically, rising prescription drug prices are an increasingly prevalent bi-partisan issue, and to the extent government regulations on drug prices impact the profitability of the industry, segments of the life science industry could face headwinds. Based on current proposals in Washington, we do not believe this is a near-term concern.

Conclusion

We believe the life sciences sector is a viable alternative property type for investment with favorable demand tailwinds. Despite the potential risks, we believe allocating capital to the sector alongside an experienced life science operator–either through acquisitions or ground-up development–offers investors potential for favorable risk-adjusted returns.

1 ARTiFACTS, November 2019. https://artifacts.ai/what-is-life-science/
2 Life Sciences: COVID-19 Report, Cushman Wakefield, June 2020.
3 Lincoln Property Co, September 2020.
4 https://commercialobserver.com/2020/07/repositioning-a-building-for-life-science-tenants/, August 2020.
5 United Nations – World Population Prospects, 2020.
6 Q2 20 PitchBook NVCA Venture Monitor, July 2020.
7 National Institute of Health Data Book.
8 National Institute of Health Data Book, Pricewaterhouse Cooper, August 2020.
9 https://commercialobserver.com/2020/07/life-science-is-pandemic-proof-real-estate/, July 2020.
10 2020 Global Life Sciences Outlook, Deloitte, January 2020.
11 Life Science: Great Promise & Rapid Growth, Cushman Wakefield, February 2019.
12 Q2 20 PitchBook NVCA Venture Monitor, July 2020.
13 Life Sciences: COVID-19 Report, Cushman Wakefield, June 2020.
14 Ibid.
15 Ibid.
16 PWC Innovation 1000 Report, 2019.
17 Outbreak Readiness and Business Impact, World Economic Forum, January 2019.
18 Bureau of Labor Statistics, Moody's Economy.com, October 2020.
19 MIM Analysis of NCREIF, Bureau of Labor Statistics, Cushman Wakefield, and GrandView Research data. September 2020.
20 REIT Lab Space Insight Report, Green Street, May 2019.
21 Ibid.

MetLife Investment Management Real Estate Research and Strategy

WILLIAM PATTISON
Head of Real Estate Research

William Pattison is the head of the real estate research & strategy team within the risk, research & analytics group of MIM. He is responsible for research and strategy development in support of MIM's real estate equity and debt platforms, working closely with MIM's regional offices and portfolio managers to craft the strategic house view, drive thought leadership initiatives, and project domestic and international capital markets. Will has over 15 years of experience in institutional real estate research, valuation, and portfolio management. He is a graduate of Iowa State University, where he earned his Bachelor of Science degree in economics.

REGINALD ROSS
Associate Director

Reginald Ross is an Associate Director in the Risk, Research, and Analytics Division of MetLife Investment Management (MIM). He is responsible for market forecasts, client engagement, investment committee participation. Reginald has over 16 years of experience in CRE financial and econometric modeling. He joined MetLife in 2019. Prior to joining MetLife, Reginald was a Director at JLL focusing on redevelopment finance and advisory. He began his career in investment banking at Wolfensohn & Co and UBS. Reginald earned a Bachelor's degree in Economics from Morehouse College and an MBA from the Wharton School of Business at the University of Pennsylvania.

MICHAEL STEINBERG
Associate Director

Michael Steinberg is a member of the real estate research & strategy team within the risk, research & analytics group of MetLife Investment Management (MIM). He is responsible for development and maintenance of the team's quantitative research models, market forecasting, and communicating the team's investment strategies and economic outlook. Prior to MetLife, Michael worked in both research and portfolio management capacities at UDR, a national multifamily REIT, and Reis, a leading real estate market research firm. Michael received a Bachelor's degree in economics from the College of the Holy Cross and an M.B.A. from Columbia Business School.

AUSTIN IGLEHART
Senior Analyst

Austin Iglehart is an analyst on the real estate research & strategy team within the risk, research & analytics group of MetLife Investment Management (MIM). He is responsible for research & strategy development in support of MIM's real estate equity and debt platforms. In this role, Austin develops and maintains analytical tools for the research team, conducts market analyses in preparing team members for investment committee, contributes to the authoring of strategy whitepapers, assists team members in client service, and supports senior members of the research team in the development of long-term investment strategies. Austin earned his Bachelor of Science degree in finance at Wake Forest University before joining the real estate research & strategy team in 2018.

Ashleigh Simpson & Mark Leonhard contributed to this whitepaper.

About MetLife Investment Management

MetLife Investment Management (MIM),[1] MetLife, Inc.'s (MetLife's) institutional investment management business, serves institutional investors by combining a client-centric approach with deep and long-established asset class expertise. Focused on managing Public Fixed Income, Private Capital and Real Estate assets, we aim to deliver strong, risk-adjusted returns by building tailored portfolio solutions. We listen first, strategize second, and collaborate constantly as we strive to meet clients' long-term investment objectives. Leveraging the broader resources and 150-year history of the MetLife enterprise helps provide us with deep expertise in navigating ever changing markets. We are institutional, but far from typical.

For more information, visit: **investments.metlife.com**

[1] MetLife Investment Management ("MIM") is MetLife, Inc.'s institutional management business and the marketing name for the following affiliates that provide investment management services to MetLife's general account, separate accounts and/or unaffiliated/third party investors: Metropolitan Life Insurance Company, MetLife Investment Management, LLC, MetLife Investment Management Limited, MetLife Investments Limited, MetLife Investments Asia Limited, MetLife Latin America Asesorias e Inversiones Limitada, MetLife Asset Management Corp. (Japan), and MIM I LLC.

L1220009500[exp1222][All States], L1220009404[exp1222][All States], L1220009394[exp1222][All States], L1220009350[exp1222][All States]

MetLife Investment Management

One MetLife Way | Whippany, New Jersey 07981