



Research

# Life Science Outlook

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The Greater Golden Horseshoe Area is emerging as an up-and-coming life science market. What needs to happen for the region to realize its potential?



# Executive Summary

## The Opportunity

There is no question that the COVID-19 pandemic was an inflection point for the life science industries in Canada. Left at the mercy of global supply chains to vaccinate its population, there has been a moment of reckoning within the public and private sectors that more needs to be done to build up biomanufacturing and research capacity. The federal government has since announced a slew of initiatives to spur innovation and investment, and the private sector, aware of the potential opportunity, is rapidly mobilizing.

Life sciences are, more than most industries, prone to clustering. The concentration of public, private, and academic sectors in a small geography is the blueprint to successful discoveries and outcomes. Given this, Toronto is well positioned to be an emerging hub and capitalize off this industry momentum. Welcoming over 100,000 new immigrants annually, it is one of the fastest growing metropolitan regions in the world and home to 43% of North America's active construction cranes. Its universities and hospitals command approximately one-third of all funding through the Canadian Institute for Health Research (CIHR), and its private sector soaks up nearly 40% of all life science venture capital funding in Canada.

While Toronto is unquestionably the regional driver for talent and innovation, nearby secondary markets provide critical inputs such as universities, incubator spaces, and affordable real estate. In this report we posit that industry players must adopt a more regional mindset, leveraging the respective advantages of satellite cities like Hamilton, London, and Waterloo Region to fortify the region's life science ecosystem. The universities, hospitals, and companies in these cities must not be considered competitors to their Toronto counterparts, but instead part of a **Greater Golden Horseshoe Area (GGHA) Life Science Ecosystem**.



## The Challenge

While Canada is home to some of the most reputable bioscience institutions in the world, it is not a major global player in the commercialization of these innovations. The industry is prone to two major bottlenecks that are restricting growth in the life sciences:

**Lack of available real estate** is pushing many of Canada's small and medium bioscience enterprises out of Canada to markets like Boston, San Diego, and the Research Triangle where space is readily available. For many enterprises, time is as much a barrier to growth as cost, and so waiting multiple years for a built-to-suit facility is not an option.

**Lack of domestic mature capital funding** leads many of these enterprises to pursue funding from international sources, either through venture partners or acquisitions involving global companies. In general, the risk averse nature of Canada's largest institutional investors does not match with an industry that is prone to a "feast or famine" risk profile. Consequently, the public sector bridges much of this funding gap.

The result of these two deficiencies has been an outflow of ideas and talent that has counterbalanced the organic growth that has occurred domestically. This report will seek to address the first by examining the real estate market and providing conclusions on where opportunities may lie on the development side.



## The Market

To build or occupy a wet lab or biomanufacturing facility represents a significant capital investment. Without adequate market knowledge, investors, developers and occupiers may be reluctant to green-light these decisions. Indeed, despite growing momentum in the sector, many have stalled plans for expansion due to a lack of clarity surrounding the market. Furthermore, strong fundamentals in other sectors like industrial and residential, which are less capital intensive and more straight-forward than life sciences, are competing for scarce land.

To address this knowledge gap, JLL has undertaken a survey to size the market, identify the nodes and clusters, and highlight important trends that are happening throughout the region. The following are some characteristics of the Toronto-Golden Horseshoe market:

The Toronto-Golden Horseshoe Area contains about **13.8 million square feet of total building area** where at least once life science tenant operates (using a user threshold of 5,000 square feet).

There is approximately **4.3 million square feet of dedicated wet lab space**. About two-thirds of this space is owned and managed by universities, with the remainder owned and managed by private sector groups.

The market contains approximately **9.3 million square feet of dedicated life science space**. The discrepancy is due to the fact that many users have fitted out spaces in a building that is not purpose-built for life science, and in many cases this is just a portion of the overall property. Unless otherwise specified, when we refer to the overall market in this report, we will be referring to life science-occupied space and not total building area.

Approximately **39% of the lab market is user-owned**, compared with 15-25% for more mature markets like Boston, San Francisco, San Diego, and Raleigh-Durham. This suggests that a significant share of users feel that they are in better position to manage the operations of their facility than a dedicated landlord - an indication that there is a long runway for growth in the sector from an institutional capital perspective.

There is approximately **5.2 million square feet of GMP space**. Approximately one-third of this is in Mississauga, which forms the largest concentration of life science manufacturing space in Canada, primarily in the Meadowvale or "Pill Hill" submarket.

# What's inside?

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## Life Science Outlook

### 5 The Ecosystem

- 6 Introduction
- 8 Labour Force
- 9 Research Institutions
- 10 Government Support
- 13 Venture Capital and Mature Funding
- 14 Biopharma Stages of Discovery

### 15 The Real Estate Market

- 16 Classifications and Methodology
- 18 Real Estate Market Survey
- 22 Interview with Ty Shattuck, McMaster Innovation Park

### 24 Contact





# The GGHA Ecosystem

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# Introduction

As we take stock of the lessons learned from the COVID-19 pandemic, one of the most pressing ones to emerge is the need for Canada to nurture its growing life science industry. Unable to vaccinate its own population after decades of biopharmaceutical decline, Canada – a country that helped produce vaccines against Polio and Ebola and facilitated the invention of insulin – was left at the mercy of global supply chains to vaccinate its 38 million inhabitants.

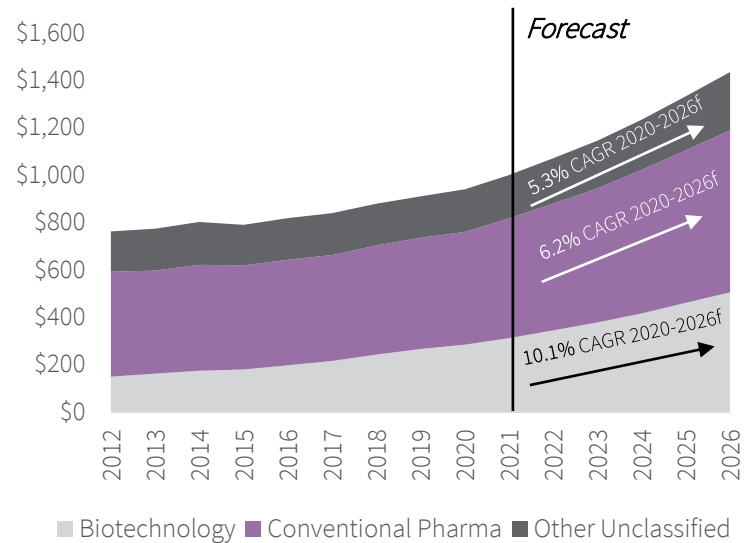
Domestic consumption of vaccines and therapeutics has exploded, from \$473m in 1997 to nearly \$5b in 2019. However, Canada’s ability to produce vaccines has fallen over the same period and today the country imports 85% of its healthcare products, mainly from Germany, Switzerland, and the United States. Such dependency has ushered in a call to action among the private, public, non-profit, and academic sectors to fortify Canada’s life science industry and build up redundancy.

Momentum had been growing long before the pandemic. Pharmaceutical sales have reached record levels in previous years with biotechnology driving an increasing share of this growth (see Figure 1). In response, life science companies are investing record amounts on research and development, with industry analysts forecasting a 50% increase in total R&D expenditures from 2014 to 2024 (see Figure 2). This collective investment bore fruit as manufacturers were able to develop life-saving vaccines within a year of the onset of the pandemic.

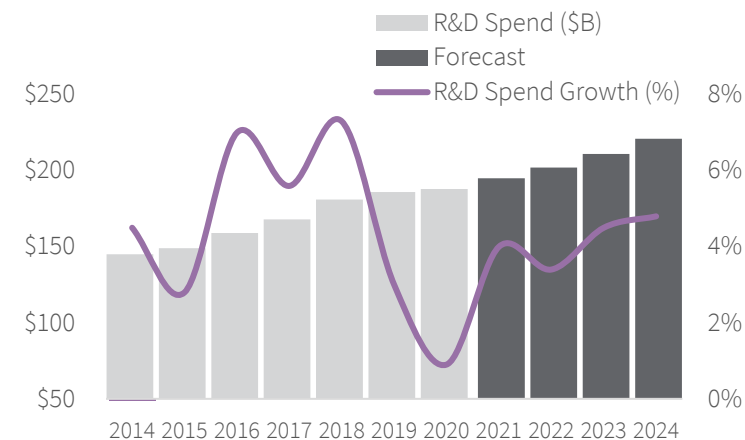
Investment into lab space and R&D facilities has grown in tandem. The sector is now attracting real estate capital from around the globe, and most investors are targeting legacy markets like Boston, San Diego, and the Bay Area where industry clusters are strongest and where a density of lab properties already exists. However, intense buyer competition and demographic tailwinds are driving investment and development activity beyond these traditional clusters and into emerging markets like Raleigh-Durham, Washington D.C., and Denver-Boulder.

The Greater Golden Horseshoe Area is well positioned to take advantage of these tailwinds and stake its claim among these emerging life science hubs. In this report we will examine the factors driving regional momentum and the obstacles that must be overcome for the GGHA to establish itself as a hub.

**Figure 1. Worldwide pharma sales by technology type**



**Figure 2. Life science R&D spend and forecast**



Source: EvaluatePharma, 2020; FDA Center for Drug Evaluation and Research (CDER); This dataset does not contain vaccines, allergenic products, blood and blood products, plasma derivatives, cellular and gene therapy products, or other products approved by the CDER

# Life Science Ecosystem

Scientific research and development is inherently fixed to the physical space in which these processes take place. However, the physical lab can only be as productive as the ecosystem that nurtures it. Lacking the proper infrastructure, talent, and ancillary industries, life science companies will be unable to grow and prosper.

Life science markets are necessarily anchored by a research institution – either a university that specializes in a certain field, or an institute or agency that is mandated to solve critical health needs. These institutions are the driving force behind developing the processes and the talent that in turn shape the industry.

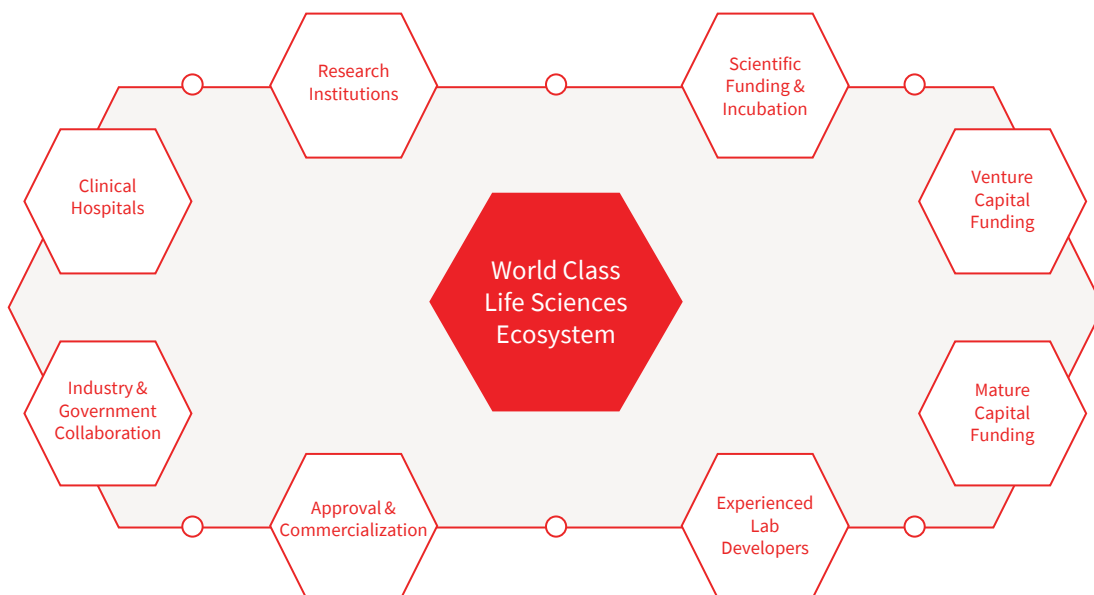
The other critical ingredient is capital. Due to the speculative and expensive nature of R&D, fertile capital markets are needed to finance the development of therapies, to conduct clinical trials, and to build the capacity required to manufacture at

scale. This funding is often provided initially by government entities, with venture capital, private equity, and stock markets stepping in at subsequent points throughout a company’s journey.

No life science ecosystem can operate at the highest level without industry knowledge, public sector support, a well-established and respected regulatory framework, and experienced real estate developers and project managers that can build, operate, and maintain the facilities where these companies work.

Toronto has all of these ingredients, but to varying degrees. It boasts world class clinical hospitals and research institutions. It commands a substantial share of Canada’s public and private sector capital funding. But the real estate market remains nascent with few dedicated players, the commercialization network remains shallow, and mature capital funding can be elusive unless it comes from abroad.

**Figure 3.**  
**Components of a World Class Life Science Ecosystem**



# 1.

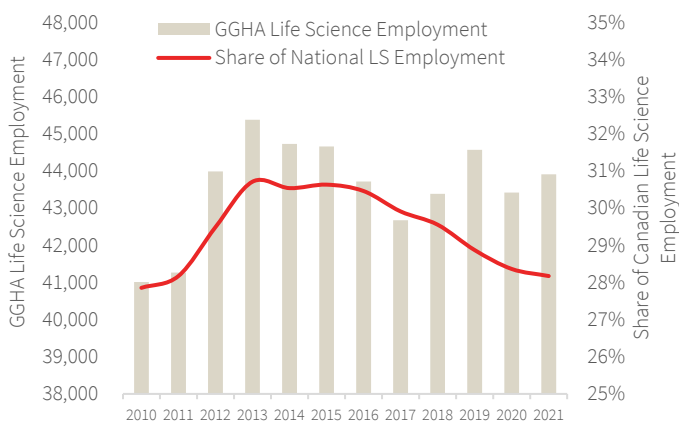
## The Ecosystem Labour Force

According to StatCan employment data, the Canadian life science industries employ over 150,000 people across the private, public, university and healthcare segments<sup>1</sup>. About 44,000 of these professionals are working in the Greater Golden Horseshoe Area, equal to about 28% of the national total, making the region by far the largest life science concentration in Canada. Many of the largest global pharmaceutical companies have a major presence in the GGHAA, leveraging the large consumer base, strong talent pool, and proximity to the U.S. border which makes it logistically advantageous.

Life science employment in the GGHAA peaked in 2013 before falling in subsequent years. Strong economic growth and immigration were the driving forces that pushed employment back up between 2016-2019 before the COVID-19 pandemic led to a drop in 2020 (see Figure 4).

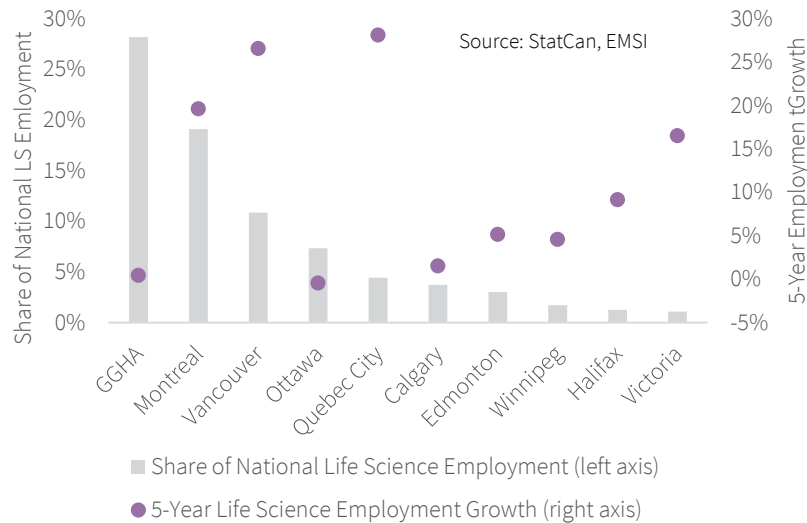
While the region forms Canada's largest life science employment cluster, it has steadily lost its share of the labour force since 2013. This is partly because some companies have left for the United States, but also because Montreal and Vancouver have seen more growth on a relative basis, particularly from small and medium sized companies (see Figure 5.)

**Figure 4. Life Science Employment Growth, GGHA**



Source: StatCan, EMSI

**Figure 5. Life Science Employment Growth by Market**



Toronto remains well positioned thanks to its strong and stable employment base and specializations in pharmaceutical and medicine manufacturing, research & development, and artificial intelligence (AI). AI processes are becoming an increasingly critical element throughout the drug development pipeline. Therapies and processes that leverage it can accelerate productivity in drug discovery, clinical trials, testing, and data aggregation.

Established biopharma companies are increasingly investing in AI-focused start-ups as a hedge against declining rates of return on R&D investment. By forming partnerships with biotechnology start-ups that are growing steadily, the development of new therapeutics will continue to scale. This type of partnership between large-cap pharma and AI was a key ingredient to producing COVID-19 vaccines in record time.

1. To quantify employment, we use NAICS codes corresponding to the following industries: Medical & Diagnostic Labs Manufacturing, Medical Equipment & Supplies Manufacturing, Medical Instruments Manufacturing, Pharmaceutical & Medicine Manufacturing, and Research & Development



## 2. The Ecosystem Research Institutions

Universities, science organizations and academic research hospitals lead innovation, drive breakthrough discoveries and build essential talent. Most companies externalize many of their R&D functions to these institutions to cost-share the pursuit of discovery and innovation. Developing new platforms is indeed a long, complex, costly and risky process, with no guarantee of success. There are many phases in that journey (see Figure 12), each requiring a large amount of experimentation and testing before reaching regulatory approval and, ultimately, commercialization. It is no wonder that strong research institutions form the backbone of any life science ecosystem.

The Greater Golden Horseshoe Area is well endowed in this respect: four of Canada's top 15 universities for scientific research are located in the region. The University of Toronto, which commands the most research funding of any Canadian university, is one of North America's largest medical faculties and one of the world's most prestigious medical research institutions. McMaster, Western, Waterloo and Guelph universities are known for their first-rate medical, life sciences and engineering schools.

In addition, the region is home to five of Canada's top 10 academic research hospital and research networks, including the University Health Network (UHN), North America's largest hospital network; The Hospital for Sick Children, the world's number one pediatric health care centre; Hamilton Health Sciences, and Sunnybrook Health Sciences Centre (see Figure 7). These world-class institutions have cemented the GGHAA as a centre for research excellence in many areas, including oncology, stem cell research, infectious disease, cardiovascular and mental health.

Additionally, this dense life-science ecosystem is supported by one of the world's top markets for clinical trials. The GGHAA is home to 9 million people and has amongst the most diverse populations in the world, making it an ideal jurisdiction for testing drugs. Indeed, Ontario is the 7<sup>th</sup> largest jurisdiction in North America for clinical trials, with more than 40 contract research organizations and 3,500 open clinic trials a year, the majority of which are located in the Greater Golden Horseshoe Area.

**Figure 6. Canadian U15 Universities by Scientific Research Funding**

University	City	Enrollment	2019 Scientific Research Funding (CAD, millions)
<b>University of Toronto</b>	Toronto, ON	74,502	\$1,089
<b>University of British Columbia</b>	Vancouver, BC	55,359	\$624
<b>McGill University</b>	Montreal, QC	31,578	\$606
<b>Université de Montréal</b>	Montreal, QC	36,774	\$597
<b>University of Alberta</b>	Edmonton, AB	37,830	\$506
<b>University of Calgary</b>	Calgary, AB	31,863	\$488
<b>Laval Université</b>	Laval, QC	28,855	\$401
<b>McMaster University</b>	Hamilton, ON	25,285	\$372
<b>University of Ottawa</b>	Ottawa, ON	35,140	\$346
<b>Western University</b>	London, ON	29,865	\$246
<b>University of Saskatchewan</b>	Saskatoon, SK	17,973	\$244
<b>Queen's University</b>	Kingston, ON	24,143	\$235
<b>University of Manitoba</b>	Winnipeg, MB	28,786	\$161
<b>Dalhousie University</b>	Halifax, NS	15,651	\$151
<b>University of Waterloo</b>	Waterloo, ON	32,804	N/A

Source: Research Infosource Inc  
Shade indicates part of GGHAA ecosystem

# 3.

## The Ecosystem Government Support

High barriers to entry and the considerable time and risk involved in developing breakthrough discoveries can make access to capital a challenge for the life science industry, particularly for start-ups and smaller-size companies.

Venture capital and private investment is growing but remains limited. The industry benefits from strong government backing through various support agencies and targeted programs to facilitate access to talent, technology, and growth opportunities (see Page 10).

More recently, Canada’s dependence on international vaccine supplies during the pandemic has led the government to invest \$1.2 billion in to expand domestic vaccine and therapeutics manufacturing capacity. As part of this program \$412 million in funding has been awarded to Sanofi to help cover capital expenditures so that they can manufacture vaccines out of their North York plant. Resilience Biotechnologies Inc. received a \$199 million grant to support their development of mRNA vaccines at their Mississauga facility. Other recipients of substantial grant funding can be found below.

**Figure 7. Top 10 Research Hospitals in Canada**

University	City	2019 Scientific Research Funding (CAD, millions)	Research Spending as Pct. of Total Hospital Spending
University Health Network	Toronto, ON	\$408	17.8%
Hospital for Sick Children	Toronto, ON	\$254	27.8%
McGill University Health Centre	Montreal, QC	\$204	16.5%
Hamilton Health Sciences	Hamilton, ON	\$185	11.9%
Vancouver Coastal Health Authority	Vancouver, BC	\$181	4.9%
Ottawa Hospital	Ottawa, ON	\$146	10%
Provincial Health Services Authority	Vancouver, BC	\$136	3.7%
London Health /St. Joseph's	London, ON	\$119	7%
CHU de Québec - Laval	Laval, QC	\$110	8.8%
Sunnybrook Health Sciences Centre	Toronto, ON	\$102	9.5%

Source: Research infSOURCE Inc  
Shade indicates part of GGHA ecosystem

### Some of the most notable vaccine-related ventures that have seen funding from the Canadian government:

- \$400m to **Sanofi** to build onto its North York plant to manufacture vaccine.
- \$199m to **Resilience Technologies** in Mississauga to support their development of mRNA vaccines.
- Quebec City-based **Medicago** received a grant of \$173m to produce a plant-based vaccine, making them the first “home-grown” Canadian company to produce a vaccine.
- \$126m for **National Research Council’s** joint venture COVID vaccine plant with **Novavax**, which is expected to roll out Canada’s first domestically-produced COVID-19 vaccine.
- \$104m to **University of Saskatchewan** Vaccine and Infectious Disease Centre for vaccine and biomanufacturing research



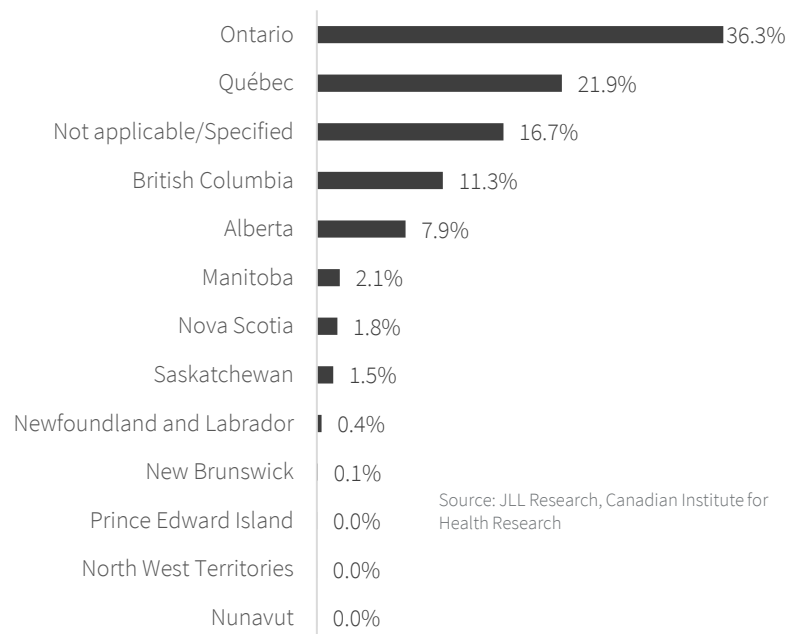
# 3.

## The Ecosystem Government Support

Beyond improving Canada’s preparedness for future pandemics, Ottawa recognized the industry’s potential to become an important engine of economic growth and the purveyor of thousands of high-paying jobs. In Budget 2021, the federal government dedicated \$2.2 billion over the next seven years to implement its ambitious Biomanufacturing and Life Science Strategy. The Strategy will provide foundational investment to strengthen research systems and Canada’s talent pipeline, improve governance of existing programs, reform regulations to remain a competitive destination for the industry, and provide \$1 billion over seven years to the Strategic Innovation Fund to support the sector.

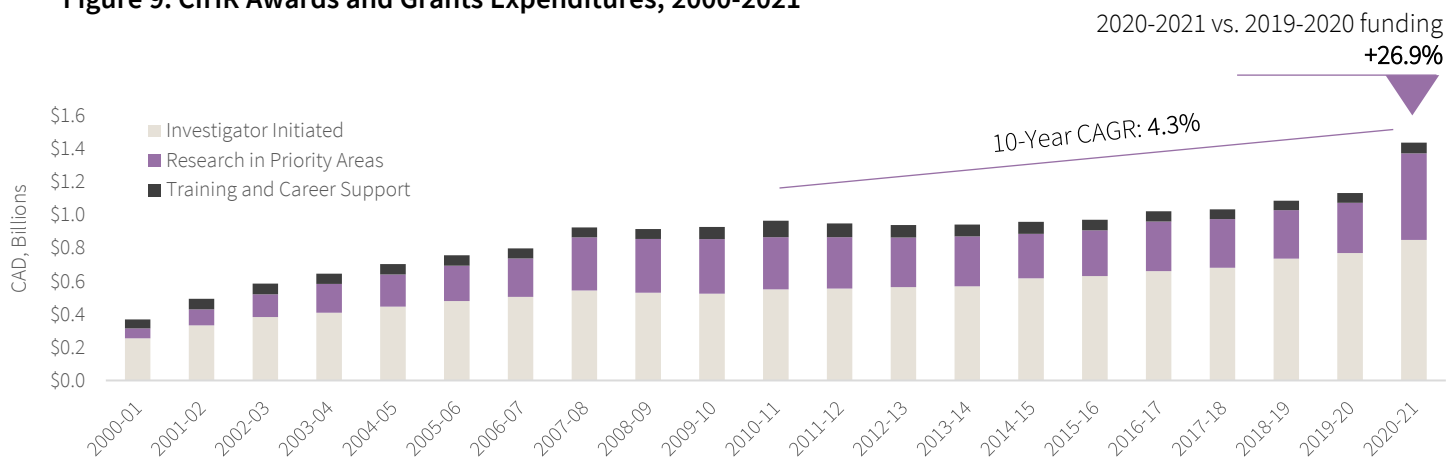
Additionally, Budget 2021 has earmarked \$50 million to the renewed Venture Capital Catalyst Initiative (VCCI) to support venture capital investment in life sciences technologies and leverage private capital from institutional investors.

**Figure 8. CIHR Awards and Grant Expenditures by Province, 2015-2020**



In all, government expenditures through CIHR grants saw a 27% year-over-year increase from the 2019-2020 to the 2020-2021 fiscal year, demonstrating the heightened importance the federal government is placing on these programs.

**Figure 9. CIHR Awards and Grants Expenditures, 2000-2021**



Source: JLL Research, StatCan

# Sources of Government Support

There are several federal agencies and programs that directly fund and support the life sciences sector, including:

**The Canadian Institute of Health Research (CIHR)** and its 13 interdisciplinary virtual institutes are focused on promoting research in specific areas, ranging from cancer to genetics to mental health and more. The CIHR is the main federal institution for research and development funding for life sciences in Canada. Its annual contribution has increased steadily over the years to \$1.4 billion in 2021 (see Figure 9). Ontario (and the GGHAA in particular) continues to be the main recipient (see Figure 8).

**Natural Sciences and Engineering Research Council (NSERC)** promotes and supports basic university research and partnered-project research in the natural sciences and engineering. Between 2018-2019, NSERC invested \$234.1 million in Health and Related Life Sciences and Technologies, with the GGHAA attracting a good portion of that funding.

**Genome Canada** promotes the development of genomics and genomic-based technologies, facilitating public-private partnerships and investing directly in large-scale scientific and leading-edge technological discoveries. Budget 2021 provides \$400 million over the next six years to support the Pan-Canadian Genomics Strategy. Some of these funds will flow to the GGHAA, home to some of the world's leading institutions in genomics research, such as the Structural Genomic Consortium.

The **Innovation Supercluster Initiative**, a funding arm of Innovation, Science, Economic Development Canada (ISED), will match up to \$950 million on a dollar-for-dollar basis with private industry to fund innovations in five identified superclusters through 2023. This initiative will be injecting \$41.33 million in the GGHAA life science industry in several diverse projects ranging from the development of next-generation plant-based proteins to AI-powered patient care monitoring technologies.

**The National Research Council (NRC)** is the premier federal research organization whose mandate is to foster innovation, technological development, and the advancement of science. Amongst its support mechanisms to qualifying businesses, the NRC Industrial Research Assistance Program (NRC-IRAP) provides advisory services and funding to support the development and commercialization of innovation for small and medium-sized companies. The program plays a central role in the federal 2021 Budget, committing \$100 million per year for the next five years. The NRC-IRAP offers start-ups and established businesses grants of up to 80% of labour costs associated with innovative projects. So far since 2020, the NRC-IRAP injected \$31.8 million worth of grants to life science companies domiciled in the GGHAA, or about 25% of Canada's total

**The Strategic Innovation Fund (SIF)** champions large-scale, strategic technological projects to promote Canadian competitiveness globally. Since 2019, the GGHAA has attracted \$716.4 million in SIF funding.

**The Business Development Bank of Canada (BDC)** is a Crown Corporation devoted to the promotion and development of small and medium-sized companies. It offers financing solutions, advisory services and is also Canada's largest purveyor of venture capital. The BDC invests in home-grown life science companies indirectly as an investor in healthcare and life sciences venture capital funds and directly through its own Healthcare Venture Fund. Two GGHAA companies directly supported by the BDC through the Healthcare Venture Fund are Interface Biologics Inc., a developer of nano-engineered biomedical-polymer technologies for medical devices (based in the MaRS Centre in Toronto) and Profound Medical Inc, a medical device company developing an MRI-guided, transurethral procedure for the treatment of localized prostate cancer (based in Mississauga).



# 4.

## The Ecosystem Venture Capital & Mature Funding

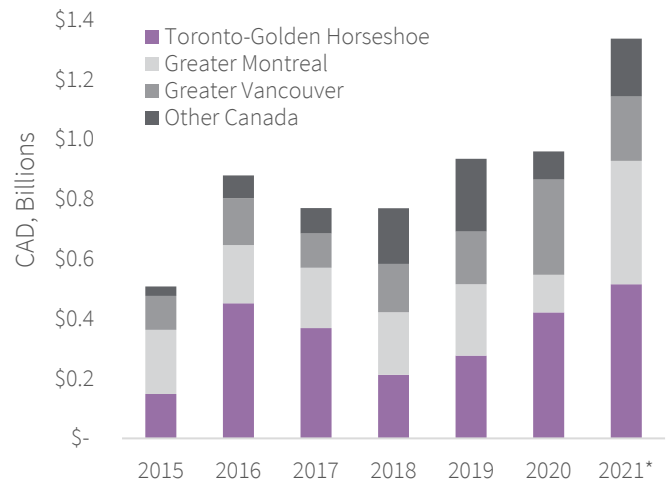
Private sector venture capital (VC) funding for life science enterprises has also grown significantly, mirroring the burgeoning public sector support. Life science VC funding in Canada this year looks poised to approach USD \$1.4 billion<sup>1</sup>, which would represent a 40% year-over-year increase from 2020. Since 2015, about 38% of these investment dollars have found their way into the GGHAA market, with another 25% landing in Montreal and 20% in Vancouver.

The Greater Golden Horseshoe Area is home to a constellation of life science companies of all sizes, from start-ups to established multinational enterprises (MNEs), including Roche, Johnson & Johnson, GlaxoSmithKlein, Abbott, AstraZeneca, Pfizer, Merck, Cardinal Health, Thermo Fisher Scientific and many others. While the large MNEs operating in the region have historically focused on sales, marketing, operations support and manufacturing, they are increasingly conducting clinical trials and research and development right in the GGHAA. MNEs serve as anchor companies in the ecosystem; they have access to and participate in international knowledge organizations, while producing innovation spillovers locally. Crucially, they contribute to the creation of start-ups and supply networks that capitalize on the MNEs' presence and investment funding.

While the GGHAA region benefits from the presence of MNEs, the investor ecosystem remains limited. Early stage funding is typically provided by domestic groups such as BDC Healthcare Ventures and Lumira Ventures, but as venture deal size increases Canadian capital is less able to compete. For venture capital deals over \$50 million, Canadian liquidity contributes just 5% while the remaining 95% comes from the U.S. and Europe (see Figure 11). This does not suggest that companies backed by foreign capital will eventually leave Canada, indeed many of Canada's most established life science companies are backed by substantial foreign equity. Rather, it points to the limited pool of dedicated life science investors on Bay Street relative to other North American hubs.

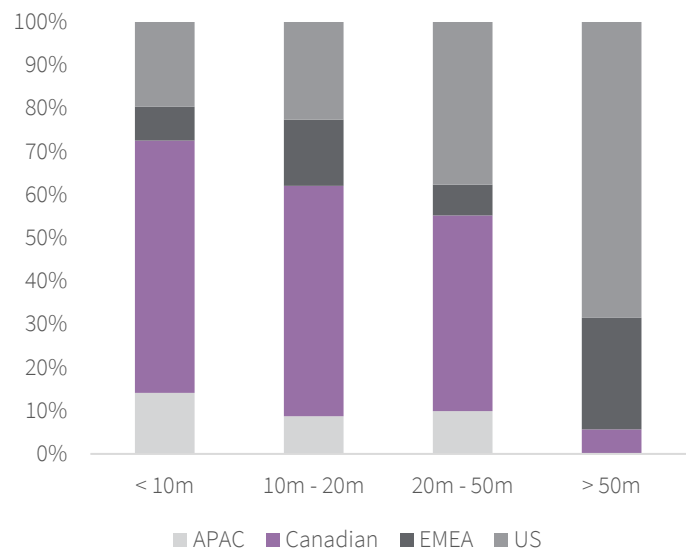
Given the global prominence of Canada's leading pension funds, private equities, and life insurance companies, the lack of domestic life science investment is striking. Yet these institutions are risk averse and often prefer more stable investments like real estate, infrastructure, equities, and fixed income. Meanwhile, those who do invest heavily in venture capital are often focused on increasing allocations abroad. Yet as the GGHAA ecosystem grows in the coming years, fueled by public and private investment, we fully expect Canadian institutional investors to gravitate more toward this space and play a more active role in mature funding.

**Figure 10. Life Science Venture Capital Funding by Market**



Source: JLL Research, Crunchbase  
\*Annualized figure based on Q3 data

**Figure 11. Venture Capital Origin by Ticket Price**



Source: JLL Research, Crunchbase

1. Due to the global nature of venture capital flows, we are expressing this in USD.

# Biopharma Stages of Discovery

Before early-stage transitional research is turned into a commercially viable product, it goes through a long process that involves several phases, extensive testing, regulatory probing and tight collaboration among researchers, entrepreneurs, investors and government bodies. The process can take many years, requiring significant resources, only to have very slim chances of commercial success. According to an MIT study, the chances of clinical trial phase I drug to make it to the pharmacy shelves was a paltry 13.8% and could be as low as 3.4% for cancer. Below is a roadmap describing the journey from ideation to treatment.

**Figure 12. The Journey of a Typical Life Science Company**





# **The GGHA Life Science Real Estate Market**

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# 5.

## The Real Estate Market Classification & Methodology

# Building Classifications

### Wet Lab



-  60%/40% lab to office split
-  Typical floorplate 30,000 – 60,000 s.f.
-  Rooftop space required for backup power
-  350-500 PSF per lab employee
-  14'-15' clear height for new build; 12' for conversion
-  Dedicated freight & loading elevator
-  Decreased chemical storage on upper floors
-  12-16W per USF lab, 6-12W per USF office
-  Increased floor loads (125-150 per SF)
-  HVAC: 1.75-2 CFM/USF standard lab  
0.25/USF office

### Good Manufacturing Practices (GMP):



-  Screened Service Areas
-  Expanded loading for secured truck delivery
-  Intricate below-slab plumbing & waste systems
-  Increased Floor Loads
-  16 feet minimum floor-to-floor heights
-  Interstitial space above ceiling for mechanical systems
-  Utility yard or roof space
-  Increased MEP in slab
-  Additional freight elevator
-  Increased HVAC package in warm shell
-  Backup Generator space



# 5.

## The Real Estate Market **Classification & Methodology**

With a substantial share of Canada's private and public sector funding concentrated in Toronto, as well as the country's largest life science innovation cluster, it begs the question why companies are often unable to find the space they need. A major reason for this is the lack of transparency on the supply and demand of life science real estate. JLL has undertaken a market survey to address this information gap and help facilitate decision making among public and private sector actors.

Our survey takes into account the existing industrial, office, and institutional building stock around the Greater Golden Horseshoe Area to identify buildings currently suited to life science operation either completely or partially.

**Our methodology can be summarized as follows:**

**What are we quantifying:** Leasable area occupied by a tenant or owner-user. Due to the lack of purpose-built space, many users have fitted out a lab or GMP facility inside a property that was not purpose-built. Hence, we have included one calculation for "Total Building Area" (13.8m square feet) and another for "Life Science Occupied Area" (9.5m square feet).

**Cutoff Threshold:** We are including tenants and owner-users in the market who occupy over 5,000 square feet.

**Area of Analysis:** Our survey spans the entire Greater Golden Horseshoe Area, including Toronto, Hamilton, Kitchener-Waterloo-Cambridge, Guelph, London, and all municipalities in between.

**Included Uses:** Dedicated lab, incubator spaces, manufacturing (GMP) spaces, as well as university- and hospital-owned lab spaces that are leased to private start-ups. Given the limited scale of the market, we are including space that is under construction within our market inventory.

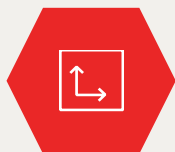
**Excluded Uses:** Healthcare-related government agencies and hospitals. We also exclude office buildings where a company might have their head office but there is no research or manufacturing component there (i.e. the head office of a pharmaceutical company). Finally, we are excluding "dry lab" spaces not designed for life science.

### GGHA Life Science Market



**13.8m**

square feet of  
**Total Building Area**  
where at least one  
life science user  
operates



**9.5m**

square feet of  
total area  
occupied by life  
science users



**4.3m**

square feet of  
dedicated lab  
space



**5.2m**

square feet of  
dedicated  
manufacturing/  
GMP area



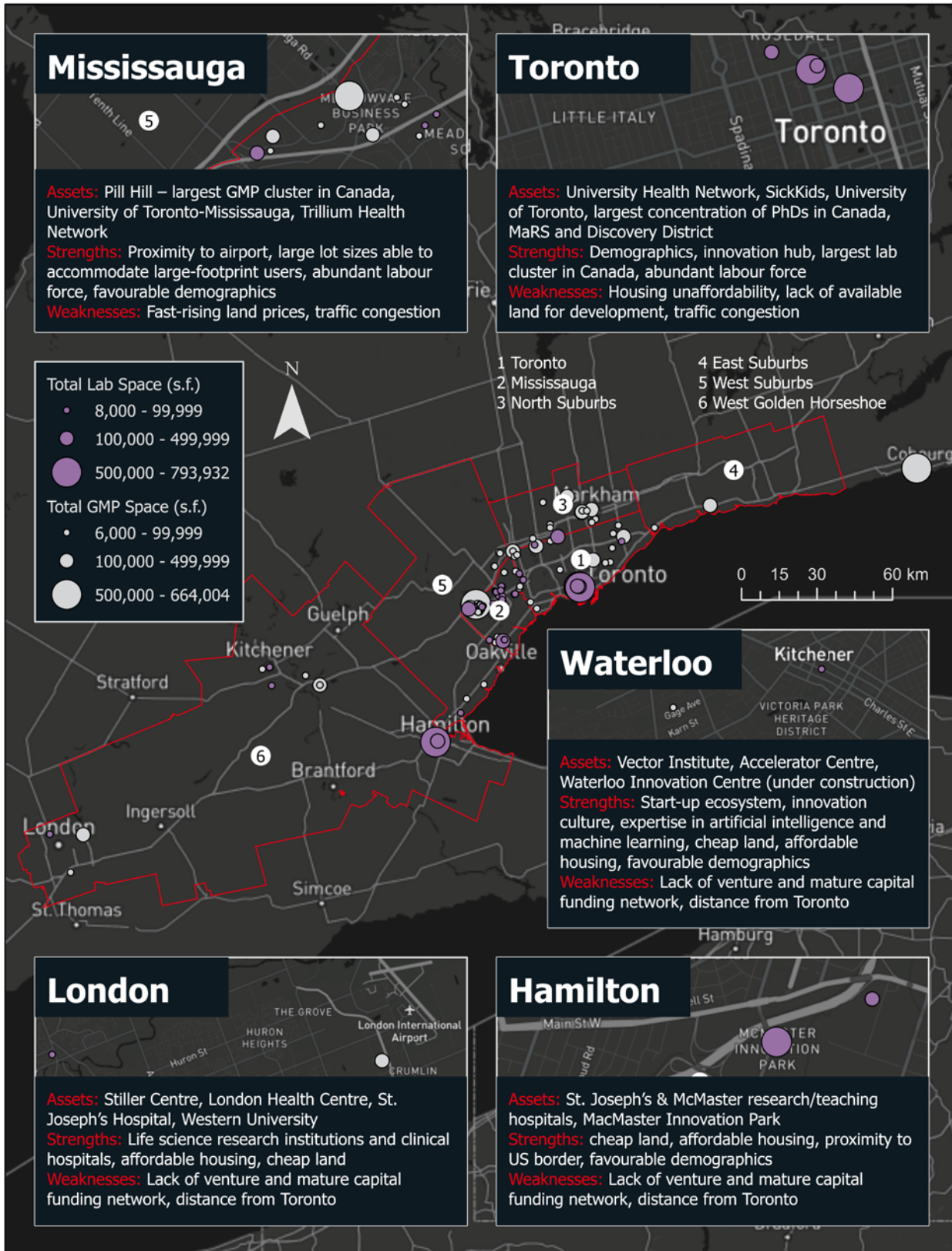
**99**

companies in  
market occupying  
over 5,000 sf

# 6.

## The Real Estate Market Market Survey

Figure 13. Market Map



# 6.

## The Real Estate Market Market Survey

### Stock and Clusters

The results of our market survey shed light on how different segments are concentrated throughout the metropolitan area. The GGHAA market includes 5.2 million square feet of GMP space (about 55% of the market) and 4.3 million square feet of dedicated life science lab space (about 45%). This is consistent with employment data showing that the main life science occupations are in manufacturing and pharmaceuticals, which often take up a larger footprint and occupy GMP facilities.

The city of **Toronto** boasts the largest life science cluster in the region, and indeed in the country with over 2.8m square feet of life science-dedicated space. About 2.2m square feet of this dedicated lab space, mostly located downtown. Toronto is anchored by the University Health Network, MaRS Discovery District, and Sick Kids Research Centre. Smaller labs and isolated manufacturing facilities in outlying areas such as **Etobicoke** and **Scarborough**.

**Mississauga** is the second largest cluster of life science activity overall with over 2.5m square feet of dedicated space, 1.6m square feet of which is GMP space. The Meadowvale (“Pill Hill”) district boasts the largest GMP cluster in Canada. Mississauga is home to some of Canada’s largest users, including Bora Pharmaceuticals, Exova/Element, Patheon, and Alcon.

**The North Suburbs** – including **Vaughan, Richmond Hill, and Markham** – make up the third largest overall cluster with 1.6m square feet of space, almost entirely dedicated toward GMP. Major users in this region include Janssen, Apotex, Johnson & Johnson, Sanofi, and Amico.

**The West Golden Horseshoe** has a considerable and growing stock, mostly in lab space with about 1.1 million square feet. Several university-owned lab facilities can be found here, such as McMaster University’s Innovation Park, Western University’s Stiller Centre, and University of Waterloo’s Innovation Arena, which is due for delivery in 2023.

Figure 14. Lab Inventory by Submarket

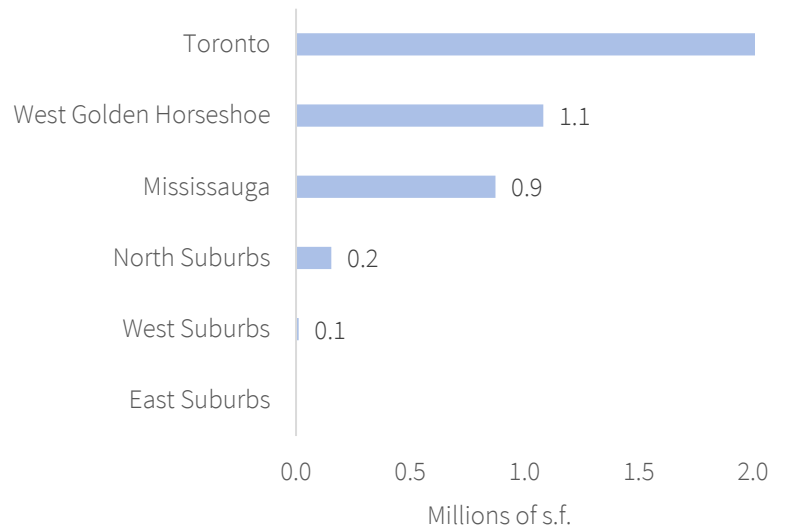
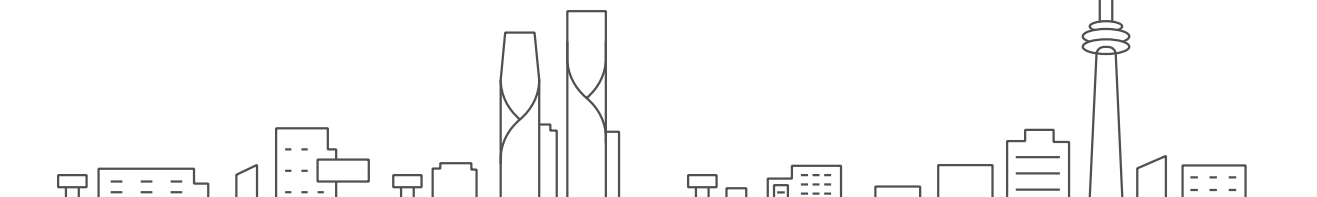
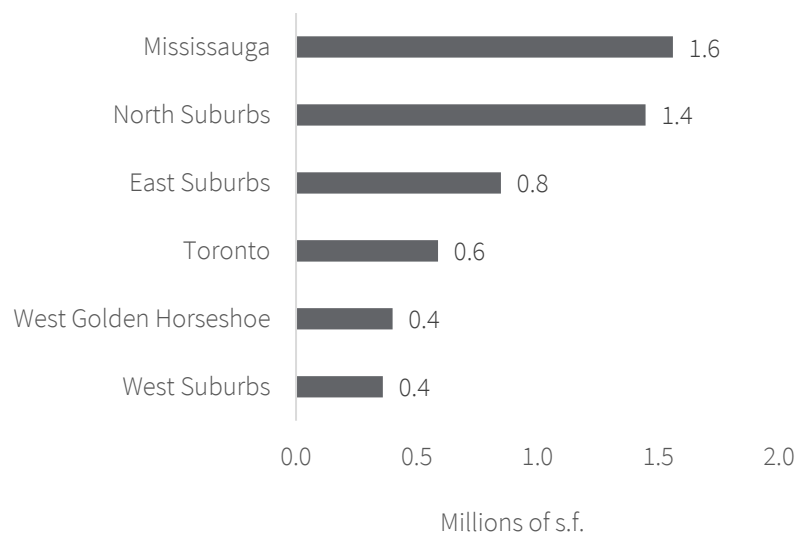


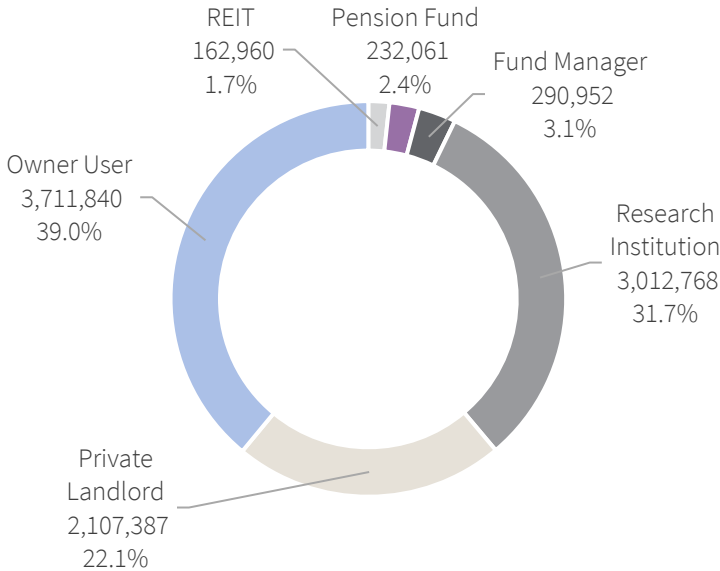
Figure 15. GMP Inventory by Submarket



# 6.

## The Real Estate Market Market Survey

**Figure 16. GGHAA Life Science Inventory by Ownership Profile**

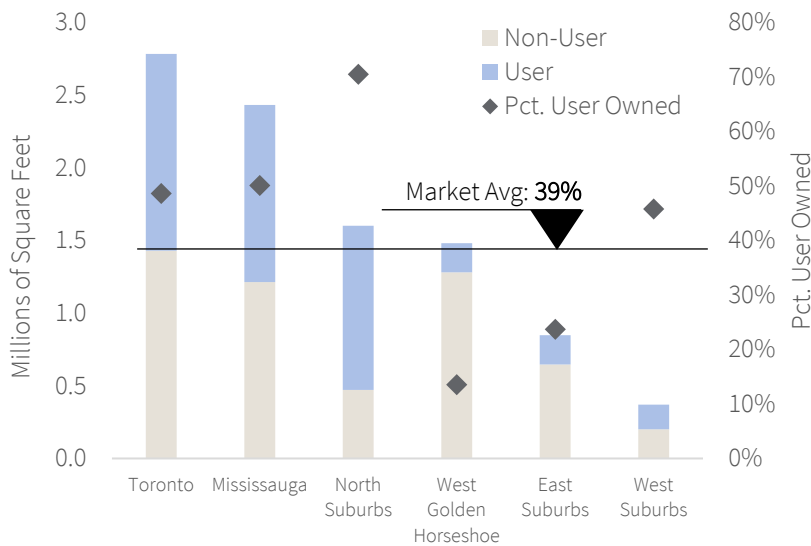


### Ownership Profile

An analysis of ownership profile reveals a highly bifurcated market (see Figure 16). Unlike most major real estate asset classes in Canada, institutional investors such as pension funds, private equities, and REITs collectively own a small share of the GGHAA life science stock – just over 7% combined. Research institutions like universities and hospitals that lease lab space to start-ups account for about one-third of market stock, mainly wet labs. Private landlords own about 22% of the stock, or 2.1 million square feet. Owner-users command about 3.7 million square feet, equal to about 39% of the overall market.

The GGHAA’s owner user ratio is one of the highest among major North American metropolitan areas, which is indicative of a nascent market. Without a deep pool of landlords, investors, and developers constructing and operating purpose-built lab or GMP space, many users prefer to build and manage their own facility.

**Figure 17. GGHAA Life Science Inventory by Ownership Structure**



Another key takeaway from this analysis of ownership is that a large share of the market is owned by groups who are not incentivized to charge competitive rents. Research institutions may offer discounts to university-affiliated tenants who bring in significant grant funding, and many private landlords might be leasing GMP space as if it were a simple warehouse, unaware of the premium that might be available (owner-users are not charging competitive rents for obvious reasons). What this means is that lease and sale comparables for true lab and GMP space are rare. This makes underwriting life science assets a challenge and has been a barrier to development.

Nevertheless, the push to mobilize the life science sector across Canada is driving real demand, and the current context of low investment returns is making this space ripe for institutionalization as investors search for yield. Indeed, many of Canada’s foremost real estate investors are looking closely at sale-leaseback, office-to-lab conversions, ground-up development, and other opportunities to gain a foothold. As this happens, transparency on underwriting metrics will follow, paving the way for more development to occur.



# 6.

## The Real Estate Market Market Survey

### What it all means

Comparing GGHAA market stock to other top North American lab markets provides further evidence of a supply-constrained market (see Figure 18). Despite commanding a large share of Canada’s public and private sector funding, the GGHAA barely cracks the top 15 markets in North America for lab space. The region commands fewer venture capital dollars than any other besides New Jersey (which competes with Philadelphia, Washington D.C., Baltimore, and New York in the crowded Mid-Atlantic corridor). In terms of overall Life Science employment Toronto ranks 11<sup>th</sup>.

This comparison shows that Canada’s top life science hub is lacking in physical space in order for it to become a major player. Companies operating in this space can only be as competitive as their facilities allow them to be. The supply-constrained nature of the market has led many to retrofit spaces that are not purpose-built, if they are able to find space at all.

Based on this analysis, we conclude that for Canada to most effectively address its deficit in life science research and manufacturing capacity, policymakers and industry players must address the two key deficiencies in the market:

1. a lack of dedicated, purpose-built lab and GMP space with next generation fit-outs; and
2. a lack of Canadian-sponsored late-stage seed capital funding that is invested in recycling the profits of the operation back into the Canadian life science ecosystem.

**Figure 18. North America Comparison: Lab Market Size, VC Funding, and Life Science Employment, 2020**

Rank	Market	Total Lab inventory (square feet)	Total 2020 VC Funding (USD, Billions)	Life Science Employment (Thousands, 2020)
1	Greater Boston Area	45.0	\$7.5	115.9
2	San Francisco Bay Area	25.5	\$6.7	137.4
3	New Jersey	20.4	\$0.4	86.6
4	Raleigh-Durham Metro Area	20.1	\$1.6	39.6
5	San Diego Metro Area	17.7	\$2.3	71.6
6	Suburban Maryland/Metro DC	16.4	\$2.2	55.2
7	Philadelphia Metro Area	14.3	\$2.2	69.6
8	Los Angeles/Orange County	12.1	\$1.9	121.6
9	New York Metro	8.7	\$3.7	65.6
10	Chicago Metro Area	8.1	\$1.2	66.9
11	Houston	6.4	\$1.0	35.6
12	Denver Metro Area	6.1	\$0.9	31.7
13	Seattle Metro Area	5.6	\$1.2	28.8
14	Greater Toronto-Golden Horseshoe Area	4.3	\$0.5	44.1
15	Minneapolis - St. Paul Metro	0.9	\$0.6	53.0

# JLL Interview with Ty Shattuck

CEO of McMaster Innovation Park



## JLL: Let's start off with an introduction.

**TS:** I am Ty Shattuck, CEO of McMaster Innovation Park. MIP is a research and innovation park in Hamilton, Ontario that is owned by McMaster University. Our mission is to work with our tenant ventures and be a bridge between academia and industry, to provide the resources and the ecosystem they need to excel. Within our network, we can provide access to capital, business partners, lawyers, marketers, and other critical services.

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## JLL: Could you describe the value-add proposition of McMaster Innovation Park?

**TS:** Put simply, our purpose is to help companies, entrepreneurs, and innovators grow and achieve their commercial aspirations. We do this by providing them with a deep and diverse ecosystem of capital partners, service providers, facilities and whatever else they need to move their business idea to the next step.

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## JLL: How large is MIP?

**TS:** In the physical park we have about 700,000 square feet under management and about 1,000 people employed here. We're in the process of growing up to 3.5 million square feet and accommodating a workforce of up to 5,000 people.

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## JLL: Where does the Greater Toronto-Golden Horseshoe Life Science corridor fit in on the global research and innovation stage?

**TS:** This Life Sciences Corridor is anchored by the MaRS Discovery District in Toronto, the life science cluster 'Pill Hill' in Mississauga, the David Johnston Research & Innovation Park in Waterloo and of course, McMaster Innovation Park in Hamilton. Collectively, that is over 3 million square feet of space for companies in research & innovation. So, with Hamilton's growing advanced technology-driven businesses and celebrated research-intensive universities and with Toronto becoming a hub for artificial intelligence, precision medicine, genomics, and immunotherapeutic, I'd say that we are critical leaders in global research & innovation. In fact, we are looking to showcase this and so much more when together MIP, MaRS, & Waterloo co-host the annual AURP conference in Toronto in 2022!

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## **JLL: What is the typical journey of a life science tenant?**

**TS:** Many spinouts of a research university or hospitals become what we refer to as a Translational Entity. From there, they may end up in an incubator space such as MaRS or JLABs, where they share a facility with other companies and pursue venture partners. Then, they may get their Series A funding and scale up, potentially move into a custom space of around 5,000 – 25,000 square feet, depending on the nature and scale of their business. From this point is where we run into issues. If they get another series of funding for a larger amount, say \$100m, that investment money is usually focused toward getting a product to market soon. If no real estate exists for them to scale their operations, it is unlikely that they will be willing to wait a few years for a design-build. Their best option may be to take the money and move their operation to Boston or San Diego, where the space exists, and they can get right to work. This is what we want to change. At this stage of the journey, we want to be able to retain these companies in Canada and provide the infrastructure they need.



## **JLL: What are the major impediments that Canada's life science industry is facing?**

**TS:** Aside from the lack of physical space which I already touched on, there is an undersupply of domestic venture capital. Canadian groups do a good job of funding Seed and Series A capital, but beyond that our ventures are often dependent on foreign capital, which then reinvests the profits abroad. Another bottleneck that we are facing is a lack of business talent. We have the technical talent but not enough people who are skilled at selling the vision and getting the product to market.



## **JLL: What are the strengths and weaknesses of different municipalities as they relate to the GGHA life science ecosystem?**

**TS:** The City of Hamilton has great research institutions with McMaster University, St. Joseph's Healthcare and Hamilton Health Sciences. We also benefit from proximity to the U.S. border and access to a large cargo airport; but when it comes to the depth of capital and business ecosystem, Hamilton is lacking. The city of Toronto's University Health Network has unparalleled access to venture capital and is Canada's biggest research cluster, but one thing it does not have is affordable real estate to allow companies to expand. Mississauga has the largest concentration of manufacturing facilities in Canada - particularly around Pill Hill - but there is not much innovation or research happening there. Waterloo has a strong innovative ecosystem and affordable real estate, but they don't have a medical school or research hospital to support life science start-ups.

## **JLL: How can Ontario fulfill its potential in becoming a global Life Science hub?**

**TS:** This region has all the necessary ingredients to be a global player within the life sciences sector, not just on the research end but on productization. However, we must think more as a cohesive region - no one jurisdiction can have all the ingredients. If we have municipalities competing against each other for grants, federal dollars, and partnerships, then we can't compete against other jurisdictions globally. We also need the private and public sectors to come together and make sure we are building the space for these companies to thrive.





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