

THE NEED FOR
WET LAB SPACE
IN THE TORONTO
REGION

AT THE
TIPPING
POINT



UNPRECEDENTED GROWTH IN THE LIFE SCIENCES SECTOR IS SPURRING GLOBAL DEMAND FOR WET LAB SPACE

The life sciences sector is witnessing an era of unprecedented innovation and growth. Key drivers for the sector include technological leaps in areas such as personalized healthcare, regenerative medicine, genomics and synthetic biology, along with the growing convergence of artificial intelligence and big data analytics in healthcare ([SOURCE](#), [SOURCE](#)). Indeed, life sciences-related companies in North America attracted a record USD 70 billion of capital in 2020, far exceeding the previous record of USD 36 billion in 2018 ([SOURCE](#)). Further, the pandemic has increased awareness of the critical importance of life sciences research together with biomanufacturing capabilities to preparing for, preventing, responding to and recovering from emerging health threats. Consequently, governments around the world have been supporting historic investments in life sciences; for example, the Canadian Federal government recently committed CAD 2.2 billion in funding toward domestic life sciences and bio-manufacturing through to 2027 ([SOURCE](#)).

The unprecedented growth in the life sciences sector is spurring a boom in the global demand for all types of lab space¹ and the Toronto Region is no exception. This paper focuses primarily on wet lab space which is in greatest demand.

While increased investment in wet lab space has been noted in other jurisdictions, concerns have been growing that there is a lack of readily available wet lab space in the Toronto Region.



WET LAB DEVELOPMENT IN THE US IS STEPPING UP TO MEET DEMAND

Adapted from [SOURCE](#).

36

million square feet of new wet lab construction is expected to be developed in the top 14 US life science markets in 2020

16%

of total office investment volume in the US in 2020 was life science volume, more than double the 2019 figure

¹This paper focuses primarily on wet lab space. While the greatest demand is for wet lab space, interviewees noted that other types of lab space (e.g. chemistry, clean rooms, GMP facilities) are also in high demand in the Toronto Region.

More wet lab development in the Toronto Region will mean more growing companies – both domestic and international – will come, stay and scale here, further strengthening the region's life science industry.



Stakeholders are cautioning that the lack of wet lab space is beginning to create significant challenges for companies that want to remain in the Region and constraining the growth of the domestic life sciences sector (SOURCE, SOURCE, SOURCE, SOURCE).

Recognizing the strategic importance of the life sciences ecosystem to the Region's economy and health, Toronto Global commissioned a study to better understand the supply and demand dynamics for wet lab space in the Toronto Region, to clarify the scope and scale of the challenge the Region faces, and to gather expert perspectives on how stakeholders can begin addressing barriers and strengthen the case for wet lab investment. Eighteen leaders representing real estate, the pharma/

biotech industry, leading research institutes and centres, and municipal economic development offices were interviewed as part of this process; this white paper presents a synthesis of key findings that emerged from these discussions.

“In speaking with both domestic and international life science companies looking to grow their operations here, I've calculated an estimated 3.5 million square feet of unmet lab space demand in the Greater Toronto and Hamilton region.”

Daniel Lacey
Associate Vice President, CBRE

NORTH AMERICA COMPARISON: LAB INVENTORY AND LIFE SCIENCE EMPLOYMENT, 2020s

Table adapted and modified from [SOURCE](#).

| Rank | Market | Total Lab inventory (million square feet) | Life Science Employment (Thousands, 2020) | Available Lab per Employee (sq. ft.) |
|------|---------------------------------------|--|--|--|
| 1 | Greater Boston Area | 45.0 | 115.9 | 388.3 |
| 2 | San Francisco Bay Area | 25.5 | 137.4 | 185.6 |
| 3 | New Jersey | 20.4 | 86.6 | 235.6 |
| 4 | Raleigh-Durham Metro Area | 20.1 | 39.6 | 507.6 |
| 5 | San Diego Metro Area | 17.7 | 71.6 | 247.2 |
| 6 | Suburban Maryland/Metro DC | 16.4 | 55.2 | 297.1 |
| 7 | Philadelphia Metro Area | 14.3 | 69.6 | 205.5 |
| 8 | Los Angeles/Orange County | 12.1 | 121.6 | 99.5 |
| 9 | New York Metro | 8.7 | 65.6 | 132.6 |
| 10 | Chicago Metro Area | 8.1 | 66.9 | 121.1 |
| 11 | Houston | 6.4 | 35.6 | 179.8 |
| 12 | Denver Metro Area | 6.1 | 31.7 | 192.4 |
| 13 | Seattle Metro Area | 5.6 | 28.8 | 194.4 |
| 14 | Greater Toronto-Golden Horseshoe Area | 4.3 | 44.1 | 97.5 |
| 15 | Minneapolis - St. Paul Metro | 0.9 | 53.0 | 17.0 |

Wet lab availability in the Toronto Region is approaching near-zero levels, especially in the downtown core.

TORONTO GLOBAL AT THE TIPPING POINT



The downtown MaRS facility – currently the only third party lab space available for companies outside of academia and hospitals – is 99.8% full and has to “turn away entities, start ups and companies wanting space there on a weekly basis².”

UofT News

²Unfortunately, there is a general lack of region-specific statistics and data on inventory and vacancy rates in the public domain. Reports remain anecdotal and sporadic; this example was taken from a recent article ([SOURCE](#)).

DEMAND FOR WET LAB SPACE IN THE TORONTO REGION IS GROWING FASTER THAN SUPPLY

“While the Structural and Biophysical Core Facility at The Hospital for Sick Children is happy to support biotech firms by providing short-term access to instruments and infrastructure, this is only a temporary solution for the growing need for permanent space in the industry.”

Greg Wasney

Manager, Structural & Biophysical Core Facility,
Peter Gilgan Centre for Research & Learning
The Hospital for Sick Children

This misalignment between supply and demand has been intensifying in recent years, driven by both supply- and demand-side factors, each of which are discussed in turn below.

Stakeholders believe that demand for wet lab space is primarily being driven by a critical mass of graduation stage companies in the Toronto Region.

Demand for wet lab space can come from various end-users including hospitals, universities, research institutes, Federal and Provincial government ministries and private sector life sciences companies. However, the consensus among stakeholders is that most of the recent uptick in

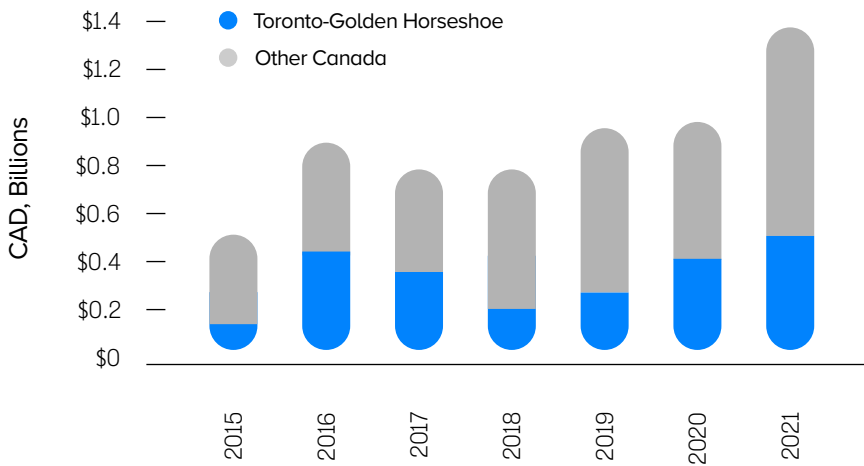
demand for wet lab space in the Toronto Region is primarily being driven by private companies. Life sciences companies typically move through a sequence of growth phases with different wet lab space requirements (See [FIGURE 1](#), below). Although a company may start in a hospital or university lab space, they cannot scale there. According to stakeholders, demand for wet lab space in the Region is specifically being driven by an increased number of companies in the so-called ‘graduation’ or ‘scale up’ phases. These are companies that are “graduating” from being small start-ups; they typically have access to venture capital funding (e.g. Series A or B) and need space to scale up operations and staff as they look to advance preclinical and clinical validation studies of their products and services.

Figure 1 LIFE SCIENCE COMPANY GROWTH STAGES
Figure adapted and modified from [SOURCE](#).

| | Startup | Graduate Mid Size | Scale Up Maturation |
|-------------|---|--|---|
| Focus | Basic R&D, proof of concept | Pre-clinical, clinical trials | Commercial Sales, new product R&D |
| Funding | Seed/Angel/Grants | Series A/B | Series C/IPO/Commercial revenue |
| Real Estate | Extremely limited funds for real estate. Typically located at hospitals, university campuses or incubators | Increase in lab space is required to support research activities May invest in small-scale manufacturing space for products to be tested in clinical trials | Major increase in lab, office and manufacturing space to accommodate commercial activities and new product R&D Typically invest in a dedicated facility/campus |

LIFE SCIENCE VENTURE CAPITAL FUNDING BY MARKET

Graph adapted and modified from [SOURCE](#).



Interviewees believe that that we are rapidly approaching a “critical mass” of such companies, and that this growth has been driven by at least two interrelated factors: 1) the growing quality and quantity of translational research conducted at Canadian hospitals, universities, and research institutes; and, 2) Canada’s significant investments in venture capital over the past decade. For example, Canada is now ranked third for venture capital investment according to the Organisation for Economic Co-Operation and Development (OECD), largely due to the federal government’s support; for example, in 2013, the Federal government launched the Venture Capital Action Plan, which included CAD 400 million in incentives to attract private sector investments in early-stage risk capital and to support the creation of large-scale venture capital funds led by the private sector ([SOURCE](#)). To build on the success of the program, the government recently made available an additional CAD 450 million through the Venture Capital Catalyst Initiative ([SOURCE](#)). Notably, life sciences companies secured over a quarter of total venture capital funds invested across Canada in 2020 ([SOURCE](#)).

Canadian success stories are growing yearly and include life sciences companies like Notch Therapeutics, Blue Rock, Abcellera, Repare Therapeutics and Fusion Pharmaceuticals, which are all in various stages of scaling up operations and infrastructure footprints ([SOURCE](#), [SOURCE](#)).

Indeed, 2020 saw the three largest Canadian IPOs in its history in the life sciences sector ([SOURCE](#)). There are at least 200 life sciences start-ups in the Toronto Region ([SOURCE](#)) and this number will only continue to grow as more and

more new intellectual property and companies emerge from our world-class institutions like the University of Toronto, McMaster, Ryerson and York. However, all the public policy pay off in terms of jobs, tax revenues, etc. are lost if companies cannot find the required space to scale here.

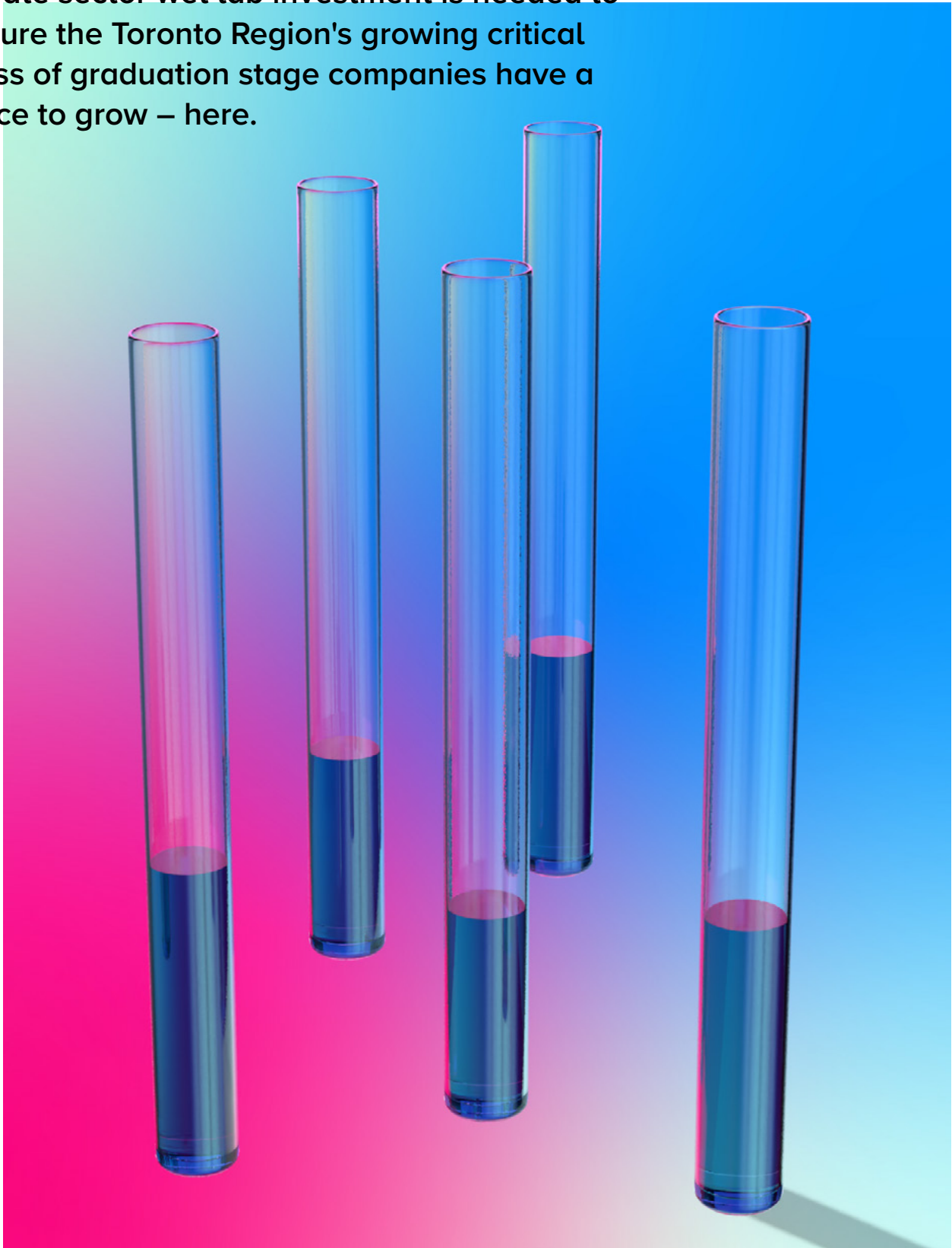
Interviewees warned that companies looking to “graduate” and scale up their operations in the Toronto Region are being forced to make difficult decisions including potentially relocating to other cities to find affordable and adequate wet lab space as it does not exist in the Toronto Region.

Indeed, disconcerting anecdotal reports of companies leaving the Toronto Region have been noted in recent years and this was confirmed by interviewees ([SOURCE](#)).

“We are a computational biology company working with three of the top 25 pharma companies. Lack of wet lab space has 1) forced us to consider growing elsewhere, 2) slowed our pace of development for novel IP, 3) impacted our ability to recruit senior talent.”

Lucas Siow
Co-Founder and CEO, ProteinQure

Despite several planned wet lab infrastructure projects in the Toronto Region, catalyzing more private sector wet lab investment is needed to ensure the Toronto Region's growing critical mass of graduation stage companies have a place to grow – here.





MARS DISCOVERY DISTRICT

On the supply side, the development of wet lab space in the Toronto Region has historically been spearheaded by academia, hospitals and the government. MaRS, for example, now provides a mix of offices, lab space, and research facilities in the heart of Toronto's Discovery District ([SOURCE](#)). New institutional infrastructure projects are also planned, including the UofT Schwartz Reisman Innovation Campus, which is planned to be constructed in two phases over the next few years. While the first phase will be traditional office space with a focus on artificial intelligence, the second phase will develop a 20-storey west tower that would provide 400,000 square feet of space for life sciences ([SOURCE](#)). Recognizing the demand for wet lab space, neighbouring jurisdictions are also investing in new projects. For example, Hamilton is home to McMaster Innovation Park (MIP); in addition to its current 700,000 square feet of space, MIP is pursuing a 2.8 million square foot expansion to support the scale-up of life sciences innovation, commercialization, and manufacturing, including 1.3 million square feet of labs and biomanufacturing space ([SOURCE](#)).

Despite these planned investments, stakeholders believe that there is still an immediate and additional need for more wet lab space in the Region. Moreover, interviewees recommended that the Region should reflect on approaches to strengthen private sector investment in wet lab space. This would support the development of a dynamic and affordable wet lab space market that could help retain and attract cutting-edge companies with the potential for

growth and job creation. The situation in the Toronto Region contrasts with other leading life sciences hubs in North America like Boston and San Francisco, where the development of wet lab space includes a significant private sector contingent, driven by real estate companies like Alexandria, BioMed Realty (Blackstone) and Healthpeak Properties to name a few and catalyzed by significant government participation. These companies have collectively invested over USD 3.5 billion in life sciences real estate over the past two years alone ([SOURCE](#)). Although they have not historically had a significant presence in the Toronto Region or Canada, some stakeholders noted anecdotally that there has been an uptick in interest from such companies in recent years.

“MIP’s expansion solves a small portion of the growing demand for lab space in the Greater Golden Horseshoe Area. The ideal solution requires a collaborative effort to accelerate an Ontario-wide response to meet the demands facing the sector.”

Scott Rasmussen
Vice President of Leasing & Business Development,
McMaster Innovation Park

RISKS ASSOCIATED WITH THE COMPLEXITIES AND COSTS OF WET LAB SPACE HAVE BEEN KEY FACTORS HINDERING SUPPLY

As noted above, there is a need for additional wet lab space investment in the Toronto Region. However, stakeholders noted that investment has historically been limited by the complex and specialized nature of the development, financing, management and leasing of wet lab space. While the complexities can be nuanced and technical, stakeholders pointed to three overarching and interrelated challenges:

- **Life science firms require significant upfront “fit-out” investments in their space to accommodate the specialized and regulated nature of their work:**

Fit-out requirements include, for example, those related to ventilation (i.e. higher ceilings, heating, ventilation and air conditioning (HVAC) systems, pressurization), electrical systems (including back up generators), plumbing (e.g. highly filtered water using on-site deionization system and point of use ultra purification), and specialized furniture (e.g. lab benches, fume hoods, clean rooms) ([SOURCE](#)).

Consequently, the costs of developing new lab space from the ground up or of converting an existing office building into lab space far exceed those of standard commercial projects.

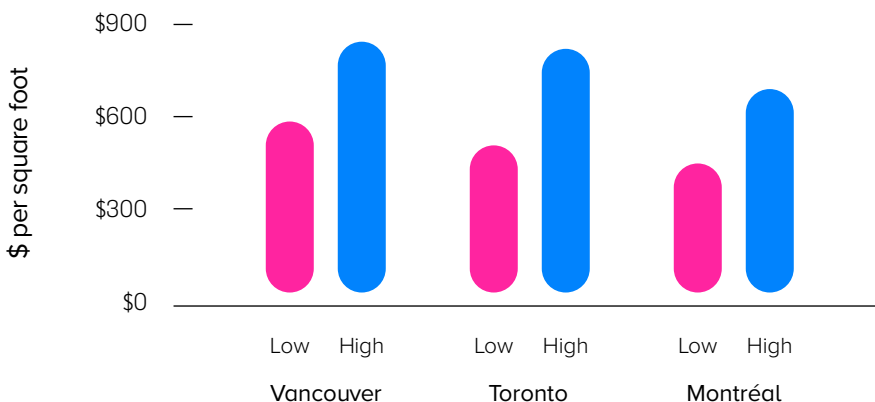
- With respect to conversion, one stakeholder pointed out that a complicating factor is that existing office buildings do not have the ceiling height, separate loading areas or infrastructure systems to accommodate life science uses. While cost estimates can vary, office construction costs can fall into the range of CAD 175-390 per square foot, while wet lab construction costs are between CAD 500-800 per square foot in the Toronto Region ([SOURCE](#), [SOURCE](#)). While these costly and specialized facilities may ultimately attract significantly higher rents, developers and investors considering new projects need to be confident that they can secure long-term tenants who can afford to pay rent in the first place. Moreover, one stakeholder noted that due to the combination of the lack of space and high development cost in the downtown core – where most companies want to be located – it is next to impossible for the private sector to develop new space in the area without a way to de-risk the investment.

“Tenants' high build out costs, quality of pre-revenue financial covenants, and uncertainty of success coupled with a lack of existing data in a yet to be actualized Canadian marketplace present significant hurdles for real estate investors.”

Andrew Kidd
Senior Vice President, NorthWest Healthcare REIT

LAB CONSTRUCTION COSTS

Graph adapted and modified from [SOURCE](#).





- **Early-stage companies in the life sciences typically have limited financial resources and therefore pose a higher risk to landlords:** Start-up and graduate-stage companies tend to prioritize their funds for research and development of their products and services, which can be risky, laborious, and costly, leading to a high cash burn rate for any funding they have raised. For example, the cost to develop and bring a new drug to market has been estimated at USD2.6 billion and can take up to 10 years from initial discovery to marketing ([SOURCE](#)). Moreover, given the lack of consistent revenue at these early stages, such companies also present a credit risk that creates difficulty in obtaining financing from traditional sources like banks.

Collectively, these financial issues amplify the risk of default and hence lost revenue for landlords³.

In addition, developers may also be required to incur additional costs to reconfigure space for new tenants if a previous tenant defaults or scales up to a larger space.

- **There is a general lack of ecosystem data to guide long-term investment decision-making:** Several stakeholders believe that any new wet lab space coming on the market today would be easily filled given pent-up demand. However, interviewees consistently pointed to a dearth of quantitative data not only for vacancy rates and inventory levels but also more generally on the life sciences ecosystem (e.g. number of companies, their current locations, size, stage of growth, level of venture capital investments and potential space needs). Such data has only recently started being collected, creating difficulty and uncertainty in forecasting the depth of future demand over the coming years, which can lead to hesitancy in fully committing to the Toronto Region as a destination for major new wet lab space investments. As a result, there are few examples of Canadian third-party lab space models to point to, exasperating the data challenge.

Collectively, these issues are constraining factors in the attraction and development of new wet lab space in the Region. These issues, however, are not insurmountable and below we summarize stakeholders' recommendations on how to begin to support a more favourable investment environment to expand the supply of wet lab space in the Region.

³ Developers leverage proformas and leasing covenants to help mitigate risks; however, stakeholders noted that many developers do not necessarily have the specialized in-house expertise to do so for tenants operating in the life sciences space.

DE-RISKING THE DUAL CHALLENGE CAUSED BY HIGH DEVELOPMENT COSTS AND PRE-REVENUE LIFE SCIENCE TENANTS MAY CATALYZE MORE PRIVATE SECTOR WET LAB INVESTMENT

While interviewees regard the projects such as the University of Toronto Schwartz Reisman Innovation Campus as timely and much needed, they noted that the underlying risks and costs hindering investment will persist given the issues described in the previous section. To this end, interviewees proposed three potential solutions to help address the underlying challenges and encourage new lab space development:

- **Programs to de-risk wet lab investment:** As mentioned above, early-stage life sciences companies are typically pre-revenue, have limited funds for investment in their facilities or Tenant Improvement build-outs and pose a high risk of default to landlords. This in turn makes debt financing very difficult. Consequently, financial assistance in the form of rental subsidies or guarantees would provide multiple benefits including, alleviating affordability issues facing these companies, improving financeability, and mitigating the default risk for developers. Life sciences companies also have expensive fit-out requirements. While some developers take on this cost and amortize it into rent, stakeholders suggested that a “fit-out” or capital expenditures (CAPEX) grant or long-term interest-free loan program available to either tenants or landlords may be a better approach for financing these types of investments. While additional ecosystem engagement would be required to properly design a life sciences-focused rental subsidy or CAPEX program, interviewees noted that natural administrators for such programs could be organizations such as the Canadian Infrastructure Bank or the Business Development Bank of Canada.
- **Tailored Incentives to attract wet lab developers and investors:** While the programs discussed above would help mitigate investor risk, stakeholders also provided recommendations on other incentives that can be used to attract developers. In particular, some interviewees pointed to the City of Toronto’s Imagination, Manufacturing, Innovation and Technology (IMIT) Program as an example of a tax incentive program that could be expanded or

serve as inspiration for creating a similar program focused on the life sciences ([SOURCE](#)). The IMIT program currently incentivizes the construction of new buildings or renovations in targeted sectors, including biomedical operations, through grants aimed at offsetting a portion of the property’s municipal taxes. Beyond tax incentives, one interviewee noted there may also be an opportunity to review the Toronto Region’s zoning laws to evaluate whether any changes could potentially facilitate the construction of new wet lab buildings. Incentives such as these have been utilized in other jurisdictions with success; for example, New York launched a USD 500 million initiative called LifeSci NYC in 2016, which included USD 300 million in tax incentives for commercial lab space ([SOURCE](#), [SOURCE](#)). New York City also recently updated its zoning laws to allow the development of commercial wet labs dedicated to research and testing ([SOURCE](#)).

- **Novel partnerships to support the development of multi-tenant wet lab space:** Stakeholders recommended that the Region should continue to explore public-private partnership models to attract both high-profile anchor tenants and wet lab developers. For example, the Ontario government and the University of Toronto collaborated with Johnson and Johnson to launch the JLABS incubator in 2016, which is situated in downtown Toronto within the MaRS Discovery District. This was the first JLABS incubator to be located outside the US and is a testament to the Toronto Region’s established strengths in the life sciences arena ([SOURCE](#)). Another example that could serve as inspiration is Biospace 1 in Calgary – a facility that will house companies working on advances in health, wellness and biomedical innovation. This facility is the product of a partnership between DynaLife Medical Laboratories, Biohubx (an NGO that supports life sciences companies) and the Western Economic Diversification Canada fund ([SOURCE](#)).

CONCLUSION

Experts interviewed as part of this qualitative study believe – and are increasingly able to quantify – that there is a lack of wet lab space in the Toronto Region. Concerns are growing that this issue is constraining the growth of our life sciences ecosystem and that we are now at a “tipping point” that demands action. While several infrastructure projects are planned, there is still an immediate need for wet lab space today. Moreover, in the longer term, it will be critical to address the underlying factors that are constraining private sector investments in wet lab space in the Region. By mitigating affordability challenges facing early-stage companies and the risks to investors through targeted

incentives and programs, the Toronto Region could bolster the investment in wet lab space in the Region, support and retain companies looking to scale and grow and attract more international companies. Ultimately, however, effectively addressing this challenge will require a coordinated and evidence-based response from all stakeholders involved, including the various levels of government, academic and health institutions, and industry. Toronto Global hopes that this white paper will help to build awareness of this critical issue, stimulate cross-sector dialogue and knowledge exchange, and galvanize action on effective solutions.

Toronto Global commissioned Shift Health to undertake stakeholder interviews and to develop this white paper, synthesizing feedback and recommendations regarding the lack of lab space in the Toronto Region.



ABOUT TORONTO GLOBAL

Toronto Global is a trusted partner for international companies exploring expansion opportunities in the Toronto Region. Supported by federal, provincial and municipal governments, we offer complimentary and customized services to facilitate the establishment of regional operations.



ABOUT SHIFT HEALTH

Shift Health brings a science mindset to strategy consulting for the health research and innovation ecosystem. Blending scientific depth, sector leadership and global perspective, Shift Health delivers sharp insights and customized solutions to create the future of healthcare.

Shift Health has been a trusted sector advisor to Toronto Global since supporting the development of Toronto Global's Life Science strategy in 2017-18.

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